

Natural areas of Whangaruru Ecological District

Reconnaissance Survey Report for the
Protected Natural Areas Programme

2005



Department of Conservation
Te Papa Atawhai

Natural areas of Whangaruru Ecological District

Reconnaissance Survey Report for the Protected Natural
Areas Programme

Andrea Booth

Published by
Department of Conservation
Northland Conservancy
P.O. Box 842
Whangarei, New Zealand

© Crown copyright 2005

This report may be freely copied provided that the Department of Conservation is acknowledged as the source of the information.

Cover photograph: Ngunguru Sandspit with Whakareiora at the base of the sandspit.

Topographic base maps reproduced under the Land Information New Zealand Map Authority 1991/42: Crown Copyright Reserved

Cataloguing-in-Publication data

Booth, Andrea Marie

Natural areas of Whangaruru Ecological District : reconnaissance survey report for the Protected Natural Areas Programme / Andrea Booth. Whangarei, N.Z. : Dept. of Conservation, Northland Conservancy, 2005.

1 v. : ill., maps ; 30 cm. (New Zealand Protected Natural Areas (Series), 0112-9252)

Includes bibliographical references.

ISBN 0-478-22688-8

1. Ecological surveys—New Zealand—Whangaruru Ecological District.
2. Whangaruru Ecological District (N.Z.). I. New Zealand. Dept. of Conservation. Northland Conservancy.

Foreword

This report describes the significant natural areas in the Whangaruru Ecological District. Most of the information for the report was gathered in surveys between 1994 and 1997. A few of the sites were, however, surveyed more recently.

Northland contains 18 mainland Ecological Districts, each characterised by their own landscape and ecological makeup. The most distinctive features of the Whangaruru Ecological District are its islands, estuaries and coastal forest remnants.

There were 46 islands and island groups identified in this Ecological District, many of which are home to threatened plants and animals. It has a total of 13 estuarine areas, the largest being the Eastern Bay of Islands Estuary; one of the largest in Northland. Coastal forest is now a nationally rare habitat type, and there is a significant amount still remaining in this Ecological District.

Another significant feature of the Whangaruru Ecological District is that it is a stronghold for pateke or brown teal. The Ecological District contains the largest remaining mainland population of this species.

As with most of Northland, extensive areas of habitat have been cleared and modified since human settlement. The Whangaruru Ecological District survey has shown that habitats such as freshwater wetlands, riverine and swamp forests, and unmodified dunelands are now very rare.

The Protected Natural Areas Programme (PNAP) provides information to help the Department of Conservation, local bodies, resource management planners, iwi, landowners, interest groups and the public at large work together to conserve what remains in the Whangaruru Ecological District. I encourage readers to work with us on this exciting challenge.

A handwritten signature in black ink, appearing to read 'Chris Jenkins', with a stylized, flowing script.

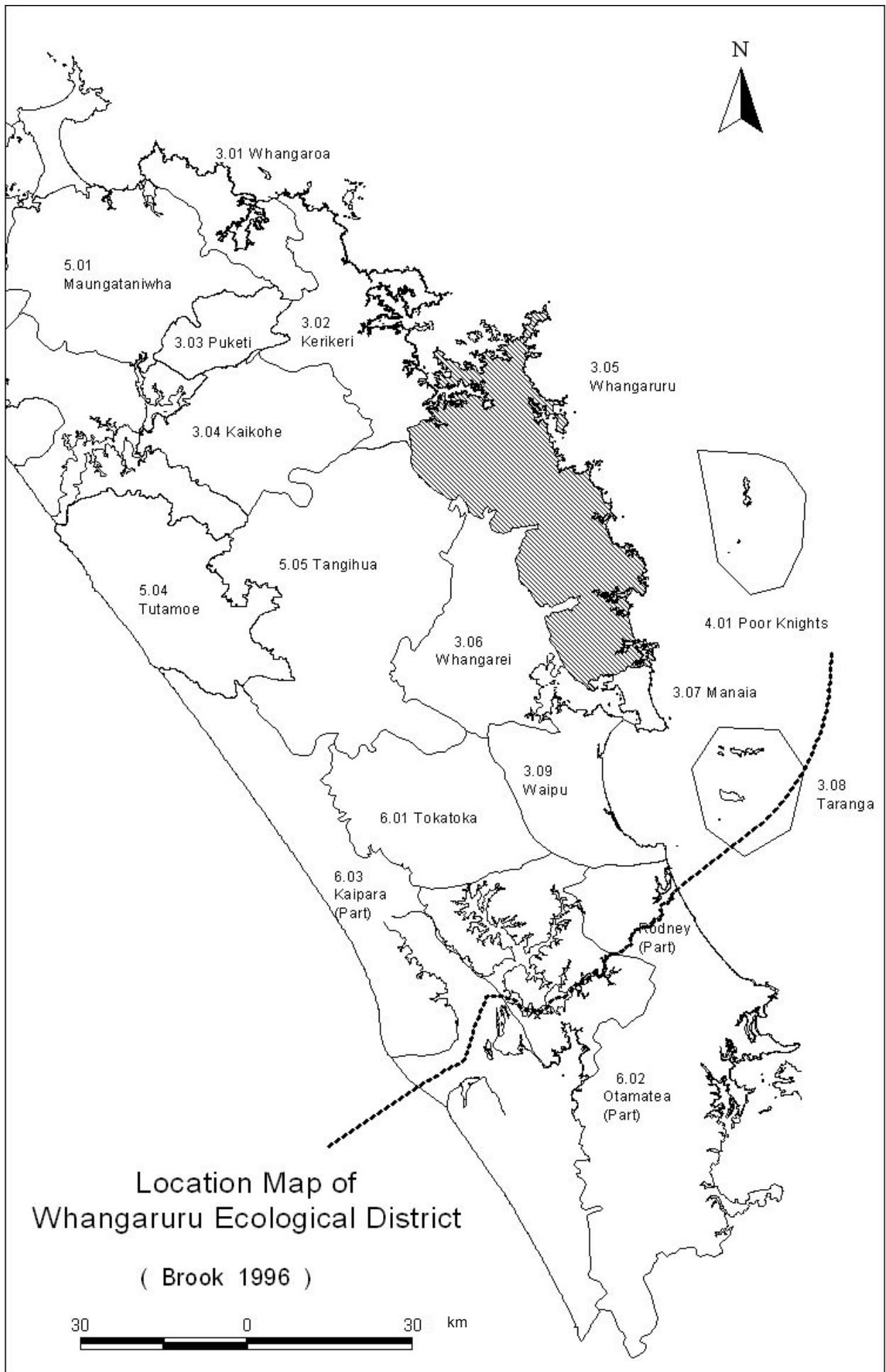
Chris Jenkins

Conservator Northland

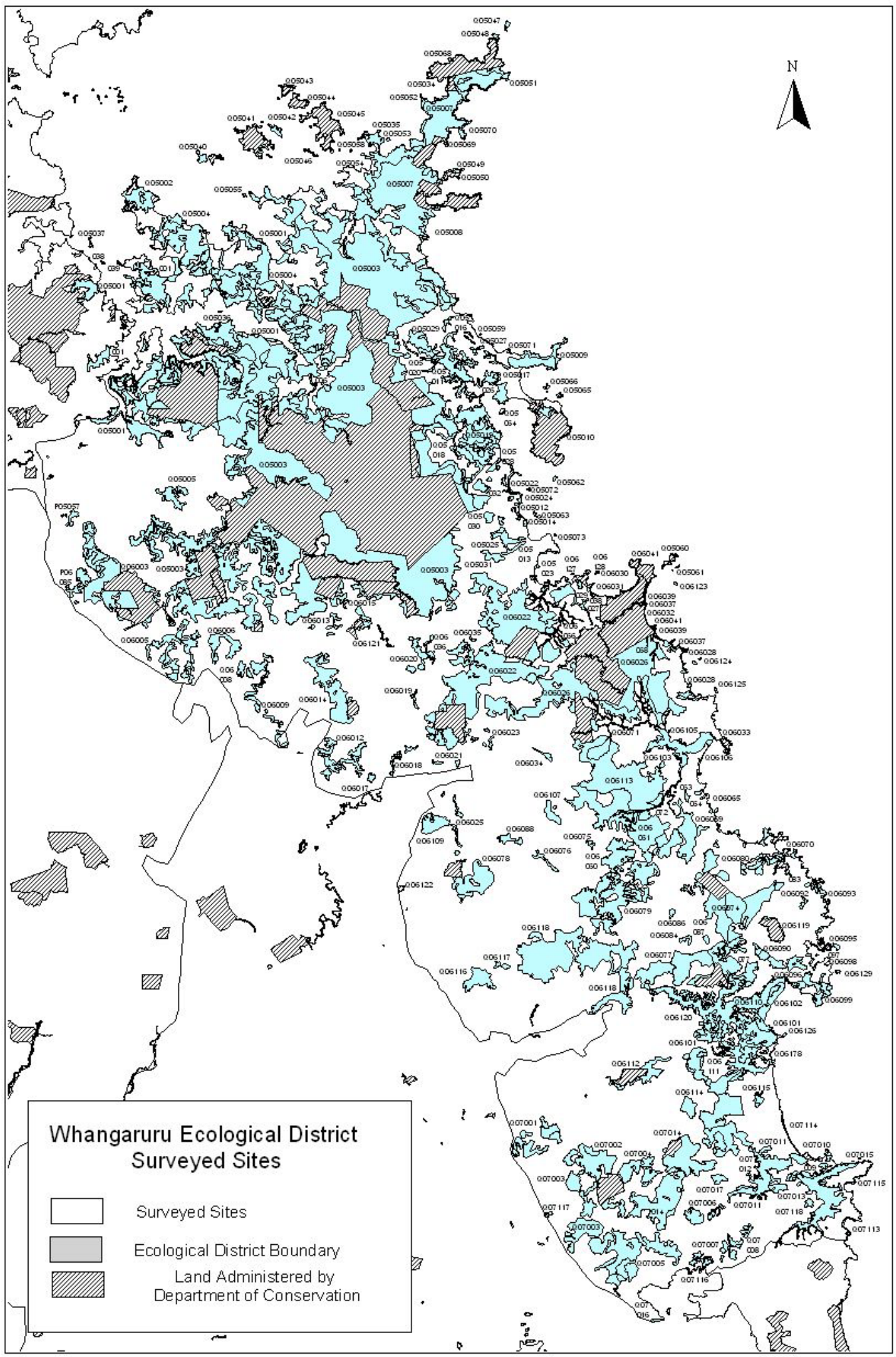
CONTENTS

Foreword	3
Map 1. Location map of Whangaruru Ecological District	6
Map 2. Map of surveyed sites, Whangaruru Ecological District, including land administered by the Department of Conservation	7
Abstract	9
1. Introduction	9
1.1 The Protected Natural Areas Programme	9
1.2 Ecological Regions and Districts	11
1.3 Contents of this report	11
1.4 Whangaruru Ecological District	12
2. Methodology	13
2.1 General approach	13
2.2 Consultation with landowners	14
2.3 Data acquisition and analysis	14
2.4 Criteria for assessing habitat significance	15
2.5 Updating of data	16
3. Ecological character	18
3.1 Topography	18
3.2 Geology	18
3.3 Climate	18
3.4 Vegetation	19
3.4.1 Historical	19
3.4.2 Broad pattern	19
3.4.3 Main vegetation types	20
3.4.4 Species of botanical interest	25
3.4.5 Threatened and regionally significant plant species	26
3.4.6 Threatened plants not recorded for some time in the Ecological District	33
3.5 Fauna	34
3.5.1 Threatened bird species	34
3.5.2 Bird species of regional significance	36
3.5.3 Threatened mammals	37
3.5.4 Threatened snails	37
3.5.5 Threatened arthropods	39
3.5.6 Threatened and Regionally Significant fish	40
3.5.7 Threatened and Regionally Significant reptiles	40
3.6 Threats	41

4.	Site descriptions	42
4.1	Level 1 sites	43
4.1.1	Mainland sites	48
4.1.2	Islands	289
4.2	Level 2 sites	357
5.	Summary and conclusions	377
5.1	Analysis of existing protected areas	377
5.2	Priority natural areas for protection in the Whangaruru Ecological District	380
	Table 1. Protected Natural Area Network in the Whangaruru Ecological District	381
	Table 2. Ecological units recorded in the Whangaruru Ecological District and protected status	384
	Table 3. Summary of site evaluations	418
6.	Acknowledgements	430
7.	Bibliography	430
8.	Appendices	433
8.1	Field survey form	433
8.2	Letter to ratepayers & news media item	435
8.3	Categories of threat	437
8.4	Categories of importance for geological and soil sites	443
8.5	Fauna	444
8.6	Common and scientific plant names used in the text	448
8.7	Glossary	451
9.	Index of sites	457



Map 1. Location map of Whangaruru Ecological District.



Map 2. Map of surveyed sites, Whangaruru Ecological District, including land administered by the Department of Conservation. Note that the representation of protected areas is indicative only and should not be taken to accurately delineate these areas.

Abstract

The Whangaruru Ecological District lies to the south of Kerikeri Ecological District, and to the east of Tangihua and Whangarei Ecological Districts. It stretches from Russell in the north to Parua Bay in the south, and covers most of the area to the east of State Highway 1 between these two points. This Ecological District covers approximately 115,782 ha, 46% (52,662 ha) of which makes up the natural areas that are described in this report.

A total of 183 natural areas of ecological significance were identified in the Whangaruru Ecological District during a reconnaissance survey conducted between 1994 and 1997, with a small number of sites surveyed up to 2004. Of these, 169 are considered to be of regional or national importance. In many cases, the values of the remaining areas could not be fully assessed in this reconnaissance survey because of time frames and limited resources. Therefore, site-specific species information is lacking for some sites, but this has been supplemented with information from existing databases, as well as information collected during the survey.

The District contains a high diversity of vegetation types at inland, coastal and island sites. One of the most important features is the relative abundance of pohutukawa coastal forest, which is a nationally rare forest type. Other nationally important habitat types in the Ecological District include swamp forest, freshwater wetlands, and estuarine systems. The most common vegetation types are secondary forest dominated by totara, taraire, or towai, and kanuka/manuka shrubland.

The protected natural areas network in the Whangaruru Ecological District consists of 14,151 ha administered by the Department of Conservation, 428 ha of Queen Elizabeth II National Trust covenants, 2673 ha protected by Nga Whenua Rahui, 3.7 ha of protected private land, 1183 ha of Conservation Covenants and 202 ha protected by the Whangarei District Council.

Priority areas for protection include coastal forests, freshwater wetlands, riverine and swamp forests, dunelands, estuarine systems, and areas supporting threatened species.

1. Introduction

1.1 THE PROTECTED NATURAL AREAS PROGRAMME

The Protected Natural Areas Programme (PNAP) was established in 1982 to implement s. 3(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 for regions and Districts outside of Northland in that it is based mainly on reconnaissance survey 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 specific criteria (see Section 2), and are not confined to recommended areas for protection (RAPs), as described in previous PNAP reports for areas outside of Northland.

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), the Convention on Biological Diversity (1992), and the New Zealand Biodiversity Strategy (2000).

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

number of sites, their size, 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, including 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 the reconnaissance phase of the PNAP survey of the Whangaruru 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, including information which has become available since the time of survey.

The natural areas described have been assessed according to ecological criteria outlined in Section 2.4. Most sites were surveyed between 1994 and 1997, with a few sites being surveyed as recently as 2004. Since being surveyed, some sites may have been partially or completely destroyed. As it has not been possible to re-survey or re-map any altered boundaries, the maps and descriptions apply to the sites as of the date of survey, which may differ from their current configuration.

Soil sites of international, national, or regional significance are derived from Arand et al. (1993). Important geological sites and landforms of international, national, and regional significance are derived from Kenny & Hayward (1996) (see Appendix 8.4).

1.4 WHANGARURU ECOLOGICAL DISTRICT

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

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

Of the identified significant areas, inland forest and shrubland covers 40,795 ha, mainland coastal forest and shrubland covers 6960 ha, island coastal forest and shrubland covers 443 ha, riverine and swamp forest covers 439 ha, estuarine habitats cover 3,289 ha, dunelands cover 173 ha, and wetlands cover 565 ha.

Significant natural features of particular note in the District include:

- Numerous islands, the largest of which are in the Bay of Islands. Other significant islands include Motukokako Island off Cape Brett, and Rimariki Island off Mimiwhangata. These islands are vegetated by a diverse range of coastal forest and shrubland types, many of which are rare or absent on the mainland. They also support a high diversity of plants, birds, lizards, and invertebrates, many of which are threatened.
- Several relatively unmodified duneland systems, the most significant of which is Ngunguru Sandspit, which supports numerous threatened species.
- Thirteen estuarine systems, the largest of which is the Eastern Bay of Islands Estuary, covering 1129 ha, and forming part of a continuous gradient from old-growth forest in Russell Forest to tidal flats. There are also significant estuaries at Whangaruru, Whananaki, Ngunguru, Horahora, Pataua, and Taiharuru. All of these estuarine sites provide habitat for threatened species, especially birds. They are also an important link between freshwater and oceanic habitats, particularly for diadromous fish species.
- Large, contiguous forest areas at Russell Forest and Cape Brett, both of which form an unbroken gradient to the coast. Both of these sites are home to numerous threatened species, especially birds, invertebrates, and plants.
- Numerous coastal forest remnants along the east coast, many of which contain old-growth pohutukawa forest, which is a nationally rare forest type. The largest areas of coastal forest are at Cape Brett Peninsula, with extensive areas also at Bland Bay and Whangaruru North Head.
- Three areas of forest and shrubland on limestone, with unique vegetation types, and several threatened terrestrial snail species endemic to these sites.
- A small number of swamp forest remnants, containing primarily kahikatea, with one area of pukatea–swamp maire. Swamp forest is a very rare vegetation type nationally, due to draining and development.
- Alluvial and riverine forest remnants, providing riparian protection and linkage functions.

- Numerous wetland areas, with raupo reedland as the most common vegetation type. These are nationally rare habitat types, which support numerous threatened species, including matuku, pateke, kiwi, and black mudfish.
- Critical areas for pateke, collectively containing almost the total Northland population, and the largest mainland population.
- A high level of terrestrial snail endemism, with 19 threatened species recorded.

2. Methodology

2.1 GENERAL APPROACH

Information on the composition, extent and ecological values of indigenous natural areas within the Whangaruru Ecological District was collected during reconnaissance surveys, using rapid semi-quantitative methods. Most surveys were conducted between 1994 and 1997, with a small number being completed up to 2004. Fieldwork was conducted by Department of Conservation staff and coordinated by the Northland Conservancy office.

Natural areas were identified from topographic maps, existing databases, published and unpublished reports, aerial photographs, and field observations. Areas were identified without regard for tenure. All natural areas, including those administered by the Department of Conservation, and other protected and unprotected areas, were surveyed using the same methodology. This provided a consistent approach to determine representativeness.

Each site was mapped and described. Having evaluated the sites (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, can be found in Appendix 8.5 (Fauna) or Appendix 8.6 (Flora).

In compiling this report, extensive use was made of information from existing biological databases and information systems, such as the Sites of Special Biological Interest (SSBI), Threatened Plants Database, NIWA Freshwater Fish Database, Amphibians and Reptiles Database, Bio-sites, published information, and Department of Conservation internal reports. The SSBI information system in the Northland Conservancy was the source of a considerable amount of information, particularly concerning fauna. Information on threatened snails was sourced from Brook (2002). Geographical and geological information was gained from existing published and unpublished maps.

Although no sites were surveyed in detail, a large amount of information was collected, considerably expanding the information base for the Ecological District. It is important to note that, because of budget constraints during the survey period, some important natural areas may have been overlooked.

2.2 CONSULTATION WITH LANDOWNERS

Due to the magnitude and geographic range of the surveys being undertaken, personal contact with all landowners was not possible. All ratepayers, therefore, were advised by way of a mailed leaflet informing them of the programme and the reason for it (Appendix 8.2). The leaflet was signed by the then 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 featured in the local newspapers (Appendix 8.2).

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

Iwi consultation with Ngati Wai was undertaken by the then Conservation Officer (Habitats) at a meeting with Ngati Wai Trust Board members.

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.

Some sites were not surveyed in this manner, due to either the site being very isolated, or failure to obtain landowner permission for access. In these instances, sites were identified and described from aerial photographs. Information on some of these sites, therefore, remains limited, and it is likely that some species associations have not been recorded.

Natural areas were mapped using five broad categories of habitat types: forest, shrubland, wetland, duneland, and estuary (See Appendix 8.7). At each site, the composition and relative abundance of canopy and emergent 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, as well as variations of the technique, have been used to describe canopy composition both within New Zealand (see Atkinson 1962, 1985; Leathwick & Rogers 1996; Park & Walls 1978) and in other parts of the world (see Kershaw & Looney 1985; Mueller-Dombois & Ellenberg 1974). The specific technique for vegetation description at each site is based on the approach set out in Myers et al. (1987).

This semi-quantitative method was favoured because of the time constraints for the field survey, the extensive areas to be covered, and because it could be applied to all vegetation types, with ground cover plant species or substrate being recorded in non-forest habitats.

More detailed, and therefore more time-consuming and expensive, methods would not necessarily provide more useful information for assessing representativeness. The disadvantage of this survey approach, however, is that it did not provide a great deal of information on the distribution and abundance of uncommon and threatened species.

Plant species present in the “abundant” and/or “common” columns of the survey sheets were used to define each ecological unit. Each site was entered into an ACCESS database, and each ecological unit recorded at that site was listed. A search on each ecological unit gave information on the frequency of the different ecological units remaining in the Ecological District. This information was used to determine the representativeness of each ecological unit (See 5. Summary and conclusions, Table 2. Ecological units recorded in the Whangaruru Ecological District and protected status). The best representative examples included ecological units of the greatest species diversity, naturalness, long-term viability, and rarity in the Ecological District.

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

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 added to the report forms.

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 in the canopy.
- 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 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) (see Table 3).

The PNAP criterion of long-term viability has not been included in Table 3. Long-term viability was considered under the umbrella of representativeness, diversity and pattern, naturalness, size and shape.

Level 1 sites

These sites contain significant vegetation and/or significant habitats of indigenous fauna and are defined by the presence of one or more of the following ecological characteristics:

1. Contains or is regularly used by critical, endangered, vulnerable, declining, range restricted or sparse taxa (i.e. species and subspecies), or taxa of indeterminate threatened status nationally.
2. Contains or is regularly used by indigenous or endemic taxa that are of regional significance in Northland or in the Ecological District.
3. Contains the best representative examples in the Ecological District of a particular ecological unit or combination of ecological units.
4. Has high diversity of taxa or habitat types for the Ecological District.
5. Forms ecological buffers, linkages or corridors to other areas of significant vegetation or significant habitats of indigenous fauna.
6. Contains habitat types that are rare or threatened in the Ecological District or regionally or nationally.
7. Supports good populations of taxa which are endemic to Northland or Northland-Auckland.
8. Is important for endemic and indigenous migratory taxa.
9. Covers a large geographic area relative to other similar habitat types within the Ecological District.

Level 2 sites

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 and are not the best representative examples of their type.
- 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.

The site evaluations were made on the basis of data available. Some Level 2 sites are likely to meet Level 1 criteria, following a detailed site-inspection.

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

LINKS BETWEEN THE PNAP CRITERIA AND LEVELS 1 AND 2.

PNAP CRITERIA	LEVEL 1	LEVEL 2
Representativeness ¹	Contains the best representative examples in the Ecological District of a particular ecological unit or combination of ecological units. (3) Supports good populations of taxa which are endemic to Northland or Northland-Auckland. (7)	Not one of the best examples of its type in the Ecological District.
Rarity and special features	Contains or is regularly used by critical, endangered, vulnerable, declining, range restricted or sparse taxa (i.e. species and subspecies), or taxa of indeterminate threatened status nationally (1). Contains or is regularly used by indigenous or endemic taxa that are of regional significance in Northland or in the Ecological District (2). Contains habitat types that are rare or threatened in the Ecological District or regionally or nationally (6). Is important for endemic and indigenous migratory taxa (8).	Does not regularly contain, or there is no currently known threatened or regionally significant species. Contains common habitat types. No currently known special features.
Diversity and pattern	Has a high diversity of taxa or habitat types for the Ecological District. (4).	May contain only one habitat type and/or have a low diversity of taxa relative to other areas of a similar type.
Naturalness	Exhibits a higher level of naturalness than other examples of its type.	Exhibits a lower level of naturalness than other examples of its type.
Buffering/corridors and linkages	Forms ecological buffers, linkages or corridors to other areas of significant vegetation or significant habitats of indigenous fauna.(5)	May be heavily impacted by external influences or may be fragmented and isolated from other natural areas
Size and shape	Covers a large geographic area relative to other similar habitat types within the Ecological District. (9)	Is likely to be small relative to other similar examples of its type, or if large, is not the best example of its type and meets no other criteria for a Level 1 site.
Long-term ecological viability	If the long-term viability of the site is high or medium, it is likely to meet one or more of the other criteria above, or if low, may nevertheless be the best or only example of its type in the Ecological District.	May require a high degree of management to achieve viability or may never be viable under present circumstances or, if viable, may not meet any other criteria for a Level 1 site

¹ Best representative examples include sites with the highest level of naturalness, diversity, in the best condition, and with values other than ecological values such as cultural and amenity values (where known).

hydrology whilst others change more gradually, e.g. climax forest. The status and composition of species within some habitats 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 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 future monitoring to note changes in both species and habitat composition and condition, and to assess whether Level 2 sites qualify as Level 1 sites.

3. Ecological character

3.1 TOPOGRAPHY

The Whangaruru Ecological District is characterised by steep, deeply dissected hill country to 460 m elevation, with some areas of lower rolling hill country. The southern part of the Bay of Islands has a deeply indented coastline with numerous small islands and islets, and is bounded to the north-east by the prominent Cape Brett Peninsula. There are a number of estuaries within the District, the most significant being the Eastern Bay of Islands Estuary (1129 ha), Whangaruru Harbour (330 ha), Whananaki Estuary (225 ha), Ngunguru Estuary (543 ha), Horahora Estuary (206 ha), Pataua Estuary (281 ha), and Taiharuru Estuary (384 ha). Much of the open coastline is steep and rocky, with pocket gravel beaches, but there are also a number of sand beaches backed by dunes. Alluvial deposits are present along the lower reaches of coastal valleys, and at the headwaters of the Hikurangi Swamp.

3.2 GEOLOGY

Predominantly steep hill country of Waipapa Terrane greywacke, with minor areas of Te Kuiti Group sedimentary sequences, allochthonous Mangakahia Complex sedimentary rock units, and Kerikeri Volcanics basalt flow remnants. The main rock types are Paleozoic–Mesozoic Waipapa Terrane greywacke and minor chert. Thin cover sequences of Eocene–Oligocene Te Kuiti Group and Northland Allochthon (Brook 1996).

3.3 CLIMATE

Within the Whangaruru Ecological District, there are weather stations at Russell and Glenbervie. In some instances, climate information is not available from these stations, so data from Kerikeri and/or Whangarei weather stations have been used (see Moir et al. 1986).

The District is one of the least windy areas of Northland, with mean monthly wind speeds of 10 km/hr recorded at Kerikeri and Whangarei airports.

Due to the close proximity to the sea, the winds in Northland are moist with abundant rainfall. Within the District, the annual rainfall ranges from 1200 mm at the coast to 2000 mm at inland sites. Glenbervie is one of the wettest sites in the District, with an annual rainfall of 1973 mm. The wettest months are from

June to August, during which time approximately 33% of the annual rainfall occurs. The driest months are from November to January, with 17% of the annual rainfall occurring at this time, but there can be large inter-year differences in the seasonality of rainfall.

Northland has a mild climate, with very few extremes of temperature. The mean annual temperature for eastern Northland ranges from 15.5° to 16.0°C. The weather station at Glenbervie, however, has one of the greatest temperature ranges in Northland, with the average daily temperature varying by 10.1°C. Glenbervie also boasts the lowest temperature recorded in Northland (-5.6°C).

The majority of the District has approximately 2000 hours of bright sunshine per year, with down to 1700 hours in highland areas.

3.4 VEGETATION

Appendix 8.5 contains a full list of common and scientific plant names used in the text.

3.4.1 Historical

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

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

Logging of kauri, primarily for spars for boats, began in Whangaruru in the 1820s (Malcolm 1982). Halkett & Sale (1986) make a reference to an account of a kahikatea forest up the Kawakawa River, which was logged by crew from the ship *Dromedary*.

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

3.4.2 Broad pattern

The most common vegetation type in the District is secondary podocarp-broadleaf forest, dominated by totara, taraire, or towai. The largest areas of this forest type are in the northern end of the District, with smaller, scattered areas to the south. Kauri forest is often present on ridges within the podocarp-broadleaf areas, especially at inland sites.

Kanuka/manuka shrubland is another common vegetation type throughout the District, especially around the Waikare Inlet, and in the northern coastal areas. There are numerous other sites with this vegetation type, usually within or adjacent to podocarp-broadleaf forest remnants.

Coastal forest remnants are found along the coastline, and on some of the numerous small islands in the Ecological District. These tend to be dominated by pohutukawa forest, with other remnants dominated by kanuka/manuka or totara forest. Much of the coastal areas were once farmed, and have now been retired or split into smaller lifestyle blocks, many of which are now regenerating kanuka/manuka shrubland.

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

3.4.3 Main vegetation types

Freshwater wetlands

Twenty-four freshwater wetlands have been identified and surveyed in the Whangaruru Ecological District. The freshwater wetland types present in the District are as follows:

- Raupo reedland is the most common wetland type, and can be found at 17 of the 24 sites. At 14 of these sites, raupo is the sole dominant species. At the remaining sites, raupo is co-dominant with harakeke, rush sp., harakeke-kanuka/manuka, or manuka. Species which occur in low numbers include kuta, ti kouka, manuka, and giant umbrella sedge. Other species found at some of the sites include jointed twig rush, pakihī rush, wheki, shaking brake, harakeke, manuka, swamp millet, and *Hebe* sp.

The following wetland types are each present at one or two sites only:

- *Juncus* sp. rushland with raupo, giant umbrella sedge, willow weed, and *Carex* sp.
- Giant umbrella sedge with raupo
- Sphagnum moss with manuka, *Baumea* sp., and *Coprosma* sp.
- Rush spp. rushland/sedgeland with manuka and tangle fern

Estuaries

There are 13 estuarine sites in the Whangaruru Ecological District, which contain a high diversity of ecological units. The vegetation types present in estuaries are as follows:

- Mangrove shrubland and forest is the most common estuarine vegetation type, and is present at all of the sites. Species associated with mangrove forest usually occur in small amounts on the edges. These include raupo, jointed twig-rush, oioi, and sea rush.
- Oioi saltmarsh occurs at five sites, and is co-dominant at some sites with one or more of the following species; kanuka/manuka, mangrove, *Juncus* sp., saltmarsh ribbonwood, raupo, or sea rush. Species which occur in low numbers at some of these sites include jointed twig-rush, harakeke, ti kouka, and giant umbrella sedge.

The following vegetation types are found at one or two sites:

- *Bolboschoenus* sp.-*Coprosma* sp.-harakeke-saltmarsh ribbonwood saltmarsh
- *Cotula* sp.-*Isolepis* sp.-sea primrose-selliera association
- *Cyperus* sp. association, with low amounts of raupo, sea rush, kuta, oioi, and harakeke
- Glasswort saltmarsh
- Rush sp.-saltmarsh ribbonwood saltmarsh, with infrequent mangrove and manuka
- Sea primrose saltmarsh, with glasswort, selliera, saltmarsh ribbonwood, and knobby clubrush

Coastal dune associations

Coastal dune vegetation has been recorded at ten sites in the Whangaruru Ecological District. The main vegetation types include:

- Sandfield, some of which have no vegetation. Other sites may have low amounts of spinifex, with rare toetoe, knobby clubrush, pohuehue, or exotic grasses.
- Spinifex grassland, which is sometimes co-dominant with exotic grasses and/or knobby clubrush. Pingao may also be present.

Flaxlands

Flaxlands (harakeke) have been recorded at 16 island sites and two mainland sites. Harakeke is sometimes co-dominant with pohutukawa, bracken, coastal tussock, or kowharawhara. Other associated species include taupata, ti kouka, mingimingi, hangehange, toetoe, and knobby clubrush.

Shrublands

Shrublands within the District are widespread in both inland and coastal areas, and occur predominantly on greywacke. Shrublands include the following types:

Kanuka/manuka shrubland

Kanuka/manuka shrubland is the most common and widespread shrubland type at both inland and coastal sites, and can be found throughout the Ecological District.

Kanuka/manuka have been recorded as the dominant species at 31 inland sites. At 30 other inland sites, kanuka/manuka is co-dominant with one or more of the following: totara, tanekaha, towai, mamaku and rimu. Kanuka/manuka shrubland at inland sites has a high diversity of associated species which occur in low densities. The most common of these is totara, along with tanekaha, towai and puriri, and emergents such as rewarewa, rimu, kauri, and kahikatea. Some kanuka/manuka shrubland sites also contain areas of nikau, ti kouka, and tree fern.

In coastal areas, kanuka/manuka have been recorded as the sole dominant species at 14 sites, and co-dominant with totara, *Pittosporum umbellatum*, houpara, tanekaha, or towai at a few other sites. Associated species include totara, puriri, tanekaha, pohutukawa, ti kouka, and tree fern. Less common species, which are not generally found at inland sites, include hangehange,

mamangi, mapou, mahoe, pate, karamu, kohekohe, akepiro, harakeke, houpara, kowhai, and karo.

Other shrubland types

There are very few shrublands in the Ecological District which do not have kanuka/manuka as the dominant or co-dominant species. Inland, there are a few shrubland sites dominated by one or more of: mamaku, tanekaha, totara, or towai. On the coast and islands, rare shrubland types include mamaku and taupata.

Podocarp forest

Totara forest

Totara forest is the most common podocarp forest type at both coastal and inland sites, and is the sole dominant species at most of these sites. It occurs predominantly on greywacke, with sites also on chert-greywacke, Kerikeri Volcanics and alluvium.

Totara forest is the sole dominant species at 36 inland sites. At other sites, it is co-dominant with kahikatea, rewarewa, tanekaha, or rimu. It has a high diversity of associated species which are present in low amounts. On areas of greywacke and chert/greywacke, the most common associated species are kanuka/manuka, puriri, taraire, towai, mamaku, and ti kouka, along with the emergents kauri, rimu, kahikatea, tanekaha, and rewarewa. Totara forest on alluvium contains the above associated species, as well as titoki, kowhai, matai, pukatea, and manatu.

In coastal areas, totara is the sole dominant species at three sites, and is co-dominant with tanekaha or kahikatea at two sites. Associated species include pohutukawa, kowhai, puriri, and kanuka/manuka, as well as the emergents kauri, rimu, rewarewa, and tanekaha.

Kahikatea forest

Kahikatea forest occurs on volcanic, alluvial, and greywacke soils, and is the sole dominant species at 10 inland sites. At a few other sites, it is co-dominant with rimu or totara. Associated species include pukatea and swamp maire, with ti kouka, taraire, towai, rewarewa, and kanuka/manuka in low numbers.

Kahikatea forest is present at one coastal site, where it is co-dominant with totara.

Tanekaha forest

Tanekaha-dominant forest is present in only a few areas, and only at inland sites. Most of the sites have other podocarps associated in small amounts, including totara, rewarewa, rimu, and kauri.

Rimu forest

Rimu-dominant forest is present at one inland site in the District; this area also features kauri, totara and rewarewa in low amounts.

Broadleaf forest

Inland broadleaf forest occurs predominantly on greywacke, with a few sites on chert-greywacke. Taraire forest also occurs on volcanic soils at four sites. At coastal sites, broadleaf forest occurs almost exclusively on greywacke.

Taraire forest

Taraire forest is the most common broadleaf forest type in the District. Taraire forest is recorded as dominant at 15 inland sites, and is co-dominant at numerous other inland sites with other broadleaf species, including kanuka/manuka, kohekohe, puriri, rewarewa, or towai. Puriri, rimu, and rewarewa are present at most sites in low amounts. Less common species are tawa, towai, karaka, and kohekohe, with kauri, kahikatea, totara, and tanekaha as emergents. A few taraire forest sites also contain low numbers of northern rata, pukatea, and miro.

On the coast, taraire forest has been recorded at a few sites, and is associated with emergents such as totara, rimu, rewarewa, tanekaha, kauri, kahikatea, miro and kawaka. Puriri, nikau, and kanuka/manuka are also present at some sites.

Towai forest

Towai forest is present at inland sites only. Towai-dominant forest is recorded at 12 sites, and is co-dominant with kanuka/manuka or taraire at other sites. Associated species are predominantly emergents, and occur in low numbers. These include podocarps (such as rimu, totara, tanekaha, kahikatea, and rewarewa), northern rata, and kauri.

Kanuka/manuka forest

Kanuka/manuka forest is also a common inland broadleaf forest type, and is frequently co-dominant with other broadleaf species, such as taraire, towai, or puriri. Associated with kanuka/manuka forest is a high diversity of species that occur in low numbers. Emergent podocarps, including matai, are the most common of these, as well as kauri, rewarewa and the occasional kawaka and northern rata. Common broadleaf species are puriri, towai, taraire, and kohekohe, with the occasional titoki or tawa.

On the coast and islands, kanuka/manuka forest is dominant at 15 sites, and co-dominant at a few other sites with species including taraire, pohutukawa, and puriri. Coastal kanuka/manuka forest differs from inland sites with the absence of emergent kahikatea, matai and northern rata, as well as towai, titoki, and tawa.

Pohutukawa forest

Pohutukawa forest is found only at coastal sites, and occurs on greywacke, or, less commonly, on chert/greywacke. This forest type is recorded as dominant at 35 sites. At the remaining sites, pohutukawa is co-dominant with kowhai, puriri, kohekohe, kanuka/manuka, or nikau. Pohutukawa forest in the District has a high diversity of associated canopy species. The most common of these are kowhai, kohekohe, puriri, karaka, totara, and kanuka/manuka. Some sites also feature emergents such as kauri, rewarewa, and rimu. Less common species include mamaku, wheki, nikau, tanekaha, taraire, tawapou, *Olearia* sp, and ti kouka.

Kohekohe forest

Kohekohe forest is rare in the Ecological District, being recorded at three coastal sites and two inland sites. On the coast it is co-dominant with pohutukawa, *Pittosporum umbellatum*, puriri, or tawaroa. Associated species include emergents such as miro, kahikatea and rimu, as well as tawa, karaka, and ponga.

Puriri forest

Puriri forest is also rare in the Ecological District, and is dominant at only one inland and one coastal site. At a few inland sites, it is co-dominant with kanuka/manuka, taraire, or kohekohe. On the coast, it is co-dominant with kanuka/manuka, pohutukawa, taraire, kohekohe, kowhai, or tawaroa.

Karaka forest

One small area of coastal karaka forest, with taraire as a co-dominant, was recorded in the Ecological District (Sandy Bay Remnants). Other species present are totara, puriri, and nikau.

Swamp maire–pukatea swamp forest

Swamp maire swamp forest with pukatea as a co-dominant is present at one site on Kerikeri volcanics. Associated canopy species are kahikatea, rimu, and kauri.

Podocarp–broadleaf forest

Greywacke is the most common geological type associated with podocarp–broadleaf forest at both inland and coastal sites, but this forest type also occurs on a range of other geological types.

The most common inland podocarp–broadleaf forest types are:

- kanuka/manuka with rimu, tanekaha, or totara
- totara with kanuka/manuka, towai, and/or taraire
- towai with totara, taraire, puriri, and/or rewarewa
- taraire with kahikatea, rewarewa, or totara

Inland areas have a high diversity of podocarp–broadleaf forest types which include various combinations of the above species, as well as mamaku, and puriri.

Rare inland podocarp–broadleaf forest types include:

- kahikatea–swamp maire swamp forest on Kerikeri volcanics
- puriri–totara forest on Kerikeri volcanics and alluvium
- titoki–totara forest on limestone

Coastal podocarp–broadleaf forest also contains a high diversity of dominant canopy species. The main forest types are:

- kanuka/manuka with pohutukawa, tanekaha, rewarewa, totara, puriri, and/or rimu
- pohutukawa with kanuka/manuka, totara, and/or puriri
- totara with pohutukawa, kanuka/manuka, or puriri

Rare coastal podocarp–broadleaf forest types include:

- kanuka/manuka–kawaka forest

Associated species at both inland and coastal sites include all those listed under podocarp forest and broadleaf forest types.

Kauri forest

All kauri-dominant forest in the District occurs on greywacke, except for one site on chert–greywacke, and is found predominantly on ridges. Kauri-dominant

forest occurs at 12 inland sites. Most sites have tanekaha and rimu present in small amounts. Rewarewa is an emergent at some sites.

Kauri-podocarp forest

Kauri-podocarp forest is found at 22 inland sites and one coastal site, and occurs predominantly on greywacke.

The most common kauri-podocarp forest type is:

- kauri (either dominant or co-dominant) with rimu, tanekaha, and/or totara.

Inland areas also features several rare kauri-podocarp forest types:

- kauri-dominant forest with kawaka and rimu on greywacke
- rimu-dominant forest with kauri on alluvium
- totara-dominant forest with kauri on Kerikeri volcanics

The coastal site has rimu as a co-dominant, and no associated canopy species.

As with other forest types, inland kauri-podocarp forest has a high diversity of species present in low numbers. The most common of these are emergents such as rewarewa, tanekaha, rimu, totara, kahikatea, taraire, puriri, and towai. Northern rata is present at a few sites; other uncommon species include karaka, pukatea, nikau, and ti kouka.

Kauri-broadleaf forest

Kauri-broadleaf forest occurs at eight inland sites, and consists of:

- kauri with towai, kanuka/manuka, and/or taraire

On the coast, there are three areas of kauri-broadleaf forest, which consist of:

- kauri with pohutukawa or kanuka/manuka

Some of the species present in low numbers differ between inland and coastal sites. Both areas have emergents such as rimu, rewarewa, totara and tanekaha. Northern rata and kahikatea are present at some inland sites, and kowhai, karaka, kohekohe and ti kouka at some coastal sites.

Kauri-podocarp-broadleaf forest

Inland kauri-podocarp-broadleaf forest occurs at eight sites and contains the following dominant species:

- kauri with rimu, totara or tanekaha, as well as towai, taraire or kanuka/manuka

Coastal kauri-podocarp-broadleaf forest (four sites) contains the same podocarp species as inland sites, along with pohutukawa or kanuka/manuka.

Species present in low amounts are the same as those in kauri-podocarp and kauri-broadleaf forest types.

3.4.4 Species of botanical interest

Coastal areas contain a higher number of threatened plants than other habitats such as forests. This Ecological District contains a high proportion of coastal fringe and islands; therefore it has a high number of threatened plants. Coastal areas are extremely influenced by natural disturbance, and are also affected by other pressures such as development, weeds, pests, vehicles, and stock. As a result, the numbers of threatened and significant plants that have disappeared

from this Ecological District are disproportionately high compared with other Ecological Districts in Northland (L. Forester, pers. comm.). The coastline in this Ecological District is also very diverse, with long stretches of sandy beach, harbours, estuaries, and eroding cliffs. This diversity is reflected in the range of coastal plant species.

3.4.5 Threatened and regionally significant plant species

The status of individual species is derived from Molloy et al. (2002) and Hitchmough (in press). All other information is taken from Forester & Townsend (2004) or the Department of Conservation threatened plants database, unless stated otherwise. Regionally Significant plant species are determined by the Department of Conservation, Northland Conservancy.

Nationally Critical

Sicyos australis mawhai

A sprawling, cucumber-like vine with small prickly fruit. Found primarily in coastal scrub, between Northland and the Bay of Plenty. There are only two records of this species on the Northland mainland, one of which is at Waiomio in this Ecological District.

Nationally Endangered

Carmichaelia williamsii

A distinctive broom growing up to 4 m. Found on islands off the northern North Island to the Hauraki Gulf, in open forest and steep coastal sites. Recorded on Motuwharariki Island, with an historic record on Wide Berth Islands.

Hibiscus aff. trionum

A distinctive annual to biennial herb up to 40 cm tall, bearing stiff, bristle-like hairs, and pale yellow flowers. Widespread in disturbed, open sites in northern and southern hemispheres. Recorded at Rimariki Island and near Whangaumu Bay.

Rorippa divaricata

A hairless perennial cress, with small white flowers in clusters. Endemic to the North Island and northern South Island. Recorded on Motukokako Island.

Senecio scaberulus

An upright, grey-green coloured rosette forming herb. This fireweed is found in open coastal and offshore island habitats from Auckland to Te Pahi. Formerly widespread, it is now rare in the wild. Its stronghold in this Ecological District, and is found primarily along the Matapouri Coast (Tutukaka Middle Gable to Whananaki). Also recorded at Cape Brett, Whangaruru, and Moturua Island.

Todea barbara

This is a large, erect fern with leathery fronds growing up to 2 m tall. This fern grows throughout Northland as far south as the Bay of Islands, and also occurs in South Africa and Australia. It has been recorded at Edwards/Tikitikioure.

Serious Decline

Brachyglottis kirkii

Brachyglottis kirkii is a shrub that can be epiphytic (Poole & Adams 1994). Recorded from Whangaruru North Head, Matapouri Bush Block, and Moturua Island and Surrounds.

Daucus glochidiatus

An annual or biennial carrot-like herb, found in lowland places on dry cliffs, rock talus, dry clay banks, or forest margins. Found from the Three Kings to Southland and the Chatham Islands. Recorded at Cape Brett, Whangaruru North Head, and Moturua Island.

***Marattia salicina* king fern**

A large, robust fern with fronds to 5 m tall. Found in wet, shady gullies in dense bush. Recorded at Russell Forest, Edge Road Remnant, Helena Bay Remnants, and Waikahoa Bay Forest, with an historic record from Taiwawe Bay Remnants (1948).

Pimelea tomentosa

A small erect shrub with slender, hairy branchlets, dark brown bark, and narrow, rather thin leaves, which are scarcely hairy on the upper surface but densely hairy beneath when young. The flowers are densely hairy white and pink, and the berry-like fruit can be white, dark red, or black. It is found in open shrubland from North Cape to Nelson/Marlborough (Poole & Adams 1994). This plant has been recorded at Cape Brett, Whangaruru North Head and Kukutawhao Island (South Gable Remnants).

Gradual Decline

Anogramma leptophylla

A small annual fern, known from South America, Africa, Europe, India, and Australia. In New Zealand, recorded from Waiomio to Dunedin.

Austrofestuca littoralis

A stout, tufted erect grass forming pale yellow-green tussocks, found on sandy and rocky places near the shoreline. Recorded from Mimiwhangata Beach, with an historic record at Matapouri.

Colensoa physaloides

This is a distinctive, blue-flowered shrubby plant with hydrangea-like foliage. It is a monotypic genus, endemic to Northland, some of its islands, and Rakitu Island east of Great Barrier Island (P.J. de Lange (pers. comm.) in: Conning & Holland 2003). It is found scattered through forest areas, generally beside streams and tracksides, and on talus slopes. It is a highly palatable plant which is sensitive to browse from possums and goats. In the Whangaruru Ecological District, it has been recorded at many sites at Cape Brett, as well as Whangamumu, Motukiekie Island, and Motukokako Island.

***Desmoschoenus spiralis* pingao**

Perennial herb with a creeping, woody rhizome. Plants bright orange-green. Forms colonies on coastal sand dunes throughout New Zealand, usually in less stable areas. Pingao is scattered but widespread, and is found between Whananaki and Pataua in this Ecological District.

***Mida salicifolia* willow-leaved maire**

A small tree reaching 8 m, with glossy green leaves (Poole & Adams 1994). Has reached threatened status due to possum impacts (L. Forester, pers. comm.). Found in forests throughout this Ecological District.

Pimelea arenaria

A low spreading, silky-haired shrub in the daphne family, which grows on coastal sand dunes. This plant is endemic to the North Island and has two distinct forms, of which one is further restricted to Northland. Recorded from one site in this Ecological District at Parauwanui Beach, which is also the largest known population in Northland.

***Raukaua edgerleyi* raukawa**

A tree usually restricted to high-altitude forests in Northland. Raukawa has been declining due to severe browsing pressure (Hitchmough in press). Recorded in this Ecological District from Russell Forest.

Thelypteris confluens

Commonly known as the swamp fern, this species grows amongst dense stands or swards of other wetland plants e.g. sedges. It grows up to 60 cm in height, and is frost-tender. Once widespread, this fern is now confined from Northland to the Bay of Plenty, with Northland as the stronghold. It has been recorded at Marriott Island in the Waikare Inlet, and in Russell Forest.

Range Restricted

Brachyglottis myrianthos

A shrub with a very limited distribution recorded in this Ecological District from Kaiikanui.

Celmisia adamsii* var. *rugulosa

A herbaceous daisy with white flowers. Only recorded at Beasley Road Remnant in this Ecological District. Also recorded from Manaia Ecological District, and Pirongia in Waikato.

Sparse

Calystegia marginata

A slender climber with narrow, arrow-shaped leaves, found on margins in open, low shrubland (Wilson & Given 1989). Also found in eastern Australia, sparse populations are found through Northland and as far south as Cuvier Island. It is found at numerous sites in this Ecological District, and has been recorded at Russell Forest, Cape Brett, Whangamumu, Bland Bay Forest, Whangaruru North, Mimiwhangata Remnants, Motukiekie Island, Urupukapuka Island, and Moturua Island.

***Cbionochloa bromoides* coastal tussock**

A coastal tussock which grows on cliffs and bluffs. Recorded from numerous island and several mainland sites in this Ecological District.

Fuchsia procumbens

This prostrate, sprawling plant is found in open coastal habitats on the mainland from North Cape to Maunganui Bluff on the west coast, and

Coromandel on the east coast. It is recorded from a number of sites in the Ecological District.

***Halocarpus kirkii* monoao**

A tree reaching 25 m that has a wide distribution but is seldom locally common, found from Hokianga to Auckland. Recorded from Russell Forest, Matapouri Bush Block and Whakareora Coastal Habitat in this Ecological District.

***Libocedrus plumosa* kawaka**

This tree has a wide distribution, but is usually seen as scattered specimens. Recorded from many sites in this Ecological District.

Myrsine aquilonia

A small tree, which is distinguished from other species in this genus by an upright growth habit and being up to 12 m tall (Heenan & de Lange 2004). Found on the Poor Knights Islands, and at three mainland locations, one of which is the North Gable Remnants in this Ecological District.

***Peperomia* 'purple vein'**

A small succulent herb with fleshy leaves bearing a purple midrib and laminae. Recorded recently on a rock stack in the Pataua Estuary (L. Forester, pers. comm.).

***Pisonia brunoniana* parapara**

A subtropical genus, parapara is a small tree reaching 10 m (Poole & Adams 1994). There are very few records of parapara on mainland Northland (L. Forester, pers. comm.) Recorded in this Ecological District from North Gable Remnants and Motukokako Island.

Pittosporum pimeleoides* subsp. *pimeleoides

A small shrub growing to 2 m with slender branches and narrow, oblong leaves. It is found growing only on fairly open ridge sites, usually with mingimangi under tanekaha and kauri. Known only from north of Auckland, it is present at Russell Forest and Edwards/Tikitikioure Coastal Habitat in this Ecological District.

Scandia rosifolia

Scandia rosifolia is sometimes referred to as native angelica. It is a perennial herb usually associated with coastal habitats (Eagle 1986). Recorded in this Ecological District from Cape Brett and Motukiekie Island.

Schizaea dichotoma

Schizaea dichotoma is an uncommon fan fern that is associated with kauri forest in Northland. Found in this Ecological District from Kaiikanui Forest.

***Streblus banksii* large-leaved milk tree**

A tree reaching 8 m found in coastal forest (Poole & Adams 1994). Recorded from several mainland and island sites in this Ecological District.

Vagrant

Doodia aspera

Vagrant from Australia (not threatened). Also known as prickly rasp fern, this has rhizomes bearing tufts of pale green upright fronds. Known from sites between Tom Bowling Bay and the Auckland area.

Regionally Significant

***Ascarina lucida* hutu**

Common further south but rare in Northland. Present at one swamp site at Puhipuhi, within Russell Forest.

Adelopetalum tuberculatum

An orchid found on trees and tree branches where it forms a tight clump. Can be seen growing on conifers in association with lichen (St George 1999). Recorded in this Ecological District from Mimiwhangata, Matapouri, and Hugh Crawford Memorial Scenic Reserve.

Asplenium flabellifolium

A distinct fern often found on dry, rocky ground (Brownsey & Smith-Dodsworth 2000). Recorded in this Ecological District from Cape Brett.

Asplenium bookerianum

This fern is very rare in Northland, and recorded in this Ecological District from Russell Forest.

Asplenium northlandicum

A coastal fern, uncommon in Northland, recorded from North Gable Remnants and Otuwhanga Island in this Ecological District.

***Beilschmiedia tawa* “tawaroa” tawaroa**

Localised hybrid between tawa and taraire. Occurs sporadically down the east coast of Northland (L. Forester, pers. comm.).

Blechnum fluviatile

A fern usually found in high-altitude forests in Northland (L. Forester, pers. comm.). Recorded in this Ecological District from Russell Forest.

Calystegia tugoriorum

Calystegia tugoriorum is a climber with small heart-shaped leaves and white flowers (Eagle 1986). Recorded in this Ecological District from Whakareora.

***Cordyline fruiticosa* ti pore**

Ti pore was introduced from the Pacific by early Maori, and the original plants were all thought to have died out until it was rediscovered at two old pa sites in this Ecological District. This plant has high ethnobotanical values for Maori.

***Cyathea cunninghamii* gully tree fern**

A tall, slender tree fern which is uncommon in Northland. Recorded from Russell Forest in this Ecological District.

Hebe bollonsii

Endemic to the Poor Knights Islands, and the coast between Whananaki and Tutukaka (L. Forester, pers. comm.).

***Hebe* “Whangarei”**

Endemic to eastern Northland, and occurs sporadically along the coast from Bream Head to the Cavalli Islands. The Whangaruru Ecological District is the stronghold for this hebe (L. Forester, pers. comm.).

Helicbrysum lanceolatum

Tomentose shrub occurring in dry places (Poole & Adams 1994). Recorded from Bland Bay Forest in this Ecological District.

Hymenophyllum lyalli

Small fan shaped filmy fern recorded from Russell Forest in this Ecological District.

Ileostylus micranthus

Common hemi-parasitic mistletoe found throughout New Zealand. It is locally common in Northland with hosts including large totara and *Coprosma propinqua*. Recorded from Russell Forest at Karetu Inlet.

Ixerba brexioides tawari

A forest tree with a distribution from Hokianga to Lake Waikaremoana (Poole & Adams 1994). Usually found in high altitude forests in Northland (L. Forester, pers. comm.), and recorded from Russell Forest in this Ecological District.

Loxsoma cunninghamii

A rare fern found in the North Island in lowland areas from Kaitaia to Thames. This fern is a New Zealand endemic genus represented by once species (Brownsey & Smith-Dodsworth 2000). In this Ecological District, recorded from Russell Forest, Whangaruru North Head, and Ngahau Bay Coastal Habitat.

Luzula picta

Luzula picta is a grassy tufted plant found in slips and damp areas (Johnson & Brooke 1998). Recorded in this Ecological District from Russell Forest.

***Melicytus novae-zelandiae* coastal mahoe**

Coastal mahoe is a shrub of around 3 m (Poole & Adams 1994) recorded from Waiwiri Island and Motuwharariki Island in this Ecological District.

Metrosideros carminea

A tall vine with bright carmine flowers, recorded from Urupukapuka Island, Russell Forest, and Rehuotane Headland in this Ecological District.

Metrosideros excelsa* × *robusta

Found in large coastal forest blocks throughout Northland (L. Forester, pers. comm.). Present in Russell Forest.

Myrsine divaricata

A divaricating shrub with a weeping habit (Poole & Adams 1994). Recorded from Mimiwhangata in this Ecological District.

***Nestegis apetala* coastal maire**

A coastal tree with a very limited distribution, recorded from Cape Brett and several islands in this Ecological District.

***Nestegis cunninghami* black maire**

Regionally uncommon canopy tree recorded from Te Waiongatahuna, Kaiikanui and Lookout Road in this Ecological District.

***Nothofagus truncata* hard beech**

A tall forest tree with a very limited distribution in Northland. Reported from Whakareora in this Ecological District.

Olearia albida

A small coastal tree of local distribution. Recorded from Cape Brett and Rehuotane Headland in this Ecological District.

***Ophioglossum coriaceum* adders tongue**

Adders tongue is an uncommon fern which dies down in winter (Brownsey & Smith-Dodsworth 2000). Recorded from Cape Brett and Abbey Caves in this Ecological District.

Parietaria debilis

Soft hairy herb found on limestone and coastal habitats (L. Forester, pers. comm.).

Pellaea falcata

Recorded from Philip Island in the Tutukaka Harbour.

***Phormium cookianum* mountain harakeke**

A smaller flax than *Phormium tenax*, mountain harakeke is uncommon in Northland, recorded from Russell Forest in this Ecological District.

***Phyllocladus glaucus* toatoa**

Tree reaching 25 m (Poole & Adams 1994) recorded from Russell Forest (at Puhipuhi), Ruapekapeka Forest, and Gomez Road Bush in this Ecological District.

Plantago raoulii

An endemic herb, referred to as native plaintain, *Plantago raoulii* has been recorded from Cape Brett in this Ecological District.

***Pouteria costata* tawapou**

Tawapou is a coastal tree which is uncommon on mainland Northland. Recorded in this Ecological District from several sites.

Pratia angulata

An endemic creeping herb of damp ground recorded from Russell Forest and Moturua Island and Surrounds in this Ecological District.

***Pseudowintera axillaris* horopito**

Horopito is a small tree which is usually restricted to high altitude forests in Northland. Recorded from Russell Forest in this Ecological District.

Psilotum nudum

Psilotum nudum is a very distinctive, primitive fern ally with twiggy stems known from thermal regions, coastal and island habitats (Brownsey & Smith-Dodsworth 2000). Recorded in this Ecological District from Motukiekie Island, Matapouri Coastal Remnants, and Tutukaka Remnants.

Ranunculus urvilleanus

Endemic hairy, tufted herb with bright yellow flowers found in damp coastal and lowland sites (Wilson & Given 1989). Recorded from Moturua Island, Poroporo Island and Elliot-Pahi-Umuheke Beaches in this Ecological District.

Schizaea bifida

Schizaea bifida is a 'comb fern' often found in lowland areas of poor soil and thermally heated ground under scrub (Brownsey & Smith-Dodsworth 2000). Recorded in this Ecological District from Russell Forest, and Ngunguru Ford Road (exact location unknown).

Sticherus flabellatus

A fern with fan-shaped fronds found in Northland in low shrubland and open hillslopes (Brownsey & Smith-Dodsworth 2000). Recorded in this Ecological District from Russell Forest.

Suaeda novae-zelandiae

Suaeda novae-zelandiae is a coastal herb found close to the high tide (L. Forester, pers. comm.) Recorded from Ngunguru Sandspit and Matapouri Estuary in this Ecological District.

Uncinia clavata

Uncinia clavata is a hook grass which is rare in Northland. Recorded from Kaiikanui Forest in this Ecological District.

3.4.6 Threatened plants not recorded for some time in the Ecological District

Nationally Critical

***Linguella puberulla* greenhood orchid**

An old record from the Bay of Islands (location not specified).

Nationally Endangered

Crassula bunua

A tiny, creeping, succulent herb that forms interlacing mats. Found in wet, muddy, open ground and amongst moss, beside rivers, streams, drains and waterfalls. No recent records from Northland; an historic record from the Kawakawa River.

Hebe speciosa

An old record at Mimiwhangata Bay. The Tutamoe Ecological District contains the only extant populations of this plant in Northland.

Ophioglossum petiolatum

An old record from the Bay of Islands (location not specified).

Serious Decline

Euphorbia glauca

Sometimes known as New Zealand sea spurge, this is a soft herb of sporadic distribution around the coast on sand dunes and coastal seeps. It occurs throughout New Zealand. In this District, there are historical records from the Whangaruru Harbour remnants.

Gradual Decline

Sonchus kirkee

An upright, simple or branching puha-like herb, with thick, waxy leaves and dandelion-like flowers. Found primarily on wet, coastal cliffs and talus, throughout New Zealand. An historic record from Cape Brett.

Range Restricted

Baumea complanata

A tufted, leafy sedge found in swamps and swampy lake edges. Once known from the northern North Island, but now confined to Te Pahi, Taheke, Ngawha, Waipoua, and Dargaville. An historic record from Owae, east of Waiohio, and in Russell Forest at Puhipuhi.

Sparse

Pomaderris hamiltoni

An old record from the Bay of Islands (exact location not specified). Also found in Auckland and Waikato.

3.5 FAUNA

Information on fauna in this report has been compiled from SSWI (Sites of Special Wildlife Interest) and SSBI information systems, as well as from field observations during this survey. The status of individual species is derived from Molloy et al. (2002), and Hitchmough (in press). Nomenclature follows Heather & Robertson (2000) for birds, Gill & Whitaker (1996) for reptiles, McDowall (2000) for fish, and Hitchmough (in press) for snails and arthropods.

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

Most of the common bird species of Northland, both indigenous and introduced, are found in the District. A checklist of fauna recorded in the Whangaruru Ecological District is included in Appendix 8.5.

3.5.1 Threatened bird species

Nationally Critical

White heron *Egretta alba modesta*

Rare visitor to the District, which has been recorded at Ngunguru Estuary and Mimiwhangata Ponds.

Nationally Endangered

Pateke (brown teal) *Anas chlorotis*

The District contains the largest mainland population in the country. Found in coastal areas from Russell Peninsula to Pataua Estuary.

Grey duck *Anas s. superciliosa*

Recorded at several of the estuarine sites in the Ecological District, as well as coastal wetland sites.

Matuku (Australasian bittern) *Botaurus poiciloptilus*

Scattered throughout the Ecological District in low numbers.

Reef heron *Egretta s. sacra*

Present at all estuaries and along much of the coastline in the District. Breeding recorded at Motungangara Island.

NI weka *Gallirallus australis greyi*

Recently reintroduced to Russell Peninsula.

NI kaka *Nestor meridionalis septentrionalis*

Records from several sites in the District; predominantly coastal areas. Birds are most likely to be visitors from breeding populations on the Hen and Chickens Islands. Numbers of birds are increasing in the southern part of the Ecological District and in the adjacent Manaia Ecological District (R. Pierce, pers. comm.).

Nationally Vulnerable

Wrybill *Anarhynchus frontalis*

Recorded at Ngunguru Sandspit where it is an infrequent visitor.

Northern NZ dotterel *Charadrius obscurus aquilonius*

Found on several beaches, dunelands and estuaries throughout the Ecological District, and on Urupukapuka Island. Ngunguru Sandspit, Mimiwhangata, and Elliot Bay-Whangamumu are important breeding areas, the former also supporting 30-40 birds in Autumn/Winter.

New Zealand falcon *Falco novaeseelandiae*

Unconfirmed report from the Russell Forest in the early 1990s.

Caspian tern *Sterna caspia*

Recorded from coastal and estuarine sites. Estuaries are important feeding areas for juveniles and adults.

Serious Decline

NI brown kiwi *Apteryx australis mantelli*

Kiwi are found in shrubland and forest remnants throughout the District. Numbers have, however, declined dramatically in most areas since the 1980s. Currently, highest densities occur at managed sites at Russell Peninsula, Mimiwhangata, and in the Tutukaka-Ngunguru area (R. Pierce, pers. comm.).

Gradual Decline

Banded dotterel *Charadrius b. bicinctus*

Recorded at Whananaki, Ngunguru, and Taiharuru Estuaries, with birds from the latter roosting at Awahoa Bay.

Long-tailed cuckoo *Eudynamys taitensis*

Passage migrant in mid-February to mid-March each year when birds fly along prominent ridges at night. During bad weather, groups of up to 10 birds may be seen during the day.

Northern little blue penguin *Eudyptula minor iredalei*

Recorded at estuaries and along the coastline in low numbers, with recent records from Whangaruru Estuary, Mimiwhangata, and Ngunguru Sandspit.

Kukupa *Hemiphaga n. novaeseelandiae*

Found at many sites throughout the District, but in low numbers compared to other parts of Northland. Some managed sites support high densities (R. Pierce, pers. comm.).

White-fronted tern *Sterna striata*

Recorded from coastal and estuarine sites throughout the Ecological District.

Sparse

NI fernbird *Bowdleria punctata vealeae*

Restricted to saltmarsh areas due to the modification of alternative habitat.

Banded rail *Gallirallus philippensis assimilis*

Locally common in mangrove-saltmarsh areas. Also present in some other wetlands, including freshwater wetlands at Mimiwhangata.

Black shag *Phalacrocorax carbo novaehollandiae*

A regular visitor to the Ecological District, typically singly or in small groups. Recorded on all estuaries, and on some large streams and ponds.

Little black shag *Phalacrocorax sulcirostris*

Visitor to the Ecological District, typically in small groups in estuaries or large ponds.

Pied shag *Phalacrocorax v. varius*

Present along the coastline and all estuaries. Breeding at some sites.

Spotless crane *Porzana tabuensis plumbea*

Reported from only a few sites in the District, but probably more widespread than recorded. Typically associated with raupo reedlands and other wetlands with good cover.

3.5.2 Bird species of regional significance

These are not considered nationally threatened, but are rare in both the Ecological District, and in Northland generally.

Grey teal *Anas gracilis*

Regular visitor to open freshwater habitats including artificial ponds eg. Mimiwhangata. Also breeding at some sites in the Ecological District.

Bellbird *Anthornis m. melanura*

At least one subspecies occurs in the Ecological District. *A. m. melanura* is breeding on the Hen and Chickens Islands, and birds (mainly males) regularly visit Manaia Ecological District north to southern parts of Whangaruru Ecological District. *A. m. oneho* breeds on the Poor Knights Islands, and may be visiting eastern Northland where there are several records of bellbirds.

Red-crowned kakariki *Cyanorbambus n. novaezelandiae*

Frequent visitor to forested parts of the Ecological District including Russell Forest, Tutukaka to Ngunguru (where breeding was suspected in 2003/04), and Mount Tiger.

Variable oystercatcher *Haematopus unicolor*

Occurs in estuaries and on some beaches and rocky shores throughout the Ecological District. Breeds at Ngunguru Sandspit, Mimiwhangata, Elliot Bay to Whangamumu Harbour, and probably elsewhere.

NI robin *Petroica australis longipes*

Tenuously established on Moturua Island, where it was reintroduced in the 1980s.

NI tomtit *Petroica macrocephala*

Russell Forest is the stronghold of this species in the Ecological District, but since 1990, distribution has greatly expanded through southern reaches of the District including Tutukaka–Ngunguru and Mount Tiger–Waikaraka–Pataua.

3.5.3 Threatened mammals

Nationally Vulnerable

NI long-tailed bat *Chalinolobus tuberculata*

Long-tailed bats have been recorded at Rehuotane, and Kiripaka–Glenbervie. There are likely to be other sites with this species, as long-tailed bats have been reported very close to the District boundary. Further surveying is required to determine the status of this species within the District.

3.5.4 Threatened snails

All records and habitat information are taken from Brook (2002).

Nationally Endangered

Punctidae sp. 64

Endemic to eastern Northland, and found in native forest on limestone karst. Four populations have been recorded; three of which are in the Whangaruru Ecological District: Waiomio Caves, Waro Limestone Scenic Reserve, and Abbey Caves Remnants.

Punctidae sp. 13

Endemic to eastern Northland, and found in broadleaf forest on limestone karst. Known from only one population at Waro Limestone Scenic Reserve in this Ecological District.

Punctidae sp. 251

Endemic to eastern Northland, and found in native forest mostly on limestone karst. Known from four populations, two of which are in this Ecological District: Waro Limestone Scenic Reserve and Abbey Caves Remnants.

Serious Decline

Succinea archeyi

A snail found in sandfields and prostrate shrubland vegetation on coastal dunefields. Recorded from Te Paki to Papamoa Beach in the Bay of Plenty. There

are 10 known extant populations in Northland, four of which are in the Whangaruru Ecological District: Mimiwhangata Beach/Pareparea Bay, Ngunguru Sandspit, Whananaki Sandspit, and Horahora Dunes.

Gradual Decline

Amborbytida dunniae

Sporadically distributed between Auckland and Kaitaia in native forest and shrubland. Populations recorded at Hugh Crawford Memorial Scenic Reserve, Whakareora Coastal Habitat, Taheke Scenic Reserve, Horahora Bush, remnants within Glenbervie Forest, Abbey Caves Remnants, Waikaraka Stream Remnants, Taihu/Kohinu Stream Bush, and Whanui Bush in this Ecological District.

Amborbytida forsythi

Sporadic distribution from Mt Camel and Karikari Peninsula to North Kaipara, in native forest and shrubland. Recorded at Tapeka Point and Cape Brett.

Paryphanta busbyi busbyi kauri snail

A Northland endemic, found in native shrubland and forest, pine plantations, and rank exotic grassland adjoining forest and shrubland. Recorded at Russell Forest, Ngaiotonga Remnants, Puhipuhi Road Remnants, Kaiikanui Forest, Monument Road Forest, and Papanui/Umuwhawha Forest in this Ecological District.

Range Restricted

***Amborbytida* sp. “motukokako”**

Endemic to the Bay of Islands, eastern Northland, and recorded only from Cape Brett and Piercy Island, both in the Whangaruru Ecological District.

Kokikora mimiwhangata

Endemic to eastern Northland, at coastal sites between Whananaki and the Bay of Islands. Recorded at Cape Brett, Whangaruru North Head Coastal Remnant, Mimiwhangata (part of Q06/026), and Motutohe Island in this Ecological District.

Liarea bicarinata

A Northland endemic, found at Cape Brett in this Ecological District, and sporadically between Motatau and Whangarei.

***Liarea turriculata* “Manaia”**

Liarea turriculata is a variable species, with a distribution extending from Karikari Peninsula to Auckland. It includes a morphologically distinct race that is restricted to the Whangarei Heads area: *L. turriculata* “Manaia”. In the Whangaruru Ecological District, this race has been recorded in native forest remnants adjacent to the Taiharuru and Pataua estuaries.

Phenacobelix brooki

Endemic to eastern Northland, and recorded at Cape Brett, Russell Forest, and Moturua Island in this Ecological District.

Pbrixgnathus paralaomiformis

Endemic to eastern Northland, with nine extant island populations and one mainland population, Cape Brett. Islands in the Ecological District with this

species are Motukokako Island, Rimariki Island, Motuwharariki Island, and Otangawhanga Island.

***Placostylus bongii* flax snail**

Endemic to eastern Northland, and recorded between Whangaroa and Whangarei Heads, as well as on northern North Island islands. Found in coastal shrubland and broadleaf forest, and susceptible to predation by introduced mammals, and habitat modification. There are eight extant mainland populations and 14 extant island populations. In the Whangaruru Ecological District, *P. bongii* are still present at Orokawa Peninsular (part of Q05/003), Whangaruru North Head, and Tauranga Kawau Point (part of Q06/037). This species was formerly present and now presumed extinct at Whangamumu South Head, Mokau (Q05/014), Paparahi Point, and Ngahau Headland (both part of Q06/030), Te Ruatahi Island (part of Q06/037), and Goat Island.

Punctidae sp. 222

Recorded only at Cape Brett, in coastal broadleaf forest.

Punctidae sp. 230

Endemic to eastern Northland, and recorded only in this Ecological District on Cape Brett, Piercy Island, and Flat Rock Island.

Punctidae sp. 147

Endemic to eastern Northland and this Ecological District; recorded at Ngaioitonga (Russell Forest) and Cape Brett.

Punctidae sp. 28

Endemic to eastern Northland, and found in litter in native forest. Recorded at Cape Brett, Russell Forest, Whangaruru North Head Coastal Remnant, Mimiwhangata Coastal Forest Remnants, and remnants within Glenbervie Forest in this Ecological District.

Sparse

Schizoglossa worthyae

This species has a sparse distribution in the northern North Island between Northland and Mamaku (Rotorua). In this Ecological District, it has been recorded at Russell Forest, Helena Bay Remnants, Puhipuhi Road Remnants, and the remnants within Glenbervie Forest.

3.5.5 Threatened arthropods

Serious Decline

***Latrodectus atritus* black katipo**

Found in the northern half of the North Island, while the better known *L. katipo*, with the red stripe, occurs in the southern half of the North Island and the northern half of the South Island. Populations have declined around the country, probably due to habitat loss and competition with the introduced spider *Steatoda capensis* (Griffiths 2000). Known from two sites in the District: Mimiwhangata Beach/Pareparea Bay and Ngunguru Sandspit.

***Dodonidia helmsii* forest ringlet butterfly**

Found throughout much of New Zealand, on forest edges and in clearings. Has become much rarer over the past 50 years, probably as a result of the caterpillar being attacked by wasps. Recorded in Russell Forest in this Ecological District.

Sparse

***Paralissotes mangonuiensis* stag beetle**

A Northland endemic flightless stag beetle recorded at Russell Forest and Cape Brett.

3.5.6 Threatened and Regionally Significant fish

Gradual Decline

Longfin eel *Anguilla dieffenbachii*

This species has been recorded throughout the Ecological District.

Black mudfish *Neochanna diversus*

Recorded from several sites in the Ecological District, in wetlands within the Whakareora Coastal Habitat, and in a wetland adjoining the Horahora Estuary.

Sparse

Lamprey *Geotria australis*

Recorded only once in the Ecological District, in Russell Forest.

Regionally Significant

Banded kokopu *Galaxias fasciatus*

Recorded at numerous sites throughout the Ecological District.

Giant bully *Gobiomorphus gobioides*

Recorded at sites throughout the Ecological District.

Bluegill bully *Gobiomorphus hubbsi*

Recorded at two sites in the Ecological District.

Koaro *Galaxias brevipinnis*

Recorded at Rehuotane Headland.

3.5.7 Threatened and Regionally Significant reptiles

Gradual Decline

Pacific gecko *Hoplodactylus pacificus*

Recorded from Russell Forest and other sites along the east coast.

Auckland green gecko *Naultinus e. elegans*

Recorded from Whangaruru North Head and Whananaki Bush.

Regionally Significant

Ornate skink *Cyclodina ornata*

Recorded from Matapouri Coastal Remnants.

Forest gecko *Hoplodactylus granulatus*

Found almost throughout New Zealand, and reach their northern limit in Russell Forest.

Undescribed “common” gecko *Hoplodactylus* sp.

An undescribed, possible new species of “common” gecko has been collected from Cape Brett. This specimen appears to be different from *H. maculatus*, and is currently awaiting genetic analysis (P. Anderson, pers. comm.).

3.6 THREATS

The clearance of land for agriculture and other development has resulted in considerable loss of biodiversity. The fragmented nature of surviving habitats has made them vulnerable to stock and weed invasion. Pest plant species such as Mexican devil, pampas, woolly nightshade, and wandering willy are widespread in the Ecological District, and are found in many forest and shrubland areas.

Many of the offshore islands have been burnt or cleared in the past, and are now regenerating. This has, however, resulted in serious weed problems on some islands, with species such as sweet pea shrub, pampas, lantana, and exotic grasses making up a significant proportion of the habitat.

In the forest and shrubland areas, livestock, possums, goats, rats, and pigs constitute the main threats to habitat. However, uncontrolled dogs are posing a serious threat to ground-dwelling species, particularly kiwi. Increased settlement brings more domestic animals, e.g. dogs and cats, which pose increased problems in these areas (Pierce & Sporle 1998).

Mustelids and also rodents are significant predators of bird species. The effect of ferrets as they increase in numbers in the District is a cause for concern due to the impact they have on adult kiwi, whereas stoats kill only juvenile kiwi.

This Ecological District is the stronghold for pateke, which are also threatened by introduced predators, in particular cats, dogs, and mustelids. Loss of habitat is another major concern for this species, as riparian and wetland habitats used by pateke are threatened by draining, stock trampling, and weed invasion.

Kukupa numbers have declined greatly in the Whangaruru Ecological District and Northland generally since the 1970s (Pierce et al. 1993, R. Pierce unpubl. data). Between 1979 and 1993 there was an 80% decline in kukupa numbers detected in Russell Forest, and numbers remained low throughout the 1990s and early 2000s (R. Pierce, unpubl. data). These declines throughout Northland resulted from combinations of predator (possum, ship rat, stoat) impacts, competition with possums, and poaching (Pierce et al. 1993; Pierce & Graham 1995; Innes et al. 2004). However, in areas where these impacts have been minimised, some local recoveries have taken place in the Ecological District.

Habitats on margins or in successional stages are under considerable pressure from deforestation, with several surveyed areas having been cleared since reconnaissance was undertaken. Regenerating areas are also threatened by the invasion of exotic species, such as woolly nightshade, mothplant, and pampas.

Coastal vegetation in the District has been greatly diminished, largely by housing and pastoral development, and increasing pressure from beach users. Weed invasion of dunelands is a particular problem, with some areas being threatened by weeds such as buffalo grass, kikuyu, and pampas.

The physical and/or legal protection of priority areas for protection will go a long way towards safeguarding the habitats/biodiversity of the Ecological District. Additional management will be needed to ensure long-term viability of natural habitats and species populations.

4. Site descriptions

Midpoint grid references are given for contiguous sites. Individual grid references are given for sites containing more than one remnant.

Vegetation types within ecological units describe abundant/dominant and common canopy species. If there is more than one canopy species, and the species are all common within the canopy, they are listed alphabetically.

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

Records of threatened flora and fauna have been sourced from herbarium and other databases mentioned in Section 2.1, the Kiwi Recovery Programme (for NI brown kiwi), or from direct observations by Department of Conservation staff during the course of this survey. The status of all records was checked prior to inclusion in this report. All records included were deemed to be valid as from 2004, unless otherwise stated.

5. Summary and conclusions

5.1 ANALYSIS OF EXISTING PROTECTED AREAS

The Protected Natural Areas network in the Whangaruru Ecological District is summarised in Table 1 (page 381).

A total of 52,662 ha were identified as natural areas in the Whangaruru Ecological District. Of these, 18,641 ha (35.4%) are formally protected. This is equivalent to about 16% of the total area of the Ecological District.

Ecological units protected

Freshwater wetlands

Of a total of 565 ha of wetlands in this Ecological District, only 82 ha (14.5%) are protected. The following eight sites have some areas of protected wetlands within them:

- Russell Forest (24.6 ha of 100 ha protected).
- Whangaruru North Head Coastal Remnant (all 8.7 ha protected).
- Punaruku/Parorerahi Bay Coastal Habitat (23.5 ha of 36 ha protected).
- Rockell Road Coastal Forest Remnants (0.3 ha of 6 ha protected).
- Te Rewa Stream Riverine Habitat (7.8 ha of 10 ha protected).
- Mimiwhangata North Wetlands (all 7.6 ha protected).
- Mimiwhangata South Wetlands and Streams (all 9.6 ha protected).
- Te Wairahi/Taupari Stream Riverine Habitat (0.3 ha of 4 ha protected).

Estuarine

A very small proportion of the estuaries in this Ecological District are protected; of a total of 3289 ha of estuarine habitat, only 89.5 ha (2.7%) are protected. The most significant estuarine area in the Ecological District, and one of the largest in Northland, is the Eastern Bay of Islands Estuary. It covers a total of 1129 ha, of which only 43.1 ha (3.8%) are protected. Of the other 12 estuarine areas in the Ecological District, the following seven have some protection:

- Whangaruru Harbour (0.8 ha of 330 ha protected).
- Matapouri Estuary (33.5 ha of 81 ha protected).
- Whananaki Estuary (0.5 ha of 225 ha protected).
- Ngunguru Estuary (5.2 ha of 543 ha protected).
- Horahora Estuary (2.8 ha of 206 ha protected).
- Pataua Estuary (8.1 ha of 281 ha protected).
- Taiharuru Estuary (3.4 ha of 384 ha protected).

Coastal forest and shrubland on mainland

The total area of mainland coastal forest and shrubland in the Ecological District is 6960 ha, of which 2758.1 ha, or 39.6%, is protected. The sites with the greatest amount of protected habitat are Cape Brett Peninsula Forest (78% of 2580 ha protected), Whangaruru North Head Coastal Remnant (86% of 354 ha

TABLE OF MAINLAND COASTAL FOREST AND SHRUBLAND SITES

SITE NAME	SITE NO.	AREA OF FOREST/ SHRUBLAND AT SITE (ha)	AREA PROTECTED (ha)
Tapeka Point Coastal Habitat	Q05/002	171	31.6
Edwards/Tikitikioure Coastal Habitat	Q05/004	1527	20.9
Cape Brett Peninsula Forest	Q05/007	2580	2013
Bland Bay Forest	Q05/009	190	0
Whangaruru North Head Coastal Remnant	Q05/010	354	304.3
Poutukiterangi Pa Forest Remnants	Q05/014	7	0
Punaruks/Parorerahi Bay Coastal Habitat	Q05/019	380	169.7
Helena Bay Remnants	Q05/023	28	2.5
Oakura Bay Remnants	Q05/024	33	0
Mokau Bush	Q05/025	78	0
Whangaruru Harbour Remnants	Q05/026	170	2.6
Ohawini Bay Bush Remnants	Q05/028	23	0
Tutaematai Bush	Q05/029	121	0
Rockell Road Coastal Forest Remnants	Q06/028	40	14.5
Mimiwhangata Coastal Forest Remnants	Q06/030	25	17.2
Motutara Point Coastal Forest Remnants	Q06/033	12	1.9
Te Rearea Pa/Tauranga Kawau Point Coastal Remnants	Q06/037	30	11.6
Sandy Bay Coastal Forest Remnants	Q06/065	16	0
Matapouri Coastal Remnants	Q06/070	82	81.1
North Gable Remnants	Q06/093	44	22.1
South Gable Remnants	Q06/095	32	21.9
Tutukaka Remnants	Q06/098	9	0
Rehuotane Headland	Q06/099	134	11.9
Whakareora Coastal Habitat	Q06/101	345	16.1
Whananaki Coastal Remnants	Q06/103	23	0.8
Ngunguru Remnants	Q06/120	242	14
Taiharuru Estuary Remnants	Q07/009	73	0.4
Ngamatengau Point Coastal Remnants	Q07/010	10	0
Pataua Estuary Remnants	Q07/011	109	0
Manganese Point Coastal Forest Remnant	Q07/016	7	0
Awahoa Bay Beach & Coastal Remnants	Q07/113	7	0
Taiharuru Head Coastal Remnants	Q07/115	14	0
Parua Bay Remnants	Q07/116	44	0
TOTAL		6960	2758.1

protected), and Punaruks/Parorerahi Bay Coastal Habitat (35% of 380 ha protected).

Coastal forest and shrubland on islands

There are 46 islands in the Ecological District, with a total of 443 ha of coastal forest and shrubland. Of this, 273.8 ha (61.8%) are protected. The largest areas of protected forest and shrubland are on Moturua Island (119.7 ha), Urupukapuka Island (88.1 ha), Okahu Island (17.5 ha), Rimariki Island (16.7 ha) and Waewaetoria Island (14.2 ha), with smaller amounts on Motumaire Island,

Motuarohia Island, Poroporo Island, Motuarahi Island, Toretore Island and Motukauri Island (b).

Coastal dunes

A total of 173 ha of dunelands have been identified as significant areas in this Ecological District. Of these, 17.5 ha (10%) are protected. Sites with protected areas are:

- Mimiwhangata Beach/Pareparea Bay (2.5 ha of 23 ha protected).
- Whananaki Sandspit (all 7 ha protected).
- Ngunguru Sandspit (2 ha of 75 ha protected).
- Parauwanui Beach (6 ha of 8 ha protected).

Riverine and swamp forest

There were 439 ha of riverine and swamp forest identified in this Ecological District, of which only 22.3 ha (5.1%) is protected. The largest area of protected riverine forest is in the Te Rewa Stream Riverine Habitat, with small amounts of protected areas also in the Waiotu Riverine Forest and the Te Oriwa Stream Riverine Habitat. The only areas of swamp forest in the Ecological District, Parsons Road Swamp Forest Remnant and Waihaha Road Swamp Forest, are not protected.

TABLE OF RIVERINE AND SWAMP FOREST SITES

SITE NAME	SITE NO.	AREA OF RIVERINE/ SWAMP FOREST AT SITE (ha)	AREA PROTECTED (ha)
Taihaha Road Swamp Forest	Q05/006	1	0
Punaruku Riverine Forest	Q05/018	16	0
Tutaematai Stream Riverine Forest	Q05/020	22	0
Waiotu Riverine Forest	Q06/009	110	2.3
Parsons Road Swamp Forest Remnant	Q06/015	6	0
Lower Kaimamaku Stream Riverine Forest	Q06/018	31	0
Kaimamaku Stream Riverine Forest	Q06/019	11	0
Opuawhanga Riverine Forest Remnants	Q06/023	20	0
Te Waiongatahuna Riverine Forest	Q06/025	40	0
Te Rewa Stream Riverine Habitat	Q06/032	13	18.4
Lower Taparahaia Stream Riverine Forest	Q06/036	25	0
Owai Stream Riverine Habitat	Q06/066	42	0
Te Wairahi/Taupari Stream Riverine Habitat	Q06/071	57	0.3
Te Oriwa Stream Riverine Habitat	Q06/072	35	1.3
McInnes Road (b) Forest	Q06/075	10	0
TOTAL		439	22.3

Inland forest and shrubland

The remaining sites consist of inland forest and shrubland, which cover 40,794 ha. Within these sites, 15,144 ha (37.1%) are protected.

The most significant areas of protected inland forest and shrubland in the Ecological District are as follows:

- Russell Forest is the largest inland forest and shrubland area in this Ecological District, and one of the largest in the Eastern Northland Ecological Region. It covers a total area of 22,737 ha, of which 11,431.3 (50.3%) are protected.
- Ruapekapeka Forest 396.2 ha of 1037 (38.2%) protected.
- Kaiikanui Forest 445.8 ha of 2340 ha (19%) protected.
- Hansens Hill Forest 1154.6 ha of 2719 ha (42.4%) protected.
- Matapouri Bush Block 128.9 ha of 834 ha (15.4%) protected.
- Hugh Crawford Memorial Scenic Reserve 160.9 ha of 783 ha (20.5%) protected.
- Whananaki Bush 155.8 ha of 1303 ha (12%) protected.
- Mains Road Remnant, Marua Road Remnant, and Lookout Road Bush, all within the Glenbervie Forest, covering a total of 1257 ha, of which 674.7 ha (53.7%) are protected.
- Waro Limestone Scenic Reserve 6.4 ha of 7 ha (91%) protected.
- Waikaraka Stream Remnants 193.1 ha of 520 ha (37%) protected.

5.2 PRIORITY NATURAL AREAS FOR PROTECTION IN THE WHANGARURU ECOLOGICAL DISTRICT

1. Nationally under-represented ecosystems, including Ngunguru Sandspit and other dune areas, riverine and swamp forests, limestone remnants, estuaries and wetlands (only minimal areas of these types occur within protected areas), as well as old-growth coastal forest and uncommon types such as pohutukawa-kowhai forest.
2. Sites supporting pateke, *Succinea archbeyi*, and the three threatened snail species found in native forest on limestone karst: Punctidae sp. 64, Punctidae sp. 13, and Punctidae sp. 251.
3. Retention of sequences from forest to estuarine areas.
4. Sites supporting acutely threatened plant and animal species (other than those listed in 2).
5. Buffers to estuaries.
6. Sites supporting chronically threatened plant and animal species.
7. Buffers and linkages between existing protected sites, especially at Russell, Mimiwhangata, and Ngunguru.

TABLE 1. PROTECTED NATURAL AREA NETWORK IN THE WHANGARURU ECOLOGICAL DISTRICT.

Area given in ha. **Key:** QEII = Queen Elizabeth National Trust Covenant; NWR=Nga Whenua Rahui; PPL=Protected Private Land; WDC=Whangarei District Council Reserve; CC = Conservation Covenant, CP=Conservation Park; MS = Marginal Strip; SL = Stewardship Land; GP=Government Purpose Reserve; HR=Historic Reserve; LP=Local Purpose Reserve; RR=Recreation Reserve; SR = Scenic Reserve

SITE NAME	SITE NO.	PROTECTION STATUS											TOTAL		
		QEII	NWR	PPL	CC	WDC	CP	MS	SL	GP	HR	LP		RR	SR
Eastern Bay of Islands Estuary	Q05/001	3.8	2.5				1.2	15.1	19.8		0.4			0.4	43.1
Tapeka Point Coastal Habitat	Q05/002			3.7				0.8	11.6		4.7	0.5	1.7	8.8	31.6
Russell Forest	Q05/003	6.3	1093.4		404.0		8339.9	67.2	276.9		19.4			1224.3	11431.3
Edwards/Tikitikioure Coastal Habitat	Q05/004	13.9							1.1		5.9				20.9
Cape Brett Peninsula Forest	Q05/007		1411.1											601.9	2013.0
Whangaruru North Head Coastal Remnant	Q05/010												3.8	300.5	304.3
Whangaruru Harbour	Q05/011													0.8	0.8
Punaruku/Parorerahi Bay Coastal Habitat	Q05/019		166.3			0.9								2.5	169.7
Helena Bay Remnants	Q05/023							0.2						2.3	2.5
Whangaruru Harbour Remnants	Q05/026													2.6	2.6
Oakura Road Remnant	Q05/030				12.9										12.9
Pukapuka Road Forest	Q05/031				27.5										27.5
Motumaire Island & Taylor Island	Q05/037										3.6				3.6
Motuarahi Island	Q05/038													1.7	1.7
Toretore Island	Q05/039													1.9	1.9
Motuarohia Island	Q05/040												2.9		2.9
Moturua Island & surrounds	Q05/041													119.7	119.7
Okahu Island	Q05/043													17.5	17.5
Waewaetorea Island	Q05/044												14.2		14.2
Urupukapuka Island & surrounds	Q05/045												88.1		88.1
Poroporo Island	Q05/046													5.6	5.6
Rimariiki Island & surrounds	Q05/060													16.7	16.7
Motukauri Island (b)	Q05/064													1.9	1.9
Ruapekapeka Forest	Q06/003						396.2								396.2

SITE NAME	SITE NO.	PROTECTION STATUS														TOTAL	
		QEII	NWR	PPL	CC	WDC	CP	MS	SL	GP	HR	LP	RR	SR			
Akerama Bush	Q06/005															1.3	1.3
Waiotu Riverine Forest	Q06/009								2.3								2.3
Papanui/Umuwhawha Forest	Q06/014								38.7								38.7
Kaiikani Forest	Q06/022	30.1			41.0			173.1				201.5					445.8
Hansens Hill Forest	Q06/026							874.8								279.9	1154.6
Waikahoa Bay Forest	Q06/027															104.7	104.7
Rockell Road Coastal Forest Remnants	Q06/028	7.2							2.6	0.8						4.0	14.5
Mimiwhangata Coastal Forest Remnants	Q06/030								0.2					6.0	10.8		17.0
Te Rewa Stream Riverine Habitat	Q06/032															18.4	18.4
Motutara Point Coastal Forest Remnants	Q06/033													1.9			1.9
Te Rearea Pa/Tauranga Kawau Point Coastal Remnants	Q06/037								5.8							5.8	11.6
Mimiwhangata Beach/Pareparea Bay	Q06/039															2.5	2.5
Mimiwhangata North Wetlands	Q06/041															7.6	7.6
Mimiwhangata South Wetland & streams	Q06/068															9.6	9.6
Olde's QEII Covenant	Q06/069	57.2															57.2
Matapouri Coastal Remnants	Q06/070					51.9										29.2	81.1
Te Wairahi/Taupari Stream Riverine Habitat	Q06/071									0.3							0.3
Te Oriwa Stream Riverine Habitat	Q06/072									1.3							1.3
Matapouri Bush Block	Q06/074	1.3														127.6	128.9
Hugh Crawford Memorial Scenic Reserve	Q06/077	2.7				53.6										104.6	160.9
Gomez Road Bush	Q06/078															55.5	55.5
Clement Road Remnants	Q06/080	8.4									0.5						8.9
Matapouri Estuary	Q06/083	0.5	0.1								32.9					0.0	33.5
Hulse's Bush	Q06/092	2.0															2.0
North Gable Remnants	Q06/093	22.1															22.1
South Gable Remnants	Q06/095					9.5		4.6	1.5					6.3			21.9
Rehuotane Headland	Q06/099	2.4				9.5											11.9

SITE NAME	SITE NO.	PROTECTION STATUS													TOTAL
		QEII	NWR	PPL	CC	WDC	CP	MS	SL	GP	HR	LP	RR	SR	
Whakareora Coastal Habitat	Q06/101							1.7						14.4	16.1
Ngunguru Sandspit	Q06/102					2.0									2.0
Whananaki Coastal Remnants	Q06/103							0.8							0.8
Whananaki Estuary	Q06/105							0.5							0.5
Whananaki Sandspit	Q06/106					7.0									7.0
Ngunguru Estuary	Q06/110	0.2								4.0			0.0	1.0	5.2
Horahora Estuary	Q06/111							2.8							2.8
Taheke Scenic Reserve	Q06/112												87.2		87.2
Whananaki Bush	Q06/113	135.9						18.3	1.6						155.8
Horahora Bush	Q06/114	51.0							0.8						51.8
Mains Road Remnant	Q06/116					78.8									78.8
Marua Road Remnants	Q06/117					9.7									9.7
Lookout Road Bush	Q06/118					586.2									586.2
Tutukaka Forest	Q06/119								87.8						87.8
Ngunguru Remnants	Q06/120	14.0													14.0
Puhipuhi Road Remnants	Q06/121					23.1	1.2		18.1						42.4
Waro Limestone Scenic Reserve	Q06/122						0.8						5.6	6.4	6.4
Abbey Caves Remnants	Q07/001	8.7					14.3								23.0
Waikaraka Stream Remnants	Q07/003	2.2					51.0						140.0	193.1	193.1
Taihu/Kohinui Stream Bush	Q07/005	2.4													2.4
Rukuwai Remnants	Q07/007	7.9													7.9
Taiharuru Estuary Remnants	Q07/009							0.4							0.4
Pataua Estuary	Q07/012												8.1		8.1
Taiharuru Estuary	Q07/013							3.4							3.4
Whanui Bush	Q07/014	41.8							50.5						92.3
Parauwanui Beach	Q07/114	6.0													6.0
Kings Kauri Scenic Reserve	Q07/117												3.5		3.5
TOTAL		428.0	2673.3	3.7	1183.1	201.7	9803.4	105.6	513.6	238.9	34.0	0.5	132.8	3322.5	18641.1

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

Key: * =Level 2 site; **Bold PNA numbers**=representative ecological units; pt=site is partially protected, but unknown whether ecological unit falls within the protected area, QEII=Queen Elizabeth II National Trust Covenant; NWR = Nga Whenua Rahui, PPL = protected private land, CC=Conservation Covenant; WDC = Whangarei District Council, DOC = Department of Conservation.

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
FRESHWATER WETLANDS										
<i>Carex secta</i> -raupo										
Harakeke-kanuka/ manuka-raupo								Q06/077 (pt QEII, WDC, DOC)		
Harakeke-manuka-rush sp.										
Harakeke-raupo								Q05/004 (pt QEII, DOC)		
Giant umbrella sedge				Q06/071 (pt DOC)				Q06/101 (pt DOC)		
Jointed twig rush-raupo								Q07/008		
<i>Juncus</i> spp.				Q06/041 (pt DOC)						
Kuta- <i>Baumea juncea</i>								Q07/116		
Manuka-raupo										
Raupo				Q05/013 Q05/016 Q05/017 Q05/020 Q06/038 Q06/041 (pt DOC)				Q05/023 (pt DOC) Q05/024 Q05/025 Q07/116		
Raupo-reed meadow grass								Q07/008		
Raupo-rush spp.				Q05/018						
Rush spp.										
Sphagnum moss										

Group 1: Clifed islets of Waipapa Terrane greywacke

Group 2: Islands of Waipapa Terrane greywacke with sandy pocket beaches

Group 3: Island of Waipapa Terrane greywacke and Zn-Pb mineralised Te Kuiti Group limestone

Group 4: Holocene valley alluvium and swamp deposits

Group 5: Holocene dunefields, locally with associated estuaries

Group 6: Te Kuiti Group limestone karst

Group 7: Te Kuiti Group limestone karst, and glauconitic sandstone

Group 8: Waipapa Terrane hill country (greywacke & chert)

Group 8a: Waipapa Terrane hill country (greywacke & chert), and Te Kuiti Group glauconitic sandstone

Group 8b: Waipapa greywacke, and Te Kuiti Group limestone karst

TABLE 2 (continued).

	Group 8c	Group 8d	Group 8e	Group 9	Group 10	Group 11	Group 12	Group 13	Group 14	Group 15
FRESHWATER WETLANDS										
<i>Carex secta</i> -raupo				Q06/068 (pt DOC)						
Harakeke-kanuka/ manuka-raupo										
Harakeke-manuka-rush sp.				Q06/068 (pt DOC)						
Harakeke-raupo		Q05/003 (pt QEII, NWR, CC, DOC)								
Giant umbrella sedge										
Jointed twig rush-raupo										
<i>Juncus</i> spp.										
Kuta- <i>Baumea juncea</i>										
Manuka-raupo							Q07/013 (pt DOC)			
Raupo		Q05/010 (pt DOC)	Q06/066 Q06/072 (pt DOC)				Q06/005 (pt DOC)			
Raupo-reed meadow grass										
Raupo-rush spp.										
Rush spp.				Q05/019 (pt NWR, WDC, DOC)						
Sphagnum moss								Q06/015		

Group 8c: Waipapa Terrane hill country (greywacke & chert), cut by a microdiorite dike (Taurikura Subgroup)

Group 8d: Waipapa Terrane hill country (greywacke & chert), locally with Kerikeri Volcanics basalt flows and colluvium

Group 8e: Hill country of Waipapa Terrane greywacke and chert, with Holocene valley-fill alluvium and swamp deposits

Group 9: Hydrothermally altered and mineralised Waipapa Terrane greywacke

Group 10: Estuaries

Group 11: Kerikeri Volcanics basalt flows and colluvium

Group 12: Mangakahia Complex sedimentary rocks, and Kerikeri Volcanics basalt flows and colluvium

Group 13: Swamps in depressions on basalt lava flows

Group 14: Taurikura Subgroup rhyolitic breccia

Group 15: Man-made lake

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
ESTUARY									
<i>Bolboschoenus</i> sp.- <i>Coprosma</i> sp.-harakeke- saltmarsh ribbonwood									
Selliera-sea primrose- <i>Isolepis</i> sp.- <i>Cotula</i> sp.									
Eelgrass									
Glasswort									
Grass-rush spp.					Q05/022				
<i>Juncus</i> sp.-oioi raupo- saltmarsh ribbonwood									
Kanuka/manuka-oioi									
Mangrove							Q05/023 (pt DOC)		
Mangrove-oioi- saltmarsh ribbonwood									
Mangrove-sea rush									
Manuka-oioi-raupo									
Oioi									

Group 8c	Group 8d	Group 8e	Group 9	Group 10	Group 11	Group 12	Group 13	Group 14	Group 15
ESTUARY									
<i>Bolboschoenus</i> sp.- <i>Coprosma</i> sp.-harakeke- saltmarsh ribbonwood				Q05/001 (pt QEII, NWR, DOC)					
Selliera-sea primrose- <i>Isolepis</i> sp.- <i>Cotula</i> sp.				Q05/001 (pt QEII, NWR, DOC)					
Eelgrass				Q05/001 (pt QEII, NWR, DOC)					
Glasswort				Q05/001 (pt QEII, NWR, DOC)					
Grass-rush spp.									
<i>Juncus</i> sp.-oioi-raupo- saltmarsh ribbonwood				Q05/001 (pt QEII, NWR, DOC)					
Kanuka/manuka-oioi				Q06/105 (pt DOC) Q06/110 (pt QEII, DOC)					
Mangrove				Q05/001 (pt QEII, NWR, DOC) Q05/011 (pt DOC) Q05/023 (pt DOC) Q06/083 (pt QEII, NWR, DOC) Q06/105 (pt DOC) Q06/110 (pt QEII, DOC) Q06/111 (pt DOC) Q07/012 Q07/013 (pt DOC) Q07/116					
Mangrove-oioi- saltmarsh ribbonwood				Q06/105 (pt DOC)					
Mangrove-sea rush				Q06/083 (pt QEII, NWR, DOC)					
Manuka-oioi-raupo				Q06/105 (pt DOC)					
Oioi				Q06/110 (pt QEII, DOC) Q06/111 (pt DOC)					

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
ESTUARY										
Oioi										
Oioi-saltmarsh ribbonwood-sea rush										
Oioi-sea rush										
Rush spp.										
						Q06/031				
Rush sp.-saltmarsh ribbonwood										
						Q05/012				
Sea primrose										
						Q06/102 (pt WDC)				
COASTAL ASSOCIATIONS/SANDFIELDS										
Bracken-harakeke										
						Q05/060 (pt DOC)				
Buffalo grass										
						Q06/106 (pt WDC)				
Buffalo grass-knobby club rush-spinifex										
						Q06/039 (pt DOC)				
Buffalo grass-spinifex										
						Q06/039 (pt DOC)				
Coastal dune association										
						Q05/008				
Coastal tussock-harakeke										
						Q05/052 Q05/071				
Coastal tussock-native iceplant										
						Q05/061				
Coastal tussock-pohutukawa										
						Q05/034				
Exotic grass sp.										
						Q05/043 (pt DOC)				
						Q05/044 (pt DOC)				
						Q05/045 (pt DOC)				
						Q05/063				
						Q05/012				
						Q06/031				
						Q07/019				
						Q07/114 (pt QEII)				
Exotic grass sp.-spinifex										
						Q06/106 (pt WDC)				
Grass spp.-harakeke										
									Q06/037 (pt DOC)	
Harakeke-kanuka										
						Q05/043 (pt DOC)				

Group 8c	Group 8d	Group 8e	Group 9	Group 10	Group 11	Group 12	Group 13	Group 14	Group 15
ESTUARY									
Oioi				Q07/013 (pt DOC) Q05/001 (pt QEII, NWR, DOC)					
Oioi-saltmarsh ribbonwood- sea rush				Q06/111 (pt DOC)					
Oioi-sea rush				Q06/105 (pt DOC) Q07/013 (pt DOC)					
Rush spp.				Q05/001 (pt QEII, NWR, DOC)					
Rush sp.-saltmarsh ribbonwood				Q06/110 (pt QEII, DOC)					
Sea primrose									
COASTAL ASSOCIATIONS/SANDFIELDS									
Bracken-harakeke									
Buffalo grass									
Buffalo grass-knobby club rush-spinifex									
Buffalo grass-spinifex									
Coastal dune association									
Coastal tussock-harakeke									
Coastal tussock-native iceplant									
Coastal tussock-pohutukawa									
Exotic grass sp.									
Exotic grass sp.-spinifex									
Grass spp.-harakeke									
Harakeke-kanuka									

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
COASTAL ASSOCIATIONS/SANDFIELDS										
Harakeke-pohutukawa	Q05/035	Q05/060						Q07/010		
	Q05/062	(pt DOC)						(pt DOC)		
	Q05/065									
	Q06/125									
Kowharawhara-hangehange		Q05/043								
		(pt DOC)								
Kowharawhara-harakeke-pohutukawa		Q05/043						Q06/028		
		(pt DOC)						(pt QEII, DOC)		
Kowharawhara-pohutukawa	Q05/072									
	Q06/127									
Native iceplant-taupata	Q05/061									
Sandfield					Q05/008					
					Q05/022					
					Q06/102					
					(pt WDC)					
					Q06/130					
					Q07/018					
					Q07/113					
Spinifex					Q06/039					
					(pt DOC)					
					Q06/106					
					(pt WDC)					
					Q07/019					
					Q07/114					
					(pt QEII)					
GRASSLAND										
Coastal tussock		Q05/060								
		(pt DOC)								
<i>Glyceria</i> sp.										
Kikuyu					Q06/032					
					(pt DOC)					
FLAXLAND										
Harakeke	Q05/048									
	Q05/049									
	Q05/059	Q05/060								
	Q05/065	(pt DOC)								
	Q05/066									
	Q06/126									
	Q06/129									
	Q05/070*									
	Q05/073*									
INLAND SHRUBLAND										
Fivefinger-mahoe								*Q06/034		
<i>Hakea</i> sp.										

COASTAL ASSOCIATIONS/SANDFIELDS

Harakeke-pohutukawa

Kowharawhara-hangehange

Kowharawhara-harakeke-pohutukawa

Kowharawhara-pohutukawa

Native iceplant-taupata

Sandfield

Spinifex

GRASSLAND

Coastal tussock

Glyceria sp.

Q06/068
(pt DOC)

Kikuyu

Q06/066
Q06/068
(pt DOC)

FLAXLAND

Harakeke

INLAND SHRUBLAND

Fivefinger-mahoe

Hakea sp.

Q05/003
(pt QEII, NWR,
CC, DOC)

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
INLAND SHRUBLAND										
Kanuka/manuka						P05/057	Q07/001 (pt QEII, WDC)	Q06/061 Q06/069 (pt QEII) Q06/074 (pt QEII) Q06/077 (pt QEII, WDC, DOC) Q06/078 (pt DOC) Q06/079 Q06/080 (pt QEII, DOC) Q06/096 Q06/113 (pt QEII, DOC) Q06/114 (pt QEII, DOC) Q06/115 Q06/120 (pt QEII) Q07/003 (pt QEII, WDC, DOC) Q07/004 Q07/005 (pt QEII) Q07/009 (pt DOC) Q07/011 Q07/014 (pt QEII, DOC) Q05/032* Q07/006* Q07/017*	Q07/002	P06/085
Kanuka/manuka-mamaku								Q06/109		
Kanuka/manuka-mamaku-totara										
Kanuka/manuka-rimu							Q07/001 (pt QEII, WDC)			
Kanuka/manuka-rimu-tanekaha								Q07/008*		
Kanuka/manuka-tanekaha							Q07/001 (pt QEII, WDC)	Q06/064 Q06/077 (pt QEII, WDC, DOC) Q06/114 (pt QEII, DOC) Q06/120 (pt QEII) Q07/003 (pt QEII, WDC, DOC)		

INLAND SHRUBLAND

Kanuka/manuka

Q06/014
(pt DOC)
Q06/022
(pt QEII,
CC, DOC)
Q06/026
(pt DOC)
Q06/118
(pt CC)

Q06/012 **Q06/005**
(pt DOC)

Kanuka/manuka-mamaku

Q06/118
(pt CC)

Kanuka/manuka-mamaku-
totara

Q06/118
(pt CC)

Kanuka/manuka-rimu

Kanuka/manuka-rimu-
tanekaha

Kanuka/manuka-tanekaha

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
INLAND SHRUBLAND										
Kanuka/manuka-tanekaha-totara							Q07/001 (pt QEII, WDC)	Q06/074 (pt QEII) Q06/080 (pt QEII, DOC) Q06/113 (pt QEII, DOC) Q06/114 (pt QEII, DOC)		
Kanuka/manuka-totara			Q06/038					Q06/061 Q06/077 (pt QEII, WDC, DOC) Q06/113 (pt QEII, DOC) Q06/114 (pt QEII, DOC) Q07/007 (pt QEII) Q07/009 (pt DOC) Q07/117 (pt DOC) Q06/088*		
Kanuka/manuka-totara-towai								Q06/069 (pt QEII) Q06/077 (pt QEII, WDC, DOC)		
Kanuka/manuka-towai								Q06/077 (pt QEII, WDC, DOC) Q07/003 (pt QEII, WDC, DOC)		
Mamaku								Q06/077 (pt QEII, WDC, DOC) Q07/005 (pt QEII)		
Manuka										
Tanekaha-totara										
Totara								Q06/079		
Totara-towai							Q07/001 (pt QEII, WDC)			
COASTAL SHRUBLAND										
<i>Coprosma</i> sp.-houpara-karo			Q06/123							
<i>Pittosporum umbellatum</i> -kanuka/manuka								Q05/002 (pt PPL, DOC)		
Houpara-kanuka/manuka								Q06/095 (pt WDC, DOC)		

INLAND SHRUBLAND

Kanuka/manuka-tanekaha-totara

Kanuka/manuka-totara Q06/090

Kanuka/manuka-totara-towai

Kanuka/manuka-towai Q06/118
(pt CC)

Mamaku

Manuka Q06/111 (pt DOC) Q07/118

Tanekaha-totara Q06/090

Totara

Totara-towai

COASTAL SHRUBLAND

Coprosma sp.-houpara-karo

Pittosporum umbellatum-kanuka/manuka

Houpara-kanuka/manuka

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
COASTAL SHRUBLAND										
Kanuka/manuka		Q05/041 (pt DOC)			Q06/102 (pt WDC)			Q05/007 (pt NWR, DOC) Q05/024 Q05/025 Q05/026 (pt DOC) Q05/028 Q05/029 Q06/070 (pt WDC) Q06/099 (pt QEII, WDC) Q06/101 (pt DOC) Q06/103 (pt DOC)		
Kanuka/manuka-tanekaha-totara								Q06/099 (pt QEII, WDC)		
Kanuka/manuka-tanekaha-totara-towai								Q06/101 (pt DOC)		
Kanuka/manuka-totara								Q06/099 (pt QEII, WDC) Q06/101 (pt DOC)		
Mamaku								Q05/002 (pt PPL, DOC) Q05/004 (pt QEII, DOC)		
Manuka								Q05/002 (pt PPL, DOC) Q05/004 (pt QEII, DOC) Q06/028 (pt QEII, DOC)		
Sweetpea shrub					Q06/102 (pt WDC)					
Taupata		Q05/048								
INLAND BROADLEAF FOREST										
Kanuka			Q06/071 (pt DOC)					Q06/029		
Kanuka/manuka				Q06/019				Q06/114 (pt QEII, DOC) Q07/004 Q07/011 Q05/032 * Q06/008*		
Kanuka/manuka-puriri										
Kanuka/manuka-puriri-taraire										

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
INLAND BROADLEAF FOREST										
Kanuka/manuka-taraire								Q05/031 (pt CC)		
Kanuka/manuka-taraire-towai								Q06/008*		
Kanuka/manuka-towai								Q06/060 Q06/061 Q06/113 (pt QEII, DOC) Q07/014 (pt QEII, DOC)		
Kanuka-taraire										
Karaka-taraire										
Kohekohe										
Kohekohe-puriri-taraire										
Mamaku-towai										P06/085
Puriri				Q06/032 (pt DOC)						
Puriri-taraire								Q05/030 (pt CC) Q06/112 (pt DOC)		
Pukatea-swamp maire										
Taraire			Q06/038					Q05/005 Q06/065 Q06/074 (pt QEII) Q06/077 (pt QEII, WDC, DOC) Q06/079 Q05/027*		
Taraire-towai				Q06/025				Q06/069 (pt QEII) Q07/014 (pt QEII, DOC)		
Towai								Q06/078 (pt DOC) Q06/079 Q06/113 (pt QEII, DOC) Q06/114 (pt QEII, DOC)	Q07/002	

INLAND BROADLEAF FOREST

Kanuka/manuka-taraire

Kanuka/manuka-taraire-towai

Kanuka/manuka-towai Q05/003
(pt QEII, NWR,
CC, DOC)

Kanuka-taraire

Karaka-taraire

Kohekohe **Q06/027**
(pt DOC)

Kohekohe-puriri-taraire **Q05/003**
(pt QEII, NWR,
CC, DOC)

Mamaku-towai

Puriri

Puriri-taraire **Q06/026**
(pt DOC)

Pukatea-swamp maire

Q06/015

Taraire	Q06/119 (pt DOC)	Q06/022 (pt QEII, CC, DOC) Q06/118 (pt CC)	Q06/012 Q06/013 Q06/020	Q06/005 (pt DOC) Q06/006
---------	---------------------	--	--------------------------------------	--

Taraire-towai Q05/003
(pt QEII, NWR,
CC, DOC)
Q06/022
(pt QEII,
CC, DOC)
Q06/027
(pt DOC)
Q06/118
(pt CC)

Towai	Q06/118 (pt CC)	Q06/121 (pt CC, WDC, DOC)	Q06/013
-------	---------------------------	--	----------------

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b	
INLAND BROADLEAF FOREST										
Towai							Q06/116 (pt CC) Q06/117 (pt CC) Q07/003 (pt QEII, WDC, DOC) Q07/014 (pt QEII, DOC)			
COASTAL BROADLEAF FOREST										
Brazilian coral tree			Q06/032 (pt DOC)							
Mahoe-pohutukawa		Q05/047								
Mahoe-harakeke-pohutukawa		Q05/051								
Houpara-karaka-pohutukawa							Q06/095 (pt WDC, DOC)			
Houpara-pohutukawa							Q06/099 (pt QEII, WDC)			
Kanuka/manuka	Q05/037 (pt DOC) Q05/038 (pt DOC) Q05/053 Q05/055	Q05/040 (pt DOC) Q05/041 (pt DOC) Q05/042 Q05/044 (pt DOC) Q05/045 (pt DOC) Q05/046 (pt DOC)					Q05/026 (pt DOC) Q05/028 Q06/037 (pt DOC) Q07/010 (pt DOC)			
Kanuka- <i>Pittosporum umbellatum</i> -pohutukawa	Q05/064 (pt DOC)									
Kanuka/manuka-pohutukawa	Q05/036 Q05/050 Q05/058 Q05/064 (pt DOC) Q07/015	Q05/040 (pt DOC) Q05/043 (pt DOC) Q05/045 (pt DOC)					Q05/023 (pt DOC) Q06/070 (pt WDC) Q06/093 (pt QEII) Q06/095 (pt WDC, DOC) Q07/009 (pt DOC) Q07/010 (pt DOC)			
Kanuka-taraire										
Kanuka/manuka-pohutukawa-puriri							Q06/030 (pt DOC)			
Kanuka/manuka-puriri										
Kanuka/manuka-puriri-taraire							Q05/002 (pt PPL, DOC) Q05/007 (pt NWR, DOC)			

INLAND BROADLEAF FOREST

Towai

COASTAL BROADLEAF FOREST

Brazilian coral tree

Mahoe-pohutukawa

Mahoe-harakeke-pohutukawa

Houpara-karaka-pohutukawa

Houpara-pohutukawa

Kanuka/manuka **Q05/009**

Kanuka-*Pittosporum*
umbellatum-pohutukawa

Kanuka/manuka-pohutukawa **Q05/010**
(pt DOC)

Kanuka-taraire **Q05/009**

Kanuka/manuka-
pohutukawa-puriri

Kanuka/manuka-puriri **Q05/010**
(pt DOC)

Kanuka/manuka-
puriri-taraire

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
COASTAL BROADLEAF FOREST										
Karaka-taraire								Q06/065		
Karo-pohutukawa		Q05/060 (pt DOC)								
Kohekohe- <i>Pittosporum umbellatum</i> -pohutukawa		Q05/064 (pt DOC)								
Kohekohe-pohutukawa-puriri								Q06/030 (pt DOC)		
Kohekohe-puriri-tawaroa								Q05/004 (pt QEII, DOC)		
Kowhai-pohutukawa		Q06/097						Q06/028 (pt QEII, DOC)		
Kowhai-pohutukawa-puriri								Q06/070 (pt WDC)		
Nikau-pohutukawa								Q06/070 (pt WDC)		
Pohutukawa		Q05/054 Q05/059 Q05/068 Q05/069 Q06/123 Q06/124 Q06/128 Q06/129	Q05/040 (pt DOC) Q05/044 (pt DOC) Q05/045 (pt DOC) Q05/060 (pt DOC)					Q05/003 (pt QEII, NWR, CC, DOC) Q05/004 (pt QEII, DOC) Q05/007 (pt NWR, DOC) Q05/024 Q05/026 (pt DOC) Q06/028 (pt QEII, DOC) Q06/030 (pt DOC) Q06/033 Q06/037 (pt DOC) Q06/065 Q06/093 (pt QEII) Q06/095 (pt WDC, DOC) Q06/098 Q06/101 (pt DOC) Q06/103 (pt DOC) Q07/009 (pt DOC) Q07/010 (pt DOC) Q07/115		
Pohutukawa-puriri								Q05/014 Q06/028 (pt QEII, DOC) Q06/033 Q06/070 (pt WDC)		

COASTAL BROADLEAF FOREST

Karaka-taraire

Karo-pohutukawa

Kohekohe-*Pittosporum umbellatum*-pohutukawa

Kohekohe-pohutukawa-puriri

Kohekohe-puriri-tawaroa

Kowhai-pohutukawa

Kowhai-pohutukawa-puriri

Nikau-pohutukawa

Pohutukawa

Q05/003
(pt QEII, NWR, CC, DOC)

Q05/009

Q05/010
(pt DOC) **Q05/019**

Q06/026 (pt NWR, (pt DOC) WDC, DOC)

Pohutukawa-puriri

Q05/010
(pt DOC)

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
COASTAL BROADLEAF FOREST										
Pohutukawa-puriri-taraire								Q07/116		
Pohutukawa-totara								Q07/116		
Puriri								Q05/025		
Puriri-taraire								Q07/016		
Rimu-totara								Q07/116		
Taraire								Q06/099 (pt QEII, WDC)		
INLAND PODOCARP-BROADLEAF FOREST										
Kahikatea-kanuka/ manuka-totara								Q07/003 (pt QEII, WDC, DOC)		
Kahikatea-taraire								Q06/113 (pt QEII, DOC)		
Kahikatea-taraire-totara										
Kahikatea-taraire-towai										
Kahikatea-swamp maire										
Kanuka/manuka-puriri- tanekaha-taraire-totara								Q06/028 (pt QEII, DOC)		
Kanuka/manuka-rewarewa- tanekaha-totara										
Kanuka/manuka-rimu								Q06/074 (pt QEII) Q06/113 (pt QEII, DOC) Q07/003 (pt QEII, WDC, DOC)		
Kanuka/manuka-rimu- tanekaha-totara										
Kanuka/manuka-rimu- totara								Q06/120 (pt QEII) Q07/008		
Kanuka/manuka-tanekaha								Q05/005 Q05/030 (pt CC)		
Kanuka/manuka-tanekaha- totara								Q06/074 (pt QEII) Q06/112 (pt DOC) Q07/011		
Kanuka/manuka-taraire								Q07/005 (pt QEII)		
Kanuka/manuka-taraire- totara								Q06/114 (pt QEII, DOC) Q07/005 (pt QEII) Q05/027*		

COASTAL BROADLEAF FOREST		
Pohutukawa-puriri-taraire		
Pohutukawa-totara		
Puriri		
Puriri-taraire		
Rimu-totara		
Taraire		
INLAND PODOCARP-BROADLEAF FOREST		
Kahikatea-kanuka/ manuka-totara		
Kahikatea-taraire		
Kahikatea-taraire-totara	Q06/090	Q06/006
Kahikatea-taraire-towai		Q06/015
Kahikatea-swamp maire		Q06/015
Kanuka/manuka-puriri- tanekaha-taraire-totara		
Kanuka/manuka-rewarewa- tanekaha-totara	Q06/027 (pt DOC)	
Kanuka/manuka-rimu		
Kanuka/manuka-rimu- tanekaha-totara	Q05/003 (pt QEII, NWR, CC, DOC)	
Kanuka/manuka-rimu- totara		
Kanuka/manuka-tanekaha	Q05/003 (pt QEII, NWR, CC, DOC)	
Kanuka/manuka-tanekaha- totara		
Kanuka/manuka-taraire		
Kanuka/manuka-taraire- totara		

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
INLAND PODOCARP–BROADLEAF FOREST										
Kanuka/manuka-totara			Q06/071 (pt DOC)	Q06/023 Q06/025 Q06/038				Q06/060 Q06/069 (pt QEII) Q06/074 (pt QEII) Q06/077 (pt QEII, WDC, DOC) Q06/112 (pt DOC) Q06/114 (pt QEII, DOC) Q06/115 Q06/120 (pt QEII) Q07/005 (pt QEII) Q07/008 Q07/011 Q07/014 (pt QEII, DOC) Q05/027*		
Kanuka/manuka-totara-towai								Q06/061		
Mamaku-totara-towai				Q06/036						
Puriri-rewarewa-towai								Q06/069 (pt QEII)		
Puriri-taraire-totara										
Puriri-totara				Q06/032 (pt DOC)			Q07/001 (pt QEII, WDC)			
Puriri-totara-titoki										P06/085
Rewarewa-tanekaha-totara										
Rewarewa-taraire								Q06/077 (pt QEII, WDC, DOC)		
Rewarewa-totara-towai										
Rimu-tanekaha-totara-towai								Q06/077 (pt QEII, WDC, DOC)		
Rimu-tanekaha-taraire-totara								Q06/114 (pt QEII, DOC)		
Rimu-taraire								Q06/069 (pt QEII)		
Rimu-totara-towai								Q06/107*		
Tanekaha-taraire								Q06/074 (pt QEII)		
Tanekaha-taraire-towai								Q06/069 (pt QEII)		

INLAND PODOCARP-BROADLEAF FOREST

Kanuka/manuka-totara
 Q06/066
 Q06/072
 (pt DOC)

Kanuka/manuka-totara-towai

Mamaku-totara-towai

Puriri-rewarewa-towai

Puriri-taraire-totara **Q06/012**

Puriri-totara **Q06/017**

Puriri-totara-titoki

Rewarewa-tanekaha-totara **Q06/118**
 (pt CC)

Rewarewa-taraire

Rewarewa-totara-towai Q06/035*

Rimu-tanekaha-totara-towai

Rimu-tanekaha-taraire-totara

Rimu-taraire

Rimu-totara-towai

Tanekaha-taraire

Tanekaha-taraire-towai

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
INLAND PODOCARP–BROADLEAF FOREST										
Tanekaha-totara-towai								Q06/077 (pt QEII, WDC, DOC)		
Tanekaha-towai										
Taraire-totara				Q06/019				Q06/029 Q06/065 Q06/074 (pt QEII) Q07/009 (pt DOC) Q06/086*		
Taraire-totara-towai								Q06/061 Q06/114 (pt QEII, DOC)		
Titoki-totara forest						P05/057 Q06/122 (pt WDC, DOC)				
Totara-towai								Q06/060 Q07/002 Q06/079 Q07/003 (pt QEII, WDC, DOC) Q07/014 (pt QEII, DOC) Q06/088*		
Towai-rewarewa										
COASTAL PODOCARP–BROADLEAF FOREST										
Kanuka/manuka-kawaka								Q06/101 (pt DOC)		
Kanuka/manuka-mamangi- mapou-totara								Q06/101 (pt DOC)		
Kanuka/manuka- pohutukawa-tanekaha										
Kanuka/manuka- pohutukawa-totara								Q05/028 Q06/030 (pt DOC) Q06/065		
Kanuka/manuka- puriri-rewarewa										
Kanuka/manuka- rewarewa-totara								Q05/029		
Kanuka/manuka-rimu								Q06/101 (pt DOC)		

INLAND PODOCARP–BROADLEAF FOREST

Tanekaha-totara-towai Q06/022
(pt QEII,
CC, DOC)
Q06/026
(pt DOC)

Tanekaha-towai Q05/003
(pt QEII, NWR,
CC, DOC)
Q06/014
(pt DOC)

Taraire-totara **Q06/017**
Q06/021

Taraire-totara-towai Q06/119
(pt DOC)

Titoki-totara forest

Totara-towai Q05/003 **Q06/012**
(pt QEII, NWR,
CC, DOC)
Q06/118
(pt CC)

Towai-rewarewa **Q06/026**
(pt DOC)

COASTAL PODOCARP–BROADLEAF FOREST

Kanuka/manuka-kawaka

Kanuka/manuka-mamangi-
mapou-totara

Kanuka/manuka-
pohutukawa-tanekaha **Q05/019**
(pt NWR,
WDC, DOC)

Kanuka/manuka-
pohutukawa-totara

Kanuka/manuka-
puriri-rewarewa **Q05/010**
(pt DOC)

Kanuka/manuka-
rewarewa-totara

Kanuka/manuka-rimu

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
COASTAL PODOCARP–BROADLEAF FOREST										
Kanuka/manuka-tanekaha								Q05/004 (pt QEII, DOC) Q05/007 (pt NWR, DOC)		
Kanuka/manuka-totara								Q05/023 (pt DOC) Q05/026 (pt DOC) Q06/093 (pt QEII) Q06/101 (pt DOC) Q06/103 (pt DOC)		
Pohutukawa-puriri-totara								Q06/037 (pt DOC)		
Pohutukawa-totara								Q06/070 (pt WDC) Q06/093 (pt QEII)		
Puriri-tanekaha-taraire								Q05/004 (pt QEII, DOC)		
Puriri-taraire-totara								Q05/023 (pt DOC) Q06/093 (pt QEII)		
Puriri-totara								Q06/103 (pt DOC)		
Rimu-taraire-totara								Q06/099 (pt QEII, WDC)		
INLAND PODOCARP FOREST										
Kahikatea				Q05/006 Q06/019 Q06/023 Q06/025				Q06/101 (pt DOC) Q07/008		P06/085
Kahikatea-rimu-totara								Q06/109		
Kahikatea-totara				Q05/020 Q06/036				Q06/061 Q07/014 (pt QEII, DOC)		
Rimu										
Rimu-tanekaha-totara								Q06/061 Q06/074 (pt QEII)		
Rimu-totara								Q07/001 (pt QEII, WDC)		
Tanekaha								Q06/008		P06/085
Tanekaha-totara								Q06/113 (pt QEII, DOC)		

COASTAL PODOCARP–BROADLEAF FOREST

Kanuka/manuka-tanekaha

Kanuka/manuka-totara

Pohutukawa-puriri-totara

Pohutukawa-totara

Puriri-tanekaha-taraire

Puriri-taraire-totara

Puriri-totara

Q05/019
(pt NWR,
WDC, DOC)

Rimu-taraire-totara

INLAND PODOCARP FOREST

Kahikatea

Q06/014
(pt DOC)

Q06/013
Q06/021

Kahikatea-rimu-totara

Kahikatea-totara

Q06/005
(pt DOC)

Rimu

Q06/119
(pt DOC)

Rimu-tanekaha-totara

Rimu-totara

Tanekaha

Tanekaha-totara

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
INLAND PODOCARP FOREST										
Totara			Q05/018				Q07/001 (pt QEII, WDC)	Q06/061 Q06/069 (pt QEII) Q06/074 (pt QEII) Q06/079 Q06/080 (pt QEII, DOC) Q06/092 (pt QEII) Q06/113 (pt QEII, DOC) Q06/114 (pt QEII, DOC) Q06/120 (pt QEII) Q07/003 (pt QEII, WDC, DOC) Q07/004 Q07/007 (pt QEII) Q07/009 (pt DOC) Q07/011 Q07/014 (pt QEII, DOC) Q06/034* Q06/062* Q06/084* Q06/086* Q06/088* Q07/006* Q07/008*		P06/085
COASTAL PODOCARP FOREST										
Kahikatea-totara								Q06/093 (pt QEII)		
Tanekaha-totara										
Totara		Q05/039 (pt DOC)						Q05/025 Q06/103 (pt DOC)		
KAURI FOREST										
Kauri								Q06/064 Q06/069 (pt QEII) Q06/079 Q06/116 (pt CC) Q07/003 (pt QEII, WDC, DOC) Q07/004 Q07/011 Q06/088* Q07/006*		

INLAND PODOCARP FOREST

Totara	Q06/090 Q06/119 (pt DOC)	Q06/026 (pt DOC)	Q06/012 Q06/020	Q06/006
--------	--------------------------------	---------------------	--------------------	---------

COASTAL PODOCARP FOREST

Kahikatea-totara

Tanekaha-totara	Q05/019 (pt NWR, WDC, DOC)
-----------------	---

Totara

KAURI FOREST

Kauri	Q06/022 (pt QEII, CC, DOC) Q06/026 (pt DOC) Q06/118 (pt CC)
-------	---

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
KAURI-BROADLEAF FOREST									
Kanuka/manuka-kauri							Q06/077 (pt QEII, WDC, DOC) Q06/120 (pt QEII)		
Kauri-puriri							Q05/032		
Kauri-tarairi-towai							Q06/116 (pt CC)		
Kauri-towai							Q06/061 Q06/117 (pt CC)		
COASTAL KAURI-BROADLEAF FOREST									
Kauri-pohutukawa							Q06/070 (pt WDC) Q06/095 (pt WDC, DOC)		
Kauri-puriri							Q05/028		
Kanuka/manuka-kauri							Q06/101 (pt DOC)		
KAURI-PODOCARP FOREST									
Kauri-kawaka-rimu							Q06/074 (pt QEII)		
Kauri-rimu			Q06/036				Q06/063 Q06/074 (pt QEII) Q06/077 (pt QEII, WDC, DOC) Q06/080 (pt QEII, DOC) Q07/014 (pt QEII, DOC) Q07/117 (pt DOC) Q07/008*		
Kauri-rimu-tanekaha							Q06/069 (pt QEII) Q06/074 (pt QEII) Q06/077 (pt QEII, WDC, DOC) Q06/080 (pt QEII, DOC)		
Kauri-rimu-totara							Q06/064 Q06/114 (pt QEII, DOC)		
Kauri-tanekaha							Q06/069 (pt QEII) Q06/113 (pt QEII, DOC) Q06/114 (pt QEII, DOC)		

KAURI-BROADLEAF FOREST

Kanuka/manuka-kauri

Kauri-puriri

Kauri-taraire-towai

Kauri-towai

Q06/022
(pt QEII,
CC, DOC)

COASTAL KAURI-BROADLEAF FOREST

Kauri-pohutukawa

Kauri-puriri

Kanuka/manuka-kauri

KAURI-PODOCARP FOREST

Kauri-kawaka-rimu

Kauri-rimu

Q06/118
(pt CC)

Kauri-rimu-tanekaha

Kauri-rimu-totara

Kauri-tanekaha

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 8a	Group 8b
KAURI-PODOCARP FOREST										
Kauri-tanekaha-totara								Q06/077 (pt QEII, WDC, DOC) Q06/076*		
Kauri-totara							Q07/001 (pt QEII, WDC)	Q06/114 (pt QEII, DOC)		
COASTAL KAURI-PODOCARP FOREST										
Kauri-rimu								Q06/070 (pt WDC)		
KAURI-PODOCARP-BROADLEAF FOREST										
Kanuka/manuka-kauri-rimu								Q06/074 (pt QEII)		
Kanuka/manuka-kauri-tanekaha										
Kanuka/manuka-kauri-totara								Q06/120 (pt QEII) Q07/011		
Kauri-rimu-towai								Q06/113 (pt QEII, DOC)		
Kauri-tanekaha-taraire								Q06/112 (pt DOC)		
Kauri-tanekaha-taraire-totara								Q06/077 (pt QEII, WDC, DOC)		
Kauri-tanekaha-towai								Q06/061		
COASTAL KAURI-PODOCARP-BROADLEAF FOREST										
Kanuka/manuka-kauri-rimu								Q06/099 (pt QEII, WDC)		
Kanuka/manuka-kauri-tanekaha								Q06/101 (pt DOC)		
Kauri-pohutukawa-rimu								Q06/070 (pt WDC) Q06/098		

KAURI-PODOCARP FOREST

Kauri-tanekaha-totara

Kauri-totara

Q06/021

COASTAL KAURI-PODOCARP FOREST

Kauri-rimu

KAURI-PODOCARP-BROADLEAF FOREST

Kanuka/manuka-kauri-rimu

Kanuka/manuka-kauri-tanekaha

Q05/003
(pt QEII, NWR,
CC, DOC)

Kanuka/manuka-kauri-totara

Kauri-rimu-towai

Kauri-tanekaha-taraire

Kauri-tanekaha-taraire-totara

Kauri-tanekaha-towai

COASTAL KAURI-PODOCARP-BROADLEAF FOREST

Kanuka/manuka-kauri-rimu

Kanuka/manuka-kauri-tanekaha

Kauri-pohutukawa-rimu

TABLE 3: SUMMARY OF SITE EVALUATIONS.

(rep. site = representative site; e.u. = ecological unit; reg. sig. = regionally significant)

LEVEL 1 SITES Survey no.	REPRESENTATIVENESS*	RARITY**/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE AND SHAPE***
Waioomio Limestone Caves Forest P05/057	Rep. site for 2 e.u.s.	Forest remnants on incised karst country. Fauna: 1 threatened. Flora: 2 threatened.	2 e.u.s.	Fragmented. Mostly shrubland with some secondary forest.	Close to Ruapekapeka Forest.	24 ha, 2 remnants, large = elongated, small = compact.
Lake Rotokereru Remnants P06/085	Rep. site for 4 e.u.s.	Forest remnant on limestone.	6 e.u.s.	Fragmented secondary forest.	Close to Ruapekapeka Forest.	28 ha, 3 remnants.
Eastern Bay of Islands Estuary Q05/001	Rep. site. for 6 e.u.s.	Large estuary. Fauna: 13 threatened, 3 reg. sig. Flora: 1 reg. sig.	9 e.u.s.	Extensive estuary with predominantly unmodified margin bordering terrestrial vegetation.	Majority of site provides unbroken vegetation sequence with terrestrial vegetation. Important linkage function for fish spp.	1129 ha, numerous bays and inlets.
Tapeka Point Coastal Habitat Q05/002	Rep. site for 2 e.u.s.	Coastal riparian forest and shrubland. Regionally important soil type. Fauna: 5 threatened, 1 reg. sig.	5 e.u.s.	Dominated by regenerating shrubland; weeds evident.	Adjacent to extensive shrubland on the Russell Peninsula.	171 ha, compact.
Russell Forest Q05/003	Rep. site. for 6 e.u.s.	Large forest supporting high diversity of biota. Fauna: 17 threatened, 4 reg. sig. Flora: 9 threatened, 18 reg. sig.	12 e.u.s.	Largest forest in E.D. Diverse, with extensive mature forest, some unmodified.	Forms unbroken gradient to estuary along most of N-W boundary. Linkage function for most of northern third of E.D.	22,737 ha, large, mostly compact.
Edwards/Tikitikioure Coastal Habitat Q05/004	Rep. site. for 6 e.u.s.	Extensive coastal vegetation and sequential gradients. Fauna: 10 threatened, 2 reg. sig. Flora: 2 threatened, 1 reg. sig.	7 e.u.s.	Large, fragmented site dominated by regenerating shrubland.	Sequential gradients to coast. Covers most of Russell Peninsula.	1527 ha, discontinuous, 1 main remnant, 2 outliers.
Pakaru Road Forest Q05/005	Rep. site.	Fauna: 1 threatened.	2 e.u.s.	Secondary forest.	Adjacent to Russell Forest.	95 ha, continuous, several arms.
Waihaha Road Swamp Forest Q05/006	Rep. site.	Swamp forest. Not surveyed.	1 e.u.	Small, drained.	Adjacent to Russell Forest.	1 ha, small, compact.
Cape Brett Peninsula Forest Q05/007	Rep. site for 4 e.u.s.	Large peninsula with coastal forest. Fauna: 19 threatened (1 historic), 3 reg. sig. Flora: 8 threatened (1 historic), 9 reg. sig.	4 e.u.s.	Largest, least modified promontory	Linkage with Russell Forest. Vegetation sequence to coast.	2580 ha, continuous vegetation on elongated headland.

* Note that most sites have more than one ecological unit present. This column indicates whether or not the site has been selected as being a representative site for one or more ecological units.

** The rapid quantitative method used in this survey did not cover survey for rare species; in most cases species information in this column has been collated from other databases. It is likely that specific species surveys for most sites would reveal additional data on threatened and Regionally Significant species, and in the case of Level 2 sites, a change in ranking.

*** Remnants in this column refers to the number of separate areas of habitat within the site.

LEVEL 1 SITES Survey no.	REPRESENT- ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Elliot-Pahi-Umuheke Beaches Q05/008	Rep. site.	Coastal dunes. Fauna: 6 threatened, 1 reg. sig. Flora: 2 threatened, 1 reg. sig.	2 e.u.s.	Predominantly unmodified.	Adjacent to Cape Brett.	35 ha, 2 beaches.
Bland Bay Forest Q05/009	Rep. site for 3 e.u.s.	Coastal forest. Flora: 2 threatened, 2 reg. sig.	4 e.u.s.	Old-growth pohutukawa with secondary forest.	Partial linkage function.	190 ha, continuous vegetation on elongated headland.
Whangaruru North Head Coastal Remnants Q05/010	Rep. site. for 6 e.u.s.	Coastal forest. Fauna: 8 threatened (1 historic), 2 reg. sig. Flora: 5 threatened (1 historic), 2 reg. sig.	7 e.u.s.	Old-growth pohutukawa with secondary forest.	Partial linkage function.	354 ha, 2 large remnants with several small outliers.
Whangaruru Harbour Q05/011	Rep. site.	Estuary. Fauna: 6 threatened, 1 reg. sig.	1 e.u.	Large, mostly unmodified.	Some adjoining coastal forest remnants. Important linkage function for fish spp.	330 ha, 3 main areas separated by headlands.
Mokau Bay Q05/012		Dune and estuary. Fauna: 1 threatened, 1 reg. sig.	2 e.u.s.	Modified, grazed.		8 ha.
Mohei Stream Wetland Q05/013	Rep. site.	Small wetland. Fauna: 2 threatened.	1 e.u.	Narrow, surrounded by pasture.	Linkage with adjacent forest/shrubland.	23 ha, elongated.
Poutukiterangi Pa Forest Remnant Q05/014	Rep. site.	Coastal forest. Fauna: 1 threatened (historic).	1 e.u.	Old-growth pohutukawa; grazed.		7 ha, compact.
Ngaiotonga Swamp Q05/016	Rep. site.	3 small wetlands. Fauna: 4 threatened.	1 e.u.	Narrow, surrounded by pasture, partially drained.	Linkage with Whangaruru Harbour.	39 ha, fragmented, 3 elongated sites.
Bland Bay Wetland Q05/017	Rep. site.	Small wetland.	1 e.u.	Narrow, surrounded by pines.		14 ha, elongated.
Punaruks Riverine Forest Q05/018	Rep. site for 1 e.u.	Riverine forest + wetland. Fauna: 2 threatened.	2 e.u.s.	Narrow, grazed.	Linkage between Punaruks Estuary and Russell Forest.	34 ha, elongated.
Punaruks/Parorerahi Bay Coastal Habitat Q05/019	Rep. site for 4 e.u.s.	Large wetland with forest buffer. Fauna: 2 threatened. Flora: 1 threatened.	6 e.u.s.	Large, unmodified wetland buffered by shrubland and regenerating coastal forest.	Linkage with Punaruks Estuary. Close to Russell Forest.	416 ha, compact.
Tutaematai Stream Riverine Forest Q05/020		Riverine forest + wetland. Fauna: 1 threatened.	2 e.u.s.	Narrow, modified, weeds issues.	Linkage between upper Whangaruru Estuary and Russell Forest.	22 ha, 2 elongated remnants.
Oakura Bay Coastal Habitat Q05/022		Beach + estuary + wetland. Fauna: 1 threatened, 1 reg. sig.	2 e.u.s.	Modified, weedy.	Possible linkage function.	14 ha, elongated.
Helena Bay Remnants Q05/023	Rep. site for 2 e.u.s.	Coastal forest+wetland+ estuary. Fauna: 4 threatened, 1 reg. sig. Flora: 2 threatened.	5 e.u.s.	Series of small coastal remnants surrounded by pasture.	Forms series of forest remnants on head- lands in bay.	35 ha, 8 small remnants.
Oakura Bay Remnants Q05/024		Coastal forest.	3 e.u.s.	Grazed, weedy.	Partial linkage function.	33 ha, 4 small remnants.

LEVEL 1 SITES Survey no.	REPRESENT- ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Mokau Bush Q05/025	Rep. site for 2 e.u.s.	Coastal forest+wetland. Fauna: 2 threatened.	4 e.u.s.	Regenerating forest & shrubland.	Linkage with adjacent wetland.	78 ha, 2 remnants.
Whangaruru Harbour Remnants Q05/026	Rep. site for 2 e.u.s.	Coastal forest. Fauna: 1 threatened. Flora: 1 threatened (historic).	4 e.u.s.	Narrow areas of regenerating forest & shrubland.	Buffer for Whangaruru Harbour.	170 ha, numerous small remnants.
Ohawini Bay Remnants Q05/028	Rep. site for 1 e.u.	2 forest remnants.	4 e.u.s.	Regenerating with emergents.	Adjacent to other remnants.	23 ha, 2 remnants.
Tutaematai Bush Q05/029	Rep. site for 1 e.u.	Coastal forest+shrubland. Fauna: 1 threatened.	2 e.u.s.	Regenerating forest & shrubland.	Links the upper Whangaruru Harbour with Russell Forest.	121 ha, compact with small outlier.
Oakura Road Remnant Q05/030	Rep. site.	Small forest remnant.	2 e.u.s.	Surrounded by pines.	Adjacent to Russell Forest.	23 ha, compact.
Pukapuka Road Forest Q05/031	Rep. site.	Small forest remnant.	1 e.u.	Surrounded by pines.		40 ha, compact.
Ruapekapeka Forest Q06/003	Rep. site for 1 e.u.	Large forest remnant. Fauna: 2 threatened, 1 reg. sig. Flora: 2 reg. sig.	6 e.u.s.	Large, regenerating.	Adjacent to Russell Forest.	1037 ha, compact.
Akerama Bush Q06/005	Rep. site.	Forest+wetland. Fauna: 3 threatened.	4 e.u.s.	Fragmented secondary forest.	Adjacent to Russell Forest.	278 ha fragmented, elongated.
Monument Road Forest Q06/006	Rep. site.	Volcanic broadleaf forest. Fauna: 3 threatened (1 historic).	3 e.u.s.	Regenerating, with emergents.	Adjacent to Russell Forest.	113 ha, elongated.
Waiotu Riverine Forest Q06/009	Rep. site.	Riverine forest.	1 e.u.	Fragmented.	Numerous remnants along Waiotu River.	110 ha, 8 elongated remnants.
Gibbs Road Forest Remnant Q06/012	Rep. site for 4 e.u.s.	Volcanic podocarp- broadleaf forest.	5 e.u.s.	Fragmented.		180 ha, elongated.
Hently Road Forest Remnants Q06/013	Rep. site for 2 e.u.s.	Volcanic broadleaf forest with some swamp forest.	3 e.u.s.	Fragmented.	Adjacent to Russell Forest.	28 ha, 3 remnants.
Papanui/Umuwhawha Forest Q06/014	Rep. site for 2 e.u.s.	Large remnant on a regionally significant geological type. Fauna: 3 threatened.	3 e.u.s.	Regenerating.	Linkage between Russell Forest and southern remnants.	376 ha, compact in part with some elongated areas.
Parsons Road Swamp Forest Remnant Q06/015	Rep. site.	Volcanic swamp forest.	4 e.u.s.	Not grazed.	Adjacent to Russell Forest.	6 ha, elongated.
Whakapara Forest Q06/017	Rep. site.	Volcanic podocarp- broadleaf forest.	2 e.u.s.	Regenerating.	Links Q06/012 & Q06/018.	13 ha, compact.
Lower Kaimamaku Stream Riverine Forest Q06/018	Rep. site.	Riverine forest.	1 e.u.	Fragmented, regenerating, fenced.	One of a series of riparian remnants.	31 ha, 2 elongated remnants.
Kaimamaku Stream Riverine Forest Q06/019	Rep. site.	Riverine forest. Fauna: 1 threatened.	3 e.u.s.	Regenerating, fenced.	One of a series of riparian remnants.	13 ha, elongated.

LEVEL 1 SITES Survey no.	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE AND SHAPE
Peach Orchard Road Remnants Q06/020		Fauna: 1 threatened. Regionally significant geological type.	2 e.u.s	Fragmented.	Linkage to Russell Forest.	69 ha, 2 remnants.
Brian Storey Memorial Bush Q06/021	Rep. site.	Volcanic forest. Fauna: 2 threatened.	3 e.u.s.	Regenerating.		14 ha, 2 remnants.
Kaikanui Forest Q06/022	Rep. site for 4 e.u.s.	Large forest remnant. Fauna: 5 threatened, 4 reg. sig. Flora: 3 threatened, 2 reg. sig.	7 e.u.s.	Diverse, regenerating.	Significant linkage function.	2340 ha, some modified enclaves.
Opuawhanga Riverine Forest Remnants Q06/023	Rep. site for 2 e.u.s.	Riverine forest.	3 e.u.s.	Fragmented.		20 ha, 4 remnants.
Te Waiongatahuna Riverine Forest Remnants Q06/025	Rep. site for 3 e.u.s.	Riverine forest. Flora: 1 reg. sig.	4 e.u.s.	Fragmented.	Linkage between 2 isolated remnants: Q06/078 & Q06/109.	40 ha, 2 elongated remnants.
Hansens Hill Forest Q06/026	Rep. site for 5 e.u.s.	Large, contiguous forest. Fauna: 5 threatened, 3 reg. sig. Flora: 1 reg. sig.	8 e.u.s.	Large, regenerating.	Significant linkage function.	2719 ha, some modified enclaves.
Waikahoa Bay Forest Q06/027	Rep. site for 2 e.u.s.	Forest remnant with some Kerikeri Volcanics. Fauna: 3 threatened, 1 reg. sig. Flora: 2 threatened.	4 e.u.s.	Regenerating.	Linkage between Hansens Hill and the coast.	108 ha, compact with an elongated arm.
Rockell Road Coastal Forest Remnants Q06/028	Rep. site for 5 e.u.s.	Coastal forest remnants. Fauna: 5 threatened. Flora: 1 threatened, 1 reg. sig.	6 e.u.s.	Fragmented, emergent pines.		46 ha, 4 remnants.
Taiwawe Bay Remnants Q06/029		2 forest remnants. Fauna: 2 threatened (1 historic), 1 reg. sig. Flora: 1 threatened (historic).	2 e.u.s.	Regenerating.	Linkage between coastal remnants and large blocks.	83 ha, 2 remnants, 1 large, 1 small.
Mimiwhangata Coastal Forest Remnants Q06/030	Rep. site for 3 e.u.s.	Coastal remnants. Fauna: 4 threatened (1 historic). Flora: 2 threatened.	4 e.u.s.	Partially grazed.		25 ha, 6 remnants.
Ngahau Bay Coastal Habitat Q06/031		Dune + estuary. Fauna: 2 threatened, 1 reg. sig. Flora: 1 reg. sig.	2 e.u.s.	Grazed, weedy.	Linkage with Ngahau Remnant.	3 ha.
Te Rewa Stream Riverine Habitat Q06/032	Rep. site for 2 e.u.s.	Riverine forest. Fauna: 4 threatened.	4 e.u.s.	Lower section modified.	Links Hansens Hill with the coast.	23 ha, elongated.
Motutara Point Coastal Forest Remnants Q06/033	Rep. site.	Coastal forest. Flora: 1 reg. sig.	3 e.u.s.	Some weeds present.	Buffer for small area of Whananaki Estuary.	12 ha, 2 elongated remnants.
Lower Taparahaia Stream Riverine Forest Q06/036	Rep. site.	Riverine forest. Fauna: 1 threatened.	3 e.u.s.	Regenerating.	One of a series of riparian remnants.	25 ha, elongated.
Te Rearea Pa/ Tauranga Kawau Point Coastal Remnants Q06/037	Rep. site for 1 e.u.	Coastal forest. Fauna: 1 threatened.	4 e.u.s.	Some old-growth pohutukawa. Weeds.	Adjacent to Hansens Hill.	30 ha, 4 remnants.

LEVEL 1 SITES Survey no.	REPRESENT- ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Ngahau Remnant Q06/038	Rep. site for 3 e.u.s.	Riverine forest + wetland. Fauna: 1 threatened.	4 e.u.s.	Modified.		17 ha, elongated.
Mimiwhangata Beach/ Pareparea Bay Q06/039	Rep. site for 1 e.u.	Dunelands. Fauna: 7 threatened, 1 reg. sig. Flora: 3 threatened.	3 e.u.s.	Weeds on dunes.		23 ha, 4 beaches.
Mimiwhangata North Wetlands Q06/041		Artificial ponds with associated wetlands. Fauna: 7 threatened, 1 reg. sig.	2 e.u.s.	Artificial.	Linkage function for pateke habitat.	8 ha, series of small wetlands.
McInnes Road (a) Forest Q06/060		Forest with linkage function.	4 e.u.s.	Regenerating.	Linkage between several large remnants.	183 ha, some modified enclaves.
Matapouri Road Forest Q06/061	Rep. site for 6 e.u.s.	Large forest remnant. Fauna: 2 threatened. Flora: 1 threatened.	10 e.u.s.	Large, regenerating.	Linkage between several large remnants.	652 ha, some modified enclaves.
Mad Dog Forest Remnants Q06/063	Rep. site.	Fauna: 1 threatened.	1 e.u.	Mature forest.	Linkage function. Buffer to parts of Te Oriwa Stream riverine forest.	5 ha, 4 remnants.
Edge Road Remnant Q06/064	Rep. site for 1 e.u.	Flora: 1 threatened.	3 e.u.s.	Regenerating.	Linkage between coastal remnants and large blocks.	9 ha, compact.
Sandy Bay Coastal Forest Remnants Q06/065	Rep. site for 3 e.u.s.	Coastal forest remnants. Fauna: 1 threatened.	5 e.u.s.	Northern remnants grazed.		16 ha, 4 remnants.
Owai Stream Riverine Habitat Q06/066		Riverine forest + wetland. Fauna: 1 threatened.	4 e.u.s.	Partially grazed, weedy in places.	Linkage between Ngawai Bay and forest remnants.	55 ha, elongated.
Mimiwhangata South Wetland and Streams Q06/068		Riverine vegetation + wetland. Fauna: 3 threatened.	6 e.u.s.	Grazed, weedy.	Linkage to Hansens Hill.	12 ha, elongated.
Olde's QEII Covenant Q06/069	Rep. site for 5 e.u.s.	Forest remnant. Fauna: 1 threatened. Flora: 1 threatened.	11 e.u.s.	Regenerating.	Adjacent to large forest block.	209 ha, long, compact.
Matapouri Coastal Remnants Q06/070	Rep. site for 7 e.u.s.	Coastal remnants. Fauna: 5 threatened, 2 reg. sig. Flora: 3 threatened, 2 reg. sig.	9 e.u.s.	Old-growth pohutukawa; some weeds.	Series of remnants along coast.	82 ha, 1 large remnant 4 small remnants.
Te Wairahi/Taupari Stream Riverine Habitat Q06/071		Riparian forest + wetland. Fauna: 3 threatened, 1 reg. sig.	4 e.u.s.	Modified, weedy.	Linkage between Whananaki Estuary and Hansens Hill.	61 ha, river catchment.
Te Oriwa Stream Riverine Habitat Q06/072		Riparian forest + wetland associations. Fauna: 1 threatened.	3 e.u.s.	Modified, weedy.	Linkage between Whananaki Estuary and Hailes Road.	37 ha, river catchment.
Matapouri Bush Block Q06/074	Rep. site for 8 e.u.s.	Large forest remnant. Fauna: 7 threatened, 4 reg. sig. Flora: 5 threatened, 1 reg. sig.	14 e.u.s.	Large, diverse.	Linkage with 2 estuaries and other remnants.	834 ha, compact with 3 arms.
McInnes Road (b) Forest Q06/075	Rep. site.	Riverine forest.	1 e.u.	Regenerating.		10 ha, elongated.

LEVEL 1 SITES Survey no.	REPRESENTATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE AND SHAPE
Hugh Crawford Memorial Scenic Reserve Q06/077	Rep. site for 8 e.u.s.	Large forest + shrubland remnant. Fauna: 4 threatened, 1 reg. sig. Flora: 1 threatened, 1 reg. sig.	17 e.u.s.	Large, diverse, regenerating shrubland & forest.	Buffer to Ngunguru Estuary; linkage with other remnants.	783 ha, some modified enclaves.
Gomez Road Bush Q06/078		Fauna: 1 threatened. Flora: 1 reg. sig.	2 e.u.s.	Regenerating; some modified enclaves.		294 ha, some modified enclaves.
Todd Road Forest Q06/079	Rep. site for 1 e.u.	Fauna: 2 threatened.	7 e.u.s.	Regenerating; some modified enclaves.	Linkage with other remnants.	553 ha, some modified enclaves.
Clement Road Remnants Q06/080	Rep. site for 2 e.u.s.	Fauna: 2 threatened.	5 e.u.s.	Regenerating.	Buffer to Matapouri Estuary.	52 ha, 3 remnants.
Matapouri Estuary Q06/083	Rep. site for 1 e.u.	Estuary. Fauna: 9 threatened, 3 reg. sig. Flora: 1 threatened, 1 reg. sig.	2 e.u.s.	Modified around most of boundary.	Linkage with bordering remnants. Important linkage function for fish spp.	81 ha, contiguous, 2 arms.
Waiotoi Road Remnant Q06/090	Rep. site for 2 e.u.s.	Fauna: 2 threatened.	4 e.u.s.	Regenerating.	Linkage with bordering remnants.	71 ha, elongated.
Hulse's Bush Q06/092		Fauna: 3 threatened, 1 reg. sig. Flora: 1 threatened.	1 e.u.	Small, modified.		10 ha, elongated.
North Gable Remnants Q06/093	Rep. site for 5 e.u.s.	Coastal forest. Fauna: 4 threatened, 1 reg. sig. Flora: 2 threatened, 2 reg. sig.	6 e.u.s.	Partly fenced; some possum control.	Series of remnants along coast.	44 ha, 7 remnants.
South Gable Remnants Q06/095	Rep. site for 4 e.u.	Coastal forest. Flora: 1 threatened.	5 e.u.s.	High quality.	Series of remnants along coast.	32 ha, 5 remnants.
Tutukaka Remnants Q06/098	Rep. site for 1 e.u.s.	Coastal forest. Flora: 1 reg. sig.	2 e.u.s.	Small; old-growth forest.	Series of remnants along coast.	9 ha, 3 remnants.
Rehuotane Headland Q06/099	Rep. site for 4 e.u.s.	Coastal forest. Fauna: 5 threatened (1 historic), 3 reg. sig. Flora: 2 threatened, 2 reg. sig.	7 e.u.s.	Fragmented, modified, regenerating.	Series of remnants along coastal headland.	134 ha, some modified enclaves.
Whakareora Coastal Habitat Q06/101	Rep. site for 11 e.u.s.	Coastal forest + shrubland. Fauna: 12 threatened (2 historic), 1 reg. sig. Flora: 5 threatened, 5 reg. sig.	12 e.u.s.	Large, regenerating, some old-growth forest.	Buffer to Ngunguru & Horahora Estuaries, and Ngunguru Sandspit.	364 ha, compact.
Ngunguru Sandspit Q06/102	Rep. site for 1 e.u.	Sandspit. Fauna: 17 threatened, 2 reg. sig. Flora: 1 threatened, 1 reg. sig.	4 e.u.s.	Largest and best example in ED; some weeds, stock.	Adjacent to Ngunguru Estuary and Whakairiora.	95 ha.
Whananaki Coastal Remnants Q06/103	Rep. site for 3 e.u.s.	Coastal forest. Fauna: 1 threatened. Flora: 1 threatened.	5 e.u.s.	Small, regenerating.	Buffer to Whananaki Estuary.	23 ha, 4 remnants.
Whananaki Estuary Q06/105	Rep. site.	Estuary. Fauna: 13 threatened, 1 reg. sig.	5 e.u.s.	Most of boundary modified.	Linkage to large remnants through riparian forest strips. Important linkage function for fish spp.	225 ha, contiguous.

LEVEL 1 SITES Survey no.	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE AND SHAPE
Whananaki Sandspit Q06/106	Rep. site for 1 e.u.	Sandspit. Fauna: 4 threatened, 1 reg. sig. Flora: 1 threatened.	3 e.u.s.	Most of spit in pines, weedy.	Adjacent to Whananaki Estuary.	10 ha, tip of spit.
Otonga Remnant Q06/109	Rep. site.	Shrubland + forest. Fauna: 1 threatened.	2 e.u.s.	Regenerating shrubland; weeds.		106 ha, compact.
Ngunguru Estuary Q06/110	Rep. site.	Estuary. Fauna: 13 threatened, 1 reg. sig.	4 e.u.s.	Large, high value.	Linked to sandspit & numerous coastal rem- nants. Important linkage function for fish spp.	543 ha, contiguous.
Horahora Estuary Q06/111	Rep. site.	Estuary. Fauna: 7 threatened, 1 reg. sig.	4 e.u.s.	High value.	Linked to Whakairiora & other remnants. Important linkage function for fish spp.	206 ha.
Taheke Scenic Reserve Q06/112	Rep. site for 3 e.u.	Forest. Fauna: 3 threatened, 1 reg. sig. Flora: 1 threatened.	4 e.u.s.	Regenerating.		202 ha, compact, slightly elongated.
Whananaki Bush Q06/113	Rep. site for 9 e.u.s.	Large shrubland + forest. Fauna: 3 threatened.	11 e.u.s.	Large, regenerating	Links several major remnants	1303 ha, some modified enclaves.
Horahora Bush Q06/114	Rep. site for 8 e.u.s.	Large shrubland + forest. Fauna: 4 threatened.	14 e.u.s.	Large, regenerating.	Links several major remnants & 2 estuaries.	822 ha, 1 large elong- ated & 1 small compact remnant.
Kowhaitai Creek Remnant Q06/115		Fauna: 1 threatened.	2 e.u.s.			26 ha.
Mains Road Remnant Q06/116	Rep. site for 1 e.u.	Fauna: 2 threatened (1 historic), 1 reg. sig.	3 e.u.s.	Regenerating.	Linkage with other remnants.	115 ha, compact.
Marua Road Remnants Q06/117		Fauna: 1 threatened.	2 e.u.s.	Small, regenerating.	Linkage with other remnants.	16 ha, 2 remnants.
Lookout Road Bush Q06/118	Rep. site for 8 e.u.s.	Fauna: 6 threatened, 1 reg. sig. Flora: 1 threatened, 1 reg. sig.	12 e.u.s.	Large, regenerating, some modified enclaves.	Linkage with other remnants.	1126 ha, some modified enclaves.
Tutukaka Forest Q06/119	Rep. site for 1 e.u.	Forest. Fauna: 2 threatened, 2 reg. sig.	4 e.u.s.	Regenerating, some mature forest.	Linkage with other remnants through pine forest.	104 ha, compact.
Ngunguru Remnants Q06/120	Rep. site for 2 e.u.s.	Coastal forest. Fauna: 2 threatened (1 historic).	7 e.u.s.	Regenerating coastal forest & shrubland.	Buffer for the Ngunguru Estuary.	242 ha, 1 large and numerous small remnants.
Puhipuhi Road Remnants Q06/121	Rep. site.	Volcanic broadleaf forest. Fauna: 3 threatened.	1 e.u.	Regenerating, surrounded by pines.	Adjacent to Russell Forest.	62 ha, 3 remnants.
Waro Limestone Scenic Reserve Q06/122	Rep. site.	Podocarp-broadleaf forest on limestone. Fauna: 3 threatened.	1 e.u.	Open canopy, weeds.		7 ha, compact.
Horahora Dunes Q06/178		Foredune. Fauna: 1 threatened.	1 e.u.	Weedy, stock present.	Adjacent to Whakairiora.	1.7 ha, compact.

LEVEL 1 SITES Survey no.	REPRESENT- ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Abbey Caves Remnants Q07/001	Rep. site.	Forest + shrubland on lime- stone. Fauna: 5 threatened. Flora: 2 reg. sig.	9 e.u.s.	Fragmented, regenerating, fenced.	Linkage with other remnants.	206 ha, 3 remnants.
Mount Tiger Road Bush Q07/002	Rep. site for 1 e.u.	Fauna: 4 threatened, 4 reg. sig.	3 e.u.s.	Large, regenerating.	Adjacent to other large remnants.	267 ha, some modified enclaves.
Waikaraka Stream Remnants Q07/003	Rep. site for 4 e.u.s.	Fauna: 3 threatened (1 historic), 3 reg. sig.	9 e.u.s.	Large, regenerating, some modified enclaves.	Adjacent to other large remnants.	520 ha, 3 remnants.
Parkes Road Bush Q07/004	Rep. site for 1 e.u.	Forest with linkage function. Fauna: 1 threatened.	4 e.u.s.	Regenerating, some modified enclaves.	Adjacent to other large remnants.	170 ha, elongated.
Taihu/Kohinui Stream Bush Q07/005	Rep. site for 2 e.u.s.	Fauna: 3 threatened, 2 reg. sig.	5 e.u.s.	Large, regenerating, some modified enclaves.	Adjacent to other large remnants.	614 ha, elongated with some modified enclaves.
Taraunui Remnants Q07/006		Fauna: 7 threatened, 1 reg. sig.	3 e.u.s.	Regenerating.	Linkage function.	80 ha, 5 fragments .
Rukuwai Remnants Q07/007		Fauna: 2 threatened (check)	2 e.u.s.		Partial linkage function.	21 ha, 2 fragments.
Campbell Road Remnants Q07/008	Rep. site for 2 e.u.	Fauna: 3 threatened (1 historic).	8 e.u.s.	Regenerating	Partial linkage function.	64 ha, 5 remnants.
Taiharuru Estuary Remnants Q07/009	Rep. site for 1 e.u.	Coastal forest. Fauna: 1 threatened.	6 e.u.s.	Small, fragmented, regenerating.	Buffer to Taiharuru Estuary.	80 ha, 11 remnants.
Ngamatengau Point Coastal Remnants Q07/010	Rep. site for 2 e.u.s.	Coastal forest. Fauna: 1 threatened. Flora: 2 reg. sig.	5 e.u.s.	Small, some old- growth pohutukawa.		23 ha, 4 remnants.
Pataua Estuary Remnants Q07/011	Rep. site for 2 e.u.s.	Estuarine forest. Fauna: 3 threatened (1 historic).	7 e.u.s.	Small, fragmented, regenerating.	Buffer to Pataua Estuary.	109 ha, 9 remnants.
Pataua Estuary Q07/012	Rep. site.	Estuary. Fauna: 10 threatened, 1 reg. sig.	1 e.u.	Large, most of edge modified.	Important linkage function for fish spp.	281 ha.
Taiharuru Estuary Q07/013	Rep. site for 3 e.u.s.	Estuary. Fauna: 13 threatened, 1 reg. sig.	5 e.u.s.	Large, most of edge modified.	Important linkage function for fish spp.	384 ha.
Whanui Bush Q07/014	Rep. site for 2 e.u.s.	Large forest. Fauna: 4 threatened, 4 reg. sig.	9 e.u.s.	Large, regenerating, with some modified enclaves.	Important linkage function.	771 ha, elongated with some modified enclaves.
Manganese Point Coastal Forest Remnant Q07/016	Rep. site.	Coastal forest. Fauna: 1 threatened.	1 e.u.	Small, modified on edge.	One of the few remnants in Whangarei Harbour.	7 ha, elongated coastal strip.
Awahoa Bay Beach & Coastal Remnants Q07/113		Beach + foredune. Fauna: 3 threatened, 1 reg. sig.	1 e.u.	Dune covered in kikuyu.	High tide use for birds using Taiharuru Estuary.	11 ha, small beach strip + 2 forest remnants.
Parauwanui Beach Q07/114	Rep. site for 1 e.u.	Fore + back dune. Fauna: 1 threatened, 1 reg. sig. Flora: 2 threatened.	2 e.u.s.	Most of foredune is high quality. Back dune mostly weedy.		10 ha, elongated.

LEVEL 1 SITES Survey no.	REPRESENT- ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Taiharuru Head Coastal Remnants Q07/115	Rep. site.	Coastal forest.	1 e.u.	Canopy open in parts.		14 ha, 3 remnants, elongated.
Parua Bay Remnants Q07/116	Rep. site for 4 e.u.	Fauna: 1 threatened.				47 ha, 5 remnants.
Kings Kauri Scenic Reserve Q07/117	Rep. site for 1 e.u.	Fauna: 2 threatened. Flora: 1 threatened.	2 e.u.s.		Linkage with other remnants	9 ha, compact.
Beasley Road Remnant Q07/118	Rep. site for 1 e.u.	Flora: 1 threatened.	3 e.u.s.	<i>Pinus</i> sp. present; canopy open in parts.		15 ha, compact.
LEVEL 1 SITES, ISLANDS Survey no.	REPRESENT- ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Putahataha Island Q05/034	Rep. site.	Coastal association on island. Flora: 1 threatened.	1 e.u.	Good quality.	Close to mainland.	0.6 ha, continuous.
Kohangaatara Point Island Q05/035	Rep. site.	Coastal association on island. Fauna: 1 threatened. Flora: 2 reg. sig.	1 e.u.		Close to mainland.	2 ha, continuous.
Marriott Island Q05/036		Coastal forest on island. Fauna: 1 threatened (historic). Flora: 1 threatened, 2 reg. sig.	1 e.u.	Weedy.	In Waikare inlet.	1.5 ha, continuous.
Motumaire Island & Taylor Island Q05/037		Coastal forest on island. Fauna: 4 threatened, 1 reg. sig.	1 e.u.	Regenerating, weedy.	Close to mainland.	4 ha, continuous.
Motuarahi Island Q05/038		Coastal forest on island. Fauna: 1 threatened, 1 reg. sig.	1 e.u.	Not recorded.	Close to mainland.	2 ha, continuous.
Toretore Island Q05/039	Rep. site.	Coastal forest on island. Fauna: 1 threatened.	1 e.u.	Modified.	Access at low tide.	3 ha, continuous.
Motuarohia Island Q05/040	Rep. site for 1 e.u.	Coastal forest on island. Fauna: 6 threatened, 1 reg. sig.	3 e.u.s	Modified, regenerating.	Linkage function.	25 ha, continuous.
Moturua Island Q05/041	Rep. site for 1 e.u.	Coastal forest on island. Fauna: 6 threatened, 3 reg. sig. Flora: 7 threatened, 3 reg. sig.	2 e.u.s	Modified, regenerating, weedy.	Linkage function.	145 ha, main island + 5 stacks.
Motukiekie Island Q05/042		Coastal forest on island. Fauna: 5 threatened, 1 reg. sig. Flora: 3 threatened.	1 e.u.	Regenerating, weedy, some exotic forest present.	Linkage function.	20.5 ha, continuous with 1 small stack.
Okahu Island Q05/043	Rep. site for 3 e.u.s	Coastal forest & associations on island. Fauna: 3 threatened, 1 reg. sig. Flora: 1 threatened.	5 e.u.s	Regenerating, weedy.	Linkage function.	27 ha, island + 3 stacks.
Waewaetorea Island Q05/044	Rep. site for 1 e.u.	Coastal forest on island. Fauna: 5 threatened, 1 reg. sig. Flora: 1 reg. sig.	2 e.u.s	Regenerating, weedy.	Linkage function.	15 ha, 4 remnants across island.
Urupukapuka Island Q05/045	Rep. site for 3 e.u.s	Coastal forest on island. Fauna: 4 threatened, 1 reg. sig. Flora: 2 threatened, 2 reg. sig.	4 e.u.s	Mostly pasture, some regeneration.	Linkage function.	98 ha, 1 large and numerous small remnants.

LEVEL 1 SITES, ISLANDS Survey no.	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE AND SHAPE
Poroporo Island Q05/046		Coastal forest on island. Fauna: 2 threatened (1 historic), 1 reg. sig. Flora: 1 reg. sig.	1 e.u.	Weedy.	Linkage function.	8 ha, continuous.
Motukokako Island Q05/047	Rep. site.	Coastal forest on island. Fauna: 6 threatened, 1 reg. sig. Flora: 5 threatened, 3 reg. sig. Site of international geological significance.	1 e.u.	Unmodified, high quality.	Close to Cape Brett.	7 ha, continuous.
Otuwhanga Island Q05/048	Rep. site.	Coastal associations on island. Flora: 1 threatened, 3 reg. sig.	2 e.u.s	Regenerating, low weed numbers.	Close to mainland.	6 ha, continuous.
Motukumara Island Q05/049	Rep. site.	Coastal flaxland on island. Flora: 1 threatened, 1 reg. sig.	1 e.u.	Modified.	Close to mainland.	2 ha, continuous.
Flat Rock Island Q05/050		Coastal forest on island. Fauna: 1 threatened. Flora: 1 threatened, 2 reg. sig.	1 e.u.	Relatively unmodified, good quality.	Close to mainland.	1.5 ha, continuous.
Waiwiri Island Q05/051	Rep. site.	Coastal association on island. Flora: 1 threatened, 3 reg. sig.	1 e.u.	Regenerating.	Close to mainland.	1.3 ha, continuous.
Motuwheke Island Q05/052	Rep. site.	Coastal association on island. Fauna: 1 threatened. Flora: 1 threatened.	1 e.u.	Good quality.	Close to mainland.	1.2 ha, continuous.
Moturahurahu Island Q05/053		Coastal shrubland on island. Flora: 2 reg. sig.	1 e.u.	Highly modified by pigs in the past.	Close to mainland.	2.5 ha, continuous.
Tawiriwiri Island Q05/054		Island. Flora: 1 reg. sig.	1 e.u.	Very modified and weedy	Close to mainland	2 ha, continuous.
Motukauri Island (a) Q05/055		Coastal forest on island. Fauna: 1 threatened, 1 reg. sig. Flora: 1 reg. sig.	1 e.u.	Good quality, low number of weeds.	Close to mainland.	2.4 ha, continuous.
Mahenotiti Island Q05/058		Coastal forest on island. Flora: 1 threatened, 1 reg. sig.	1 e.u.	Regenerating, few weeds.	Close to mainland.	1 ha, continuous.
Motukiore Island Q05/059	Rep. site for 1 e.u.	Coastal vegetation on island. Fauna: 1 threatened. Flora: 1 threatened, 1 reg. sig.	2 e.u.s	Regenerating, few weeds.	Close to mainland.	0.7 ha, continuous.
Rimariki Island & surrounds Q05/060	Rep. site.	Coastal vegetation on island. Fauna: 6 threatened. Flora: 4 threatened, 3 reg. sig.	6 e.u.s	Highly modified in the past, re- generating, weedy.	400 m from mainland.	22 ha, continuous.
Wide Berth Islands Q05/061	Rep. site.	Coastal association on islands. Fauna: 2 threatened. Flora: 2 threatened.	2 e.u.s	Unmodified, few weeds.	1 km from mainland.	1.4 ha.
Motutara Island Q05/062	Rep. site.	Coastal association on island. Fauna: 3 threatened. Flora: 1 threatened.	1 e.u.	Good quality.	600 m from mainland.	3.1 ha, continuous.
Motukehua Island Q05/063		Island. Fauna: 1 threatened, 1 reg. sig. (historic). Flora: 1 threatened.	1 e.u.	Modified, weedy.	500 m from mainland.	4.5 ha, continuous.
Motukauri Island (b) Q05/064	Rep. site for 2 e.u.s	Coastal forest on island. Fauna: 3 threatened, 1 reg. sig.	3 e.u.s	Modified, weedy.	In Whangaruru Harbour.	2.8 ha, continuous around edge of island.

LEVEL 1 SITES, ISLANDS Survey no.	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE AND SHAPE
Moanarua Island Q05/065		Coastal association on island. Fauna: 1 threatened. Flora: 1 threatened.	2 e.u.s	Regenerating.	Close to mainland.	7 ha, continuous.
Motuhi and Parerangi Islands Q05/066	Rep. site.	Coastal flaxland on island. Fauna: 3 threatened, 1 reg. sig. Flora: 1 threatened.	1 e.u.	Relatively unmodified.	Close to mainland.	5 ha, continuous.
Cape Brett West Island Q05/068	Rep. site.	Coastal forest on island. Flora: 1 threatened, 2 reg. sig.	1 e.u.	Regenerating, low weeds numbers.	Close to mainland.	2.4 ha, continuous.
Outu Bay Stack Q05/069	Rep. site.	Coastal forest on island. Flora: 2 reg. sig.	1 e.u.	Regenerating.	Close to mainland.	0.8 ha, continuous.
Motukorari Island Q05/070		Coastal flaxland on island. Flora: 1 threatened.	1 e.u.	Highly modified	Close to mainland	0.7 ha, continuous.
Motukowhai Island Q05/071	Rep. site.	Coastal association on island. Flora: 1 threatened.	1 e.u.		Close to mainland.	1.4 ha, continuous.
Bland Rocks Q05/072	Rep. site.	Coastal forest on island. Fauna: 1 threatened, 1 reg. sig. (historic). Flora: 1 threatened, 1 reg. sig.	1 e.u.	Good quality, relatively unmodified.	Close to mainland.	1.3 ha, continuous.
Moturoa Island Q05/073		Coastal flaxland on island. Flora: 1 threatened.	1 e.u.	Moderate quality	Close to mainland	0.8 ha, continuous.
Philip Island Q06/097	Rep. site.	Coastal forest on island. Fauna: 1 threatened, 1 reg. sig. Flora: 1 reg. sig.	1 e.u.	Good quality, relatively unmodified.	In the Tutukaka Harbour.	0.9 ha, continuous.
Otawhanga Island Q06/123	Rep. site.	Coastal forest & shrub land on island. Fauna: 1 threatened, 1 reg. sig. Flora: 2 threatened, 1 reg. sig.	2 e.u.s	Unmodified, low weed numbers.	1 km from mainland.	2.2 ha, continuous.
Four Islet Group Q06/124	Rep. site.	Coastal forest on island. Fauna: 1 reg. sig. Flora: 1 threatened, 1 reg. sig.	1 e.u.	Cleared in past, regenerating.	300 m from mainland.	4.4 ha, 2 main islands, continuous.
Motutohe Island Q06/125		Coastal association on island. Fauna: 2 threatened. Flora: 2 reg. sig.	1 e.u.	Burnt in past, regenerating.	Close to mainland.	3.6 ha, continuous.
Motutaniwha Island Q06/127		Coastal association on island. Flora: 1 threatened, 1 reg. sig.	1 e.u.	Moderate quality	Close to mainland	0.8 ha, continuous.
Paparahi Point Islands Q06/128	Rep. site.	Coastal forest on island. Fauna: 2 threatened, 1 reg. sig. Flora: 1 reg. sig.	1 e.u.	Good quality, relatively unmodified.	Close to mainland.	1.5 ha, continuous.
Rahomaunu Island Q06/129	Rep. site for 1 e.u.	Coastal vegetation on island. Fauna: 1 threatened. Flora: 1 reg. sig.	2 e.u.s	Good quality, relatively unmodified.	Close to mainland.	3.6 ha, continuous.
Motungangara Island & surrounds Q07/015	Rep. site.	Coastal forest on island. Fauna: 1 threatened, 1 reg. sig.	1 e.u.	Some good quality islets, partially modified, eroding.	Close to mainland.	3.7 ha, several small islands.

LEVEL 2 SITES Survey no.	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE AND SHAPE
Ngaiotonga Remnants Q05/027		Provide potential food/habitat for kukupa.	3 e.u.s	Small, modified.	Partial linkage function.	18 ha, 5 small remnants.
Oakura Remnants Q05/032		Provides potential food/habitat for kukupa.	3 e.u.s	Small, modified.	Partial linkage function.	42 ha, 2 remnants.
Taipuhi Road Remnants Q06/008		Not surveyed.	3 e.u.s	Fragmented.	Linkage to Russell Forest.	78 ha, 3 remnants.
Jubilee Road Remnant Q06/034		Some riverine forest. Not surveyed.	2 e.u.s	Fenced.		15 ha, elongated.
Haumakariri Stream Remnant Q06/035		Riparian values.	1 e.u.		Partial linkage function.	43 ha, 2 remnants.
Lowe Road Remnant Q06/076		Not surveyed.	1 e.u.			28 ha, elongated.
Kaiatea Remnant Q06/084		Not surveyed.	1 e.u.	Grazed by deer.		14 ha, elongated.
Omaikao Stream Remnant Q06/086		Not surveyed.	1 e.u.			10 ha, compact.
Te Toira Road Remnant Q06/087		Not surveyed.	1 e.u.			10 ha, compact.
Kirikiritoki Remnants Q06/088		Not surveyed.	4 e.u.s	Modified, grazed.	Partial linkage function.	35 ha.
Tutukaka Block Shrubland Q06/096		Fauna: 1 threatened (historic). Flora: 1 threatened.	1 e.u.	Modified.	Linkage function.	49 ha, compact.
Maddren Road Bush Q06/107		Some mature forest. Not surveyed.	1 e.u.		Linkage function.	51 ha, compact with small outlier.
Waiparera Shrubland Q07/017		Not surveyed.	1 e.u.	Regenerating.	Linkage function.	28 ha, compact.
LEVEL 2 SITES, ISLAND Survey no.	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/LINKAGE/CORRIDOR	SIZE AND SHAPE
Goat Island Q06/126		Island. Fauna: 1 threatened (historic).	1 e.u.	Modified, grazed by sheep, weedy	Access at low tide.	2.7 ha, patchy vegetation.

6. Acknowledgements

We thank the landowners who cooperated with this survey, and who willingly provided field staff with transport around their properties. We are also grateful to, and encouraged by, those landowners who were supportive of protecting the native species and special natural areas on their properties.

Most of the northern sites in the Whangaruru Ecological District were surveyed by Nigel Miller and Karen Riddell.

Linda Conning had a large input into the writing of this report, as most of the methodology, and some of the other introductory information presented in this report was based on work originally published by her.

A big thanks to Wendy Holland and Peter Anderson, who provided constant support and advice throughout the writing of this report.

Fred Brook compiled the geomorphological data, and provided information on the threatened landsnails in the District.

Lisa Forester provided advice on the threatened plants in the District, and identified plants for the field staff.

Information on island values and threats was obtained from surveys carried out by Richard Parrish and other Department of Conservation and Wildlife Service staff.

Information on the distribution of threatened birds in the District was provided by Ray Pierce and Nigel Miller.

Lorraine Wells, Craig Buchanan, and Terry Conaghan provided all the maps, as well as information on the protection status of sites, and the proportions of habitat types currently protected.

Finally, I am grateful to Wendy Holland, Ray Pierce, Lisa Forester, and Peter Anderson, who all reviewed this report and provided valuable feedback, which added significant value to the information presented.

7. Bibliography

- Arand, J.; Basher, L.; Wardle, R; Wardle, K. 1993: Inventory of New Zealand soil sites of international, national and regional importance. Part 2. North Island and northern offshore islands (1st edn). *New Zealand Society of Soil Science Occasional Publication 2*. Lincoln University.
- Atkinson, I.A.E. 1962: Semi-quantitative measurements of canopy composition as a basis for mapping. *Proceedings of the New Zealand Ecological Society* 9: 1-8.
- Atkinson, I.A.E. 1985: Derivation of vegetation mapping units for an ecological survey of Tongariro National Park, North Island, New Zealand. *New Zealand Journal of Botany* 23: 361-178.
- Brook, F.J. 1996: Classification of the Ecological Districts of Northland. Unpublished report, Department of Conservation, Whangarei.

- Brook, F.J. 1999: Distribution and conservation status of the dune snail *Succinea archeyi* Powell (Stylommatophora: Succineidae) in Northern New Zealand. *Science for Conservation* 129. Department of Conservation, Wellington.
- Brook, F.J. 2002: Uncommon and rare landsnails in the Northland region of New Zealand, and an assessment of conservation management priorities. Department of Conservation, Whangarei.
- Brook, F.J.; Goulstone, J.F. 1999: Prehistoric and present-day landsnail faunas between Whananaki and Whangamumu, northeastern New Zealand, and implications for vegetation history following human colonisation. *Journal of the Royal Society of New Zealand* 29: 107–134.
- Brook, F.J.; McArdle, B.H. 1999: Morphological variation, biogeography, and local extinction of *Placostylus bongii* (Gastropoda: Bulimulidae) of northern New Zealand. *Journal of the Royal Society of New Zealand* 29: 407–434.
- Conning, L. 2001: Northland Protection Strategy. A Report to the Nature Heritage Fund Committee. Nature Heritage Fund, Wellington.
- Conning, L.; Holland, W.; Miller, N. 2004: Natural areas of Aupouri Ecological District. Reconnaissance Report for the Protected Natural Areas Programme. Department of Conservation, Whangarei.
- De Lange, P.J.; Heenan, P.B.; Given, D.R.; Norton, D.A.; Ogle, C.C.; Johnson, P.N.; Cameron, E.K. 1999: Threatened and uncommon plants of New Zealand. *New Zealand Journal of Botany* 37: 603–628.
- Eagle, A. 1986: Eagle's trees and shrubs of New Zealand. Vol. 2. Revised edn. Collins, Auckland.
- Forester, L.; Townsend, A. 2004: Threatened plants of Northland Conservancy. Department of Conservation, Wellington.
- Gill, B.; Whitaker, T. 1996: New Zealand frogs and reptiles. David Bateman, Auckland.
- Griffiths, J. 2000: The distribution and abundance of *Latrodectus atritus* on the west and east coasts of northern New Zealand. Unpublished report, Department of Conservation, Whangarei.
- Halkett, J.; Sale, E.V. 1986: The world of the kauri. Reed Methuen Publishers Ltd. Auckland.
- Heather, B.D.; Robertson, H.A. 2000: The field guide to the birds of New Zealand. Penguin Books (New Zealand) Ltd, Auckland.
- Heenan, P.B.; de Lange, P.J. 2004: *Myrsine aquilonia* and *M. umbricola* (Myrsinaceae), two new species from New Zealand. *New Zealand Journal of Botany* 42: 753–769.
- Hitchmough, R. (comp.) in prep: New Zealand Threat Classification System lists—2004. Department of Conservation, Wellington.
- Innes, J.; Nugent, G.; Prime, K.; Spur, E.B. 2004: Responses of kukupa (*Hemiphaga novaeseelandiae*) and other birds to mammalian pest control at Motatau, Northland. *New Zealand Journal of Ecology* 28: 73–81.
- Johnson, P.; Brooke, P. 1998: Wetland plants in New Zealand. Manaaki Whenua Press, Lincoln, New Zealand.
- Kershaw, K. A.; Looney, J.H.H. 1985: Quantitative and dynamic ecology. 3rd edn. Edward Arnold, London.
- Kenny, J.A.; Hayward, B.W. 1996: Inventory and maps of important geological sites and landforms in the Northland Region. *Geological Society of New Zealand Miscellaneous Publication* 83.
- Leathwick, J. R.; Rogers, G.M. 1996: Modelling relationship between environment and canopy composition in secondary vegetation in central North Island, New Zealand. *New Zealand Journal of Ecology* 20: 147–162.
- Malcolm, M. 1982: Where it all began. The story of Whangaruru, taking in from Mimiwhangata to Whangamumu. M. Malcolm, Hikurangi, New Zealand.
- McDowell, R.M. 2000: The Reed field guide to New Zealand freshwater fishes. Reed, Auckland.
- McEwen, W.M. 1987: Ecological Regions and Districts of New Zealand. *New Zealand Biological Resources Centre Publication* 5.

- Miller, P.J.; Pierce, R.J. 1995: Distribution and decline of North Island brown kiwi (*Apteryx australis mantelli*) in Northland. *Notornis* 42: 201-211.
- Moir, R.W.; Collen, B.; Thompson, C.S. (1986). The Climate and Weather of Northland. *New Zealand Meteorological Service Misc Pub 115 (2) 2nd Ed.* Ministry of Transport, Wellington.
- Molloy, J.; Bell, B.; Clout, M.; de Lange, P.; Gibbs, G.; Given, D.; Norton, D.; Smith, N.; Stephens, T. 2002: Classifying species according to threat of extinction. A system for New Zealand. *Threatened Species Occasional Publication 22*. Department of Conservation, Wellington. 26 p.
- Mueller-Dombois, D.; Ellenberg, H. 1974: Aims and methods of vegetation ecology. John Wiley & Sons, New York.
- Myers, S.; Park, G.; Overmars, F. 1987: A Guidebook for the Rapid Ecological Survey of Natural Areas. *New Zealand Biological Resources Centre Publication 6*.
- New Zealand Technical Advisory Group 1986: A scientific focus. New Zealand Department of Scientific and Industrial Research, Wellington.
- Nichol, E.R. 1997: Common names of plants in New Zealand. Manaaki Whenua Press, Lincoln, New Zealand.
- Ogle, C. 1982: Wildlife and wildlife habitat values of Northland. *Fauna Survey Unit Report 30*. New Zealand Wildlife Service, Wellington.
- Park, G.N.; Walls, G.Y. 1978: Inventory of tall forest stands on lowland plains and terraces in Nelson and Marlborough Land Districts, New Zealand. Botany Division, Department of Scientific and Industrial Research, Lower Hutt.
- Pierce, R.J.; Atkinson, R.; Smith, E. 1993: Changes in bird numbers in six Northland forests 1979-93. *Notornis* 40: 285-293.
- Pierce, R.J.; Graham, P.J. 1995: Ecology and breeding biology of kukupa (*Hemiphaga novaeseelandiae*) in Northland. *Science and Research Series No. 91*. Department of Conservation, Wellington.
- Pierce, R.J.; Sporle, W. 1998: Causes of kiwi mortality in Northland. *Conservation Advisory Science Notes 169*. Department of Conservation, Wellington.
- Poole, L.; Adams, N. 1994: Trees and shrubs of New Zealand. Manaaki Whenua Press, Landcare Research, Lincoln.
- St George, I. 1999: The nature guide to New Zealand native orchids. Godwit, Auckland.
- Wilson, C.M.; Given, D.R. 1989: Threatened plants of New Zealand. Department of Scientific and Industrial Research Publishing, Wellington.

8. Appendices

8.1 FIELD SURVEY FORM

**DEPARTMENT OF CONSERVATION
PROTECTED NATURAL AREAS PROGRAMME**

NAME OF HABITAT:..... **DATE:**

GRID REF.: **SSBI NO.:** **PNA NO.:**

HABITAT TYPE(S):.....

GEOMORPHOLOGICAL TYPE(S):

VEGETATION TYPE(S):

Vegetation Type	% of Total Habitat	Percentage of Cover Value (canopy)			
		Abundant (50-100)	Common (20-50)	Uncommon (5-20)	Rare (0-5)

Vegetation Type	% of Total Habitat	Percentage of Cover Value (canopy)			
		Abundant (50-100)	Common (20-50)	Uncommon (5-20)	Rare (0-5)

8.2 LETTER TO RATEPAYERS/NEWS MEDIA ITEM



Department of Conservation *Te Papa Atawhai*

Dear Landowner,

Department of Conservation officers are currently surveying significant natural areas, e.g. bush, wetlands, gumland etc within the Far North District. This has involved mapping natural areas from roadsides or (with the permission of landowners) from other viewpoints, and recording information on their type and condition.

You may well have already talked to staff working in your area. If not, at a later stage departmental staff may ask for permission to enter your land and gather more detailed information on your properties natural areas.

Why are we doing this survey? Northland's natural areas, especially bush pockets, contribute significantly to the character and quality of the region. Many of these areas are habitat for some of our increasingly rare native wildlife.

The Resource Management Act 1991 requires District Councils to consider the natural areas they administer when preparing the District Plan. The information compiled from this survey will be given to the Far North District Council to provide them with a "snapshot" of the distribution and condition of natural areas in the various parts of Northland at a single point in time. The information will be valuable as a reference point for assessing habitat changes over time.

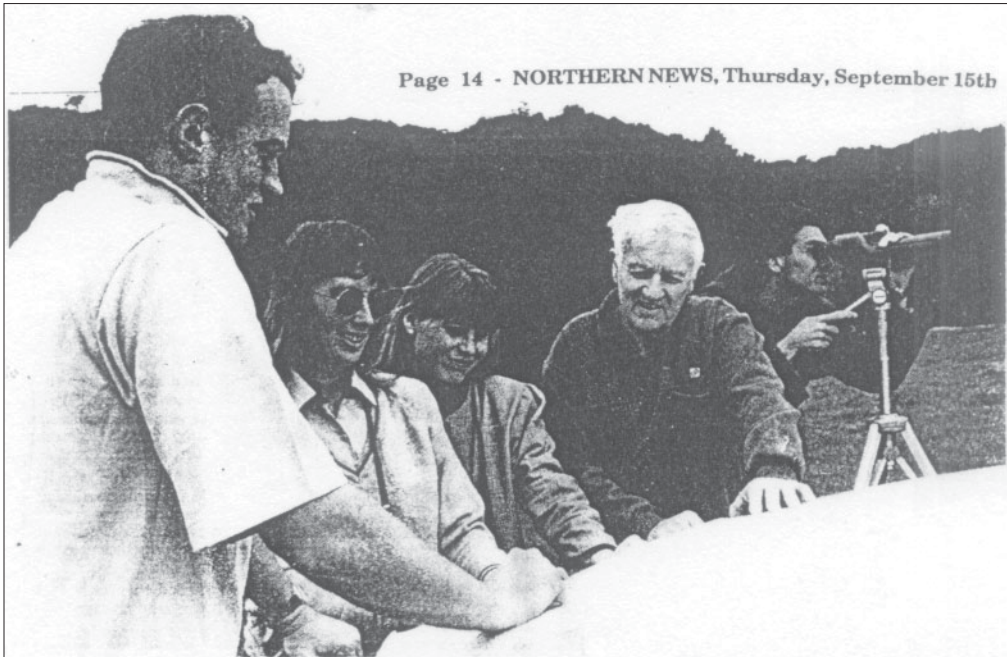
Perhaps the principal value of this survey will be to provide you, the landowners, with information on the significance and makeup of the natural areas that you have preserved on your property so you can better plan the way you wish to manage these areas.

If you have any questions or concerns about the survey process, please contact your local Department of Conservation Field Centre or ring **Peter Anderson, Fraser Moors** or **John Beachman** at our Whangarei Office, telephone (09) 438 0299, fax (09) 438 9886.

If you wish to contact the Far North District Council about this aspect of the District Plan, please phone Peggy Kilberg at the Kaikohe office, telephone (09) 401 2101.

A handwritten signature in black ink, appearing to read 'Gerry Rowan'.

Gerry Rowan
REGIONAL CONSERVATOR



Discussing natural habitats on Geoff Wightman's property at Waimate North are, from left, Department of Conservation officers Fraser Moors and Linda Winch, Far North District Council resource planner Kaylee Wilson, Mr Wightman and DOC officer Nigel Miller.

Natural sites studied in the Far North

Northland's most important natural habitats are being identified in a joint Department of Conservation and Far North District Council project.

Conservation officers have started working on the year-long project, which aims to identify significant habitat areas outside the department's protected land area.

The study is being done for a number of reasons, including the fact that many lowland forests, gumlands, dune lands, wetlands and sea coasts are under-represented in the existing reserve system.

There is also insufficient information about the location and extent of remnant

areas of native bush, wetlands, dune systems and other areas.

Conservation officers Nigel Miller, Fraser Moors and Linda Winch have begun gathering information by checking DOC's database and then looking at areas from the roadside.

Identification

Once the team has broadly noted the natural features and habitat types which exist in the district, the more important sites will be identified and permission asked from landowners to complete a more indepth survey.

This will provide valuable information for the FNDC's district plan, which is required under the 1991 Re-

source Management Act to consider the environmental values of any proposed activity, and for DOC to advise and assist landowners to voluntarily manage and protect key sites.

It is the first time a Protected Natural Areas programme survey has been done in Northland. The last major Northland survey by the Wildlife Service in 1977-79 did not include observations of vegetation and landform types.

DOC officer Peter Anderson said that five years later it was found 40 per cent of all surveyed wildlife habitats had been modified in some way or totally lost through land development.

8.3 CATEGORIES OF THREAT

In this report the categories of threat are taken from the New Zealand Threat Classification developed by Molloy et al. (2002). This new system replaces Molloy & Davis (1994), the prioritising system used previously for threatened species work by the Department of Conservation.

Below are Sections 3 and 7, which have been taken from Molloy et al. (2002) to explain the new species classification system.

3. Classification structure and categories

... This section describes each of the categories (shown in Fig. 1).

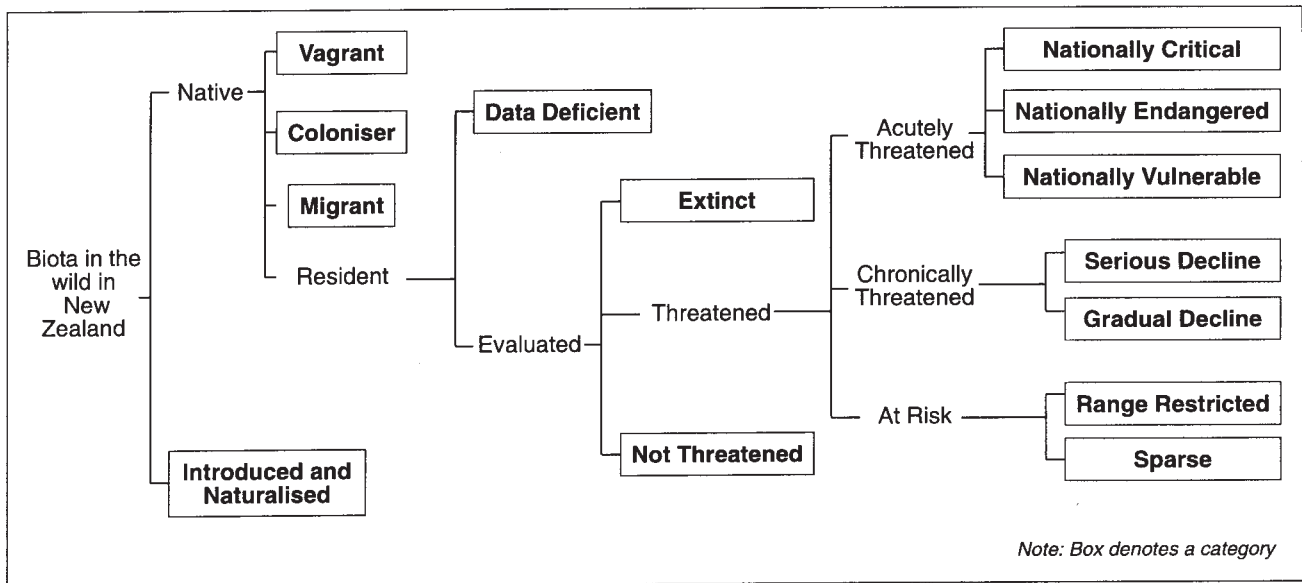


Figure 1. Structure of the New Zealand Threat Classification System.

INTRODUCED AND NATURALISED

Introduced and Naturalised taxa are those that have become naturalised in the wild after being deliberately or accidentally introduced to New Zealand by human agency.

If an Introduced and Naturalised taxon has an IUCN Red Listing in its country (or countries) of origin, the IUCN category and source of the listing are shown after the taxon's name in the New Zealand list. Current examples of this include the cress *Lepidium byssopifolium* and the southern bell frog (*Litoria raniformis*), both of which are listed as Endangered in Australia; and the Parma wallaby (*Macropus parma*), listed as Lower risk/Near threatened.

VAGRANT

For the purposes of this document, vagrants are taxa that are found unexpectedly and rarely in New Zealand, and whose presence in our region is naturally transitory. These are taxa that do not establish themselves beyond their point of arrival because of reproductive failure or for specific ecological reasons (see de Lange & Norton 1998).

Examples include the red-kneed dotterel (*Erythrogonys cinctus*) and the blue moon butterfly (*Hypolimnas bolina nerina*), both from Australia, and the spotted sawtail (*Prionurus maculatus*) from the tropical south-west Pacific Ocean.

If a taxon in the Vagrant category has been listed in an IUCN Red List in its country of origin, the IUCN category and source of the listing are shown beside the taxon's name in the New Zealand list.

COLONISER

Colonisers are taxa that have arrived in New Zealand without direct or indirect help from humans and have been successfully reproducing in the wild for less than 50 years. Three examples are the Nankeen night heron (*Nycticorax caledonicus*), the scoliid wasp *Radumeris tasmaniensis* and the orchid *Cryptostylis subulata*.

The IUCN Red List category and source of the listing is included where this exists.

MIGRANT

Taxa that predictably and cyclically visit New Zealand as part of their normal life cycle, but do not breed here are included in the category Migrant. Examples include the Arctic skua (*Stercorarius parasiticus*) and striped marlin (*Tetrapturus audax*).

In contrast, taxa that either breed here and migrate beyond New Zealand during their life cycle, e.g. Chatham Island albatross (*Thalassarche eremita*), or taxa that are resident in New Zealand for most of their lives, such as longfinned eels (*Anguilla dieffenbachii*), are not included in this category.

The IUCN Red List category and source of the listing is included where this exists.

DATA DEFICIENT

The amount of information available for assessing the threat of extinction is highly variable between taxa and groups of taxa. At one extreme there are taxa such as kakapo, *Gunnera hamiltonii* and *Tecomantbe speciosa* where every wild individual is known, while at the other extreme there are taxa whose ecology and biology is virtually unknown (e.g. *Koeleria riguorum*, a recently described grass).

Certain criteria and/or definitions must be met for a taxon to be listed in a category. Where information is so lacking that an assessment is not possible, the taxon is assigned to the Data Deficient category. If a taxon is listed in a category other than Data Deficient but confidence in the listing is low due to poor quality data, then the listing can be qualified with the letters DP (Data Poor) to indicate this ...

EXTINCT

A taxon is listed as Extinct when there is no reasonable doubt, after repeated surveys in known or expected habitats at appropriate times (diurnal, seasonal and annual) and throughout the taxon's historic range, that the last individual has died. Examples include huia (*Heteralocha acutirostris*) and Adams's

mistletoe (*Trilepidea adamsii*). Only taxa that have become extinct since 1840 are included in the list. Taxa that are extinct in the wild but occur in captivity or cultivation are not listed in this category. These are listed as Critically Endangered and are qualified with the letters EW (Extinct in the Wild).

THREATENED

The threatened categories are grouped into three major divisions: 'Acutely Threatened', 'Chronically Threatened' and 'At Risk'.

Acutely Threatened

The categories in the 'Acutely Threatened' division—Nationally Critical, Nationally Endangered and Nationally Vulnerable—equate with the IUCN categories of Critically Endangered, Endangered and Vulnerable. Taxa in these three categories are facing a very high risk of extinction in the wild, as defined by criteria that quantify:

- Total population size
- Area of occupancy
- Fragmentation of populations
- Declines in total population
- Declines in habitat area
- Predicted declines due to existing threats

Although the criteria (described in Section 6) measure similar population features as those in the IUCN Red List criteria, numerical limits and timeframes are tailored to suit New Zealand circumstances. These were set through a process of testing and refinement by the project team and as a result of feedback from New Zealand species experts. Criteria that attempt to predict declines due to possible future threats are not included because of the highly speculative nature of this type of assessment.

Chronically Threatened

Taxa listed in either of the two categories in the 'Chronically Threatened' grouping (Serious Decline and Gradual Decline) also face extinction, but are buffered slightly by either a large total population, or a slow decline rate (see Section 6).

At Risk

Taxa that do not meet the criteria for Acutely Threatened or Chronically Threatened, but have either restricted ranges or small scattered sub-populations, are listed in one of two categories (Range Restricted and Sparse) that fall under the division 'At Risk'. Although these taxa are not currently in decline, their population characteristics mean a new threat could rapidly deplete their population(s). Range Restricted taxa either occur in a small geographic area (e.g. Three Kings Islands), are restricted to a particular habitat (e.g. geothermal areas), or require very specific substrates (e.g. ultramafic rock), and for colonial breeders, have fewer than 10 subpopulations. Taxa that have naturally restricted ranges and taxa that have become restricted as a result of human activities are both included in this category. This is because both would face the same risk of extinction in the face of a new threat. The two groups are differentiated by the use of a qualifier (see Section 4).

Sparse taxa have very small, widely scattered populations, e.g. New Zealand spinach (*Tetragonia tetragonoides*). As with the Range Restricted category, taxa that are either naturally sparse or have become sparse as a result of human activities are included in this category.

NOT THREATENED

Taxa that are assessed and do not fit any of the Threatened categories are listed in the Not Threatened category.

7. **Criteria for the Acutely Threatened and Chronically Threatened categories**

... a taxon must meet specific criteria to be listed in one of the Acutely Threatened or Chronically Threatened categories. The criteria for each category are set out below ...

NATIONALLY CRITICAL

Very small population *or* a very high predicted decline

A taxon is Nationally Critical when available scientific evidence indicates that it meets any of the following three criteria:

1. The total population size is < 250 mature individuals.
2. Human influences have resulted in < 2 sub-populations *and either*:
 - a. < 200 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is < 1 ha (0.01 km²).
3. There is a predicted decline of > 80% in the total population in the next 10 years due to existing threats.

NATIONALLY ENDANGERED

A: Small population *and* moderate to high recent or predicted decline

A taxon is Nationally Endangered when available scientific evidence indicates that it fits at least one Status criterion *and* one Trend criterion as follows:

Status criteria

1. The total population size is 250-1000 mature individuals.
2. There are < 5 sub-populations *and either*:
 - a. < 300 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is < 10 ha (0.1 km²).

Trend criteria

1. There has been a decline of > 30% in the total population or habitat area in the last 100 years.
2. There is a predicted decline of > 30% in the total population in the next 10 years due to existing threats.

B: Small to moderate population *and* high recent or predicted decline

A taxon is Nationally Endangered when available scientific evidence indicates that it fits at least one Status criterion *and* one Trend criterion:

Status criteria

1. The total population size is 1000–5000 mature individuals.
2. There are < 15 sub-populations *and either*:
 - a. 300-500 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is 10–100 ha (0.1–1 km²).

Trend criteria

1. There has been a decline of > 60% in the total population or habitat area in the last 100 years.
2. There is a predicted decline of > 60% in the total population in the next 10 years due to existing threats.

NATIONALLY VULNERABLE

Small to moderate population *and* moderate recent or predicted decline

A taxon is Nationally Vulnerable when scientific evidence indicates that it fits at least one Status criterion *and* one Trend criterion:

Status criteria

1. The total population size is 1000–5000 mature individuals.
2. There are < 15 sub-populations *and either*:
 - a. 300–500 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is 10–100 ha (0.1–1 km²).

Trend criteria

1. There has been a decline of 30–60% in the total population or habitat area in the last 100 years and the total population or habitat area is still in decline.
2. There is a predicted decline of 30–60% in the total population in the next 10 years due to existing threats.

SERIOUS DECLINE

A. Moderate to large population *and* moderate to large predicted decline

A taxon is listed in Serious Decline when scientific evidence indicates that it fits at least one Status criterion *and* the Trend criterion:

Status criteria

1. The total population size is > 5000 mature individuals.
2. There are > 15 sub-populations *and either*:
 - a. > 500 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is >100 ha (1 km²).

Trend criterion

1. There is a predicted decline of > 30% in the total population in the next 10 years due to existing threats.

B. Small to moderate population *and* small to moderate predicted decline

A taxon is listed in Serious Decline when available scientific evidence indicates that it fits at least one Status criterion *and* the Trend criterion:

Status criteria

1. The total population size is < 5000 mature individuals.

2. There are < 15 sub-populations *and either*:
 - a. < 500 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is < 100 ha (1 km²).

Trend criterion

1. There is a predicted decline of 5-30% in the total population in the next 10 years due to existing threats.

GRADUAL DECLINE

Moderate to large population *and* small to moderate decline

A taxon is listed in Gradual Decline when available scientific evidence indicates that it fits at least one Status criterion *and* the Trend criterion:

Status criteria

1. The total population size is > 5000 mature individuals.
2. There are > 15 sub-populations *and either*:
 - a. > 500 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is > 100 ha (1 km²).

Trend criterion

1. There is a predicted decline of 5-30% in the total population in the next 10 years due to existing threats, and *the decline is predicted to continue beyond 10 years*.

8.4 CATEGORIES OF IMPORTANCE FOR GEOLOGICAL AND SOIL SITES

Geological sites

Ranking criteria for important geological sites and landforms in the Northland Region follow Kenny & Hayward (1996).

Sites are listed under three levels of importance:

- (a) International – site of international scientific importance.
- (b) National – site of national scientific, educational or aesthetic importance.
- (c) Regional – site of regional scientific, educational or aesthetic importance.

Soil sites

Ranking criteria for New Zealand soil sites of international, national, and regional significance, from Arand et al. (1993).

Soil sites are listed under three levels of importance:

(a) International

- Contains the best example of a soil (generally a soil group) or soil-vegetation or soil-landform association that is unique to New Zealand (or these latitudes)
- Contains a soil that is naturally uncommon or greatly reduced in extent in other parts of the world
- Contains a wide range of extensive soils with a relatively unmodified vegetation cover
- Has been studied in detail and is known internationally.

(b) National

- Contains the best or a 'classic' example of a soil (either a soil group or a mapping unit) or a soil-vegetation or a soil-landform association in New Zealand
- Contains a soil or soil-vegetation or a soil-landform association that is nationally uncommon or reduced in extent
- Contains a moderate range of extensive soils with a relatively unmodified vegetation cover
- Has been studied in detail and is known nationally.

(c) Regional

- Contains the best regional example of a soil (generally a mapping unit) or a soil or soil-vegetation or a soil-landform association
- Contains a limited range of soils under vegetation that is relatively unmodified.

8.5 FAUNA

A. Checklist of birds of Northland recorded in the Whangaruru Ecological District

Follows *The field guide to the birds of New Zealand* (Heather & Robertson 2000).

Excludes vagrants; * = introduced.

Source: Department of Conservation, Northland Conservancy records.

PL = Present in large numbers (>100); P = Present in small numbers (<100); R = Recorded (<10).

Species name	Other name	Scientific	Mainland	Islands
NI brown kiwi		<i>Apteryx australis mantelli</i>	PL	P
Black-winged petrel		<i>Pterodroma nigripennis</i>		R
Grey-faced petrel	Oi	<i>P. macroptera gouldi</i>		P
Northern little blue penguin	Korora	<i>Eudyptula minor treadei</i>	PL	P
Australasian gannet	Takapu	<i>Morus serrator serrator</i>		P
Black shag	Kawau	<i>Pbalacrocorax carbo novaehollandiae</i>	P	P
Pied shag	Karuhiruhi	<i>P. v. varius</i>	P	P
Little black shag		<i>P. sulcirostris</i>	P	P
Little shag	Kawaupaka	<i>P. melanoleucos brevirostris</i>	P	P
White-faced heron		<i>Ardea n. novaehollandiae</i>	PL	P
White heron	Kotuku	<i>Egretta alba modesta</i>	R	
Little egret		<i>E. garzetta nigripes</i>	R?	
Reef heron	Matuku moana	<i>E. s. sacra</i>	P	R
Cattle egret		<i>Bubulcus ibis coromandus</i>	R?	
Matuku	Australasian bittern	<i>Botaurus poiciloptilus</i>	P	
Royal spoonbill	Kotuku-ngutea	<i>Platalea regia</i>	R	
*Black swan		<i>Cygnus atratus</i>	P	
Paradise shelduck	Putangitangi	<i>Tadorna variegata</i>	PL	P
*Mallard		<i>Anas platyrhynchos</i>	PL	P
Grey duck	Parera, karakahia	<i>A. s. superciliosa</i>	PL	P
Pateke	Brown teal	<i>A. chlorotis</i>	PL	P
Australasian harrier	Kahu	<i>Circus approximans</i>	PL	P
NZ falcon	Karearea	<i>Falco novaeseelandiae</i>	R	
*California quail		<i>Callipepla californica</i>	PL	P
*Brown quail		<i>Synoicus ypsilophorus</i>	PL	P
*Pheasant		<i>Phasianus colchicus</i>	PL	P
*Wild turkey		<i>Meleagris gallopavo</i>	PL	
Banded rail	Moho-pereru	<i>Rallus philippensis assimilis</i>	PL	P
NI weka		<i>Gallirallus australis greyi</i>	R	
Spotless crane	Puweto	<i>P. tabuensis plumbea</i>	P	P
Pukeko	Purple swampphen	<i>Porphyrio porphyrio melanotus</i>	PL	PL
Pied oystercatcher	Torea	<i>Haematopus ostralegus finschi</i>	P	
Variable oystercatcher	Torea	<i>H. unicolor</i>	P	P
Pied stilt	Poaka	<i>Himantopus himantopus leucocephalus</i>	P	P
Northern NZ dotterel	Tuturi whatu	<i>Charadrius obscurus aquilonous</i>	P	P
Banded dotterel	Tuturiwhatu	<i>C. bicinctus bicinctus</i>	P	P
Wrybill	Ngutuparore	<i>Anarhynchus frontalis</i>	R	
Spur-winged plover	Masked lapwing	<i>Vanellus miles novaehollandiae</i>	PL	P
Turnstone		<i>Arenaria interpres</i>	R	

Species name	Other name	Scientific	Mainland	Islands
Lesser knot	Huahou	<i>Calidris canutus rogeri</i>	R	
Bar-tailed godwit	Kuaka	<i>Limosa lapponica baueri</i>	P	
Sharp-tailed sandpiper		<i>Calidris acuminata</i>	R	
Whimbrel		<i>Numenius phaeopus</i>	R	
Arctic skua		<i>Stercorarius parasiticus</i>	P	P
Black-backed gull	Kararo	<i>Larus d. dominicanus</i>	PL	PL
Red-billed gull	Tarapunga	<i>L. novaebollandiae scopulinus</i>	PL	P
Caspian tern	Taranui	<i>Sterna caspia</i>	P	P
White-fronted tern	Tara	<i>S. striata</i>	P	P
Kukupa	New Zealand pigeon, kereru	<i>Hemiphaga n. novaeseelandiae</i>	PL	P
NI kaka		<i>Nestor meridionalis septentrionalis</i>	R	
*Eastern rosella		<i>Platycercus e. eximius</i>	PL	P
Red-crowned kakariki	Kakariki	<i>Cyanoramphus n. novaeseelandiae</i>	P	P
Shining cuckoo	Piwiwharau	<i>Chrysococcyx l. lucidus</i>	P	P
Long-tailed cuckoo	Koekoea	<i>Eudynamis taitensis</i>	P	P
Morepork	Ruru	<i>Ninox n. novaeseelandiae</i>	PL	P
*Kookaburra		<i>Dacelo n. novaeguineae</i>	R	
New Zealand kingfisher	Kotare	<i>Halcyon sancta vagans</i>	PL	PL
*Skylark		<i>Alauda arvensis</i>	PL	P
Welcome swallow		<i>Hirundo tabitica neoxena</i>	PL	PL
New Zealand pipit	Pihoihoi	<i>Antbus n. novaeseelandiae</i>	P	P
*Dunnock	Hedge sparrow	<i>Prunella modularis</i>	PL	P
*Blackbird		<i>Turdus merula</i>	PL	P
*Song thrush		<i>T. philomelos</i>	PL	P
NI fernbird	Matata	<i>Bowdleria punctata vealeae</i>	PL	P
Grey warbler	Riroriro	<i>Gerygone igata</i>	PL	PL
NI fantail	Piwakawaka	<i>Rhipidura fuliginosa placabilis</i>	PL	PL
NI tomtit	Miromiro, pied tit	<i>Petroica macrocephala toitoi</i>	P	
NI robin	Toutouwai	<i>Petroica australis longipes</i>	R	
Silvereye	Tahou, whiteye	<i>Zosterops l. lateralis</i>	PL	PL
Bellbird	Korimako	<i>Anthoris m. melanura</i>	R	PL
Poor Knights bellbird	Korimako	<i>A. m. onebo</i>	R?	PL
Tui		<i>Prosthemadera n. novaeseelandiae</i>	PL	P
*Yellowhammer		<i>Emberiza citrinella</i>	PL	P
*Chaffinch		<i>Fringilla coelebs</i>	PL	P
*Greenfinch		<i>Carduelis chloris</i>	P	
*Goldfinch		<i>C. carduelis</i>	P	
*Redpoll		<i>C. flammea</i>	P	
*House sparrow		<i>Passer domesticus</i>	PL	P
*Starling		<i>Sturnus vulgaris</i>	PL	P
*Myna		<i>Acridotheres tristis</i>	PL	P
*Australian magpie		<i>Gymnobia tibicen</i>	P	

B. Other fauna recorded in the Whangaruru Ecological District

Snails		
	Punctidae sp. 64	Nationally Endangered
	Punctidae sp. 13	Nationally Endangered
	Punctidae sp. 251	Nationally Endangered
	<i>Schizoglossa worthbyae</i>	Sparse
	<i>Succinea archeyi</i>	Serious Decline
	<i>Amborhytida dunniiae</i>	Gradual Decline
	<i>Amborhytida forsythi</i>	Gradual Decline
kauri snail	<i>Paryphanta busbyi busbyi</i>	Gradual Decline
	<i>Amborhytida</i> sp. "motukokako"	Range Restricted
	<i>Kokikora mimiwbangata</i>	Range Restricted
	<i>Liarea bicarinata</i>	Range Restricted
	<i>Liarea turriculata</i> "Manaia"	Range Restricted
	<i>Pbenacobelix brooki</i>	Range Restricted
	<i>Pbrixgnalbus paralaomiformis</i>	Range Restricted
flax snail	<i>Placostylus bongii</i>	Range Restricted
	Punctidae sp. 222	Range Restricted
	Punctidae sp. 230	Range Restricted
	Punctidae sp. 147	Range Restricted
	Punctidae sp. 28	Range Restricted
Arthropods		
black katipo	<i>Latrodectus atritus</i>	Serious Decline
forest ringlet butterfly	<i>Dodonidia belmsii</i>	Gradual Decline
stag beetle	<i>Paralissotes mangonuiensis</i>	Sparse
Fish		
yelloweye mullet	<i>Aldrichetta forsteri</i>	
shortfin eel	<i>Anguilla australis</i>	
longfin eel	<i>A. dieffenbachii</i>	Gradual Decline
torrentfish	<i>Cbeimarrichthys fosteri</i>	
lamprey	<i>Geotria australis</i>	Sparse
koaro	<i>Galaxias brevipinnis</i>	Regionally Significant
banded kokopu	<i>G. fasciatus</i>	Regionally Significant
inanga	<i>G. maculatus</i>	
Cran's bully	<i>Gobiomorphus basalis</i>	
redfin bully	<i>G. buttoni</i>	
common bully	<i>G. cotidianus</i>	
giant bully	<i>G. gobioides</i>	Regionally Significant
bluegill bully	<i>G. hubbsi</i>	Regionally Significant
cockabully	<i>Grabamina nigripenne</i>	
black mudfish	<i>Neochanna diversus</i>	Gradual Decline
common smelt	<i>Retropinna retropinna</i>	
Lizards		
copper skink	<i>Cyclodina aenea</i>	
ornate skink	<i>C. ornata</i>	Regionally Significant
forest gecko	<i>Hoplodactylus granulatus</i>	Regionally Significant
Pacific gecko	<i>H. pacificus</i>	Gradual Decline
undescribed "common" gecko	<i>H. sp.</i>	Regionally Significant
Auckland green gecko	<i>Nautilinus e. elegans</i>	Gradual Decline
shore skink	<i>Oligosoma smithi</i>	

Introduced mammals

feral cattle	<i>Bos taurus</i>
feral dog	<i>Canis familiaris</i>
feral goat	<i>Capra hircus</i>
European hedgehog	<i>Erinaceus europaeus</i>
feral cat	<i>Felis catus</i>
brown hare	<i>Lepus europaeus</i>
house mouse	<i>Mus musculus</i>
common weasel	<i>Mustela nivalis</i>
stoat	<i>M. erminea</i>
ferret	<i>M. furo</i>
European rabbit	<i>Oryctolagus cuniculus</i>
ship rat	<i>Rattus rattus</i>
Norway rat	<i>R. norvegicus</i>
feral pig	<i>Sus scrofa</i>
brush-tail possum	<i>Trichosurus vulpecula</i>

8.6 COMMON AND SCIENTIFIC PLANT NAMES USED IN THE TEXT

This is not a definitive list of common names used for plants for 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 plants	
aka	<i>Metrosideros perforata</i>
akeake	<i>Dodonaea viscosa</i>
akepiro	<i>Olearia furfuracea</i>
black maire	<i>Nestegis cunninghamii</i>
bracken	<i>Pteridium esculentum</i>
coastal mahoe	<i>Melicytus novae-zelandiae</i>
coastal maire	<i>Nestegis apetala</i>
coastal tussock	<i>Chionochloa bromoides</i>
cutty grass	<i>Gabnia lacera</i>
eelgrass	<i>Zostera capricorni, Z. novaezelandica</i>
five-finger	<i>Pseudopanax arboreus</i>
giant umbrella sedge	<i>Cyperus ustulatus</i>
glasswort	<i>Sarcocornia quinqueflora</i>
gully tree fern	<i>Cyathea cunninghamii</i>
hangehange	<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>
harakeke	<i>Phormium tenax</i>
hard beech	<i>Nothofagus truncata</i>
heketara	<i>Olearia rani</i> var. <i>rani</i>
hinau	<i>Eleocarpus dentatus</i>
horopito	<i>Pseudowintera axillaris</i>
houhere	<i>Hoberia populnea</i>
houpara	<i>Pseudopanax lessonii</i>
jointed twig rush	<i>Baumea articulata</i>
kahikatea	<i>Dacrycarpus dacrydioides</i>
kanuka	<i>Kunzea ericoides</i>
karaka	<i>Corynocarpus laevigatus</i>
karamu	<i>Coprosma robusta</i>
karo	<i>Pittosporum crassifolium</i>
kauri	<i>Agathis australis</i>
kawaka	<i>Libocedrus plumosa</i>
kawakawa	<i>Macropiper excelsum</i>
king fern	<i>Marattia salicina</i>
kiokio	<i>Blechnum novae-zelandiae</i>
knobby clubrush	<i>Isolepis nodosa</i>
kohekohe	<i>Dysoxylum spectabile</i>
kohuhu	<i>Pittosporum tenuifolium</i>
kowhai	<i>Sopora microphylla</i>
kowharawhara	<i>Astelia banksii</i>
kuta	<i>Schoenoplectus tabernaemontani</i>
lancewood	<i>Pseudopanax crassifolius</i>
large-leaved milktree	<i>Streblus banksii</i>
large-seeded coprosma	<i>Coprosma macrocarpa</i>
mahoe	<i>Melicytus ramiflorus</i>
mamaku	<i>Cyathea medullaris</i>

mamangi	<i>Coprosma arborea</i>
manatu	<i>Plagianthus regius</i>
mangrove	<i>Avicennia resinifera</i>
mawhai	<i>Sicyos australis</i>
monoao	<i>Halocarpus kirkii</i>
manuka	<i>Leptospermum scoparium</i>
mapou	<i>Myrsine australis</i>
matai	<i>Prumnopitys taxifolia</i>
mingimingi	<i>Leucopogon fasciculatus</i>
miro	<i>Prumnopitys ferruginea</i>
mountain harakeke	<i>Phormium cookianum</i>
native broom	<i>Carmichaelia australis</i>
native iceplant	<i>Disphyma australe</i>
New Zealand spinach	<i>Tetragonia trigyna</i>
ngaio	<i>Myoporum laetum</i>
nikau	<i>Rhopalostylis sapida</i>
northern rata	<i>Metrosideros robusta</i>
oioi	<i>Apodasmia similis</i>
pakihi rush	<i>Baumea teretifolia</i>
parapara	<i>Pisonia brunoniana</i>
pate	<i>Schefflera digitata</i>
pingao	<i>Desmoschoenus spiralis</i>
pohuehue	<i>Muehlenbeckia complexa</i>
pohutukawa	<i>Metrosideros excelsa</i>
ponga	<i>Cyathea dealbata</i>
puka	<i>Grislenia lucida</i>
pukatea	<i>Laurelia novae-zelandiae</i>
pukio	<i>Carex secta</i>
puriri	<i>Vitex lucens</i>
rangiora	<i>Brachyglottis repanda</i>
rasp fern	<i>Doodia australis</i>
raukawa	<i>Raukaua edgerleyi</i>
raupo	<i>Typha orientalis</i>
rengarenga lily	<i>Arthropodium cirratum</i>
rewarewa	<i>Knightia excelsa</i>
rimu	<i>Dacrydium cupressinum</i>
saltmarsh ribbonwood	<i>Plagianthus divaricatus</i>
sea primrose	<i>Samolus repens</i>
sea rush	<i>Juncus kraussii</i> var. <i>australiensis</i>
sedge sp.	<i>Baumea</i> sp.
selliera	<i>Selliera radicans</i>
shaking brake	<i>Pteris tremula</i>
sharp spike sedge	<i>Eleocharis acuta</i>
shining spleenwort	<i>Asplenium oblongifolium</i>
shore bindweed	<i>Calystegia soldanella</i>
shore groundsel	<i>Senecio lautus</i>
shore lobelia	<i>Lobelia anceps</i>
sphagnum moss	<i>Sphagnum</i> sp.
spinifex	<i>Spinifex sericeus</i>
supplejack	<i>Ripogonum scandens</i>
swamp maire	<i>Syzygium maire</i>
swamp millet	<i>Isachne globosa</i>
tanekaha	<i>Phyllocladus trichomanoides</i>
tangle fern	<i>Gleichenia dicarpa</i>
taraire	<i>Beilschmiedia tarairi</i>
tarata	<i>Pittosporum eugenoides</i>

tauhinu	<i>Ozothamnus leptophyllus</i>
taupata	<i>Coprosma repens</i>
tawa	<i>Beilschmiedia tawa</i>
tawapou	<i>Pouteria costata</i>
tawaroa	<i>Beilschmiedia tawa</i> "tawaroa"
ti kouka	<i>Cordyline australis</i>
ti pore	<i>Cordyline fruticosa</i>
titoki	<i>Alectryon excelsus</i>
toatoa	<i>Phyllocladus glaucus</i>
toetoe	<i>Cortaderia splendens</i>
toru	<i>Toronia toru</i>
totara	<i>Podocarpus totara</i>
towai	<i>Weinmannia silvicola</i>
tree daisy	<i>Olearia</i> sp.
tree fern	<i>Cyathea</i> sp.; <i>Dicksonia</i> sp.
wharangi	<i>Melicope ternata</i>
wheki	<i>Dicksonia squarrosa</i>
willow-leaved maire	<i>Mida salicifolia</i>
Adventives	
arum lily	<i>Zantedeschia</i> sp.
blackberry	<i>Rubus fruticosus</i>
blackwood	<i>Acacia melanoxylon</i>
Brazilian coral tree	<i>Erythrina crista-galli</i>
buffalo grass	<i>Stenotaphrum secundatum</i>
crack willow	<i>Salix fragilis</i>
dandelion	<i>Taraxacum officinale</i>
flame tree	<i>Brachychiton acerifolium</i>
gazania	<i>Gazania rigens</i>
giant reed	<i>Arundo donax</i>
gorse	<i>Ulex europaeus</i>
hawkbit	<i>Leontodon sellonaa</i>
jointed rush	<i>Juncus articulatus</i>
kikuyu	<i>Pennisetum clandestinum</i>
macrocarpa	<i>Cupressus macrocarpa</i>
marram grass	<i>Ammophila arenaria</i>
Mexican daisy	<i>Erigeron karvinskianus</i>
Mexican devil	<i>Ageratina adenophora</i>
mistflower	<i>A. riparia</i>
Morton Bay fig	<i>Ficus macrophylla</i>
Norfolk pine	<i>Araucaria heterophylla</i>
pampas	<i>Cortaderia selloana</i>
pine	<i>Pinus</i> sp.
poplar	<i>Populus</i> sp.
prickly hakea	<i>Hakea sericea</i>
privet	<i>Ligustrum</i> sp.
smilax	<i>Asparagus asparagoides</i>
sweetpea shrub	<i>Polygala myrtifolia</i>
tobacco weed	<i>Solanum mauritianum</i>
wattle	<i>Racosperma</i> sp.
wandering willy	<i>Tradescantia fluminensis</i>
wild ginger	<i>Hedychium</i> sp.
willow	<i>Salix babylonica</i> or <i>S. fragilis</i>
willow weed	<i>Polygonum</i> sp.
yellow ginger	<i>Hedychium flavescens</i>

8.7 GLOSSARY

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.

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.

Flaxland

Flaxland describes vegetation types that are dominated by harakeke (flax) *Phormium tenax*.

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.

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.

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*, *Glyceria*, harakeke.

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 filter for non-point water discharges.

Riparian zone

An area of land immediately adjacent to a watercourse.

Rush/Sedgeland

Swampy areas dominated by rushes, sedges, or rush-like sedges, e.g. *Baumea*, *Juncus* (rush), *Carex*, *Schoenus*, *Isolepis*, marsh clubrush.

Saltmarsh

Saltmarsh describes an estuarine zone that is periodically flooded by salt water. In Northland saltmarshes are important buffers to mangrove forest and are typically characterised by oioi (*Apodasmia similis*), *Baumea juncea*, sea rush (*Juncus kraussii*) and saltmarsh ribbonwood (*Plagianthus divaricatus*).

Scrub

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

Secondary vegetation

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

Seral

Describes a plant community in the process of succession.

Shrubland

Vegetation in which the canopy is dominated by woody plants less than 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, e.g. gumland manuka shrubland, pohuehue 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 addressed 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. For example the colonisation of bare rock, or soil by algae and lichens ending with a stable climax community in equilibrium with the environment. Secondary succession occurs where the original vegetation has been destroyed, e.g. by fire.

Survey no.

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

Sustainability

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

Swamp

Fertile or eutrophic wetland, usually dominated by raupo, *Carex*, *Baumea articulata*, harakeke and ti kouka.

Swamp forest

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

Swamp shrubland

A transitional type with woody co-dominants like *Coprosma propinquu--manuk--ti kouka* 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.

9. Index of sites

Site	Survey no.	Page
Abbey Caves Remnants	Q07/001	250
Akerama Bush	Q06/005	108
Awahoa Bay Beach & Coastal Remnants	Q07/113	280
Beasley Road Remnant	Q07/118	286
Bland Bay Forest	Q05/009	72
Bland Bay Wetland	Q05/017	84
Bland Rocks	Q05/072	342
Brian Storey Memorial Bush	Q06/021	126
Campbell Road Remnants	Q07/008	264
Cape Brett Peninsula Forest	Q05/007	66
Cape Brett West Island	Q05/068	337
Clement Road Remnants	Q06/080	193
Eastern Bay of Islands Estuary	Q05/001	51
Edge Road Remnant	Q06/064	164
Edwards/Tikitikioure Coastal Habitat	Q05/004	61
Elliot-Pahi-Umuheke Beaches	Q05/008	70
Flat Rock Island	Q05/050	314
Four Islet Group	Q06/124	347
Gibbs Road Forest Remnant	Q06/012	112
Goat Island	Q06/126	374
Gomez Road Bush	Q06/078	189
Hansens Hill Forest	Q06/026	133
Haumakariri Stream Remnant	Q06/035	363
Helena Bay Remnants	Q05/023	91
Hently Road Forest Remnants	Q06/013	115
Horahora Bush	Q06/114	231
Horahora Dunes	Q06/178	249
Horahora Estuary	Q06/111	225
Hugh Crawford Memorial Scenic Reserve	Q06/077	186
Hulse's Bush	Q06/092	199
Jubilee Road Remnant	Q06/034	361
Kaiatea Remnant	Q06/084	366
Kaiikanui Forest	Q06/022	128
Kaimamaku Stream Riverine Forest	Q06/019	123
Kings Kauri Scenic Reserve	Q07/117	286
Kirikiritoki Remnants	Q06/088	370
Kohangaatara Point Island	Q05/035	290
Kowhaitai Creek Remnant	Q06/115	235
Lake Rotokereru Remnants	P06/085	48
Lookout Road Bush	Q06/118	239
Lowe Road Remnant	Q06/076	364
Lower Kaimamaku Stream Riverine Forest	Q06/018	121
Lower Taparahaia Stream Riverine Forest	Q06/036	151
Mad Dog Forest Remnants	Q06/063	164
Maddren Road Bush	Q06/107	373

Site	Survey no.	Page
Mahenotiti Island	Q05/058	322
Mains Road Remnant	Q06/116	236
Manganese Point Coastal Forest Remnant	Q07/016	278
Marriott Island	Q05/036	291
Marua Road Remnants	Q06/117	237
Matapouri Bush Block	Q06/074	180
Matapouri Coastal Remnants	Q06/070	175
Matapouri Estuary	Q06/083	195
Matapouri Road Forest	Q06/061	161
McInnes Road (a) Forest	Q06/060	160
McInnes Road (b) Forest	Q06/075	185
Mimiwhangata Beach/Pareparea Bay	Q06/039	156
Mimiwhangata Coastal Forest Remnants	Q06/030	144
Mimiwhangata North Wetlands	Q06/041	158
Mimiwhangata South Wetland and Streams	Q06/068	171
Moanarua Island	Q05/065	334
Mohei StreamWetland	Q05/013	80
Mokau Bay	Q05/012	78
Mokau Bush	Q05/025	96
Monument Road Forest	Q06/006	110
Motuarahi Island	Q05/038	294
Motuarohia Island	Q05/040	297
Motuhi and Parerangi Islands	Q05/066	335
Motukauri Island (a)	Q05/055	321
Motukauri Island (b)	Q05/064	332
Motukehua Island	Q05/063	330
Motukiekie Island	Q05/042	301
Motukiore Island	Q05/059	324
Motukokako Island	Q05/047	310
Motukorari Island	Q05/070	339
Motukowhai Island	Q05/071	341
Motukumara Island	Q05/049	313
Motumaire Island & Taylor Island	Q05/037	293
Motungangara Island & Surrounds	Q07/015	354
Moturahurahu Island	Q05/053	318
Moturoa Island	Q05/073	343
Moturua Island & surrounds	Q05/041	298
Motutaniwha Island	Q06/127	350
Motutara Island	Q05/062	329
Motutara Point Coastal Forest Remnants	Q06/033	149
Motutohe Island	Q06/125	349
Motuwheteke Island	Q05/052	317
Mount Tiger Road Bush	Q07/002	252
Ngahau Bay Coastal Habitat	Q06/031	147
Ngahau Remnant	Q06/038	154
Ngaiotonga Remnants	Q05/027	357
Ngaiotonga Swamp	Q05/016	82
Ngamatengau Point Coastal Remnants	Q07/010	268
Ngunguru Estuary	Q06/110	223

Site	Survey no.	Page
Ngunguru Remnants	Q06/120	243
Ngunguru Sandspit	Q06/102	213
North Gable Remnants	Q06/093	200
Oakura Bay Coastal Habitat	Q05/022	91
Oakura Bay Remnants	Q05/024	94
Oakura Remnants	Q05/032	359
Oakura Road Remnant	Q05/030	104
Ohawini Bay Bush Remnants	Q05/028	100
Okahu Island	Q05/043	302
Olde's QEII Covenant	Q06/069	173
Omaikao Stream Remnant	Q06/086	367
Opuawhanga Riverine Forest Remnants	Q06/023	131
Otangawhanga Island	Q06/123	346
Otonga Remnant	Q06/109	221
Otuwhanga Island	Q05/048	312
Outu Bay Stack	Q05/069	338
Owai Stream Riverine Habitat	Q06/066	169
Pakaru Road Forest	Q05/005	64
Papanui/Umuwhawha Forest	Q06/014	117
Paparahi Point Islets	Q06/128	351
Parauwanui Beach	Q07/114	281
Parkes Road Bush	Q07/004	257
Parsons Road Swamp Forest Remnant	Q06/015	119
Parua Bay Remnants	Q07/116	284
Pataua Estuary	Q07/012	272
Pataua Estuary Remnants	Q07/011	270
Peach Orchard Road Remnants	Q06/020	124
Philip Island	Q06/097	345
Poroporo Island	Q05/046	308
Poutukiterangi Pa Forest Remnant	Q05/014	81
Puhipuhi Road Remnants	Q06/121	246
Pukapuka Road Forest	Q05/031	105
Punaruku Riverine Forest	Q05/018	84
Punaruku/Parorerahi Bay Coastal Habitat	Q05/019	87
Putahataha Island	Q05/034	289
Rahomaunu Island	Q06/129	353
Rehuotane Headland	Q06/099	207
Rimariki Island & surrounds	Q05/060	325
Rockell Road Coastal Forest Remnants	Q06/028	140
Ruapekapeka Forest	Q06/003	106
Rukuwai Remnants	Q07/007	262
Russell Forest	Q05/003	56
Sandy Bay Coastal Forest Remnants	Q06/065	167
South Gable Remnants	Q06/095	202
Taheke Scenic Reserve	Q06/112	227
Taiharuru Estuary	Q07/013	274
Taiharuru Estuary Remnants	Q07/009	266
Taiharuru Head Coastal Remnants	Q07/115	283
Taihu/Kohinui Stream Bush	Q07/005	259

Site	Survey no.	Page
Taipuhi Road Remnants	Q06/008	360
Taiwawe Bay Remnants	Q06/029	142
Tapeka Point Coastal Habitat	Q05/002	54
Taraunui Remnants	Q07/006	260
Tawiriwiri Island	Q05/054	320
Te Oriwa Stream Riverine Habitat	Q06/072	180
Te Rearea Pa/Tauranga Kawau Point Coastal Remnants	Q06/037	152
Te Rewa Stream Riverine Habitat	Q06/032	147
Te Toira Road Remnant	Q06/087	368
Te Waiongatahuna Riverine Forest Remnants	Q06/025	133
Te Wairahi/Taupari Stream Riverine Habitat	Q06/071	178
Todd Road Forest	Q06/079	191
Toretore Island	Q05/039	295
Tutaematai Bush	Q05/029	102
Tutaematai Stream Riverine Forest	Q05/020	89
Tutukaka Block Shrubland	Q06/096	371
Tutukaka Forest	Q06/119	242
Tutukaka Remnants	Q06/098	205
Urupukapuka Island & surrounds	Q05/045	306
Waewaetorea Island	Q05/044	304
Waihaha Road Swamp Forest	Q05/006	65
Waikahoa Bay Forest	Q06/027	138
Waikaraka Stream Remnants	Q07/003	254
Waiomio Limestone Caves Forest	P05/057	48
Waiotoi Road Remnant	Q06/090	197
Waiotu Riverine Forest	Q06/009	112
Waiparera Shrubland	Q07/017	374
Waiwiri Island	Q05/051	316
Waro Limestone Scenic Reserve	Q06/122	247
Whakapara Forest	Q06/017	120
Whakareora Coastal Habitat	Q06/101	209
Whananaki Bush	Q06/113	228
Whananaki Coastal Remnants	Q06/103	215
Whananaki Estuary	Q06/105	217
Whananaki Sandspit	Q06/106	219
Whangaruru Harbour	Q05/011	76
Whangaruru Harbour Remnants	Q05/026	98
Whangaruru North Head Coastal Remnant	Q05/010	74
Whanui Bush	Q07/014	276
Wide Berth Islands	Q05/061	327