Natural areas of Tutamoe Ecological District

Reconnaissance survey report for the Protected Natural Areas Programme

2008

Department of Conservation
Te Papa Atawhai

Natural areas of Tutamoe Ecological District

Reconnaissance survey report for the Protected Natural Areas Programme

2008

Nigel Miller and Wendy Holland

Published by
Department of Conservation
Northland Conservancy
P.O. Box 842
Whangarei 0140, New Zealand

Cataloguing-in-Publication data

Natural areas of Tutamoe Ecological District : reconnaissance survey report for the Protected Natural Areas Programme / Nigel Miller and Wendy Holland. Whangarei, N.Z. : Dept. of Conservation, Northland Conservancy, 2007.

1 v.. : ill., maps ; 30 cm.

ISBN 978-0-478-14203-7 (Hard copy)
ISBN 978-0-478-14204-4 (Web pdf)

ISSN 0112-9252

(New Zealand Protected Natural Areas Programme (Series))

1. Ecological surveys–New Zealand–Northland. 2. Natural areas–New Zealand–Northland
3. Tutamoe Ecological District (N.Z.). I. Miller, Nigel (Nigel Charles) II. Holland, Wendy

In the interest of conservation, DOC supports paperless electronic publishing. When printing, paper manufactured with environmentally sustainable materials and processes is used wherever possible.

Foreword

"Natural areas of Tutamoe Ecological District" describes significant natural areas surveyed in 1994–95 and is part of a series of reconnaissance survey reports for the Protected Natural Area Programme (PNAP) in the Northland Conservancy of the Department of Conservation. The survey showed that over half (57.4%) of the District is defined by natural areas of regional, national or international significance.

The Tutamoe Ecological District is dominated by the Waipoua/Mataraua/Waima Forest tract, the largest contiguous tract of indigenous forest in Northland, containing the highest point (Te Raupua at 781 m asl) and some of the best altitudinal sequences running unbroken from the swamp forest tablelands of the Mataraua Forest down to coastal dune complexes along the Waipoua coast.

The ecological values of the Waipoua/Mataraua/Waima Forest tract are exceptional, containing a multitude of threatened plants and animals, including many endemic to the District.

Waipoua Forest in particular is internationally renowned as home to the largest mature kauri trees in the world, some of which have been around for 2000 years.

Northland is the stronghold for NI brown kiwi in the country, with Waipoua Forest containing the largest population, estimated to be in the hundreds.

Coastal features to the south of Omapere and forest remnants within the Waimamaku River catchment define the most significant natural features outside of the large forested areas. Of national importance are the coastal and dune remnants containing several threatened species and old growth forest remnants on an alluvial base—an extremely uncommon association not only in this Ecological District but throughout Northland.

This report contains a wealth of information on the ecological values of the Tutamoe Ecological District and will be an important reference to a wide interest group including private landowners, iwi, conservation groups and local bodies.

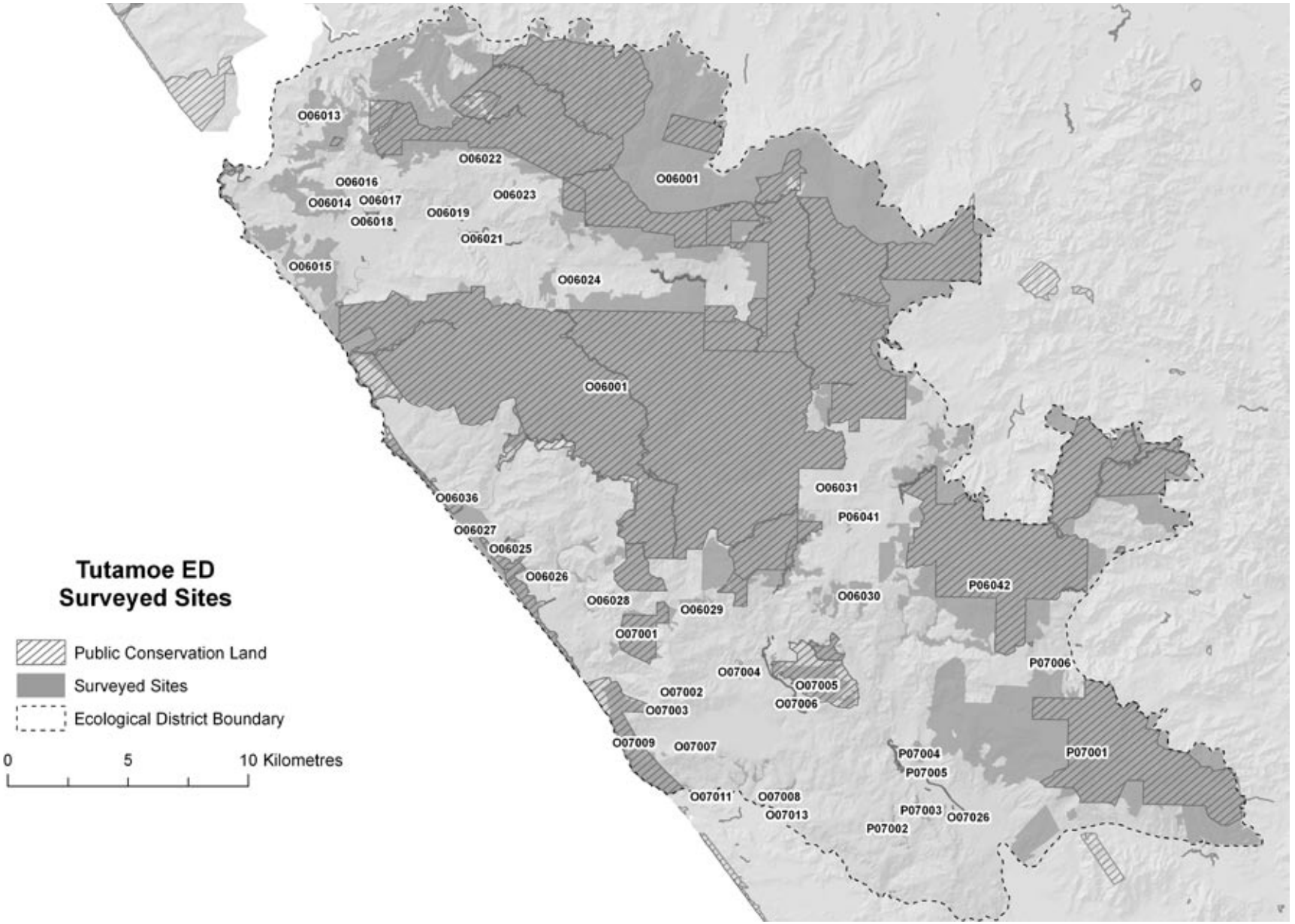
Chris Jenkins
Conservator Northland

CONTENTS

MAPS

TABLES

Map 1. Location of Tutamoe Ecological District



Map 2. Tutamoe Ecological District surveyed sites and 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 Tutamoe Ecological District is very distinct, containing unique topography, geology, vegetation types and plants and animals within Northland.

The most outstanding feature of this Ecological District is the large forest tract comprising Waipoua, Mataraua and Waima Forests. This continuum represents the largest remaining indigenous forest north of Auckland and is of national and international significance. At approximately 31,934 ha, this forest covers around 38.9% of the total land area of the Tutamoe Ecological District.

This large ecosystem is a vitally important refuge for many nationally threatened and regionally significant plants and animals, including plants and invertebrates that do not occur anywhere else.

A total of 41 significant natural areas were identified in this survey totalling 47,168.6 ha. This equates to 57.2% of the land area of the Ecological District. As a comparision 30% of the neighbouring Hokianga Ecological District (which includes three harbours), is defined by significant natural areas.

Currently 32,743.5 ha or 69.4% of the natural areas of the Tutamoe Ecological District are formally protected.

Priority areas for protection include forest buffers and enclaves associated with the Waipoua, Mataraua, Waima, Marlborough and Kaihu Forests, remnants of old growth forest on alluvium, full protection of the Muriwai Stream Swamp (the largest swamp remaining in the District), and coastal habitats.

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 PNAP reports in other parts of the country in that it is based mainly on reconnaissance survey and existing published and unpublished data, and includes descriptions of most natural areas within the Eological 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 (RAP's), as defined in PNAP reports 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) and the Convention on Biological Diversity (1992) and the more recent New Zealand Biodiversity Strategy (2000).

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

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

Of particular relevance is Section 6 (c) of the RMA 1991, which lists as a 'matter of national importance':

- *The protection of areas of significant indigenous vegetation and significant*
- *Habitats of indigenous fauna.*

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 Tutamoe 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 (i.e. species and subspecies) of scientific interest, including information which has become available since the time of survey.

The reconnaissance survey was undertaken in 1994 and 1995 and unless otherwise stated, some sites may have since been partially or completely destroyed, while others may have regenerated. It has not been possible to re-survey and so the site descriptions apply to the date of survey but we have employed the latest aerial photography to produce the site maps as a check against the original survey. In a few cases the site boundaries have changed significantly, in others very little or not at all whilst the site boundary of some sites was improved upon by the benefit of an aerial view compared to the outdated topographical interpretation used for the original survey. Where changes occurred an explanation was made at the beginning of the site report in the "Area" section including the date of the aerial photography. In Appendix 8 a map was produced indicating potential sites or possible site extensions in the District, all of which are subject to survey.

Soil descriptions are given for sites listed in Arand *et al.* (1993) as being of regional, national or international importance. Important geological sites and landforms of international, national and regional significance are derived from Kenny and Hayward (1996) (See Appendix 4).

1.4 TUTAMOE ECOLOGICAL DISTRICT

The Tutamoe Ecological District comprises approximately 82,035.56 hectares of western Northland from South Head of Hokianga Harbour to south of Maunganui Bluff.

The western boundary is along the west coast (Tasman Ocean), the southern boundary follows the eastern side of Kai Iwi Lakes and across to Kaihu Forest and the southern Hokianga Harbour entrance forms the northern boundary; while Marlborough and Mataraua Forests form the eastern boundary and the Waima Range.

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

The District includes the largest contiguous tract of indigenous forest in Northland, including large areas of unmodified forest, featuring the largest mature kauri trees in the world and many threatened plants and animals. This forest tract contains the highest point in Northland (Te Raupua in the

Waima Range at 781 m asl) with an altitudinal sequence running unbroken from the swamp forest tablelands of the Mataraua Forest down to coastal dune complexes south of Waimamaku. In particular the Waima Forest contains plant species which are found nowhere else. *Olearia crebra* was discovered for the first time in 1982 followed by two other exciting additions to science, *Coprosma waima* in 1986, and *Ackama nubicola* or turoa onamata in 2000. These plants are generally restricted to the cold, south-facing, windblasted cliffs of the Waima Range (over 500 m asl) and due to their restricted distribution and threat from browsing animals are ranked as being Acutely Threatened.

Waipoua Forest supports the largest population in the country of the nationally threatened NI brown kiwi (Serious Decline), possibly between 1–2000 birds (R. J. Pierce pers. comm.), while the Waipoua/Mataraua plateau contains the most viable population of NI kokako (Nationally Endangered) in Northland.

The largely vegetated catchment of the Waipoua River is reflected in its high water quality, and because of this is considered to be the least modified of all the large river systems in Northland. It contains a rich diversity and density of macroinvertebrate life (Seitzer 1996). Short-jawed kokopu, a species in Gradual Decline, has been recently rediscovered there.

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

The Ecological District contains approximately 32 km of unbroken coastline, which includes the outstandingly diverse coastal forest, shrubland and associations of Maunganui Bluff. Many threatened plant and animal species are found at Maunganui Bluff including a large population of *Hebe speciosa*, titirangi or napuka. This plant now only occurs on the west coast of the North Island at South Hokianga Heads and Maunganui Bluff in this Ecological District and on the cliffs west of Aotea Harbour, Mokau and at Titirangi Bay in the Marlborough Sounds (NZPCN 2007).

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

Of the natural areas identified, 90.4% (42,669.8 ha) are forest, 8.7% (4,116.3 ha) shrubland (shrubland includes coastal associations on bluffs and beaches), 0.4% (186.5 ha) duneland/sandfield and 0.41% (196 ha) freshwater wetland. Estuarine habitats were not recorded in the Tutamoe Ecological District.

Priorities for protection includes the full protection of the only large swamp, Muriwai Stream Swamp (O06/026), left in the Ecological District, forest buffers and remnants close to large forests of Waipoua, Mataraua, Waima, Marlborough and Kaihu, and coastal forest/shrubland associations of Te Kaiatewhetu Shrublands and Te Arai te Uru Coastal Strip (O06/015) and alluvial forest (see section 5.1 p. 156).

2. Methods

2.1 GENERAL APPROACH

Reconnaissance surveys using rapid semi-quantitative methods were carried out in 13[1] Ecological Districts in the northern sector of the Northland Conservancy, predominantly between 1994 and 1997, to obtain information on the composition, extent and ecological values of indigenous natural areas. Since 1997 a further 5[2] Ecological Districts have been surveyed. A rapid survey method was selected by the Department of Conservation (DOC), Northland Conservancy, because of time constraints for the field survey and the extensive areas to be covered and because it could be easily applied to all natural areas.

Field work was conducted by Department of Conservation staff and coordinated in the Whangarei Office of the Northland Conservancy.

Natural areas were identified from topographic maps, existing databases and information systems, published and unpublished reports, aerial photographs and field observations. Areas were identified irrespective of tenure. Consequently many natural areas that are administered by the Department of Conservation, as well as other protected areas, were also surveyed using the same methodology. This provided a consistent approach to determine representativeness for both protected and unprotected natural areas.

Each site recorded was mapped and ecologically described and as already stated above in 1.3 the original topographical mapping was checked against the latest aerial photography. Aerial orthophotography was

1 Northland contains 19 mainland EDs: Te Paki, Aupouri, Maungataniwha, Ahipara, Whangaroa, Hokianga, Puketi, Kerikeri, Kaikohe, Tutamoe, Tangihua, Whangaruru, Whangarei, Otamatea (part), Rodney (part), Waipu, Kaipara (part), Tokatoka, Manaia. The first 13 were surveyed/ or survey was started between 1994 and 1997 in Northland Conservancy; to date 14 reports have been published. Rodney ED was one of the original PNAP surveys to be conducted in the country with work carried out in 1983/84.

2 The 5 EDs are Manaia, Tokatoka, Otamatea (part), Waipu, Kaipara (part).

provided courtesy of Northland Regional Council and Kaipara District Council. Copyright reserved.

Having evaluated the sites (see Section 2.4 below), they were grouped according to one of two levels of ecological significance. Scientific names of species which appear in this report by their common names can be found in Appendix 5 (fauna) or Appendix 6 (flora).

In the writing of this report, extensive use was made of information from existing biological databases and information systems such as the Sites of Special Biological Interest (SSBI), Department of Conservation, Northland Conservancy's Threatened Plants Database, Department of Conservation Bioweb Threatened Plant and Herptofauna database, the NIWA Freshwater Fish Database, geopreservation and soil inventories, 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. Herbarium records from Auckland Institute and Museum were also consulted. Geographical and geological information was gained from existing published and unpublished maps.

Although many sites were not surveyed in detail, large amounts of data were collected, considerably expanding the information base for the Ecological District. It is important to note that because of a tight timetable and budget constraints, some important natural areas and vegetation types may have been overlooked.

2.2 CONSULTATION WITH LANDOWNERS

Personal contact with all landowners was not possible, however all ratepayers were advised by mail by way of a leaflet (Appendix 2) informing them of the programme and the reasons for it. 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 featured in the local newspapers (see Appendix 2).

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

Consultation with iwi was undertaken by the then Conservancy Protection Manager.

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 sighted or surveyed in this manner, due to either the site being very isolated or failure to obtain landowner permission for access. Information on some of these sites, therefore, remains limited, and it is likely that some vegetation associations have not been recorded.

Natural areas were mapped using four broad categories of habitat types; forest, shrubland[3], freshwater wetland and duneland/sandfield[4] (see Appendix 9 for definition of terms). Estuary is an additional category other Northland PNAP reports have used however estuarine habitat not feature in this survey of the Tutamoe Ecological District. Rockland was also used for the first time in the Waipu Ecological District Report (Lux, Martin and Beadel 2007) however this report and all PNAP Northland reports preceeding Waipu did not categorise or specifically survey rockland.

At each site, the composition and relative abundance of canopy plant species was recorded on the field survey sheet (see Appendix 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 an appropriate method of describing 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 and Rogers 1996; Park and Walls 1978) and in other parts of the world (see Kershaw and Looney 1985; Mueller-Dombois and 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. In some instances, ground cover plant species or substrate was recorded in non-forest/shrubland habitats.

More detailed, and therefore more time-consuming and expensive methods, would not necessarily provide more useful information for assessing representativeness. However, one disadvantage of this survey was that it was not possible to update threatened and regionally significant species records (except through checking existing databases and information systems) or provide information on understorey species.

Canopy 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, including each ecological

3 The shrubland category is very broad, and includes diverse vegetation associations that could not be described as forest, wetland or duneland / sandfield, e.g., kowharawhara–*Astelia solandri* association

4 The broad category of duneland has been used in previous Northland PNAP reports. In this ED and in the Waipu ED sandfield was a more accurate description for this category as it represents an area dominated by bare sand, and so the category was changed to duneland/ sandfield.

unit recorded. A search on each ecological unit gave information on the frequency of the different ecological units remaining in the Ecological District. Some sites had only one vegetation type on one geological unit, while others had multiple of each. This information was used to determine the representativeness of each ecological unit (see 5. Summary and conclusions, Table 2. Ecological units recorded in the Tutamoe 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.

For the purpose of evaluation of representativeness and description, 'coastal' ecological units are those units which occur less than 1 km from the coast, or are adjacent to the coast. However it must be acknowledged that this is an arbitrary division. Some 'inland' ecological units will also have coastal influence because of the narrowness of the Northland Peninsula.

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 sources, e.g. SSBI and threatened species information, was added to the site descriptions.

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

2.4. CRITERIA FOR ASSESSING HABITAT SIGNIFICANCE

The natural areas described in this report meet at least one of the following criteria:

- They are of predominantly indigenous character, by virtue of physical dominance or species composition 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 then assessed using a two-level classification of habitat significance based on the PNAP ecological criteria of representativeness, rarity and special features, diversity and pattern, 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 size, representativeness, diversity and pattern, naturalness, and shape. Table A outlines the links between PNAP criteria and the Level 1 and 2 criteria.

Level 1 sites

The 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, recovering or naturally uncommon 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 indigenous or endemic migratory taxa.
9. Covers a large geographic area relative to other similar habitat types within the Ecological District.

Level 2 sites

A Level 2 site is a natural area that supports populations of indigenous flora and fauna not identified as meeting the criteria for Level 1. It is a site which:

- contains common indigenous species or ecological units 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. the forest understorey is grazed.
- has not been surveyed sufficiently to determine whether it meets 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 inspecton.

TABLE A. 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 or declining or naturally uncommon 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 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 in the Ecological District.	Exhibits a lower level of naturalness than other examples of its type in the Ecological District..
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).

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 ground water 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 the invasion of adventive weeds, can dramatically modify shrublands. Drainage of adjoining land can alter the water tables of wetlands thus lowering the quality of the habitat and facilitating the establishment of

weeds. Ongoing piecemeal destruction or modification of habitats and sustained grazing of bush remnants will, in the long term, completely eliminate some habitats and species dependent on those habitats.

It should also be noted that it is close to ten years since most of the sites in this report were surveyed, and it would be expected that the majority of fern and shrubland areas, if they still exist, would exhibit notable changes in terms of succession. Some ecological units, especially those in early successional stages, may have altered significantly or even be replaced completely, and descriptions of vegetation height may no longer be accurate.

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

3. Ecological character

3.1 TOPOGRAPHY/GEOLOGY

Topography

There are two main physiographic elements:

1. The steep and rugged, deeply dissected east-west trending Waima Range in the north of the Ecological District rising to the highest point in Northland (Te Raupua—780 m asl); and
2. A gently south-westward sloping, partly eroded basalt plateau incorporating the Parataiko Range, Tutamoe Range and Maunganui Bluff, and reaching its highest point at Mt Tutamoe (770 m asl) in the south-east. The plateau is drained by three main catchment systems of the Waimamaku, Waipoua and Waima-Kaihu Rivers. Colluvial basalt boulders are common on steep slopes in valleys and on the escarpment along the eastern margin of the plateau, and there are several very large areas of landslide deposits in Waimamaku valley. The west coast has stretches of sandy beaches backed by dunes and small freshwater wetlands, interspersed with rocky headlands including the 459 m high Maunganui Bluff in the south.

Geology

The Waima Range is formed of allochthonous Cretaceous Tangihua Complex ophiolitic rocks (predominantly altered submarine basalt and subvolcanic intrusions), whereas the volcanic plateau to the south is formed of deeply weathered lower Miocene Waitakere Group basaltic lava flows and tuff that were erupted from a large shield volcano centred west of Maungauni Bluff. Underlying lower Miocene Otaua Group sandstone and igneous conglomerate, and allochthonous Cretaceous-Paleogene Mangakahia Complex and Motatau Complex sedimentary rocks outcrop in Waimamaku and Kaihu valleys, and Otaua Group igneous conglomerate also forms prominent headlands on the coast in the vicinity of Hokianga South Head. Extensive areas of Pleistocene dune sand and minor Holocene dunefields are present along the west coast, mantling older rock units (Brook 1996).

3.2. CLIMATE

Data is derived largely from Waipoua Forest and Punakitere weather stations.

The climate in Northland is generally warm and temperate. In western and southern areas, winter is usually the wettest season, receiving 30–35% of yearly rainfall during June to August. The mean annual rainfall at Waipoua Forest is 1657 mm. The western ranges of Northland receive the highest rainfall on average in the region.

The Tutamoe Ecological District has about 2000 h of bright sunshine per year although the western flanks of the Tutamoe Ranges receive significantly less sunshine hours.

High altitude sites can expect about 1700 hours of sunshine.

The mean annual temperatures for western and southern areas is between 14ºC and 15.5ºC.

In areas of 500 m asl the mean annual temperature could drop to 12ºC.

Spring is generally the windiest season with airflow predominating from the south-west.

The mean annual wind speed for the District is 10.6 km/h.

Tropical cyclones and depressions can affect Northland between December and April resulting in heavy rain and strong north easterly winds.

(Moir *et al.* 1986)

3.3 VEGETATION

3.3.1 Historical

Large areas of unmodified indigenous forest remain in the Tutamoe Ecological District.

In particular there are some magnificent examples of unmodified kauri forest and associated forest types found within the Waipoua, Mataraua and Waima Forest tract.

In A.H Reeds book "The new story of the Kauri" reference is made to the exceptional kauri tree known as Kairaru that lived on the eastern side of Tutamoe.

"*...in the depths of the Tutamoe Forest, a tree known to the Maoris as Kairaru, which, though some six feet less in circumference than the Mercury Bay giant, exceeded it by twenty feet in height to the first limb.*"

"...using my long knife to cut a track up one of the south east spurs of Tutamoe Mountain, when I saw (out of the corner of my eye, as it where), in a slight depression, what I took to be a cliff! But as I advanced a few paces I saw that I could look round it, and then it dawned on me that is was a kauri tree of enormous size.

"...we came to the conclusion that it was just a chain (66ft) round."

This tree was later confirmed as having a circumference of 66 ft (20 m), length 100 ft (30.5 m) to the first branches (this equates to a volume of 453 m^3 which is almost twice as big as Tane Mahuta, 244.5 m^3 (Halkett and Sale 1986)). A letter by Sydney Mair to A.H. Reed stated that Kairaru had died as a result of a fire in 1886 (Reed 1964).

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

Maori and in particular European settlement resulted in significant modification to the District through agriculture, kauri extraction and the gum industry.

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

"*Much of the coastal and inland areas that are in scrub today had their forest cover first burnt in pre-European times. Other areas cleared and inhabited can be recognised by the presence today of large kanuka and coppices of karaka (used for food).*"

"*Historical evidence indicates regular, extensive burning of the current scrub prior to European occupation. Much of the lower Waipoua River Valley and coastal area was a well developed grassland at the time of the first gumdigger. The gumdiggers themselves lit numerous small fires to clear vegetation and hence make digging easier.*"

Up to 600 gumdiggers lived on the gumfields near Kawerua, at the height of the gumdigger period.

Eadie, Leathwick and Burns suggest that kauri, kanuka, miro and Hall's totara forest may be very similar to the original coastal forest type in the Waipoua area.

The Waipoua Forest was originally purchased from Maori in 1876. World War II initiated the beginning of intensive logging within the forest and this continued until 1948. It is likely that the forest was 'saved' prior to World War II because of difficulties in accessing and removing timber. It was not until 1952 that the forest was finally protected (Eadie, Burns and Leathwick 1987).

Maunganui Bluff became a reserve in 1911. "*It is likely that the original vegetation on the more sheltered parts was similar in nature to that of Waipoua Forest i.e. kauri (dense in places and sparse at others) with podocarps and northern rata reaching far above a canopy of tawa and taraire where the kauris are few. It is evident that all useable timber was removed, probably early this century.*"

"*Since then there have been many fires. Cattle have grazed and browsed all the accessible parts for a very long time, probably continuously since the land was reserved.*"

(Esler and Dobbins 1977)

3.3.2 Broad pattern

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

The Waipoua/Mataraua/Waima Forest tract represents 38.9% of the land area of the Ecological District or 67.7% cover of the natural areas identified in this report.

The uniqueness of this District is reflected particularly in its vegetative associations e.g. high altitude swamp forest on the Tutamoe Plateau defined by kiekie, supplejack and towai with maire tawake and emergent

rimu. In Waipoua Forest Sanctuary and the expanded protected areas, the intricate relationship between soil processes, altitude and forest type, are well described by Eadie, Burns and Leathwick (1987). They recognise 13 different forest types, which include two lowland coastal types described as mamangi-mapou-kanuka and taraire/kohekohe-karaka-nikau forest. On well-drained, lowland areas kauri/mamangi-kanuka-towai and taraire-towai/kohekohe forest is prevalent and grades into extensive areas of taraire/kohekohe and kauri/taraire forest at mid-altitude. Also at middle altitudes are variants of towai-kanuka-miro-Hall's totara forest with different frequencies of taraire and kauri. At high altitude, towai-tawa forest is found with varying proportions of rimu, miro, northern rata and maire tawake. Seven shrubland types with different mixtures of *Gleichenia-Baumea*-manuka-*Dracophyllum*-towai and rewarewa (depending on soil type and topography) were also identified.

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

Shrubland on coastal hillslopes and cliffs is perhaps best represented at Maunganui Bluff where an intricate mix of coastal associations occupies the coastal cliffs to an altitude of over 300 m asl. Dominant species include harakeke, toetoe, native iceplant, kowharawhara, *Isolepis* spp., *Juncus* spp., mapou, taupata, kiekie, hangehange, *Rhabdothamus solandri, Hebe* spp., manuka, mingimingi, mahoe, and pohutukawa.

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

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

Closer to the foredunes, oioi, *Coprosma acerosa, Pimelea prostrata* and *Leucopogon fraseri* make an appearance before giving away to the true sand-binders of the foredune such as *Spinifex,* pingao and shore bindweed.

Freshwater wetlands are few, but the best examples being amongst the consolidated dune sands south of the Waipoua River. Where deep dune lakes have formed, vegetation is largely restricted to a peripheral reed zone usually comprising raupo, *Baumea articulata* or *Eleocharis*

sphacelata. Where the adjoining land is not grazed, rush-like sedge associates melt into manuka, wheki and ti kouka dominant associations. Harakeke and bracken also dominate in the more fertile drier sites.

3.3.3 Main vegetation types

Due to the reconnaissance nature of this survey there are undoubtedly many more vegetation types and ecological units found within the Tutamoe Ecological District which have not been recorded in this report. In the vegetation classification system used for this study the term 'coastal' has only been applied to vegetation that directly occurs on the coast or is in 1 km from the coast. The extent of vegetation types recorded in this study are listed in Table 2 (pg 159). The following section describes the main vegetation types recorded across the Ecological District.

Freshwater wetlands

Freshwater wetlands are recorded from 7 sites (only 0.41% of the natural areas surveyed) occurring along the western side of the District.

Muriwai Stream Swamp (O06/026) on the west coast is a very significant wetland in Northland and is the largest wetland in the Tutamoe Ecological District containing a mosaic of wetland vegetation types. This site is contiguous with the coastal wetland of Waipoua Coastal Strip and Taha Moana Scenic Reserve (O06/027).

(i) Open water occurs at 3 sites. Te Riu Lagoon (O06/025) and Lake Waingata North (O06/036) are dunelakes. The remaining site is a small pond in the south of the District, Monteith South Road Shrubland (P07/002).

(ii) Three sites contain raupo dominant ecologicial units—O06/015, O06/025 and O06/026.

(iii) Uncommon freshwater wetland vegetation types in this survey include:

- *Baumea articulata* (O06/025)
- *Baumea arthrophylla-B. juncea* (O06/036)
- Ti kouka-harakeke (O06/026)
- *Eleocharis sphacelata* (O06/025)
- *Eleocharis sphacelata-Baumea articulata* (O06/036)
- *Eleocharis* sp.-raupo (O06/026)
- Harakeke (O06/026)
- Manuka-ti kouka (O06/026)
- Rush sp.-raupo (O06/026)

A lagoon occurs at O06/027. The following ecological units were recorded:

- *Carex* sp. occurs on lagoon margin
- Marsh clubrush with raupo occurs in the lagoon along with;
- Oioi and knobby clubrush

Shrubland and shrubland association (including coastal shrubland)

The shrubland category is very broad, and includes diverse vegetation associations that could not be described as forest, wetland or duneland / sandfield.

Shrubland areas comprise only 8.7% of the natural areas surveyed in this Ecological District. Manuka and kanuka are the most common shrubland types in the District. In the site reports coastal shrubland if defined as occuring adjacent to or within 1 km of the coast.

Twelve shrubland or shrubland associations were identified. The largest area of shrubland is found on the coastal side of the Waipoua Forest (O06/001). Six shrubland types were identified within the large forest tract of O06/001:

- *Baumea* spp.-umbrella fern
- *Dracophyllum lessonianum*-umbrella fern-manuka
- Kanuka/manuka
- Manuka
- Pate-wineberry
- Towai

Outside the large forest tract, pockets of shrubland/associations occur at O06/030, O07/001 (shrubland type unknown), O07/005, P06/041, and P07/042 and are represented by:

- Kanuka/manuka (O06/030), (O07/001), (P07/002)
- Kanuka/manuka-towai (P06/042)
- Kotukutuku-wheki-wineberry (P06/041)
- Manuka (O07/001, O07/005)
- Mapou (O07/005)

Associations on dunes occur within two sites in the District, Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip (O06/015) and Waipoua Coastal Strip and Taha Moana Scenic Reserve (O06/027).

- Oioi-harakeke-hangehange-knobby clubrush-manuka-toetoe coastal association occurs at O06/015

A diversity of associations occurs at O06/027 including:

- *Baumea* sp.
- Manuka-*Gleichenia* sp.
- Harakeke-manuka-toetoe
- Toetoe-knobby clubrush
- Oioi
- Shore bindweed-*Spinifex*
- *Carex* sp.

On the steep coastal bluffs of Maunganui Bluff (O07/009) the vegetation is characterised by strap-shaped leaved plants tolerant of coastal winds and thin soils (Esler and Dobbins 1977).

- kowharawhara-*Astelia solandri*

- *Astelia solandri-Chionochloa bromoides*-harakeke

There are two exotic scrubland types recorded on the coast, gorse (O07/008) and Chinese privet (O06/021).

Fernland

Fernland vegetation types are recorded from two sites.

- bracken (O06/001)
- wheki (O06/030)

Forest

Approximately 90.4% of the natural areas of the Tutamoe Ecological District are represented by forest. The large areas of indigenous old growth forest are an outstanding feature of this District. A diversity of forest types were recorded. Undoubtedly there are many other forest types that have not been identified within the limits of this survey.

Coastal forest

Many habitats in this Ecological District contain canopy species typical of coastal forest such as kohekohe, karaka, pohutukawa, and puriri. However, in this report, only forest directly adjacent to the coast or within 1 km of the coast, are described as coastal forest in the site reports. Forest alongside the coast is represented at O06/001, O06/015, O06/027, and O07/009. Maunganui Bluff Scenic Reserve (O07/009), which was logged around the turn of the century (Esler and Dobbins 1977), contains the most diverse coastal habitat recorded in this survey.

Coastal forest types in this District include:

- karaka (O06/015)
- kohekohe-mapou-*Olearia albida*-pohutukawa (O07/009)
- kohekohe-pohutukawa-puriri-taraire (O07/009)
- mamangi (O06/001)
- pohutukawa (O06/015), (O06/027), (O07/009)
- taraire (O07/009)
- taraire-nikau (O07/009)
- pohutukawa-towai (O07/001)

Broadleaf forest

The main broadleaf forest types are:

Taraire forest

Taraire forest is the most widespread forest type recorded in this survey. Taraire forest has been recorded at 15 sites and two small sites O06/022 and O07/011 are solely defined by taraire. The majority of taraire forest occurs on Waipoua basalt.

Fourteen sites contain abundant taraire. Species occurring frequently include northern rata, puriri, karaka, kohekohe, rewarewa, nikau, kahikatea, towai, hinau, tawa, and totara. A diversity of species are occasional, including, kauri, pukatea, miro, matai, mangeao, rimu, houhere and mamaku.

Taraire is associated with puriri at five sites on the western side of the Ecological District.

Uncommon taraire forest associations recorded include:

- taraire-karaka-puriri (O07/008)
- taraire-tawa (P06/042)
- taraire-totara (O07/005)
- pohutukawa-taraire (O06/018)

Towai forest

Towai forest is the second most widespread forest type in the District recorded at 11 sites. A range of frequent and occasional species occur. Of note is towai swamp forest with frequent maire tawake at Tutamoe Domain Recreation Reserve and Surrounds (O06/031).

Maire tawake forest

In this District maire-tawake can be locally common at forested sites with poor drainage. This survey recorded maire tawake forest at two sites. Tutamoe Maire tawake Forest (P07/006) contains abundant maire tawake with occasional makamaka, kahikatea, pukatea and towai. Marlborough Road Forest (O06/029) is secondary maire tawake with frequent pukatea and supplejack. Kahikatea and towai are occasional.

Tawa-towai forest

Co-dominant tawa-towai forest is recorded at two sites, one with frequent miro and makamaka and occasional towai, toru, mamaku, rewarewa, northern rata and kohekohe, Waipoua/Mataraua/Waima Forest Tract (O06/001), and the other frequent taraire and emergent rimu, occasional miro, totara, northern rata and kahikatea, Kaihu Forest (P07/001).

Unique broadleaf forest types include:

The plateau vegetation of Kaihu Forest (P07/001) contains a unique vegetation type not found outside of this Ecological District in Northland. It is comprised of co-dominant kiekie, supplejack and towai, with frequent maire-tawake and emergent rimu.

Uncommon broadleaf forest types recorded in the District include:

- kanuka/manuka-rewarewa-towai (O07/001)
- kanuka-taraire-towai (O06/013)
- karaka-kowhai-taraire (O06/013)
- kohekohe-taraire-tawa-towai (P06/042)
- kowhai-puriri-taraire (P06/019)
- houhere-mamaku (O07/003)
- makamaka-tawa (P07/001)
- nikau-taraire-towai (O07/001)
- pohutukawa-towai (O07/001)
- taraire-tawa-towai (O06/030)
- taraire-tawa-towai (O06/030)
- tawa-tawari (P06/042)
- tawari-towai (O06/001)

Podocarp forest

Kahikatea forest

Kahikatea forest occurs at 6 sites throughout the District and is a rare forest type in this survey, occurring within relatively small sites.

Species occurring frequently or occasionally include ti kouka, pukatea, puriri, rewarewa, maire tawake, towai, rimu, matai, kowhai, totara, and hinau.

Kahikatea is co-dominant with totara at two sites, Waitapu Road Bush (O07/008) and Baker Road Forest (P07/005).

Totara forest and totara associated forest

Totara forest occurs in three sites with a range of frequent and occasional species. Associated forest types include totara-kahikatea forest at Kaihu Forest (P07/001) and totara-tanekaha forest at Hooper Road Bush (O07/004).

Uncommon co-dominant podocarp forest includes rimu-totara forest occurs at (O07/008).

Broadleaf-podocarp forest

A range of broadleaf-podocarp forest types are present including:

- kahikatea-manuka (O06/017)
- kahikatea-puriri (O06/019)
- kahikatea-maire tawake (O06/031)
- kanuka-tanekaha-towai (O06/013)
- mahoe-totara (P07/003)
- mamangi-totara (P07/004)
- northern rata-rimu-taraire-tawa (P07/001)
- puriri-taraire-totara (O07/008)
- rewarewa-totara-towai (O07/008)
- taraire-totara (O07/007)
- totara-towai (O07/008)

Kauri forest

The Tutamoe Ecological District contains the largest areas of old growth kauri forest to be found in New Zealand today with the Waipoua Forest containing the best and most extensive examples of all stages of kauri forest including old growth kauri forest. Waima and Trounson Kauri Park also contain some particulary significant areas of kauri. Kauri is a feature at other sites but is not necessarily the most significant tree in terms of biomas or numerical dominance. Kauri only occurs in small pockets in Kaihu, notably one stand at 640 m asl which is probably the highest stand of kauri in Northland (J. Nicholls pers. comm. cited in Forester and Cummings 1984).

Examples of kauri co-dominance include:

- toikiwi-kauri-manuka (O06/001)
- kauri-tanekaha (O06/001)

- kanuka/manuka-kauri (O06/014)
- kauri-taraire (O06/001, O07/005)
- kahikatea-kauri (O07/005)
- kauri-northern rata-tawa-towai (P07/001)
- kauri-rimu-tawari-towai (P07/001)

3.3.4 Species of botanical interest

The Tutamoe Ecological District contains many distinct and unique botanical features including a diverse range of threatened and regionally significant plants.

The Waima Forest can be described as a node of endemism containing plant species that do not occur anywhere else in New Zealand. Remarkably in the last two decades, three endemic plants have been discovered there. In 2000, a new tree species, similar to makamaka now known as *Ackama nubicola* or turoa onamata was recorded for the first time in the Waima Forest. *Coprosma waima* was discovered in 1986 and *Olearia crebra* in 1982. It is reasonable to speculate that the Waima Forest may be sheltering further new and exciting scientific discoveries.

Other special botanical features of the District include the unique high altitude plateau vegetation of Kaihu and Mataraua Forests. Several plants, including some common elsewhere in New Zealnd, are usually restricted to these high altitude habitats in Northland including, hutu, *Astelia nervosa*, *Dracophyllum traversii*, *Griselinia littoralis*, southern rata, *Metrosideros colensoi*, horopito (*Psuedowintera axillaris* and *P. colorata*), tawari, raukawa, *Blechnum nigrum* and *B. fluviatile*.

Makamaka is a Northland endemic which is common in this Ecological District with a distribution from Kaitaia and Mangonui to Whangarei.

Peraxilla tetrapetala (the only extant record of this plant in Northland has since died) and *Blechnum colensoi* reach their known northern limit in this District.

51 threatened plants and 81 regionally significant plants have been recorded in this District.

3.3.5 Threatened plant species

The current threat status of species listed below follows de Lange *et al.* (2004). Appendix 8.3 gives the definitions of threat categories as set out in Molloy *et al.* 2002.

Where possible the accession numbers from Auckland Museum herbarium (AK) have been added. In many cases the records have been derived from plant lists or comments in the Sites of Special Biological Interest (SSBI) information system held at Northland Conservancy; this is identified with the SSBI number following the record. Records were also derived from the Northland Threatened Plants Database and the Department of Conservation's Bioweb Threatened Plants Database.

ACUTELY THREATENED

Fungus (Undescribed genus) (Trichocomaceae) (Nationally Critical)

This fungus is host-specific to shells of dead *Paryphanta* kauri snails, Waipoua Forest part of O06/001 in this Ecological District and *Powelliphanta* snails in Karamea, north-west Nelson (Department of Conservation Internal File).

Ackama nubicola turoa onamata (Nationally Endangered)

Ackama nubicola or turoa onamata was discovered in 2000 for the first time from a single site in the Waima Forest (part of O06/001) by Karen Riddell in this Ecological District and is similar to the Northland endemic tree, makamaka. In 2001 the Whirinaki Maori committee gave the tree the name "Turoa onamata", translated as "long standing from the beginning of time". Turoa onamata is at risk from browsing animals and because of its restricted distribution and limited number of mature plants it has been given the ranking of Nationally Endangered (de Lange, Gardner and Riddell 2002).

Coprosma waima (Nationally Endangered)

Coprosma waima is unusual in that is has a large subsessile leaf, and was first known from the Waima Forest, part of O06/001, in 1986 where it was found on steep cliffs of basic volcanic rock (Druce 1989) generally over 500 m asl. *Coprosma waima* has been recently recorded (year 2000) below 500 m asl in the Mataraua Forest (SSBI O06/H013) and like turoa onamata, has a very restricted distribution and is at risk from predation by browsing animals.

Fissidens integerrimus (Nationally Endangered)

The moss *Fissidens integerrimus* has been found by forest streams at Puketi, Kerikeri, Waitakeres and from Waipoua Forest, part of O06/001 in this Ecological District (Department of Conservation Internal Files).

Fissidens strictus (Nationally Endangered)

Fissidens strictus is a moss associated with forest streams and has been recorded from Waipoua Forest, part of O06/001 in this Ecological District, and also Puketi, Kerikeri, Waitakere and Auckland Islands (Department of Conservation Internal Files).

Hebe speciosa titirangi (napuka) (Nationally Endangered)

Hebe speciosa is an endemic coastal, low-spreading shrub with dark magenta or red flowers now only known from Maunganui Bluff (O07/009) and outer south Hokianga Head (O06/015) in this Ecological District and elsewhere from near Muriwai Beach, near Aotea Harbour, Mokau and Titirangi Bay in the Marlborough Sounds. It appears that only the Maunganui Bluff, south Hokianga Head and Muriwai populations are naturally occurring wild populations with the other populations resulting from past deliberate cultivation by Maori. *Hebe speciosa* is a popular garden plant in nurseries, although commerical plants have usually been hybridised. (NZPCN 2006)

Olearia crebra (Nationally Endangered)

Olearia cebra is a large-leaved tree daisy (4–6m) endemic to the Waima Forest (part of O06/001) where it is generally found over 500 m asl on steep cliffs. *Olearia crebra* was first discovered in 1982 (Heenan and Cameron 2002).

Picris burbidgeae (Nationally Endangered)

Picris burbidgeae (AK 288553) is an indigenous annual herb recorded in 2004 for the first time in this Ecological District from alluvial silt banks on the Waipoua River, part of O06/001 (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

Pomaderris phylicifolia (Nationally Endangered)

Pomaderris phylicifolia is a shrub found mainly on the coast in open sites amongst manuka and sedges. Maureen Young recorded this plant in the Waipoua area on the roadside under some pine trees in 1986 (Department of Conservation, Bioweb Threatened Plants Database, March 2006) and it has been recorded at Maunganui Bluff (Esler and Dobbins 1977).

Senecio scaberulus (Nationally Endangered)

Senecio scaberulus is a grey/green or yellow fireweed found in lava fields, open coastal and offshore islands from Auckland to Te Paki. Formerly widespread, it is now rare in the wild. The east coast of Northland is the stronghold for this species and hybridisation with a close relative *S. hispidulus* and weed invasion of its habitat are major threats to its survival (L. J. Forester pers. comm.). Recorded from the Waipoua Forest part of O06/001 (SSBI O06/H015) in this Ecological District.

Todea barbara (Nationally Endangered)

Todea barbara is a fern which can have a trunk up to one metre tall. There is only one record of *Todea barbara* on the west coast of Northland, recorded in the Waipoua Forest (part of O06/001) by Jenny Lux in 2004 (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

Utricularia australis (Nationally Endangered)

Utricularia australis (also known as yellow bladderwort) is an indigenous submerged free-floating bladderwort known only from the North Island in New Zealand. This wetland plant is found in coastal and lowland situations where it appears to like a sunny situation in shallow and still water. In the northern North Island this plant is seriously at risk in particular through competition from the introduced *U. gibba* which occupies the same habitat and has a far more aggressive growth form (NZPCN 2007).

Hebe perbella Bartlett's koromiko (Nationally Vulnerable)

Bartlett's koromiko is an endemic koromiko with voilet red or violet, or occasionally pink or blue fading to white flowers. It grows on cliff

faces and rocky outcrops and is only known from Ahipara to Maungaraho Rock (Tokatoka Ecological District) along the west coast of Northland. (Source: NZPCN 2006)

Recorded in this Ecological District from the Waima Range part of O06/001 (Department of Conservation, Bioweb Threatened Plants Database, March 2006) with a 2003 record by the Auckland Botanical Society (SSBI O06/H010).

Leptinella rotundata (Nationally Vulnerable)

Leptinella rotundata is an endemic small creeping herb with a button-like flower head found on coastal cliffs and seepages amongst low vegetation (Forester and Townsend 2004)). It is now known only from Northland's west coast from Mitimiti to Maunganui Bluff,and in 2007 a new population was discovered in the Te Paki ED. It was formerly known from the Waitakere coast (NZPCN 2006). Records in the Ecological District from Maunganui Bluff O07/009 and Te Kaiatewhetu and Arai te Uru Coastal Strip O06/015 (recorded by Peter de Lange in 1991), (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

CHRONICALLY THREATENED

Brachyglottis kirkii var. *kirkii* Kirks daisy (Serious Decline)

Kirks daisy is a spring flowering shrub that is usually epiphytic and is found throughout the North Island. The flowers are white and daisy-like. In this Ecological District it is recorded from Maunganui Bluff O07/009 (Esler and Dobbins 1977), Waipoua Forest part of O06/001 (SSBI O06/H015) where it is not uncommon (L. J. Forester pers. comm.), Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002), Tutamoe Domain Recreation Reserve O06/031 recorded in this survey and Kaihu Forest P07/001 where it was recorded in 1999 by Peter Anderson (SSBI P07/H001).

Doodia squarrosa (Gradual Decline)

Doodia squarrosa is an endemic fern found in lowland areas in Northland (Brownsey and Smith-Dodsworth 2000). Recorded in this Ecological District from Waipoua Forest part of O06/001 (AK 500503) (SSBI O06/H015).

Euphorbia glauca (Serious Decline)

Euphorbia glauca is a perennial herb found on open sand dunes and coastal gravel banks and rocky bluffs. It is endemic to New Zealand and the Chatham Islands (NZPCN 2006). In this Ecological District it has been recorded on the south Hokianga coast (O06/015), with the latest record from year 2000 (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

Pimelea tomentosa (Serious Decline)

Pimelea tomentosa is a slender erect shrub found in open shrubland from North Cape to Nelson/Marlborough (Poole and Adams 1990) which was recorded in the 1990s at Pawakatutu/Wairau, Waipoua, part of O06/001 in this Ecological District (L. J. Forester pers. comm.).

Pittosporum kirkii (Serious Decline)

Pittosporum kirkii is a naturally uncommon shrub that can be epiphytic in mature forest stands, recorded from several sites in this Ecological District including Marlborough Forest P06/042 (SSBI P06/H040), Waima (SSBI O06/H010) and Waipoua Forests (SSBI O06/H015) both part of O06/001, Kaihu Forest P07/001 (SSBI P07/H001) and Tutamoe Domain Recreation Reserve O06/031 (recorded during this survey).

Colensoa physaloides (Gradual Decline)

Colensoa physaloides is a very distinctive, shrubby plant with blue flowers and hydrangea-like foliage. *Colensoa* is a monotypic genus, which is endemic to Northland-Auckland, including some of the offshore islands from the Three Kings south as well as Rakitu Island, to the east of Great Barrier Island (P. J. de Lange pers. comm. 1996). It is found scattered throughout forest areas, generally beside stream and tracksides and on talus slopes. This plant is very vulnerable to browsing and it is usually destroyed where wild goats or stock have access. In this Ecological District there are 1980s records from Waima Forest (part of O06/001) and Maunganui Bluff (O07/009) (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

Desmoschoenus spiralis pingao (Gradual Decline)

Pingao is an important coastal sandbinder, now far less common along New Zealand's coastline. It is recorded from Maunganui Bluff O07/009 (Esler and Dobbins 1977), on the Waipoua Coast and at Taha Moana Scenic Reserve O06/027, where it is locally common amongst the dunes in year 2000 (Department of Conservation, Bioweb Threatened Plants Database, March 2006 and SSBI O06/H014).

Sophora fulvida (Gradual Decline)

Sophora fulvida occurs on volcanic rock outcrops and has been recorded in Northland on Maunganui Bluff O07/009 in this Ecological District and on Bream Head and Mount Manaia in the Manaia Ecological District (Heenan et. al. 2001).

Mida salicifolia willow-leaved maire (Gradual Decline)

Willow-leaved maire is a small tree which is not as common as it was, and is impacted by possum browse (L. J. Forester pers. comm.), recorded from several sites in this Ecological District including Marlborough Forest P06/042 (SSBI P06/H040), Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Waiwhatawhata Bush O06/014 (SSBI O06/H007), Kaihu Forest P07/001 (SSBI P07/H001) and Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002).

Pellaea falcata (Gradual Decline)

Pellaea falcata is a fern known only from coastal areas in Northland (Brownsey and Smith-Dodsworth 2000) and is recorded in this Ecological District from Katui Scenic Reserve and Surrounds O07/001 (L. J. Forester pers. comm.).

Raukaua edgerleyi raukawa (Gradual Decline)

Raukawa is a small tree found in forest throughout New Zealand whose decline is attributed to severe browsing pressure (Department of Conservation Internal Files), it is targeted by possums.

In this Ecological District it is scattered to common especially in the uplands (L. J. Forester pers. comm.). Recorded from the forests of Marlborough P06/042 (SSBI P06/H040), Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Kaihu Forest P07/001 (SSBI P07/H001), Tutamoe Domain Recreaton Reserve and Surrounds O06/031 and Kaikohe Road Forest Remnant P06/041. Raukawa was recorded from the latter two sites during this survey.

Sonchus kirkii (Gradual Decline)

Sonchus kirkii (native puha) is an endemic coastal sow thistle, usually occurring in open wet fertile sites. Found from this District in the south end of Maunganui Bluff O07/009 (cited in Cameron 2000).

AT RISK

Baumea complanata (Range Restricted)

Baumea complanata is a tufted sedge with strap-like leaves. It grows from a fan-shaped base and is found in swampy places sometimes amongst wet stands of manuka (Forester and Townsend 2004). It can form dominant swards in disturbed areas, but is generally overtopped in heath successions (L. J. Forester pers. comm.).

This plant is now confined to Northland where it is found in the Tutamoe (Waipoua Forest (part of O06/001), L. J. Forester pers. comm.), Kaikohe, Te Paki and Tangihua Ecological Districts.

Chionochloa bromoides (Range Restricted)

Chionochloa bromoides is a North Island endemic coastal tussock, predominantly occurring on Northlands east coast and on northern off-shore islands however in this Ecological District it is also recorded from Maunganui Bluff O07/009 which is the only west coast record of this plant in Northland (NZPCN 2006). Esler and Dobbins 1977, described it as being the "main plant" of the steep salty coastal cliffs.

Coprosma neglecta (Range Restricted)

Coprosma neglecta is a shrub recorded from Maunganui Bluff O07/009 in this Ecological District by Anthony Wright in 1989 (Department of Conservation, Bioweb Threatened Plants Database, March 2006). Also recorded from Three Kings, Te Paki, and Whangaroa Ecological Districts.

Schistochila nitidissima (Range Restricted)

A liverwort found in pristine river beds, recorded in Northland from Waipoua Forest, part of O06/001 in this Ecological District and Puketi Forest in the Puketi Ecological District (Department of Conservation Internal File).

Sphagnum perichaetiale (Range Restricted)

A moss found in Auckland and Northland where it likes ditches in gumland soils (Department of Conservation Internal File). Recorded from Waipoua Forest part of O06/001 in this Ecological District in 1994 and also known from the Ahipara gumfields in the Ahipara Ecological District (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

Cornunastylis pumila (Sparse)

Cornuastylis pumila is an erect orchid with tubular leaves and inverted creamy green and sometimes pink and red-marked flowers (St George 1999) and is usually found in open unfertile habitats like gumland areas (NZPCN 2006). Recorded in this Ecological District from Waipoua Forest part of O06/001 (SSBI O06/H015).

Doodia mollis (Sparse)

Doodia mollis is an endemic rasp fern with a local distribution. Recorded from Waipoua Forest part of O06/001 (AK 203154) in this Ecological District (SSBI O06/H015).

Drucella entegristipula (Sparse)

A very rare liverwort recorded by John Braggins from the Waipoua Forest part of O06/001 (SSBI O06/H015).

Fuchsia procumbens (Sparse)

This prostrate, sprawling plant is found in open coastal habitats in the North Island. In this Ecological District *Fuchsia procumbens* is recorded on the Waipoua coast within O06/001 (SSBI O06/H015) and O06/027 (Department of Conservation, Bioweb Threatened Plants Database, March 2006 and SSBI O06/H014); also found at Maunganui Bluff O07/009 (Department of Conservation, Bioweb Threatened Plants Database, March 2006) where there is a major population (L. J. Forester pers. comm.).

Grammitis rawlingsii (Sparse)

Grammitis rawlingsii is a small inconspicuous fern with stout, red-brown, often bent hairs near the sori. It is epiphytic on trees and roots in kauri forest (Brownsey and Smith-Dodsworth 2000) but mostly occurs near the ground (L. J. Forester pers. comm.). Recorded from Waipoua Forest part of O06/001 in this Ecological District with the latest record on Bioweb from Peter de Lange in 1991 ((Department of Conservation, Bioweb Threatened Plants Database, March 2006).

Halocarpus kirkii monoao (Sparse)

Monoao is a large endemic tree reaching 25 metres and is associated with kauri forest (NZPCN 2006). Recorded from Waipoua part of O06/001 (SSBI O06/H015) and Marlborough Forests P06/042 (SSBI P06/H040) and also Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002) in this Ecological District.

Hymenophyllum atrovirens (Sparse)

Endemic filmy fern of local distribution usually found in deep shade by streams and near waterfalls (Brownsey and Smith-Dodsworth 2000) in mature forest known from several sites in this Ecological District; Waipoua (AK 185532) (SSBI O06/H015), Mataraua (SSBI O06/H013), Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (SSBI P06/040), and Kaihu Forest P07/001 (SSBI P07/H001).

Lagenifera lanata (Sparse)

Lagenifera lanata is a small herb endemic to the North Island (NZPCN 2006). In this Ecological District it has been recorded from Waipoua Forest part of O06/001 (SSBI O06/H015).

Libocedrus plumosa kawaka (Sparse)

Kawaka is tree of local, but widespread distribution in Northland, recorded from Maunganui Bluff O07/009 (Esler and Dobbins 1977), Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough Forest P06/042 (SSBI P06/H040), Kaihu Forest P07/001 (SSBI P07/H001) and Trounson Kauri Park O07/005 (SSBI O07/H002) in this Ecological District.

Microlaena carsei (Sparse)

An endemic grass reaching its northern limit in this Ecological District where it is recorded from the Waipoua Forest, part of O06/001 (Department of Conservation, Bioweb Threatened Plants Database, March 2006), and a 1998 record by G. Jane from Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002).

Pittosporum ellipticum (Sparse)

Pittosporum ellipticum is a tree species with grows on bluffs (L. J. Forester pers. comm.) with noticeably black bark. Recorded from Waima Forest, part of O06/001 (SSBI O06/H010) in this Ecological District.

Pittosporum pimeleoides subsp. *pimeleoides* (Sparse)

Pittosporum pimeleoides subsp. *pimeleoides* is a small shrub which is endemic to Northland, growing to two metres with slender branches and narrow-oblong leaves crowded at tips or whorled (Poole and Adams 1990). This species is usually found on dry and fairly open ridge sites; usually with mingimingi under tanekaha and kauri. Recorded from the Wairau River catchment in the Waipoua Forest, part of O06/001 in 1984 and 1990 (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

Schizaea dichotoma (Sparse)

Schizaea dichotoma is a fan fern with an uncommon distribution. In Northland it is found in lowland kauri forest (Brownsey and Smith-Dodsworth 2000) and often in gumland (L. J. Forester pers. comm.). It is recorded in this Ecological District from Waipoua Forest, part of O06/001 (SSBI O06/H015).

Sticherus flabellatus (Sparse)

Sticherus flabellatus is an umbrella fern which is usually found on riversides where it can form dense swards (L. J. Forester pers. comm.). Recorded from Waipoua Forest, part of O06/001 (SSBI O06/H015) in this Ecological District.

Thismia rodwayi (Sparse)

Thismia rodwayi is a tiny saprophytic herb which grows in 'gloomy' forest in association with a tree root fungus (L. J. Forester pers. comm.). This herb requires much accumulation of litter on the forest floor where there is opportunity for the fungus to build up sufficiently to support the *Thismia* plants (Campbell 1968). *Thismia rodwayi* was recorded in 2003 for the first time in the Waima Forest, part of O06/001 (SSBI O06/H010). There are historical records from Trounson Kauri Park Scenic Reserve O07/005 by Warwick Silvester (1963) (Department of Conservation, Northland Conservancy Threatened Plants Database). Mr Silvester has returned several times to the exact spot in Trounson but has never found it again.

Trichomanes strictum (Sparse)

Trichomanes strictum is an uncommon endemic fern found in damp mature forest on streamsides. Recorded from Marlborough P06/042 (SSBI P06/H040), Mataraua (SSBI O06/H013) and Waipoua Forests, (SSBI O06/H015) both part of O06/001 and Kaihu Forest P07/001 (SSBI P07/H001) in this Ecological District.

DATA DEFICIENT

Dianella latissima (Data Deficient)

Two new species of *Dianella* have recently been described in New Zealand; *Dianella haematica* and *Dianella latissima* with the latter recorded from Waima Forest in this Ecological District. *Dianella haematica* is endemic to the northern North Island where it inhabits mainly acidic peat bogs. *Dianella latissima* has been collected from coastal to montane forest from the northern half of the North Island however it maybe more widespread and until its distribution, abundance and threats are sufficiently known it is considered Data Deficient. (Heenan and de Lange 2007)

Nematoceras rivulare

Nematoceras rivulare is known as a 'spider' orchid and is found growing near streams. It has been recorded from Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough Forest P06/042 (SSBI P06/H040) and Kaihu Forest P07/001 (SSBI P07/H001) in this Ecological District.

Olearia angulata

Olearia angulata is a small tree similiar to *O. albida*, recorded in this Ecological District by Lisa Forester in 1992 (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

Pimelea (f)

Pimelea (f) is an endemic prostrate plant known only from Northland. It is recorded from Maunganui Bluff O07/009 in this Ecological District where it is uncommon (L. J. Forester pers. comm.).

3.3.6 Regionally significant plant species

The following species are uncommon species in Northland regarded by the Department of Conservation, Northland Conservancy as being regionally significant species.

Anaphalioides trinervis (incl. *A. keriense*)

Anaphalioides trinervis is a small grey-green cudweed which grows on open banks of large rivers (L. J. Forester pers. comm.). Recorded from Marlborough P06/042 (SSBI P06/H040), Waipoua (SSBI O06/H015) and Mataraua Forests (SSBI O06/H013) both part of O06/001 in this Ecological District.

Ascarina lucida hutu

Hutu is a small tree which occurs largely at high altitudes on the western side of Northland where it is of local distribution (L. J. Forester pers. comm.). Recorded from Kaihu Forest P07/001 (SSBI P07/H001), Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001.

Astelia nervosa

Astelia nervosa is a tufted plant found in high altitude habitats in Northland. Recorded from Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (SSBI P06/H040) and Kaihu Forests P07/001 (P07/H001) in this Ecological District.

Australina pusilla

Australina pusilla is a creeping groundcover plant that forms mats (Allan 1961) and is usually associated with rich soils (L. J. Forester pers. comm.). Recorded in this Ecological District from Waima Forest part of O06/001 (AK 174892) and Maunganui Bluff O07/009 (Esler and Dobbins 1977).

Azolla filiculoides Pacific azolla or red azolla

Pacific azolla is a free floating fern with leaves that often turn red. Recorded in this Ecological District from a pond in the Waipoua Forest, part of O06/001 (SSBI O06/H015).

Blechnum colensoi

Blechnum colensoi is a New Zealand endemic fern found in wet lowland to montane forest (Brownsey and Smith-Dodsworth 2000). Recorded from Kaihu P07/001 (SSBI P07/H001) and Waima Forests, part of O06/001 (SSBI O06/H010) where it also reaches its northern limit.

Blechnum fluviatile

Blechnum fluviatile is a native fern found in high altitude forests in Northland, recorded from a number of sites in this Ecological District; Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (P06/H040) and Kaihu Forests P07/001 (SSBI P07/H001).

Blechnum nigrum

Blechnum nigrum is uncommon in Northland restricted to higher altitudes and dark gullies (L. J. Forester pers. comm.). Recorded in this Ecological District from Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (P06/H040) and Kaihu Forests P07/001 (SSBI P07/H001).

Brachyglottis kirkii var. *angustoir*

Brachyglottis kirkii var. *angustoir* is a ground dwelling autumn flowering shrub with white daisy-like flowers. Recorded in this Ecological District from Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (P06/H040), Kaihu Forests P07/001 (SSBI P07/H001) and Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002).

Calystegia tuguriorum

Calystegia tuguriorum is a vine with white flowers recorded from Maunganui Bluff O07/009 (Esler and Dobbins 1977) and Waipoua Forest part of O06/001 (AK 143712, SSBI O06/H015) in this Ecological District.

Chionochloa conspicua subsp. *cunninghamii*

Chionochloa conspicua subsp. *cunninghami* is a robust tussock resembling toetoe, recorded from the Waipoua coast, part of O06/001 at Wairau, the only record of this plant in Northland (L. J. Forester pers. comm.).

Collospermum microspermum

Collospermum microspermum is an epiphytic fan-shaped plant, much smaller and finer than its relative *C. hastatum*. It is found in wet and high altitudes mostly from western uplands (L. J. Forester pers. comm.). Recorded from all the large forests in this Ecological District; Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests O06/001 (SSBI O06/H010), Marlborough P06/042 (P06/H040) and Kaihu Forests P07/001 (SSBI P07/H001) as well as Maunganui Bluff O07/009 (Esler and Dobbins 1977) and Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002).

Coprosma acerosa

Coprosma acerosa grows on dunes and can be an effective sand-catcher however it is increasingly becoming rare as it is effected by disturbance and developement (L. J. Forester pers. comm.). Recorded during this survey from (006/027).

Coprosma dodonaeifolia

Coprosma dodonaeifolia is a narrow-leaved form of *Coprosma lucida* and is always found at high altitudes. Currently there is only one record from Northland, recorded from Mt Misery in the Waima Forest, part of O06/001 where it was collected in 1989, this record is therefore the known northern limit. (Ewen Cameron pers. comm.)

Coprosma parviflora

Coprosma parviflora is an endemic shrub to Northland and can be locally common. It is a distinctive shrub with branches lying in a flat plain. Recorded in this Ecological District from Maunganui Bluff (Esler and Dobbins 1977) and Waipoua (SSBI O06/H015) and Waima Forests, (SSBI O06/H010) both part of O06/001.

Coprosma rigida[5]

Coprosma rigida is an endemic shrub to New Zealand with stiff red-brown branches at right angles, recorded in this Ecological District from Mataraua (SSBI O06/H013) and Waima Forests, (SSBI O06/H010) both part of O06/001. It is uncommon in Northland, probably due to habitat loss which includes lowland fertile areas.

Coprosma rotundifolia

Coprosma rotundifolia is an endemic shrub with roundish softly hairy leaves that is uncommon in Northland due to its habitat declining which includes alluvial flats. Recorded from Marlborough Forest P06/042 (SSBI P06/H040) in this Ecological District.

Cyathea cunninghamii

An uncommon tree fern in Northland, *Cyathea cunninghamii* is recorded from Marlborough P06/042 (SSBI P06/H040), Waipoua (SSBI O06/H015) and Waima Forests, (SSBI O06/H010) both part of O06/001 in this Ecological District.

Dicksonia lanata

Dicksonia lanata is a short-trunked tree fern usually occurring in kauri forest. Recorded from the big forests of Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (SSBI P06/H040) and Kaihu Forests P07/001 (SSBI P07/H001) as well as Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002) in this Ecological District.

Dracophyllum traversii mountain neinei

Dracophyllum traversii is a North and South Island endemic tree (NZPCN 2006). In Northland it occurs on high altitude habitats, recorded from Waipoua, part of O06/001 (SSBI O06/H015) and Kaihu Forests P07/001 (SSBI P07/H001) in this Ecological District.

---

5 This record is derived from a plant list of an area (now Nga Whenua Rahui – Te Mahurehure Roopu Whenua Toanga) which lies between the forests of Waima and Mataraua.

Drosera binata

Drosera binata is an indigenous forked sundew orchid which was recorded from Muriwai Swamp O06/026 in 1986/87 (SSBI O06/H017) and has also been recorded from Waipoua (SSBI O06/H015) and Waima Forests (SSBI O06/H010), both part of O06/001.

Drosera peltata

Drosera peltata is an indigenous sundew orchid usually found in gumland shrubland and adjacent shrubland (NZPCN 2006). Recorded in this Ecological District from Waipoua Forest (SSBI O06/H015) and Taha Moana Scenic Reserve (O06/027) by Karen Riddell in year 2000 (SSBI O06/H014).

Elaeocarpus hookerianus pokaka

Pokaka is a small tree with a divaricating juvenile form. Found throughout New Zealand with a local distribution in Northland, recorded from the big forests in this Ecological District; Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (SSBI P06/H040), and Kaihu Forests P07/001 (SSBI P07/H001).

Epilobium pallidiflorum

Epilobium pallidiflorum is an indigenous tall wetland herb which has been recorded from this Ecological District at Waipoua Forest, part of O06/001 (SSBI O06/H010).

Gastrodia cunninghamii

Gastrodia cunninghamii is an orchid that is common in the south of New Zealand beneath open beech forest (St George 1999). It was recorded in 1990 by Lisa Forester in Waima Forest (part of O06/001) in this Ecological District (SSBI O06/H010).

Grammitis billardierei

Grammitis billardierei is an indigenous strap fern that occurs in higher altitude places in Northland (L. J. Forester pers. comm.). It has been recorded from all the big forests in the Ecological District; Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (SSBI P06/H040), and Kaihu Forests P07/001 (SSBI P07/H001) as well as Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002).

Gratiola sexdentata

Gratiola sexdentata is a wetland and aquatic herb of local distribution found from the North and South Islands and also in Australia (Johnson and Brooke 1998). Recorded from Waipoua (SSBI O06/H015) Waima[6] (SSBI O06/010) and Mataraua Forests, (SSBI O06/H013) all O06/001 in this Ecological District.

---

6 This record is derived from a plant list of an area (now Nga Whenua Rahui – Te Mahurehure Roopu Whenua Toanga) which lies between the forests of Waima and Mataraua.

Griselinia littoralis

Griselinia littoralis is a tree of local distribution, associated with high altitude habitats in Northland recorded from Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (SSBI P06/H040), and Kaihu Forests P07/001 (SSBI P07/H001) in this Ecological District.

Gunnera monioca

Gunnera monioca is a perennial herb found in damp places such as boggy ground and alongside streams (Allan 1961) and in gumland habitat (L. J. Forester pers. comm.). Recorded in this Ecological District from Waipoua (SSBI O06/H015) and Mataraua Forests (SSBI O06/H013), both part of O06/001.

Hebe diosmifolia

Hebe diosmifolia is a Northland endemic with has lavender to white flowers in the spring and is found in scattered populations in Northland (L. J. Forester pers. comm.). In this Ecological District it is recorded from the Waipoua River area, part of O06/001 (SSBI O06/H015).

Hebe flavida

Hebe flavida (*Hebe* aff. "yellow petioles") is endemic to Northland where it is mostly known from upland areas including cloud forest. It has been recorded in this Ecological District from Waipoua (SSBI O06/H015) and Waima Forests (SSBI O06/H010), both part of O06/001, Katui Scenic Reserve and Surrounds O07/001 and Maunganui Bluff O07/009 (SSBI O07/H001).

Hebe macrocarpa var. *macrocarpa*

Hebe macrocarpa var. *macrocarpa* is a relatively tall *Hebe* which is uncommon in Northland. Recorded in this Ecological District from Waima Forest, part of O06/001 (L. J. Forester pers. comm.).

Helichrysum lanceolatum

Helichrysum lanceolatum is a tomentose shrub found at Maunganui Bluff O07/009 (SSBI O07/H001), Marlborough P06/042 (P06/H040) and Waima Forests, part of O06/001 (SSBI O06/H015) in this Ecological District.

Hymenophyllum armstrongii

Records of the filmy fern *Hymenophyllum armstrongii* are uncommon in Northland, it maybe that this fern has been undercollected (L. J. Forester pers. comm.). Records from this Ecological District include Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (P06/H040) and Kaihu Forests P07/001 (SSBI P07/H001).

Hymenophyllum cupressiforme

Hymenophyllum cupressiforme is an uncommon filmy fern usually found on rocks in light shade (Brownsey and Smith-Dodsworth 2000) recorded from the Waima Forest, part of O06/001 (SSBI O06/H015) in this Ecological District.

Hymenophyllum lyallii

Hymenophyllum lyallii is a small fan-shaped filmy fern found in mature forest at Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough P06/042 (SSBI P06/H040) and Kaihu Forests P07/001 (SSBI P07/H001) in this Ecological District.

Hypolepis rufobarbata

Hypolepis rufobarbata is an endemic fern that is uncommon in Northland, more commonly seen from Auckland to Wellington (Brownsey and Smith-Dodsworth 2000). Recorded from Waipoua (SSBI O06/H015) and Mataraua Forests (SSBI O06/H013) both part of O06/001 and Marlborough Forest P06/042 (SSBI P06/H040) in this Ecological District.

Ileostylus micranthus

Ileostylus micranthus is a mistletoe with yellow-green flowers found throughout New Zealand and on Norfolk Island (Poole and Adams 1990). In Northland this species is extremely uncommon despite it having once been widespread in the area (P. J. de Lange pers. comm. 1996). Recorded from Waipoua (SSBI O06/H015) and Waima Forests (O06/H010), both part of O06/001, in this Ecological District.

Isopterygium limatum

Isopterygium limatum is a moss found at Hauturu in the Waima Forest (part of O06/001) and on the summit of Tutamoe (P07/001) (Beever 1989) in this Ecological District.

Ixerba brexioides tawari

Tawari is a tree of restricted distribution in Northland where it is recorded from mainly high altitude places. It is browsed by possums. In this Ecological District it is locally common and is recorded from Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Kaihu P07/001 (SSBI P07/H001) and Marlborough Forests P06/042 (SSBI P06/H040) also from Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002).

Leionema nudum mairehau

Mairehau is a shrub up to 4 metres with fragrant white flowers (Poole and Adams 1994) and a reddish look to its bark and the underside of its leaves (Allan 1961). Recorded in this Ecological District from Waipoua (SSBI O06/H015) and Waima Forests (SSBI O06/H010) both part of O06/001, Kaihu P07/001 (SSBI P07/H001) and Marlborough Forests P06/042 (SSBI P06/H040).

Leptolepia novae-zelandiae

Leptolepia novae-zelandiae is an uncommon endemic fern favouring heavy shade (Brownsey and Smith-Dodsworth 2000), recorded from the Waipoua (SSBI O06/H015) and Waima Forests (SSBI O06/H010), both part of O06/001 in this Ecological District.

Loxsoma cunninghamii

Loxsoma cunninghamii is an uncommon fern found in the North Island in lowland areas from Kaitaia to East Cape. It is a New Zealand endemic genus represented by one species (Brownsey and Smith-Dodsworth 2000). In this Ecological District it is recorded from Waipoua, part of O06/001 (SSBI O06/H015) and Marlborough Forests P06/042 (SSBI P06/H040).

Luzula picta var. *picta*

Luzula picta var. *picta* is an endemic grassy tufted plant which is uncommon in Northland, recorded in this Ecological District from Waipoua Forest, part of O06/001 (SSBI O06/H015).

Lycopodium scariosum creeping clubmoss

Creeping clubmoss is an indigenous clubmoss found throughout New Zealand but is rare in Northland (Brownsey and Smith-Dodsworth 2000). In this Ecological District it was recorded from a road escarpment near Marlborough Forest (P06/042) in 1984 (AK 166098).

Manoao colensoi silver pine

Silver pine is a tree of uncommon distribution in Northland, recorded from Waipoua Forest, part of O06/001 (SSBI O06/H015) in this Ecological District.

Metrosideros carminea

Metrosideros carminea is a tall rata vine with bright carmine flowers, recorded from several sites in this Ecological District including Maunganui Bluff (O07/009) (Esler and Dobbins 1977), Waipoua (NZFRI 3496) (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001, Marlborough Forests P06/042 (SSBI P06/H040).

Metrosideros excelsa × *M. robusta*

Metrosideros excelsa × *M. robusta* is a pohutukawa-rata cross found in this Ecological District at Katui Scenic Reserve and Surrounds O07/001, Waipoua, part of O06/001 (SSBI O06/H015), and Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip O06/015 (1995 PNAP survey), elsewhere in Northland recorded occasionally on the east coast (L. J. Forester pers. comm.).

Metrosideros colensoi

Metrosideros colensoi is an endemic climbing shrub generally found in high altitude forests in Northland, recorded in this Ecological District from Mataraua Forest, part of O06/001 (SSBI O06/H013), Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002) and Kaihu Forest P07/001 recorded by Peter Anderson in 1999.

Metrosideros umbellata southern rata

Southern rata is a shrub or small tree of local distribution at higher altitudes in Northland, recorded from Kaihu P07/001 (SSBI P07/H001), Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) all O06/001 in this Ecological District.

Myriophyllum votschii

An uncommon endemic herb usually found near the coast but also recorded inland on lake margins and in shallow waters (Johnson and Brooke 1998). Recorded in this District from the Waipoua River mouth, O06/027 by Ewen Camerson in 1989 (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

Myrsine divaricata

Myrsine divaricata is an uncommon divaricating shrub with a weeping habit and is found in this District from Maunganui Bluff O07/009 (Esler and Dobbins 1977).

Neomyrtus pedunculata rohutu

Rohutu is a shrub to small tree which is uncommon in Northland, recorded in this Ecological District from Waipoua Forest, part of O06/001 (SSBI O06/H015).

Nestegis cunninghamii black maire

Black maire is an uncommon canopy tree throughout Northland, recorded from Waipoua Forest, part of O06/001 (SSBI O06/H015), Marlborough Rd Reserve Bush O06/029 (SSBI O06/H023) and Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002) in this Ecological District.

Olearia albida

Olearia albida is a small coastal tree of local distribution, very similar to *O. angulata* and is recorded from Maunganui Bluff O07/009 (Esler and Dobbins 1977), Waipoua Forest, part of O06/001 (SSBI O06/H015), Waima Forest, part of O06/001 (Department of Conservation, Bioweb Threatened Plants Database, March 2006) and Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip O06/015 (recorded in this survey).

Oxalis magellanica

Oxalis magellanica is an indigenous oxalis with white flowers recorded from Waipoua Forest, part of O06/001 (SSBI O06/H015) in this Ecological District.

Pennantia corymbosa kaikomako[7]

Kaikomako is an uncommon but widespread tree in Northland, recorded from Maunganui Bluff O07/009 (Esler and Dobbins 1977) and Waima Forest (SSBI O06/H010) and Mataraua Forests (SSBI O06/H013) both part of O06/001 in this Ecological District.

Phormium cookianum whaririki

Sometimes known as mountain flax, whaririki is smaller than *Phormium tenax* and is characterised by drooping leaves and flower stalks. It is naturally uncommon in Northland usually found in higher altitudes. In this Ecological District whaririki is recorded from Waipoua (SSBI O06/

7 This record is derived from a plant list of an area (now Nga Whenua Rahui – Te Mahurehure Roopu Whenua Toanga) which lies between the forests of Waima and Mataraua.

H015 and Waima Forests (SSBI O06/H010), both part of O06/001, Kaihu Forest P07/001 (SSBI P07/H001) also Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002).

Phyllocladus toatoa toatoa

Toatoa is a tree of rare occurrence in Northland, recorded in this Ecological District from Waipoua part of O06/001 (SSBI O06/H015) and Kaihu Forests P07/001 (SSBI P07/H001).

Pratia angulata[8]

A creeping herb, *Pratia angulata* is recorded from Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013), Waima Forests (SSBI O06/H010) all O06/001 and Lake Waingata North in 1986 O06/036 (SSBI O06/028) in this Ecological District.

Psilotum nudum

Psilotum nudum is a small stalky fern ally that is widespread but sparse and is generally found in sunbaked open shrubland habitats. Recorded in this Ecological District from Hokianga South Head (O06/015), a year 2000 record (E. Cameron pers. comm.). Only a handful of specimens have been recorded elsewhere in Northland. Interestingly this plant has been found growing in several Auckland bark gardens (E. Cameron pers. comm. 2003) and has recently been found in rock gardens in Whangarei and on the Tutukaka coast (L. J. Forester pers. comm. 2005).

Psuedowintera axillaris horopito

Horopito is a small tree usually restricted to high altitudes in Northland, recorded from Waipoua (SSBI O06/H015) and Waima Forests (SSBI O06/H010), both part of O06/001, Marlbourgh P06/040 (SSBI P06/H040) and Kaihu Forests P07/001 (SSBI P07/H001) also Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002) in this Ecological District.

Psuedowintera colorata mountain horopito

Mountain horopito is a small tree with distinctive blotchy red peppery leaves occurring from the Tutamoe Range south to Stewart Island (Poole and Adams 1994). Recorded in this Ecological District from Waipoua (SSBI O06/H015) and Waima Forests (SSBI O06/H010), both part of O06/001, in this Ecological District and Kaihu Forest P07/001 (AK 205862).

Ranunculus urvilleanus

Ranunculus urvilleanus is an endemic buttercup found in swampy, wet places. It is now uncommon in Northland with only one record in this Ecological District from Waipoua Forest, part of O06/001 (SSBI O06/H015).

8 This record is derived from a plant list of an area (now Nga Whenua Rahui – Te Mahurehure Roopu Whenua Toanga) which lies between the forests of Waima and Mataraua.

Raukaua anomalus

Raukaua anomalus is an endemic shrub with zig-zagging, interlacing branchlets (Wilson and Galloway 1993). Recorded from Marlborough P06/042 (SSBI P06/H040), Waipoua (SSBI O06/H015), Mataraua (SSBI O06/H013) and Waima Forests (SSBI O06/H010) both O06/001, and Kaihu Forest P07/001 (SSBI P07/H001) in this Ecological District.

Rubus squarrosus

Rubus squarrosus is a prickly, leafless, yellow scrambler with a scattered distribution in Northland, recorded in this Ecological District from Waima Forest, part of O06/001 (SSBI O06/H010) and Maunganui Bluff O07/009 (Esler and Dobbins 1977).

Schizaea bifida

Schizaea bifida is a comb fern recorded from Waipoua Forest, part of O06/001 (SSBI O06/H015) in this Ecological District.

Scleranthus biflorus

Scleranthus biflorus is a perennial low mat-forming herb which is uncommon in Northland. Recorded from this Ecological District at Maunganui Bluff O07/009 (Esler and Dobbins 1977).

Sparganium subglobosum burr reed, maru

Burr reed is a fertile wetland grassy-leaved herb with distinctive spherical spikes, recorded from the Waipoua Forest, part of O06/001 (SSBI O06/H015) in this Ecological District.

Spiranthes novae-zealandiae

Spiranthes novae-zealandiae is an orchid which is widespread but with a very local distribution (L. J. Forester pers. comm.). It has white to pink flowers. Recorded in this District from Waipoua Forest (AK 1380620), part of O06/001 under manuka and a 1986 record by Lisa Forester at Lake Waingata North O06/036 (SSBI O06/H028).

Triglochin striata arrow grass

Triglochin striata is an indigenous wetland grass found in saltmarshes and lake margins. Recorded in this Ecological District from Waipoua Coastal Strip and Taha Moana Scenic Reserve O06/015 during this survey.

Uncinia distans

Uncinia distans is a hook grass which is uncommon in Northland, recorded in this Ecological District from Marlborough P06/042 (SSBI P06/H040) and Waipoua Forests, (SSBI O06/H015) both part of O06/001.

Urtica ferox ongaonga[9]

Ongaonga is uncommon tree nettle in Northland with coarsely toothed leaves and stinging hairs. Recorded in this Ecological District from Waima (SSBI O06/H010) and Mataraua Forests (SSBI O06/013) both part of O06/001 in this Ecological District.

Urtica incisa

An uncommon nettle in Northland, *Urtica incisa* is recorded from Kaihu P07/001 (SSBI P07/H001) and Marlborough Forests P06/042 (SSBI P06/H040) in this Ecologial District.

Viola filicaulis

Viola filicaulis is a mat forming herb found in moist places throughout New Zealand, recorded in this Ecological District from Kaihu Forest P07/001 (SSBI P07/H001), Waipoua (SSBI O06/H015) and Mataraua Forests (SSBI O06/H013), both part of O06/001.

Zoopsis nitida

Zoopsis nitida is an endemic liverwort known only from Northland. Recorded from the Waipoua Forest, part of O06/001 and the Tutamoe Range (P07/001) (Glenny *et al.* 1997).

3.3.7 Threatened and Regionally significant plant species not recorded for some time in the Ecological District

EXTINCT

Trilepidea adamsii Adams mistletoe

Trilepidea adamsii is a shrubby semi-parasitic mistletoe now presumed extinct which was endemic to the northern North Island from the Waipoua River to the Waikato and Coromandel Peninsula. *Trilepidea adamsii* was last recorded in 1954 from Cambridge (NZPCN 2007).

ACUTELY THREATENED

Rorippa divaricata (Nationally Endangered)

Rorippa divaricata is a herb recorded by T. F. Cheesman from Kaihu Forest (P07/001) in 1875 and by Allan at Waipoua (part of O06/001) in 1947 (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

CHRONICALLY THREATENED

Utricularia delicatula (Gradual Decline)

Recorded in 1976 from Waipoua Forest, part of O06/001 (Department of Conservation, Bioweb Threatened Plants Database, March 2006).

---

9 The Waima and Mataraua records are derived from a plant list of an area (now Nga Whenua Rahui – Te Mahurehure Roopu Whenua Toanga) which lies between the forests of Waima and Mataraua.

Peraxilla tetrapetala (Gradual Decline)

Peraxilla tetrapetala is a mistletoe species which was recorded in this District in 1993 (Threatened Plants Database) as a lone plant, parasitic on an isolated towai tree within farmland between Waima and Waipoua Forests (part of O06/001). This plant has since died from this location and is now possibly extinct in Northland.

REGIONALLY SIGNIFICANT

Danhatchia australis

A New Zealand endemic, *Danhatchia australis* is a monotypic leafless epiparasite orchid, often found in association with nikau or taraire (St George1999). In this Ecological District it was last recorded in 1955 (AK 185189) from the banks of the Waipoua River (part of O06/001).

3.4. FAUNA

Information on indigenous fauna in this report has been compiled from the following sources:

- Sites of Special Biological Interest (SSBI) files held at the Northland Conservancy Office, Department of Conservation.
- The Bioweb Herptofauna database (DOC, 2006).
- The NZ Freshwater Fish Database (NIWA, 2006).
- Incidental field observations during the course of this survey.
- Dr Fred Brook provided the text for Land snail descriptions.

The individual site descriptions detail known significant fauna only.

A feature of this Ecological District is the diversity of invertebrates found and this is directly related the size and diversity of forest habitat. Many of them are currently ranked as Data Deficient due to the paucity of information known about their distribution and abundance. However it is recognised that the invertebrate fauna, both common and less common including snails, arachnids and insects, are a significant facet of indigenous ecosystems. Indeed it is estimated that invertebrates outnumber vertebrates by 230 times and that there are around 40 times as many invertebrates as endemic vascular plants in New Zealand (McGuiness 2001). 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 to be found in the Ecological District. A checklist of fauna recorded in included in Appendix 5.

The Tutamoe Ecological District formerly supported large populations of NI brown kiwi, NI kokako, NI kaka and black petrel. The NI brown kiwi population is still the largest in Northland while NI kokako and NI kaka had all but disappeared by the 1990s. The Waipoua/Mataraua Plateau now supports the only viable population of NI kokako in Northland, with 17

pairs recorded in 2005 (4 pairs and 1 single recorded in Waima Forest) (T. Donovan pers. comm.). NI kaka are now only seen occasionally, more than likely as visitors from the Hauraki Gulf (R. J. Pierce pers. comm.). Colonies of black petrel formerly occurred on the Tutamoe Range, however by the 20th century they had completely disappeared.

The conservation status of individual species and scientific names for invertebrates is derived from Hitchmough, Bull and Cromarty 2007 (See Appendix 3). Species classifed as Regionally Significant are determined by the Department of Conservation, Northland Conservancy. Nomenclature follows Turbott (1990) and Heather and Robertson (2000) for birds, and Gill and Whitaker (1996) for reptiles.

3.4.1 Threatened bird species

ACUTELY THREATENED

Australasian bittern (matuku) *Botaurus poiciloptilus* (Nationally Endangered)

Indigenous

Australasian bittern are a swamp dwelling bird recorded in this District from Muriwai Stream Swamp, O06/026 (SSBI O06H017), Waipoua Coastal Strip and Taha Moana Scenic Reserve, O06/027 (SSBI O06/H014) and a 2004 record from Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002).

Pateke (brown teal) *Anas chlorotis* (Nationally Endangered)

Endemic

Pateke were once widespread in swampy streams and tidal estuaries throughout New Zealand. In 2006 the strongholds are eastern Northland, Great Barrier Island and Coromandel Peninsula. Pateke were released into wetlands on the eastern and western sides of Trounson Kauri Park Scenic Reserve (O07/005) in 1997 but are no longer present.

Grey duck *Anas superciliosa* (Nationally Endangered)

Indigenous

Recorded within Te Riu Lagoon O06/025 in this Ecological District (1978 record SSBI O06/H016), grey ducks are threatened due to loss of habitat, hunting, predation, competition and hybridisation with the mallard (Heather and Robertson 2000).

NI kaka *Nestor meridionalis septentrionalis* (Nationally Endangered)

Endemic

Kaka were recorded in the Marlborough Forest, P06/042 (SSBI P06/040) in 1983, Kaihu Forest, P07/001 (SSBI P07/H001) in 1999 and birds are regularly heard from Mataraua Forest (pt of O06/001) (SSBI O06/H013) including 2004 records) and the Mataraua plateau. One to two birds were seen at Trounson Kauri Park Scenic Reserve, O07/005 (SSBI O07/H002) in 2004 and 2005. These birds are probably vagrants with resident populations of kaka now largely restricted to islands in the Hauraki Gulf

and Bream Head in the Manaia Ecological District (R. J. Pierce pers. comm.).

NI kokako *Callaeas cinerea wilsoni* (Nationally Endangered)

Endemic

The Waipoua/Mataraua Plateau (part of O06/001) supports the most viable population of kokako in Northland. This is one of two remaining populations in Northland, the other occurring in Puketi/Omahuta Forest (Puketi Ecological District). Several birds were located in the Waima Range (part of O06/001) in 2003–2005 (R. J. Pierce pers. comm.). NI kokako were translocated to Trounson Kauri Park Scenic Reserve (O07/005) in 1995 and 1998 but are no longer present there. At least one of these birds was known to have 'migrated' into Marlborough Forest (P. J. Anderson pers. comm.). In 2005 17 pairs were recorded from Waipoua/Mataraua and 4 pairs and 1 single from Waima Forest (T. Donovan pers. comm.).

Reef heron *Egretta sacra sacra* (Nationally Vulnerable)

Indigenous

Reef herons have a scattered distribution around the rocky coastlines of New Zealand with their decline attributed to increased human disturbance on the coast (Heather and Robertson 2000). Found in the Hokianga Harbour and coastline in this Ecological District.

Caspian tern *Sterna caspia* (Nationally Vulnerable)

Indigenous

Caspian tern occur along the coast and at the Waimamaku River mouth including Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip O06/015 and the coastal part of O06/001 (R. J. Pierce pers. comm.).

Northern NZ dotterel *Charadrius obscurus aquilonius* (Nationally Vulnerable)

Endemic

Small numbers of Northern NZ dotterel have been recorded from several coastal habitats in this Ecological District including Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip O06/015 (SSBI O06/H014), Muriwai Stream Swamp O06/026 (SSBI O06/H017), Waipoua Coastal Strip and Taha Moana Scenic Reserve O06/027 (SSBI O06/H014), and on the coast of Waipoua Forest pt of O06/001.

CHRONICALLY THREATENED

NI brown kiwi *Apteryx mantelli* (Serious Decline)

Endemic

The highest numbers of NI brown kiwi in Northland are recorded from the Waipoua Forest in this Ecological District. Habitat loss and particularly predation by stoats, dogs, ferrets and cats severely impact on kiwi populations. Road kills of kiwi are known to occur in the area. NI brown kiwi are recorded from many sites in this District, some of which are now being managed. Management of kiwi at Trounson Kauri Park

has increased numbers with 'overflow' of birds moving into adjoining habitats.

Banded dotterel *Charadrius bicinctus* (Gradual Decline)

Endemic

Banded dotterel occur in small numbers on the coast in Northland, including the mouth of the Waimamaku River O06/015 (R. J. Pierce pers. comm.) and the Waipoua Coastal Strip and Taha Moana Scenic Reserve, O06/027 (SSBI O06/H014).

Kukupa *Hemiphaga novaeseelandiae novaeseelandiae* (Gradual Decline)

Endemic

Significant populations of kukupa are recorded in the Waipoua/Mataraua/ Waima forest complex (O06/001) as well as several other sites in this Ecological District. There was a significant decline in numbers in Waipoua and Mataraua between 1979 and 1993 (Pierce et. al. 1993) but numbers have recovered during the 1990s (R. J. Pierce pers. comm.). Corridor habitats will help in the survival of kukupa populations; predation, poaching and competition for food with possums however severely affect their populations.

Long-tailed cuckoo *Eudymanys taitensis* (Gradual Decline)

Indigenous

Long-tailed cuckoo breed in New Zealand and migrate to islands in Oceania via Northland Forests, including Waipoua and Waima (both part of O06/001) (R. J. Pierce pers. comm.).

Northern little blue penguin *Eudyptula minor iredalei* (Gradual Decline)

Endemic

Northern little blue penguin are known to breed along the coastal margin at Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip, O06/015. Several nests were occupied in a survey of the Waimamaku-Wairau coastal area in the late 1980s—part of O06/001 (SSBI O06/H014).

Red-billed gull *Larus novaehollandiae scopulinus* (Gradual Decline)

Endemic subspecies

Red-billed gull is listed as chronically threatened because of a decline in numbers at its three largest colonies at the Three Kings, Mokohinau Island and Kaikoura.

White-fronted tern *Sterna striata striata* (Gradual Decline)

Endemic

White-fronted tern are present offshore and are also observed feeding at Waimamaku Estuary (Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip, O06/015 and on the coast of O06/001) with roost sites on beaches

in this Ecological District (R. J. Pierce pers. comm.). White-fronted tern are also recorded from Waipoua Coastal Strip and Taha Moana Scenic Reserve, O06/027 (SSBI O06/H014).

Yellow-crowned kakariki *Cyanoramphus auriceps* (Gradual Decline)

Endemic

Yellow-crowned kakariki are mainly restricted to extensive forests of the central North Island and South Island. There is an historical record (1970s) from Trounson Kauri Park Scenic Reserve, O07/005 in this Ecological District (P. J. Anderson pers. comm.).

AT RISK

Banded rail *Rallus philippensis* (Sparse)

Indigenous

The banded rail is a wetland bird mainly found in mangroves, saltmarshes and rush dominated freshwater wetlands in Northland (Heather and Robertson 1996). Banded rail were observed in the Trounson – Kaihu area in 2004–05 (R. J. Pierce pers. comm.).

Black shag *Phalacrocorax carbo* (Sparse)

Indigenous

Black shags are found on coastal sites and rivers in this Ecological District. Recorded from the Waipoua coast at the Waipoua River – Waipoua Coastal Strip and Taha Moana Scenic Reserve, O06/027 (SSBI O06/H014), and Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip, O06/015 and the coastal part of O06/001 at the Waimamaku River (R. J. Pierce pers. comm.).

NI fernbird *Bowdleria punctata vealeae* (Sparse)

Endemic

NI fernbird are predominantly a bird of wetlands and adjacent shrublands. They are of a restricted distribution in Northland. Recorded from many sites in this Ecological District including Waipoua Forest, part of O06/001 (SSBI O06/H015), Mataraua Forest, part of O06/001 (SSBI O06/H013), Te Riu Lagoon O06/025 (1994 record from this survey), Muriwai Stream Swamp O06/026 (SSBI O06/H017), Waipoua Coastal Strip and Taha Moana Scenic Reserve O06/027 (SSBI O06/H014), Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip O06/015 (SSBI O06/H014), Maunganui Bluff Scenic Reserve O07/009 (SSBI O07/H001), and Marlborough Forest P06/042 (SSBI P06/H040).

NZ dabchick *Poliocephalus rufopectus* (Sparse)

Endemic

The NZ dabchick is a wetland species found mainly in dunelakes in Northland. A pair were recorded from an artifical pond just east of Kaihu Forest in this Ecological District (SSBI P07/H001) and also from Te Riu Lagoon, O06/025 in year 2000 (SSBI O06/H016).

Spotless crake *Porzana tabuensis* (Sparse)

Indigenous

Spotless crake is a species with restricted distribution, being confined on the mainland largely to raupo swamps. There are past records of spotless crake from Muriwai Stream Swamp O06/026 where 'high numbers' were recorded in 1987 (SSBI O06/H017).

3.4.2 Regionally significant bird species

Australasian little grebe *Tachybaptus novaehollandiae novaehollandiae*

Australasian little grebe are self-introduced from Australia in the 1960s and 1970s and inhabits ponds and lakes in the northern North Island. The total New Zealand population was c. 50 birds in 1995 (Heather and Robertson 1996) and may now be as high as 100–200 birds (R.J. Pierce pers. comm.). In Tutamoe ED, Australasian little grebe have been recorded from Te Riu Lagoon O06/025 during this survey and Muriwai Stream Swamp O06/026 (SSBI O06/H016).

NI robin *Petroica australis longipes*

Endemic

At the time of European settlement robins were widespread throughout mainland New Zealand but by the 1900s they had largely disappeared from northern and southern North Island (Heather and Robertson 2000). Robins were re-introduced into Trounson Kauri Park Scenic Reserve (O07/005) in 1997 however they are no longer present.

NI tomtit *Petroica macrocephala toitoi*

Endemic

NI tomtit are of restricted distribution in Northland, mainly occurring in large mature forested areas. Recorded from several sites in this Ecological District including Waipuoa Forest (SSBI P06/H040), Mataraua Forest (SSBI O06/H013) and Waima Forest (SSBI O06/H010) of O06/001, Jones Road/ Mangatu Bush Remnants O06/030 (SSBI O06/H020), Waiwhatawhata Bush O06/014 (SSBI O06/H007), Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002), Maunganui Bluff Scenic Reserve O07/009 (SSBI O07/ H001), Marlborough Forest P06/H042 (SSBI P06/H040), and Kaihu Forest P07/001 (SSBI P07/H001),

Red-crowned kakariki *Cyanoramphus novaezelandiae novaezelandiae*

Endemic

Kakariki are rare in indigenous forest habitats on the mainland but they are more common on predator-free offshore islands. Increasing numbers are being recorded in some managed sites in eastern Northland. Red-crowned kakariki were recorded in the District at Waipoua Forest in 1990 (R. J. Pierce pers. comm.) and there is a historical record from Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002).

Variable oystercatcher *Haematopus unicolor*

Endemic

Variable oystercatcher have been recorded from coastal habitats in this Ecological District including Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip O06/015 (SSBI O06/H014), Waipoua Coastal Strip and Taha Moana Scenic Reserve O06/027 (SSBI O06/H014), and on the coast of Waipoua Forest pt of O06/001.

3.4.3 Threatened mammal species

ACUTELY THREATENED

Northern short-tailed bat *Mystacina tuberculata aupourica* (Nationally Endangered)

In 2005 a short-tailed bat survey was undertaken at Waipoua Forest, no short-tailed bats were detected (automatic bat detectors were used), however a previous survey had recorded a short-tailed bat pass although this record is being treated as 'unconfirmed', further short-tailed bat survey is therefore required (SSBI O06/H015). Northern short-tailed are only known from Puketi/Omahuta Forest (Puketi Ecological District) and Warawara (Ahipara Ecological District) in Northland and Hauturu (Little Barrier Island).

Long-tailed bat *Chalinolobus tuberculata* (Nationally Vulnerable)

Long-tailed bats are widespread in Northland but very uncommon. They have been recorded from Trounson Kauri Park Scenic Reserve O07/005 and the Waipoua Forest (SSBI O06/H010) and Waima Forest, (SSBI O06/H015) both part of O06/001.

3.4.4 Threatened invertebrate species

ACUTELY THREATENED

Notoreas sp. "Northern" (Nationally Endangered)

Notoreas sp. "Northern" is a small, brightly coloured diurnal moth which is found on the sand daphne *Pimelea prostrata* on the coast. The agents of decline for this species are unclear, but are thought to be habitat loss and predation by paper wasps. This species hasn't yet been recorded in this ED, but surveys in the Kawerua area have found large areas of suitable habitat, so it is highly likely they are present. Some of the *Notoreas* sp. "Northern" habitat in this area has been completely taken over by pines and Spanish heath. (A. Booth pers. comm.)

CHRONICALLY THREATENED

Black katipo *Latrodectus atritus* (Serious Decline)

Latrodectus atritus is found in the northern half of the North Island. The other katipo species, which has a red stripe, *L. katipo*, is found in the southern half of the North Island, and in the South Island. Populations of black katipo have declined around the country, probably due to habitat

loss and competition with the introduced spider *Steatoda capensis* (Griffiths 2000). In the Tutamoe Ecological District, the black katipo has been recorded in dunelands right along the coast from Hokianga South Head to 1 km north of Maunganui Bluff including sites O06/015 and O06/027. This area has some of the best katipo habitat in Northland, although it is still threatened by modification, especially weed incursion. (A. Booth pers. comm.)

Forest ringlet butterfly *Dodonidia helmsii* (Gradual Decline)

The adult forest ringlet butterfly lives for only 3–4 weeks, the caterpillars feed at night on *Gahnia* and bush snowgrass (Crowe 1999). This butterfly was recorded in 2001 in Waima Forest (SSBI O06/H015) and there is a 2003 record from Mataraua Forest (SSBI O06/H013), both part of O06/001.

Weta/Beetles/Weevils

AT RISK

Beetle *Syrphetodes* sp. "Waipoua" (Sparse)

Syrphetodes sp. "Waipoua" is a beetle recorded from the eastern side of Waipoua Forest (part of O06/001) (A. Booth pers. comm.).

Darkling beetle *Menimus clarkei* (Range Restricted)

A darkling beetle which has been recorded from the Waimatenui area of this Ecological District (Department of Conservation Internal Files).

Ground weta *Hemiandrus* "Otekauri" (Range Restricted)

This ground weta has only been recorded from Waipoua (part of O06/001) in Northland, also known from one specimen at the Coromandel Peninsula (Department of Conservation Internal Files).

Northland tusked weta *Anisonra nicobarica* (Sparse)

In this District Northland tusked weta have been recorded from the large forest tract of Waipoua/Mataraua/Waima 006/001 and in 2005 tusked weta were recorded from Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002).

Stag beetle *Paralissotes mangonuiensis* (Sparse)

A stag beetle recorded from the Waipoua/Mataraua/Waima Forest continuum, O06/001.

DATA DEFICIENT

Euconnus microcilipes

Euconnus microcilipes is a tiny beetle (1.5 mm long) which has only been recorded from the Waipoua Forest (part of O06/001) where it was recorded from the leaf litter of kauri/podocarp-broadleaf forest (McGuinness 2001).

Euconnus paracilipes

Euconnus paracilipes is slightly bigger (2 mm long) than *E. macrocilipes* where it has only been recorded from the Waipoua Forest (part of O06/001) in the leaf litter of broadleaf/podocarp forest (McGuinness 2001).

Megacolabus bifurcatus

Megacolabus bifurcatus is a dull black flightless weevil that has only been recorded between Tutamoe and Waimatenui on road verges in this Ecological District (McGuinness 2001).

Megacolabus obesus

Megacolabus obesus is a dull black flightless weevil that has been recorded from Mataraua (part of O06/001) in this Ecological District as well as from Kaikohe area (Kaikohe Ecological District) where it is found on the underside of fern leaves (McGuinness 2001).

Maorinus hunuaeformis

Maorinus hunuaeformis is a minute beetle (2.2 mm long) which has only been collected from Waipoua Forest (part of O06/001) in the litter of podocarp/broadleaf forest (McGuinness 2001).

Maorinus sp.

Maorinus sp. is another tiny beetle (2 mm long) recorded only from Waipoua Forest (part of O06/001) in leaf litter (McGuinness 2001).

Maorinus toronouii

Maorinus toronouii is also a very tiny beetle at 2.1–2.1 mm long and has only been recorded from Waipoua Forest (part of O06/001) where it was found under logs in kauri/podocarp-broadleaf forest (McGuinness 2001).

Peace's weevil *Nothaldonus peacei*

Peace's weevil is a shiny black flightless weevil with black spots that has been recorded from the Waipoua River (part of O06/001) in this Ecological District as well as from Parua Bay (Whangaruru Ecological District) and Maungatapere (Whangarei Ecological District) (McGuinness 2001).

Sciacharis yakasensis

Sciacharis yakasensis, a minute beetle has only been recorded at Waipoua Forest (part of O06/001) where it was found in leaf litter under podocarp/ broadleaf forest (McGuinness 2001).

Earthworm

DATA DEFICIENT

Earthworm *Rhododrilus agathis*

An earthworm endemic to Waipoua Forest, part of O06/001 (Department of Conservation Internal Files).

Land snails

(Main text provided by Dr Fred Brook with SSBI records added for kauri snail)

ACUTELY THREATENED

Phrixgnathus murdochi (Nationally Endangered)

This snail is endemic to western Northland, and has been recorded from two locations only: Waima (part of O06/001), in Tutamoe Ecological District; and Rawene, in Hokianga Ecological District. Museum collections suggest that this species was relatively common at both localities up until at least the mid 19th century, but no records are known from the last few decades. Most of the original native forest at Rawene has been clear felled, with only small, highly modified pockets remaining. A recent survey of these failed to locate any *P. murdochi*, so there is a possibility that the population at this location might have become extinct. The current conservation status of the population at Waima is not known.

CHRONICALLY THREATENED

Amborhytida forsythi (Gradual Decline)

This small carnivorous snail is a Northland endemic with a patchy distribution extending from the Aupouri Ecological District south to the Tokatoka Ecological District. It lives in native forest and shrubland, generally on the ground in litter and under wood, stones and ground-layer plants, but also arboreal in epiphytes and pockets of trapped litter. *Amborhytida forsythi* presently has a fragmented, relict distribution resulting from forest clearance, but it is still relatively widely distributed and locally common in the Tutamoe Ecological District.

Kauri snail – pupurangi *Paryphanta busbyi busbyi* (Gradual Decline)

This large carnivorous snail is endemic to Northland and North Auckland. It has a natural distribution extending from Kaitaia south to Brynderwyn, with outlying populations at Hen Island and Warkworth. It lives on the ground in native shrubland and forest, but also inhabits *Pinus radiata* plantations, and rank exotic grassland adjoining forest and shrubland. The overall distribution and abundance of this species has declined historically as a result of land clearance, but it is still relatively widely distributed and locally common in forest within the Tutamoe Ecological District. However, local populations there are threatened by predation by pigs, rats, possums, and possibly also hedgehogs. Kauri snail numbers have increased at Trounson following intensive pest control (N. Coad pers. comm.).

In this Ecological District records include Waipoua Forest (SSBI O06/H015), Mataraua Forest (SSBI O06/H013) and Waima Forest (SSBI O06/H010) all part of O06/001, Muriwai Bush O06/028 (SSBI O06/H019), Marlborough Road Forest O06/029 (SSBI O06/H023), Katui Scenic Reserve and Surrounds O07/001 (SSBI O06/H022), Trounson Kauri Park Scenic Reserve O07/005 (SSBI O07/H002), Maunganui Bluff O07/009 (SSBI O07/H001), Marlborough Forest P06/042 (SSBI P06/H040), Kaihu Forest P07/001 (SSBI P07/H001) and State Highway 12 Forest Remnant P07/026 (recorded in 2001 during an ecological survey of this site).

AT RISK

Phrixgnathus waipoua (Range Restricted)

This small, litter-dwelling snail is endemic to the Tutamoe Ecological District, and is known only from Waipoua Forest, and Waiotemarama at the western end of the Waima Range both part of O06/001.

Punctidae sp. 21 (Range Restricted)

This undescribed species is endemic to Maunganui Bluff O07/O09, where it inhabits native coastal shrubland, broadleaved forest, and conifer-broadleaved forest.

Punctidae sp. 34 (Range Restricted)

This snail is known from two forested sites in west-central Northland: Waimatenui, east of Mataraua Forest, near the eastern boundary of the Tutamoe Ecological District; and Mt Hikurangi, in the Tangihua Ecological District.

Punctidae sp. 5 (Range Restricted)

This undescribed species is recorded only from Maunganui Bluff O07/009. No information is available on its ecology and abundance.

Punctidae sp. 28 (Range Restricted)

This minute litter-dwelling snail has a sparse distribution in western and central Northland. Within the Tutamoe Ecological District it has been recorded from Waiotemarama and Waima at the western and northeastern ends of the Waima Range (part of O06/001) respectively. Elsewhere it is known only from Puketi Forest (Puketi Ecological District) and Mangataipa (Maungataniwha Ecological District).

Punctidae sp. 29 (Range Restricted)

This undescibed species is known from two forested sites in western Northland: in Waima Forest (part of O06/001), Tutamoe Ecological District; and at Mitimiti, in the Ahipara Ecological District.

DATA DEFICIENT

Athoracophorus sp. 7

This large, undescribed native slug was formerly known only from lowland to mid-altitude forest in Warawara Forest (Ahipara Ecological District), but has recently been found living in Trounson Kauri Park Scenic Reserve

O07/005. It has a distinctive colour pattern of dark blotches on a pink background. Individuals shelter under debris on the ground during the day, and are active on mossy tree trunks on humid nights.

Charopidae sp. 12

This undescribed species of *Therasiella* is known from a single site at Waioitemarama, western end of the Waima Range, part of O06/001.

Charopidae sp. 8

This undescribed charopid is known from a single site near the Kawerua Road, Waipoua Forest, part of O06/001.

Charopidae sp. 13

This undescribed species of *Therasiella* is known from a single site in high altitude forest at Hauturu, near the western end of the Waima Range, part of O06/001.

Punctidae sp. 32

This undescribed snail species is known from a single site in Waipoua Forest, part of O06/001.

Punctidae sp. 33

This undescribed snail species is known from a single site in Waipoua Forest, part of O06/001.

Punctidae sp. 31

This undescribed snail is known from a single site in high altitude forest at Hauturu, near the western end of the Waima Range, part of O06/001.

Punctidae sp. 4

This undescribed snail is known from a single site at Maunganui Bluff O07/009.

3.4.5 Threatened lizard species

Little is known of the lizard fauna from this Ecological District. Future lizard and frog surveys could reveal new exciting records as the Ecological District contains the greatest contiguous unmodified tract of indigenous forest remaining in Northland, together with a full altitudinal sequence from sea level to Northland's highest point.

An extinct species of skink, *Oligosoma gracilicorpus* (narrow-bodied skink) is known from a single and bleached preserved museum specimen which was collected from the Hokianga District prior to 1955. This species is similar to the large endangered chevron skink (*O. homalonotum*) which is known only from Great and Little Barrier Islands. In 1979, an elderly gentleman landowner reported to the Wildlife Service about seeing large lizards on the flanks of the Tutamoe Range when he was a boy (around the early 1900s) and during WWII. When this report was followed up, the gentleman had passed away and the location of his sightings (possibly *O. gracilicorpus*) was lost (P. J. Anderson pers. comm.).

ACUTELY THREATENED

Auckland green gecko *Naultinus elegans elegans* (Gradual Decline)

Auckland green gecko are an arboreal gecko which have been recorded from exotic vegetation adjacent to the Waipoua Forest (P. J. Anderson pers. comm.). This gecko is close to its northern limit in the Tutamoe and neighbouring Hokianga Ecological Districts. On the northern side of the Hokianga Harbour the Auckland green gecko is replaced by the Northland green gecko (P. J. Anderson pers. comm.).

3.4.6 Threatened and regionally significant freshwater species

ACUTELY THREATENED

Short-jawed kokopu *Galaxias postvectis* (Gradual Decline)

Short-jawed kokopu were probably once widespread throughout New Zealand but are now known from relatively few locations. There are several recent records of short-jawed kokopu in Northland—recorded from the Waipoua River (part of O06/001) in 1999 in this District (previously recorded from Waipoua back in 1965), also recent records from Warawara and Herekino Forest (both in Ahipara Ecological District), Raetea Forest (Maungataniwha Ecological District), Puketi (Puketi Ecological District) and Tangihua Forest (Tangihua Ecological District) (NIWA, 2005). It appears that the Raetea population is the Northland stronghold.

Longfin eel *Anguilla dieffenbachii* (Gradual Decline)

Longfin eels are found throughout New Zealand, and are threatened by harvest and habitat modification. Recorded from a few sites in this Ecological District.

Range Restricted

AT RISK

***Oxyethira waipoua* (Range Restricted)**

Oxyethira waipoua is a caddisfly known from only one site in New Zealand, Waipoua (part of O06/001) in this Ecological District (Department of Conservation Internal Files).

Lamprey *Geotria australis* (Sparse)

The lamprey can be described as being eel like and is one of the most widely distributed freshwater fish in the world (McDowall 1990). In Northland the lamprey has been recorded in less than 10 sites (NIWA, 2006). Recorded from the Waipoua and Waima Rivers (part of O06/001) in this Ecological District.

Regionally significant species

Banded kokopu *Galaxius fasciatus*

Banded kokopu occur in shaded streams throughout New Zealand, and have been recorded at several sites in this Ecological District: O06/001

(NIWA 2006), O06/015 (SSBI O06/H014), O06/026 (NIWA 2006), O07/001 (SSBI O06?H022) and P07/026 (recorded during this survey). This species is currently not threatened, however, it is listed in Hitchmough *et al*. (2007) with a Data Poor qualifier. There is a historic decline of this species nationally because of habitat modification and loss (Department of Conservation 2005).

Giant bully *Gobiomorphus maculatus*

Giant bully have an intermittent distribution around the New Zealand coast, with few records from Northland. Recorded in this District from Muriwai Stream Swamp (O06/026) (NIWA, 2006).

Koaro *Galaxias brevipinnis*

Recorded in many locations in Northland but are certainly not as widespread as banded kokopu. This galaxiid is more commonly found inland in mountainous streams (McDowall 1990). Recorded from the Waipoua (part of O06/001), Wairau and Waimamaku Rivers in this Ecological District (NIWA 2006).

3.5 THREATS

All areas in the Tutamoe Ecological District have been modified to some extent and continue to be modified by the impact of browsing and predatory animals, including goats, cats, cattle, possums, rats, mustelids and pigs.

It is interesting to note chronological details on forest modification post European settlement from Wildlife and Wildlife values of Northland (Ogle 1982):

1921: Possums released at Tutamoe (ibid).

(Possum invasion into Northland was relatively late and it was not until the early 1960s that possums were apparent in the Waipoua Forest area, Payton et. al. 1996).

1948: Cattle present in Waipoua Forest.

1948: Goats had not reached Waipoua Forest but were close by.

Outside the large forest tracts, modification is much more evident with the majority of remnant stands being either secondary or heavily cutover.

On the coast habitats have been reduced by farming and exotic forestry with natural areas suffering the effects of grazing and exotic weed invasion.

Exotic forestry can affect freshwater wetlands and lakes hydrologically and high silt loads may be experienced as a result of logging. Where wetlands and streams adjoin farmland, grazing, loss of a riparian buffer and fertiliser run off will be impacting upon natural values.

The invasion of natural areas by weeds has the potential to compromise the intrinsic values and viability of all natural areas. Some of the most prominent weed species threatening forest ecosystems in this District include kahili ginger, mistflower, Mexican devil, *Montbretia*, African clubmoss, *Aristea*, tutsan and wandering willy, with many additional weeds species present.

Gorse and *Hakea* spp. are a particular concern in gumlands areas as these species tend to dominate quickly after a fire event. Wilding pines can also seed easily in gumland areas and once established can dominate for a long time.

Many large and medium-sized land snails in Northland are seriously affected by predation from pigs, rats, mice, possums, hedgehogs and naturalised and non-indigenous birds (Brook 2002).

These threats have particular significance in areas of local endemism such as Maunganui Bluff which has three locally endemic land snail taxa.

The cluster of nationally threatened plants in the Waima Forest (*Ackama nubicola*, *Coprosma waima*, *Olearia crebra*) are at threat by browse and damage particularly by goats and degradation of habitat by possums.

Introduced predatory mammals have caused and continue to cause declines in avifauna, lizard and invertebrate populations. Mustelids, cats, possums, and dogs impact on kiwi, penguins, shorebirds, petrels, forest birds etc, except in well-managed parts of the Ecological District. Possums, rats, pigs and goats impact on lizards and invertebrates and their habitats and rats and possums also impact on many forest bird species. In recent years specific predators have been identified for many threatened fauna eg. kiwi (possums, rats, stoats), kauri snails (rats, pigs, possums) and management is increasingly applied locally (R. J. Pierce pers. comm.).

Argentine ants, an invasive exotic ant, can reach a very high biomass within a site, with nests containing hundreds of thousands of workers. They are very efficient foragers, and are one of the few ant species which forage 24 hours a day. They find new food sources faster than other ants, resulting in competitive exclusion of other ant species. They especially influence invertebrate communities through direct predation, competition and egg predation. Argentine ants also feed on nectar and honey dew, which impacts adversely on invertebrate communities, and results in competition with insect- and nectar-feeding vertebrates such as birds and lizards. They have also been recorded killing nestling birds.

Recent research into the invasibility of native habitats by Argentine ants has shown that relatively open canopy scrub environments in northern New Zealand are likely to be vulnerable to invasion. However, intact indigenous forest will probably not be invaded or at least have Argentine ants only on the margins. Impacts of Argentine ants are predicted to be significant in highly fragmented landscapes (Ward and Harris 2005). Areas within the Tutamoe ED which are particularly susceptible to establishment by Argentine ants include coastal sites and open shrubland areas (A. Booth pers. comm.).

4. Site descriptions

Midpoint grid references (New Zealand Map Grid (NZMG)) are given for all sites. Where more than one remnant exists, the number of remnants is given in brackets after the grid reference.

Vegetation types within ecological units describe abundant/dominant (species which form >50% of the canopy) and common (species which form 20–50% of the canopy) canopy species (refer to Section 2.3). If there is more than one canopy species, and the species are all common within the canopy they are listed alphabetically.

Where available, the percentage cover of ecological units has been included in the site descriptions.

Records of threatened flora and fauna have been sourced from herbaria and other databases and information systems mentioned in Section 2.1, or from direct observations by Department of Conservation staff during the course of this survey. Many of the threatened and regionally significant flora and fauna records were obtained from the SSBI information system (*please refer to Sections 3.3.5-3.4.6 for the SSBI reference*). The status of all records was checked prior to inclusion in this report. The Fauna section of each site report is focussed on significant fauna with their current New Zealand conservation status (e.g. Gradual Decline) or regionally significant status as determined by the Department of Conservation, Northland Conservancy. Some common species are also included. See Appendix 5 for fauna lists in the Tutamoe Ecological District.

"Not surveyed" is written in the Fauna section of the site descriptions if, at the time of publication, the Department of Conservation, Northland Conservancy did not have any information on indigenous significant fauna species from that natural area.

Recent aerial photography from 1999, 2002, and 2006 was used to produce the site maps as a check against the original 1994/95 survey. In a few cases, the site boundaries have changed significantly, and hence the vegetation description may have changed from the original survey. Generally sites changed very little or not at all whilst the site boundary of some sites was improved upon with the benefit of an aerial view compared to the topographical interpretation used for the original survey.

Where changes occurred an explanation was made at the beginning of the site report in the "Area" section.

As it was not possible to re-survey the District, a map was produced from the aerial photography to indicate possible potential sites which after survey could be categorised as Level 1 or Level 2 sites or additions to existing sites. This map is a guide only (see Appendix 8 p. 2009). (Please also refer to 2.3 Data Acquisition and Analysis on p. 9 for additional information.)

4.1 LEVEL 1 SITES

Table C lists the places that were assessed to be Level 1 sites at the date of survey. They are described and mapped in the ensuing sections.

TABLE C. LIST OF LEVEL 1 SITES

SITE NAME	SURVEY NO.	GRID REF.
Waipoua/Mataraua/Waima Forest Tract	O06/001	O06 576 235
Waiotemarama Gorge Forest	O06/013	O06 481 312
Waiwhatawhata Bush	O06/014	O06 475 283
Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip	O06/015	O06 465 256
Smoothy Road Bush	O06/016	O06 493 288
Waiotemarama Stream Bush	O06/017	O06 505 286
Te Wai-O-Te Marama Scenic Reserve and Surrounds	O06/018	O06 502 275
Waimamaku Scenic Reserve	O06/019	O06 533 276
Waimamaku Riverine Forest Remnant	O06/020	O06 540 267
Te Moho Rock Bush	O06/021	O06 547 256
Hansen Road Forest Remnant	O06/022	O06 546 298
Taita Road Bush	O06/023	O06 560 285
Wekaweka Bush	O06/024	O06 587 248
Te Riu Lagoon	O06/025	O06 559 138
Muriwai Stream Swamp	O06/026	O06 585 125
Waipoua Coastal Strip and Taha Moana Scenic Reserve	O06/027	O06 536 155
Muriwai Bush	O06/028	O06 600 115
Marlborough Road Forest	O06/029	O06 635 112
Jones Road/Mangatu Bush Remnants	O06/030	O06 689 115
Tutamoe Domain Recreation Reserve and Surrounds	O06/031	O06 695 162
Lake Waingata North	O06/036	O06 536 157
Katui Scenic Reserve and Surrounds	O07/001	O07 608 104
Hood Road Forest Remnant	O07/002	O07 630 076
Maunganui Outlier Forest Remnant	O07/003	O07 623 069
Hooper Road Bush	O07/004	O07 653 085
Trounson Kauri Park Scenic Reserve	O07/005	O07 688 091
Waima Riverine Forest Remnant	O07/006	O07 677 074
Waitapu Road Bush	O07/008	O07 656 043
Maunganui Bluff Scenic Reserve	O07/009	O07 612 054
Aranga Beach Coastal Forest Remnant	O07/011	O07 642 033
Kaikohe Road Forest Remnant	P06/041	P06 700 146
Marlborough Forest	P06/042	P06 773 153
Kaihu Forest	P07/001	P07 781 029
Kaihu Bush Remnant	P07/003	P07 729 027
Waingarara Stream Bush	P07/004	P07 728 051
Tutamoe Maire tawake Forest Remnant	P07/006	P07 783 089

WAIPOUA/MATARAUA/WAIMA FOREST TRACT

Survey no.	O06/001
Survey date	December 1994 Additional information from Eadie, Burns and Leathwick 1987; Nicholls 1976
Grid reference	O06 576 235
Area	32,934.1 ha (1 large continuum and 2 small outliers) (29,349.9 ha forest, 2,538.4 ha shrubland, 45.8 ha wetland) (Small adjustments were made to the original 1994 boundary of this site to fit with 2002 and 2006 aerial photography. The Waipoua River was added from the coast to the forest)
Altitude	0–781 m asl

Ecological unit

(a) Mamangi forest on coastal hillslope

(b) Taraire forest on hillslope

(c) Taraire-towai forest on hillslope

(d) Towai forest on hillslope and high altitude plateau (Nichols 1976)

(e) Tawari-towai forest on elevated hillslope

(f) Tawa-towai forest on hillslope

(g) Kauri-taraire forest on hillslope

(h) Kauri forest on flats

(i) Kauri-tanekaha forest on ridges

(j) Towai shrubland on hillslope

(k) *Dracophyllum lessonianum*-umbrella fern-manuka shrubland association on gentle hillslope

(l) Manuka shrubland on hillslope

(m) Toikiwi-kauri-manuka forest association on flats

(n) *Baumea* spp.-umbrella fern association on gentle hillslope

(o) Pate-wineberry shrubland on moderate hillslope

(p) Bracken fernland on hillslope

(q) Kahikatea-towai secondary forest on hillslope

(r) Kanuka/manuka shrubland on hillslope

Landform / geology

The Waima Range comprises a rugged massif of Tangihua Complex Igneous rocks; most of remainder of the area of Mataraua and Waipoua Forests comprises a dissected plateau formed on deeply weathered Lower Miocene Waipoua Subgroup basalt flows. The area also includes minor Lower Miocene Otaua Group sandstone and conglomerate within the valley of the Wairau, Toronui and Waimamaku Rivers and at the northern end of Waoku Coach Road; extensive landslips at north end of Waoku

and in Waimamaku Valley; and dunefields of Pleistocene consolidated sands and Holocene dunes along the coast.

Vegetation

There are undoubtedly many other ecological units within this forest continuum than the 18 recorded here. Because of the reconnaissance nature of this PNAP survey and time constraints, the ecological units recorded through PNAP survey are a guide only, as is the distribution of forest, shrubland and wetland shown on the site map. Eadie, Burns and Leathwick's 1987 ecological survey of Waipoua Forest has been referenced as well as Nicholls 1976 description of plateau vegetation in western Northland.

(a) Mamangi with frequent mapou and kanuka and occasional pohutukawa, *Metrosideros excelsa* × *robusta*, *Olearia albida* and kowhai.

(b) Abundant taraire with frequent puriri, northern rata and occasional towai, tawa, tawari and emergent rimu, totara, miro, kahikatea, kauri and pukatea.

(c) Associated taraire and towai with frequent rimu and tanekaha and occasional emergent kahikatea, kauri, northern rata, tawa and pukatea.

(d) Towai forest containing frequent rimu with occasional tawari, willow-leaved maire, maire tawake, makamaka and northern rata.

(e) Co-dominant tawari and towai with frequent tawheowheo, makamaka and occasional hinau and miro.

(f) Tawa and towai are associated with frequent taraire and emergent rimu. Miro, totara, northern rata and kahikatea are occasional.

(g) Kauri and taraire forest with frequent towai and totara. Tawa, miro, kahikatea, rewarewa, rimu, tanekaha and northern rata are occasional.

(h) Dominant kauri forest with the occasional kanuka, totara, miro and tanekaha.

(i) Kauri and tanekaha are associated with frequent mamangi and kanuka and occasional taraire, towai and rewarewa.

(j) Abundant towai with frequent manuka and occasional lancewood, rewarewa and tarata.

(k) *Dracophyllum lessonianum,* umbrella fern and manuka form a shrubland canopy with frequent *Baumea teretifolia* and occasional towai.

(l) Dominant manuka with frequent bracken and occasional *Dracophyllum lessonianum* and hangehange.

(m) Toikiwi, kauri and manuka are common with occasional towai, willow-leaved maire and tawari.

(n) *Baumea* spp. and umbrella fern are co-dominant with frequent manuka and occasional hangehange, harakeke and *Blechnum* sp.

The vegetation of the Mataraua Plateau is typical of Nicholls (1976) description of the plateau vegetation of western Northland:

Abundant towai (type d) with occasional emergent rimu, miro and rata, and hinau, rewarewa, pukatea, maire tawake and tawari.

Professor W. R. McGregor Memorial Reserve

(Grid Reference O06 648 128)

Vegetation types recorded within this area include:

(o) Abundant pate with common wineberry. Occasional species include mamaku, kotukutuku, mahoe, wheki, towai, makamaka and totara.

(p) Bracken fernland.

(q) Co-dominant kahikatea and towai. Pukatea, miro, totara and maire tawake are occasional.

Type (d) towai forest, with frequent kanuka/manuka and occasional mamaku. Hinau is occasional.

Type (b) taraire forest, is common with frequent towai and rewarewa. Kawaka, emergent northern rata, miro, rimu, towai and epiphetic puka are present.

(r) Kanuka/manuka is dominant with occasional totara and towai.

Significant Flora

Nationally Critical

Fungus (Undescribed genus (Trichocomaceae),

Schistochila nitidissima.

Nationally Endangered

Coprosma waima, *Fissidens integerrimus*, *F. strictus*, *Olearia crebra*, *Picris burbidgeae*, *Todea barbara,* turoa onamata.

Historical record of *Rorippa divaricata* (1947) from Waipoua Forest.

Nationally Vulnerable

Bartlett's koromiko.

Serious Decline

Pittosporum kirkii, Kirks daisy, *Pimelea tomentosa.*

Gradual Decline

Colensoa physaloides, *Doodia squarrosa*, willow-leaved maire, raukawa.

Historical record of *Utricularia delicatula* and *Peraxilla tetrapetala.*

Range Restricted

Baumea complanata, *Sphagnum perichaetiale.*

Sparse

Corunastylis pumila, *Doodia mollis*, *Drucella entegristipula*, *Grammitis rawlingsii*, *Hymenophyllum atrovirens*, *Fuchsia procumbens*, *Lagenifera lanata*, kawaka, *Microlaena carsei*, monoao, *Pittosporum ellipticum*,

P. pimeleoides subsp. *pimeleoides*, *Schizaea dichotoma*, *Sticherus flabellatus*, *Trichomanes strictum.*

Data Deficient

Dianella latissima, *Nematoceras rivulare.*

Regionally significant species

Anaphalioides trinervis, *Astelia nervosa*, *Australina pusilla*, black maire, *Blechnum colensoi*, *B. fluviatile*, *Brachyglottis kirkii* var. *angustoir*, *Calystegia tuguriorum*, *Chionochloa conspicua* subsp. *cunninghamii, Collespermum microspermum*, *Coprosma dodonaeifolia*, *Coprosma parviflora, Coprosma rigida*, *Cyathea cunninghamii*, *Dicksonia lanata*, *Dracophyllum traversii*, *Drosera binata*, *Drosera peltata*, *Epilobium pallidiflorum*, *Gastrodia cunninghamii*, *Gratiola sexdentata*, *Grammitis billardierei*, *Grisilenia littoralis*, *Hebe flavida*, *Gunnera monoica*, *Hebe diosmifolia, Hebe macrocarpa* var. *macrocarpa*, *Helichrysum lanceolatum*, horopito, hutu, *Hymenophyllum armstrongii, H. cupressiforme*, *H. lyalli*, *H. nigrum*, *Hypolepis rufobarbata*, *Ileostylus micranthus*, *Isopterygium limatum*, kaikomako, *Leptolepia novae-zelandiae, Loxsoma cunninghamii*, *Luzula picta* var. picta, mairehau, *Metrosideros carminea*, *Metrosideros colensoi*, *M. excelsa* × *robusta*, mountain horopito, *Olearia albida, Oxalis magellanica*, Pacific azolla, pokaka, *Pratia angulata*, *Ranunculus urvilleanus*, *Raukaua anomalus*, rohutu, *Rubus squarrosus, Schizaea bifida*, silver pine, southern rata, tawari, toatoa, ongaonga, *Uncinia distans,* whaririki and *Zoopis nitida*.

Historical record (1955) of *Danbatchia australis*.

Fauna

Birds

Nationally Endangered

NI kaka and NI kokako.

Nationally Vulnerable

Caspian tern, reef heron and Northern NZ dotterel.

Serious Decline

NI brown kiwi.

Gradual Decline

Kukupa, long-tailed cuckoo, northern little blue penguin, white-fronted tern and banded dotterel.

Sparse

Black shag and NI fernbird.

Regionally significant species

Red-crowned kakariki, NI tomtit and variable oystercatcher.

Mammals

Long-tailed bat (Nationally Vulnerable).

Aquatic fauna

Short-jawed kokopu (Gradual Decline), longfin eel (Gradual Decline), *Oxythira waipoua* (caddisfly) (Range Restricted), lamprey (Sparse), koaro (Regionally significant species), banded kokopu (Regionally significant species), red-finned bully, common bully, inanga, koura, torrentfish, common smelt. High diversity of aquatic invertebrates recorded from the Waipoua River (Seitzer 1996).

Invertebrates

Gradual Decline

Auckland green gecko, forest ringlet butterfly.

Range Restricted

Hemiandrus "Otekauri" (ground weta).

Sparse

Syrphetodes sp. "Waipoua" (beetle), Northland tusked weta *Paralissotes mangonuiensis* (stag beetle).

Data Deficient

Rhododrilus agathis (earthworm), the minute beetles *Euconnus microcilipes*, *Euconnus paracilipes*, *Maorinus hunuaeformis*, *Maorinus* sp., *Maorinus toronouii* and *Sciacharis yakasensis. Megacolabus bifurcatus* and *Megacolabus obesus* (beetles) and Peace's weevil.

Land snails

Nationally Endangered

Phrixgnathus murdochi.

Gradual Decline

Kauri snail.

Range Restricted

Phrixgnathus waipoua, Punctidae sp. 28, Punctidae sp. 29, Punctidae sp. 34.

Data Deficient

Charopidae sp. 8, Charopidae sp. 12, Charopidae sp. 13, Punctidae sp. 31, Punctidae sp. 32, Punctidae sp. 33.

Significance

The contiguous forest tract of Waipoua/Mataraua/Waima is of international significance and is clearly the single largest forest tract left in Northland. At nearly 32,000 ha the forest tract occupies approximately 38.9% of the entire Tutamoe Ecological District and would contain the highest number

of native plant species of any Northland forest. The continuum represents the best altitudinal sequence in Northland—from its highest point to sea level. Nationally, it represents the largest tract of old growth kauri forest in New Zealand—a type now reduced to less than 2% of its original cover (Department of Conservation, 1999). In addition the Waipoua River is the most pristine full catchment river system in Northland.

Waima Forest supports several narrow-ranged cold climate endemics (*Coprosma waima*, *Olearia crebra*, turoa onamata) which are thought to be possible relics of a previous colder climate (L. J. Forester pers. comm.).

Mataraua Forest contains one of the best examples of upland plateau forest in Northland with other examples occurring at Marlborough and Kaihu Forests in this Ecological District and Warawara Forest in the Ahipara Ecological District.

The forest continuum supports the largest NI brown kiwi population in Northland and possibly the North Island and is a refuge for the last functional kokako population in Northland. Fauna and flora values are extremely high, including 36 nationally threatened and 64 regionally significant plants, 46 threatened and 4 regionally significant animals including a diversity of invertebrates, both terrestrial and freshwater. Just to the south, a further 11,000 ha of forest occurs within the Marlborough and Kaihu Forests.

Representative site for all vegetation types. The only record in this survey of type (a), (e), (g), (i), (k), (m), (n) and (o) and one of two examples of type (f), (h), and (q) in the Ecological District.

Waipoua Forest Sanctuary (O06 635 199) is a soil site of international importance for:

- Large area containing a diverse range of brown granular clays under indigenous vegetation.
- Only example of Parataiko and Waimamaku soils in Arand *et al.* 1993.
- Contains good examples of uncommon soil types, Hihi, Waipoua, and Katui.

The large majority of Katui soils have been developed for dairy and sheep farming.

Most other Waimamaku soils have been developed for sheep farming.

Waima Forest (O06 593 328) is a soil site of regional significance for containing a large area of diverse brown granular clays under indigenous vegetation.

Mataraua Forest (P06 728 260) is a soil site of regional significance because:

- It contains a large area of a moderate range of brown granular clays under indigenous vegetation.
- It contains good examples of Waipoua soils which are uncommon.

(Arand *et al.* 1993)

Public conservation land, administered by the Department of Conservation totals 23,424.8 ha within this site, the majority of which is Conservation Park (22,218.8 ha) with 8,977 ha at Waipoua Forest having the additional protection of Sanctuary status. Ownership of a small portion of this site is being transferred to Te Iwi O Te Roroa on completion of their Treaty settlement agreement.

The Queen Elizabeth II National Trust has protected 367 ha within this site including the The Professor W. R. McGregor Memorial Reserve owned by the New Zealand Native Forest Restoration Trust. This reserve was named in honour of Professor W. R. McGregor whose successful campaign in the 1940s put an end to continued logging in the Waipoua kauri forest followed by the implementation of sanctuary status in 1952 (NZNFRT Brochure).

An additonal 840 ha is protected by Nga Whenua Rahui in the Waima Range.

The total protected area is 24,631.8 ha or 77.1% of this site.

WAIOTEMARAMA GORGE FOREST

Survey no.	O06/013
Survey date	5 May 1994
Grid reference	O06 481 312
Area	421.2 ha (Small adjustments were made to the original 1994 boundary of this site to fit with 2006 aerial photography)
Altitude	10–414 m asl

Ecological unit

(a) Karaka-kowhai-taraire forest on steep hillslope

(b) Kanuka-tanekaha-towai forest steep hillslope

(c) Kauri forest on hillslope

(d) Kanuka-taraire-towai forest on hillslope

(e) Manuka forest on hillslope

Landform / geology

Steep, dissected hillcountry underlain by Tangihua Complex igneous rocks.

Vegetation

A large site made up of coastal broadleaf forest on the steeper eastern sites. Some emergent northern rata, kauri and rimu remain near the top of the steeper catchments.

(a) Karaka, kowhai and taraire association is common on the eastern side of the forest while tawa, kohekohe and puriri are frequent. A range of species occur occasionally, including miro, rewarewa, titoki, mahoe, houhere, mangaeo, whau and *Olearia* sp.

(b) On the western side kanuka, tanekaha and towai occur with frequent rewarewa, kauri, puriri, and rimu. Nikau is occasional.

(c) Kauri dominates an area in the west.

(d) Kanuka, taraire and towai occur with frequent rewarewa and puriri and occasional kowhai, tawa, emergent northern rata and tanekaha.

(e) Manuka forest is abundant in an area with frequent ti kouka and mamangi. Kauri and puriri are occasional.

Fauna

NI brown kiwi (Serious Decline) and NI tomtit (Regionally significant species) (R. J. Pierce pers. comm.).

Northland tusked weta (Sparse) has been recorded within the Pakanae Stream catchment to the east of this site.

O06/013 Waiotemarama Gorge Forest

0 750 1,500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield

Aerial photography flown 2006

Significance

Large forested habitat supporting threatened and regionally significant species, within close proximity to the large forest tract (O06/001).

Contributes to water and soil protection in the catchment.

Representative site for four ecological units, type (a), (b), (c), (d). Only record of type (a), (b), (d) and (e) in the District.

Kokohuia Conservation Area is public conservation land (Stewardship Land) administered by the Department of Conservation protecting 11.6 ha (2.7%) of this site.

WAIWHATAWHATA BUSH

Survey no.	O06/014
Survey date	15 December 1994
Grid reference	O06 475 283
Area	384.6 ha (Small adjustments were made to the original 1994 boundary of this site to fit with 2006 aerial photography)
Altitude	20–283 m asl

Ecological unit

(a) Manuka-mamangi forest on hillslope

(b) Kanuka/manuka forest on hillslope

(c) Taraire-puriri forest in gullies and hillslope

(d) Towai-puriri forest on hillslope

(e) Kanuka/manuka-kauri forest on ridge and hillslope

(f) Hangehange-mahoe forest on hillslope

Landform / geology

Dissected hill country underlain by Lower Miocene Otaua Group sandstone and conglomerate.

Vegetation

(a) Manuka is abundant and mamangi is common over most of the site. Kowhai, karaka and puriri are frequent and ti kouka, lancewood, pohutukawa, titoki and towai are occasional.

(b) Kanuka/manuka occurs with frequent towai and occasional pohutukawa.

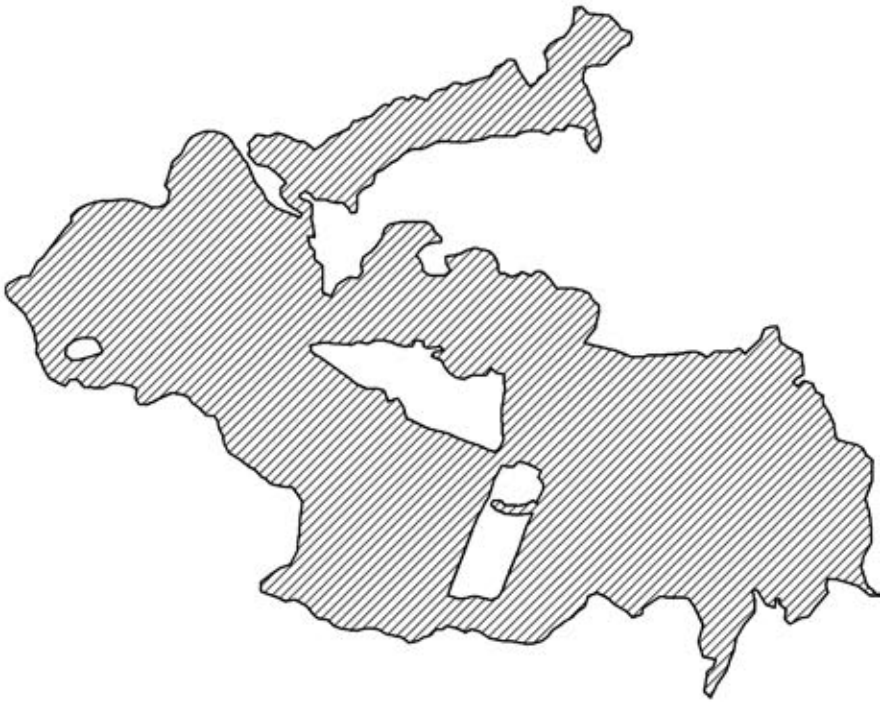
(c) Abundant taraire associated with puriri occurs mostly in gullies in the west (cutover and about 30% of the site), along with frequent rewarewa and occasional karaka.

O06/014 Waiwhatawhata Bush

0 750 1,500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

(d) Secondary forest canopy comprising abundant towai and common puriri occurs over approximately 25% of the site. Northern rata and kahikatea are frequent and karaka and kowhai are scattered.

(e) Kanuka/manuka and kauri are common in a small area with frequent rewarewa and occasional towai. Karaka and kowhai occur on steeper faces.

(f) Hangehange and mahoe are co-dominant with frequent ti kouka, nikau and manuka.

Kauri occurs on drier ridges.

Significant Flora

Willow-leaved maire (Gradual Decline).

Fauna

NI brown kiwi (Serious Decline), NI tomtit (Regionally significant species) and common forest birds.

Significance

Within close proximity to Waiotemarama Gorge Forest (O06/013) and linkage to the coastal forest of northern Waipoua and western Waima.

Presence of threatened and regionally significant fauna. This site contributes to riparian and upper catchment protection.

Representative site for all 6 ecological units. In this report, the only record of type (a), (d), (e) and (f) and only one of two records of type (c) in the Ecological District.

A Queen Elizabeth II National Trust Open Space covenant protects 90.9 ha (23.6%) of this site.

TE KAIATEWHETU SHRUBLANDS AND ARAI TE URU COASTAL STRIP

Survey no.	O06/015
Survey date	3 July 1995
Grid reference	O06 465 265
Area	671.7 ha (4 remnants) (579 ha shrubland (incl. associations), 56.6 ha duneland/sandfield, 25.2 ha wetland, 10.9 ha forest) (This site was adjusted to fit 2006 aerial photography resulting in an increased area of shrubland, the addition of sandfield and a wetland component (Waimamaku River). The area of raupo wetland, although identifed in the original survey was not marked on the original topographical map and not located on the aerial photography)
Altitude	0–276 m asl

Ecological unit

(a) Pohutukawa forest on consolidated dunes

(b) Karaka forest on steep coastal hillslope

(c) Oioi-harakeke-hangehange-knobby clubrush-manuka-toetoe association on consolidated dunes

(d) Manuka shrubland on coastal hillslope

(e) Manuka-*Baumea* sp.-*Gleichenia* sp. association on coastal hillslope

(f) Manuka-*Gahnia* sp. association on coastal hillslope

(g) Raupo reedland in swamp

(h) Sandfield on beach

Landform / geology

Steep coastal ridge of seawards-dipping Lower Miocene Waipoua Subgroup basalt lava flows and underlying Otaua Group sandstone and conglomerate, mantled by Pleistocene weakly consolidated dune sands on the lower seaward slope.

Vegetation

Extensive coastal shrublands and associations with small coastal broadleaf forest remnants and freshwater wetlands in some valleys. Vegetation types include:

(a) Around Pukekororo Stream dominant pohutukawa with frequent *Olearia albida* and occasional kanuka, karaka and *Metrosideros excelsa* × *M. robusta* occurs (not identified on the mapping).

Type (a) also occurs in the southern forested area by Waimamaku River with occasional karaka and *Pinus radiata*.

(b) In this forested area karaka also occurs with a diversity of occasional species including kowhai, rangiora, whau, taraire, ti kouka, puriri, wharangi, mapou, kawakawa and nikau.

(c) A complex coastal association of oioi, harakeke, hangehange, knobby clubrush, manuka and toetoe occurs along the Arai te Uru coastal strip.

(d) Manuka is the dominant shrubland type within this site with frequent ti kouka and some pampas and *Pinus radiata.*

Other shrubland types include:

(e) Abundant manuka with *Baumea* sp. and *Gleichenia* sp.

(f) Manuka is dominant with common *Gahnia* sp. and the occasional ti kouka.

(g) A raupo dominant wetland with frequent harakeke occurs in the northern area of the site (unidentified on the mapping).

(h) Sandfield on beach.

Significant Flora

Threatened plants within this site include titirangi (Nationally Endangered), *Leptinella rotundata* (Nationally Vulnerable) and a relatively recent year 2000 record of *Euphorbia glauca* (Serious Decline).

Regionally significant plants include *Metrosideros excelsa* × *M. robusta*, *Olearia albida* and *Psilotum nudum*.

Of interest, *Coprosma repens* × *acerosa*, a naturally occurring hybrid has been recorded at this site.

Fauna

Birds: reef heron (Nationally Vulnerable), Caspian tern and northern NZ dotterel (both Nationally Vulnerable), white-fronted tern and banded dotterel (both Gradual Decline), NI fernbird and black shag (both Sparse), variable oystercatcher (Regionally significant species) little shag, white-faced heron and other common bird species were recorded between Hokianga South Head and the Waipoua River in 1992 by Auckland Ornithological Society members (in SSBI O06/H014).

The Northern little blue penguin (Gradual Decline) is known to breed along the coastal margin.

The last remaining breeding colony of grey-faced petrel on mainland Northland occurs at South Head (R. J. Pierce and P. J. Anderson per. comm.).

Lizards

Shore skink.

Fish

Banded kokopu (Regionally significant species), shortfin eels, and red-finned bullies (Maxwell 1996).

In the 1996 Dr Brent Maxwell wrote an ecological assessment for a Nga Whenua Rahui application on behalf of its owners. In his assessment Dr Maxwell comments that the coastline of this site is well known as a fur seal haulout during the winter and spring, mainly for young males not actively involved in breeding. Infact Dr Maxwell photographed a large male during his survey.

Significance

Coastal bluffs, headland and sandy beach/dune associations with adjoining coastal shrubland and forest containing numerous threatened and regionally significant species and the last mainland breeding colony of grey-faced petrel in Northland at South Head. Representative site for all 8 ecological units including some uncommon coastal associations.

Sole record of type (b), (c), (e) and (f) in this District.

Important geopreservation site of national significance for the best example in the Hokianga region of marine deltaic conglomerate and terrestrial volcaniclastic sequence (Kenny and Hayward 1996).

Approximately 46.5 ha (6.9%) of this site is public conservation land administered by the Department of Conservation with 15 ha of forest protected by Nga Whenua Rahui.

SMOOTHY ROAD BUSH

Survey no.	O06/016
Survey date	15 December 1994
Grid reference	O06 493 288
Area	15.5 ha (2 remnants) (The 1994 area of this site was 20.4 ha. The site was adjusted to fit 2006 aerial photography. The main change was removal of a contiguous arm extending from the south-west (including the small remnant shown here)
Altitude	110–200 m asl

Ecological unit

(a) Puriri-taraire forest on hillslope (65%)

(b) Kahikatea forest on hillslope (25%)

(c) Kanuka/manuka forest on hillslope (10%)

Landform / geology

Hillslopes of Mangakahia Complex mudstone.

Vegetation

(a) Puriri and taraire is common with frequent mamangi and nikau and occasional kahikatea, tawa, rimu and kohekohe.

(b) Abundant kahikatea with frequent kanuka/manuka and occasional towai.

(c) Kanuka/manuka occurs in remaining forest areas with frequent kahikatea.

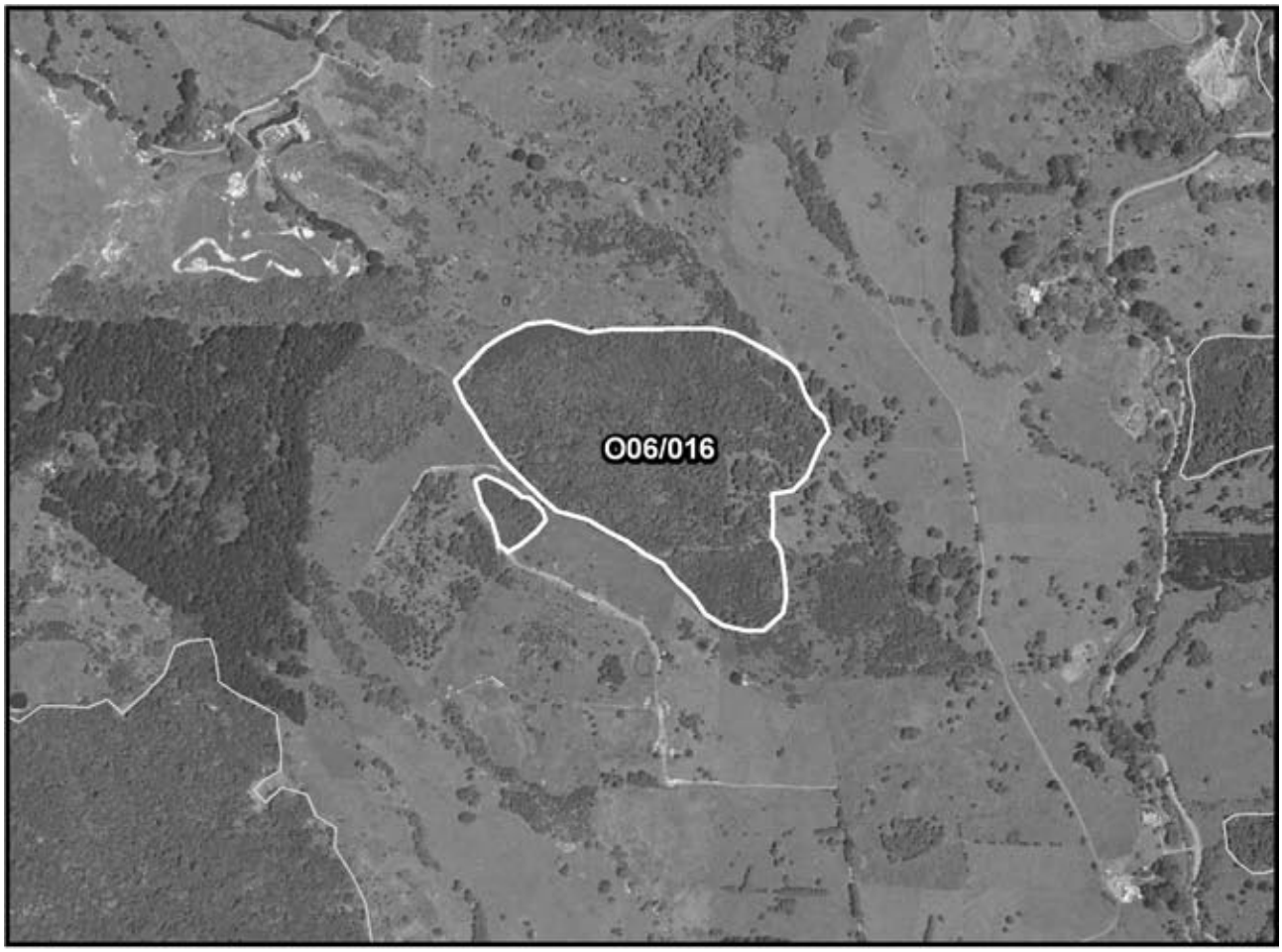
Fauna

Not surveyed.

Significance

This small forest remnant effectively forms an outlier to Waiwhatawhata Bush and contains kahikatea forest, a vegetation type not represented within that forest block. Drainage may be the main gradient determining this difference in vegetation pattern.

Representative site for type (a), puriri-taraire forest (one of two records in the District) and type (b) kahikatea forest.



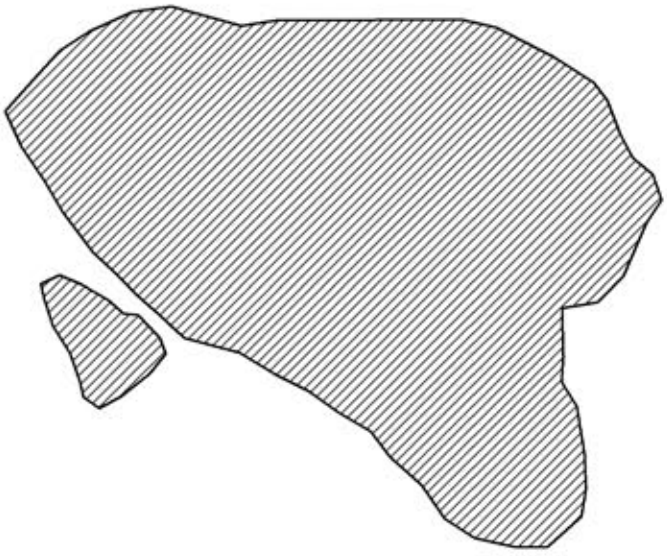
O06/016 Smoothy Road Bush

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

WAIOTEMARAMA STREAM BUSH

Survey no. O06/017

Survey date 15 December 1994

Grid reference O06 505 286

Area 8.1 ha (3 remnants)
(In comparision to 2006 aerial photography, this site has changed quite dramatically from the 1994 survey which originally mapped the area at 22.3 ha showing 5 remnants. Two remnants were completely removed with the three remaining remnants shown here, reduced in size by about one-third)

Altitude 60–140 m asl

Ecological unit

(a) Puriri-taraire riverine forest on alluvium

(b) Kahikatea-puriri riverine forest on alluvium

(c) Kahikatea-manuka riverine forest on alluvium

Landform / geology

Hillslopes underlain by Mangakahia Complex sandstone-dominated lithofacies in the north and east, and by Lower Miocene Otaua Group sandstone and conglomerate in the south and west.

Vegetation

This site is very fragmented and at the time of the survey was degarded along much of the stream edge by grazing livestock. The southern portion just north of the Pinehill/Gorge Road intersection appears to be fenced.

(a) Co-dominant puriri and taraire occur on the drier areas of the site along with frequent kowhai and manuka. Ti kouka and *Pinus radiata* are also present.

(b) Abundant kahikatea is associated with puriri. Ti kouka is frequent and matai and kowhai are occasional.

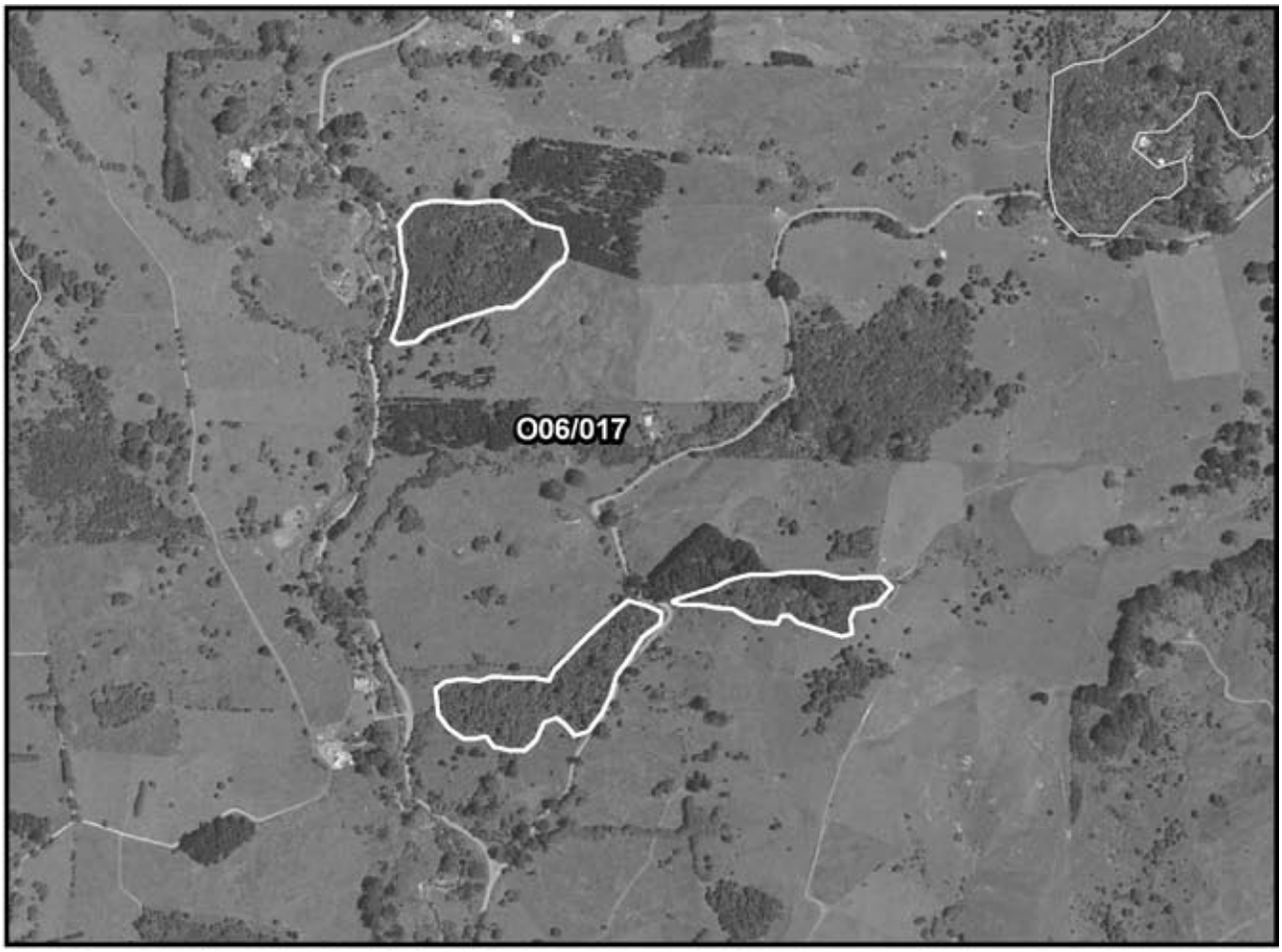
(c) Kahikatea and manuka association with frequent ti kouka and mamangi. Towai and lancewood are occasional.

Fauna

Not surveyed.

Significance

Riparian forest performing a mid-catchment and riparian protection function. Presence of uncommon forest types within this Ecological District. Representative site for all three ecological units and the only record of type (b) and (c) in the Ecological District. Updated survey is required.

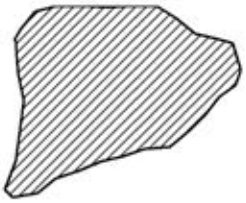


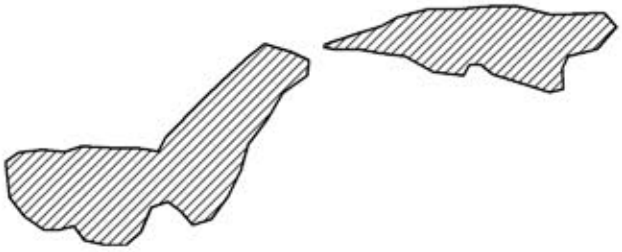
O06/017 Waiotemarama Stream Bush

0 250 500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield





Aerial photography flown 2006

TE WAI-O-TE MARAMA SCENIC RESERVE AND SURROUNDS

Survey no.	O06/018
Survey date	15 December 1994
Grid reference	O06 502 275
Area	18.4 ha (2 remnants) (This site was adjusted from the original 1994 boundary to fit with 2006 aerial photography. The main change was the reduction by about half of the north-western arm of the main remnant)
Altitude	20–120 m asl

Ecological unit

(a) Kanuka/manuka-towai forest on hillslope

(b) Taraire-puriri forest on hillslope

(c) Pohutukawa-taraire forest on hillslope

Landform / geology

Steep south-facing hillside and small valley underlain by Lower Miocene Otaua Group sandstone and conglomerate.

Vegetation

(a) Kanuka/manuka and towai are common with frequent pohutukawa, rewarewa and puriri. Occasional species include kahikatea, kowhai and *Pinus radiata*.

(b) Taraire is dominant and puriri is common. Karaka, rewarewa and manuka are frequent and kahikatea, kowhai and ti kouka are occasional.

(c) Pohutukawa, taraire association with frequent puriri. Tawa, totara, rewarewa, karaka, kauri and manuka are also present.

At the time of survey kahili ginger was the dominant understorey species throughout most of this remnant.

Fauna

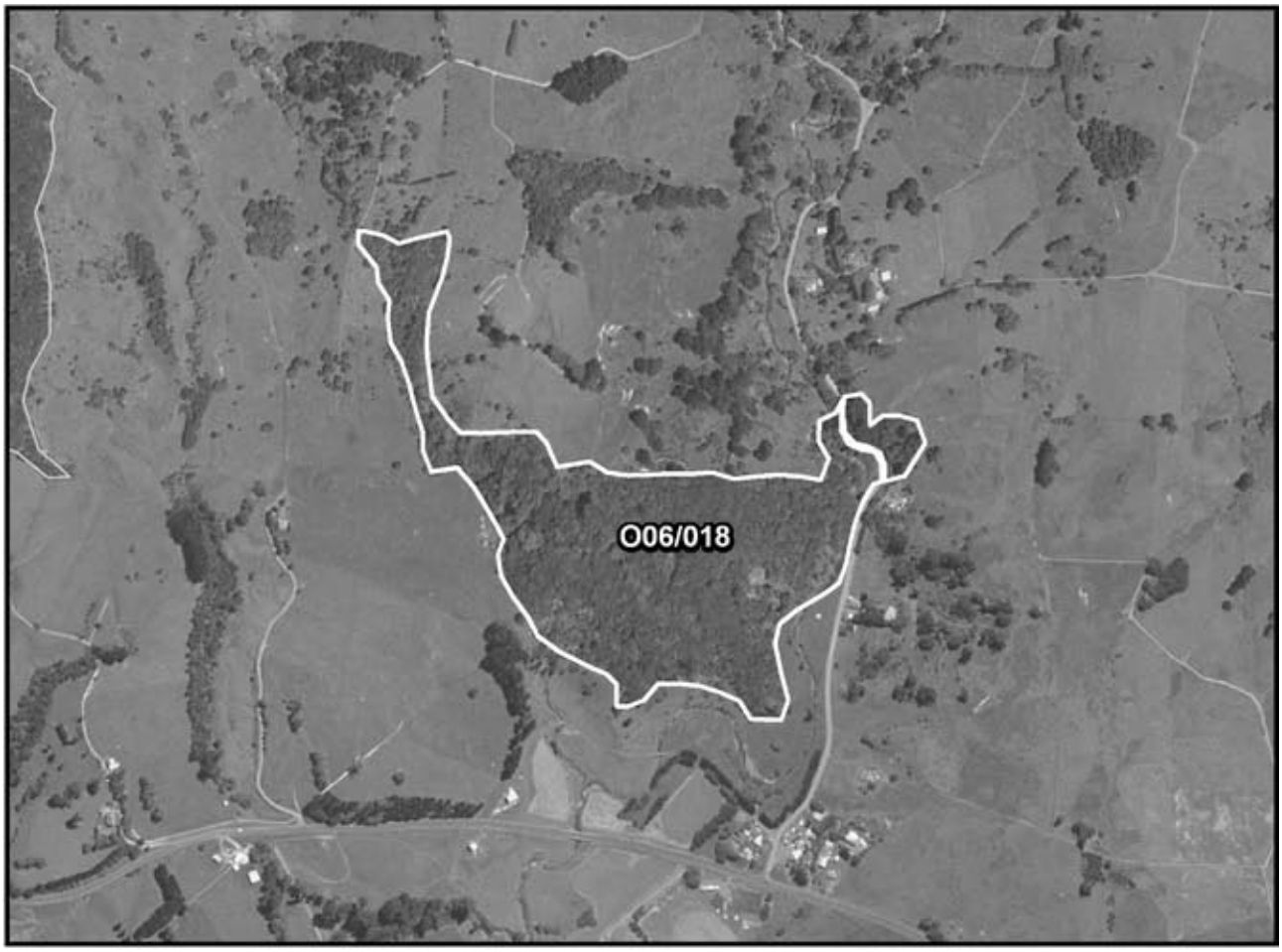
Not surveyed.

Significance

This site performs a linkage and riparian protection function. The threatened kauri snail is known to utilise dense ginger and is recorded in habitats adjacent to this site. Further survey work is necessary before the full significance of this site can be assessed.

Representative site for type (b) and (c). Only record of type (c) and one of two records of type (a) and (b) in the Ecological District.

The southern area of this site is protected by Te Wai-O-Te Marama Scenic Reserve which equates to 12.8 ha or 69.5% of the site and is currently administered by the Department of Conservation. Ownership of a portion of this site is being transferred to Te Iwi O Te Roroa on completion of their Treaty settlement.

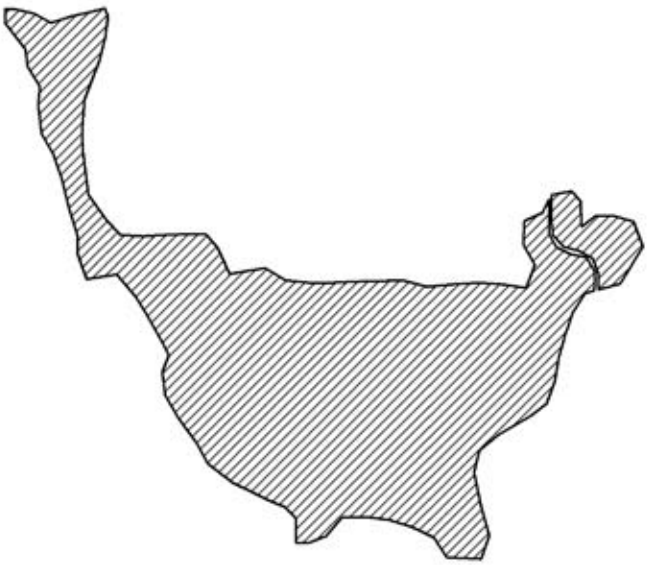


O06/018 Te Wai-O-Te Marama Scenic Reserve and Surrounds

0 250 500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

WAIMAMAKU SCENIC RESERVE

Survey no.	O06/019
Survey date	14 December 1994
Grid reference	O06 533 276
Area	5.7 ha
Altitude	30–140 m asl

Ecological unit

(a) Kahikatea-puriri forest on moderate hillslope (80%)

(b) Kowhai-puriri-taraire forest on moderate hillslope (20%)

Landform / geology

A steep south-facing gullied hillside in Lower Miocene Otaua Group sandstone and conglomerate, running down to the Waimamaku River.

Vegetation

(a) Kahikatea with puriri dominates this site along with frequent ti kouka, mamangi, manuka and kanuka and occasional taraire and emergent kahikatea.

(b) Kowhai, puriri and taraire occur over the remainder of the site with frequent kanuka/manuka. Ti kouka, totara and kahikatea are occasional.

Fauna

Not surveyed.

Significance

Although small, this forest remnant contains uncommon vegetation types not well represented in the large forest blocks which surround it. Further survey work is required before the full significance of this site can be assessed.

Representative site and sole record for both ecological units in the District.

Nearly 95% of this site, 5.4 ha, is public conservation land, Scenic Reserve, administered by the Department of Conservation.

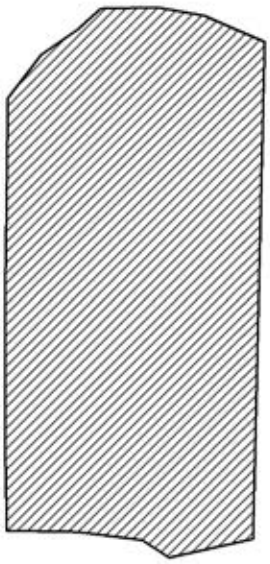
O06/019 Waimamaku Scenic Reserve

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

WAIMAMAKU RIVERINE FOREST REMNANT

Survey no.	O06/020
Survey date	15 December 1994
Grid reference	O06 540 267
Area	5.2 ha (6 remnants) (This site has reduced by over half (originally 12.4 ha) from the 1994 mapping to 2006 aerial photography used here. The 5 western remnants were in 1994 linked as one site. The eastern remnant remains the same)
Altitude	≤40 m asl

Ecological unit

(a) Puriri-taraire riverine forest on alluvium (90%)

(b) Crack willow riverine treeland in stream channel (10%)

Landform / geology

Forest on alluvial river flats in meander bends.

Vegetation

(a) The majority of this site is co-dominant puriri and taraire with frequent totara. A variety of species occur occasionally, including matai, kowhai, kauri, karaka, titoki, kahikatea and towai. A nikau understorey further enhances its alluvial nature.

(b) Crack willow treeland occurs in the remaining area with occasional weeping willow.

Kahili ginger, *Acacia* sp., wandering willy and other weeds are present. At the time of the survey these weeds were not beyond control and could conceivably be excluded from the area if it were fenced and managed.

Fauna

Not surveyed.

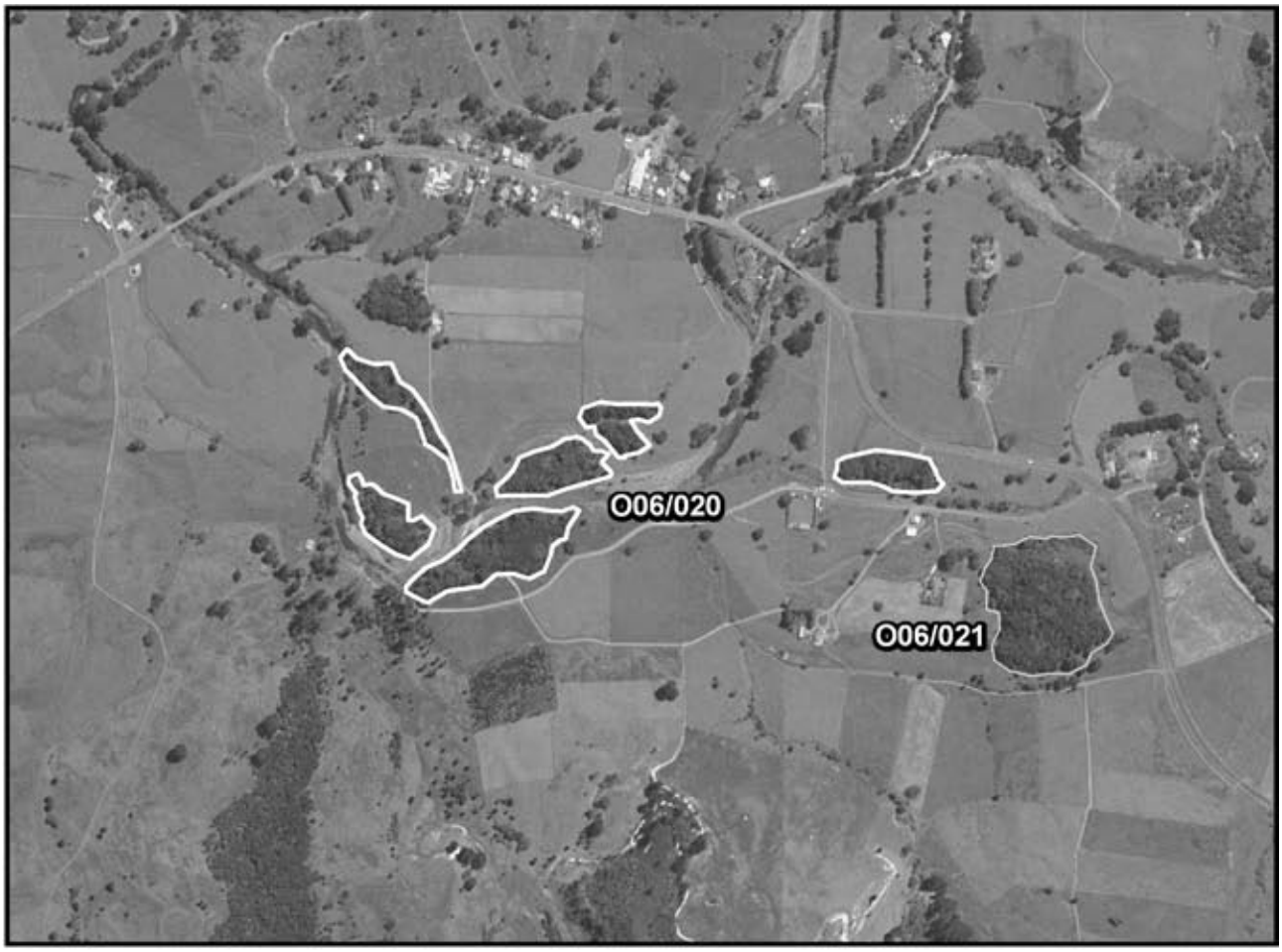
Significance

One of the few examples of old growth riverine forest remaining within this Ecological District and until further survey remains a Level 1 site. This forest type is rare regionally and nationally.

The puriri-taraire forest association is known to be a preferred forest type for the threatened kukupa.

Representative site for puriri-taraire riverine forest.

Over 34.6% (1.8 ha) of this site is protected Stewardship Land administered by the Department of Conservation.

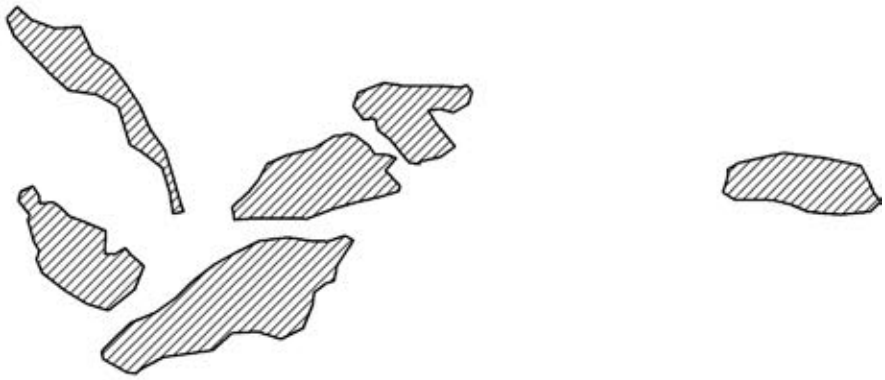


O06/020 Waimamaku Riverine Forest Remnant

0 250 500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

TE MOHO ROCK BUSH

Survey no. O06/021

Survey date 15 December 1994

Grid reference O06 547 256

Area 3 ha

Altitude 50–99 m asl

Ecological unit

(a) Kahikatea forest in basin (10%)

(b) Puriri-taraire forest on hillslope (40%)

(c) Karaka-kowhai forest on steep hillslope (40%)

(d) Chinese privet scrubland on rocky knoll (10%)

Landform / geology

Rocky knoll of Tangihua Complex igneous rock, bounded by alluvial flats in the Waimamaku River valley.

Vegetation

The vegetation types reflect the topography on which they occur.

(a) A small basin at the southern edge of Te Moho contains abundant kahikatea with occasional pukatea, rewarewa, and puriri. The native passion vine *Passiflora tetrandra* occurs in the canopy.

(b) Common puriri and taraire occur with frequent rewarewa and towai. Miro and karaka are occasional.

(c) Karaka and kowhai with frequent titoki and puriri dominate the steep faces. Other species present include kohekohe, taraire, tawa and mapou.

(d) Abundant Chinese privet has become established in some steep areas and may be suppressing natural regeneration of native species.

Significant Flora

Of note is the presence of *Lophomrytus bullata* x *L. obcordata*, an uncommon record nationally (L. J. Forester pers. comm. 2003).

Fauna

Not surveyed.

Significance

Te Moho Rock is a distinctive rock landform visible from State Highway 12 which supports an interesting assemblage of broadleaf and podocarp forest types.

Representative site for type (a), (b), and (c).

Sole record of type (c) and one of two records for type (b) in the Ecological District.

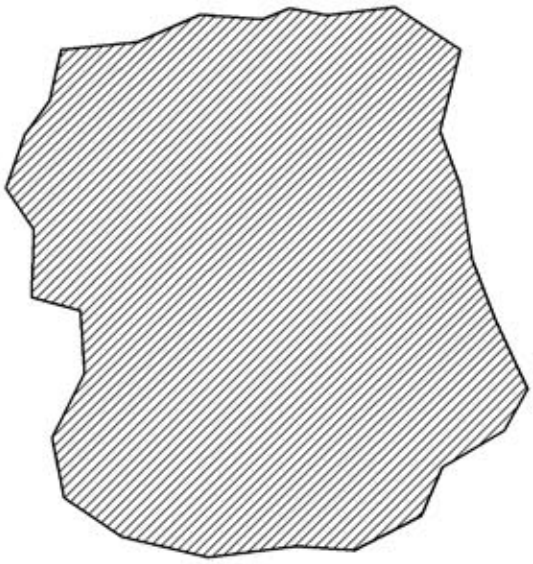
O06/021 Te Moho Rock Bush

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

HANSEN ROAD FOREST REMNANT

Survey no. O06/022

Survey date 14 December 1994

Grid reference O06 546 298

Area 1 ha

Altitude 150–180 m asl

Ecological unit

(a) Taraire forest on alluvium

Landform / geology

Valley alluvial deposits.

Vegetation

Old growth taraire forest dominates this remnant (100%) with occasional tawa, northern rata, puka and mangeao.

This site is unfenced and has no understorey or ground cover. Continued grazing could result in a slow collapse of the canopy. The only other example of taraire forest on alluvium, Waima Riverine Forest Remnant O07/006, is in poor health and appears to be in the process of collapse with nikau and karaka competing to replace the fallen taraire.

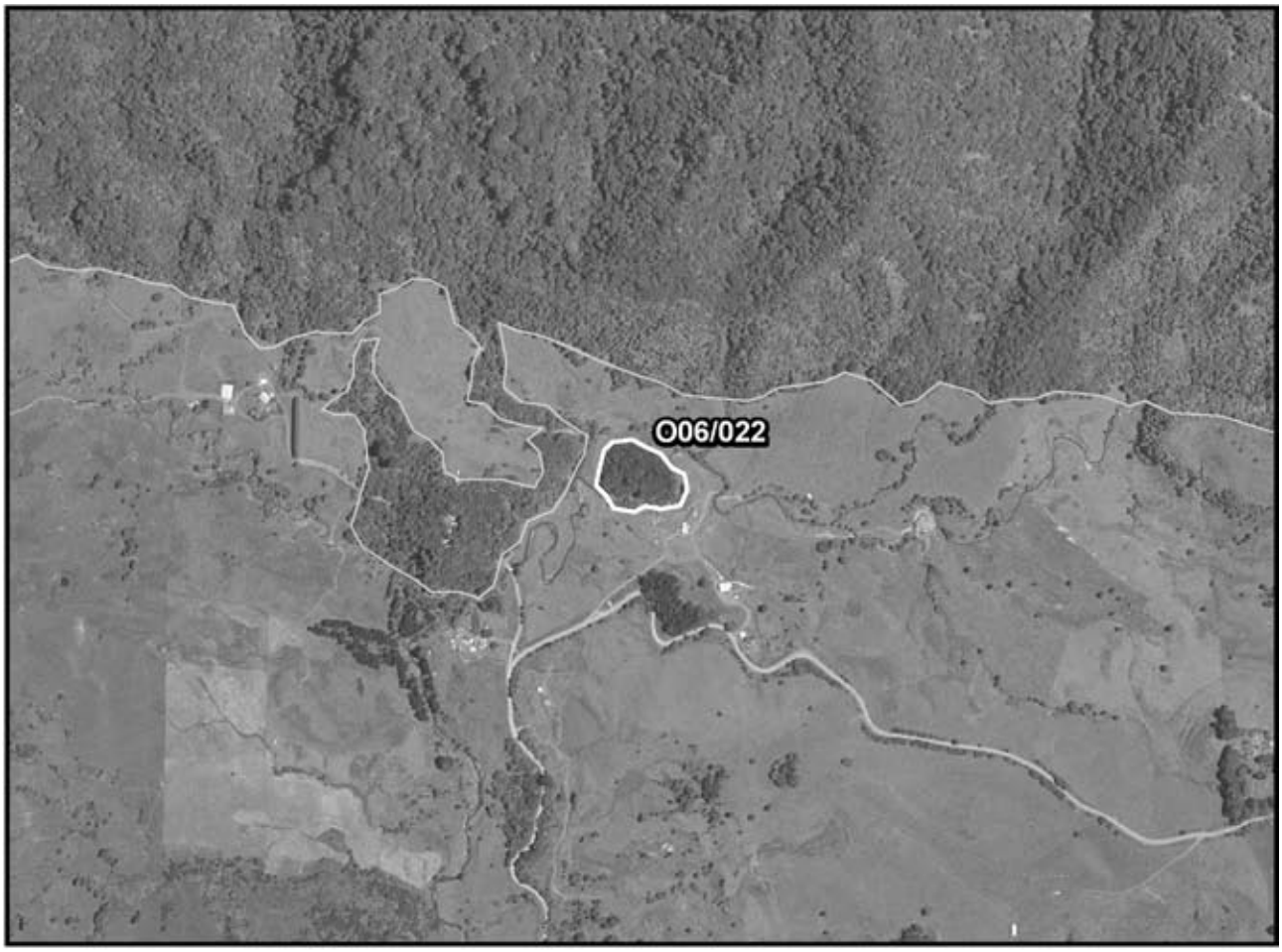
Fauna

Not surveyed.

Significance

This small remnant is one of the very few remaining examples of old growth broadleaf forest on alluvium within the Tutamoe Ecological District.

Representative site and one of two records of this forest type in the Ecological District.

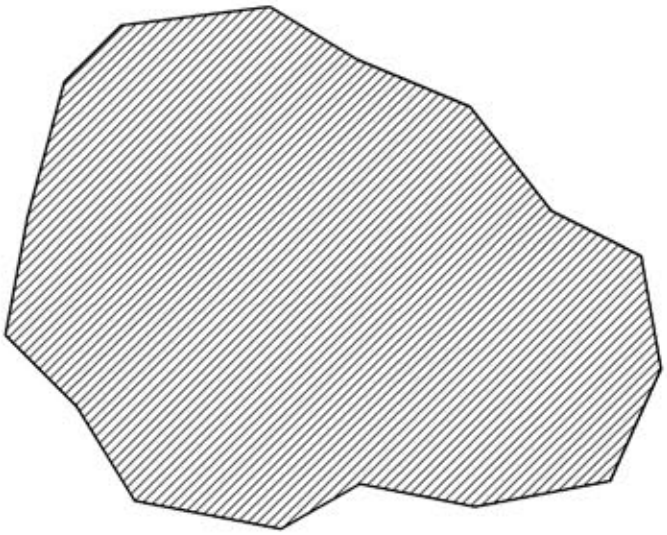


O06/022 Hansen Road Forest Remnant

0 250 500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

TAITA ROAD BUSH

Survey no.	O06/023
Survey date	14 December 1994
Grid reference	O06 560 285
Area	23.7 ha (2 remnants) (This site was slightly adjusted to fit 2006 aerial photography)
Altitude	220–300 m asl

Ecological unit

(a) Taraire-towai forest on hillslope (20%)

(b) Kanuka/manuka-towai forest on hillslope (80%)

Landform / geology

Dissected plateau of Lower Miocene Waipoua Subgroup basalt lava flows.

Vegetation

(a) Co-dominant taraire and towai with frequent tawa and rewarewa. Emergent miro, northern rata and rimu are present along with pukatea and kahikatea.

(b) The majority of the site is tall kanuka/manuka with common towai. Kauri and tanekaha are frequent and rimu and rewarewa are occasional.

Fauna

Common forest birds.

Significance

A cutover, secondary forest remnant within close proximity to the Waipoua/Mataraua/Waima Forest tract with some old growth emergent rimu, miro and northern rata. Considerable kauri and tanekaha regeneration is evident on ridge sites. The site has been fenced off from stock from at least 1978. However at the time of the survey livestock were periodically allowed access.

Representative site for both ecological units and one of two records of type (b) in the District.

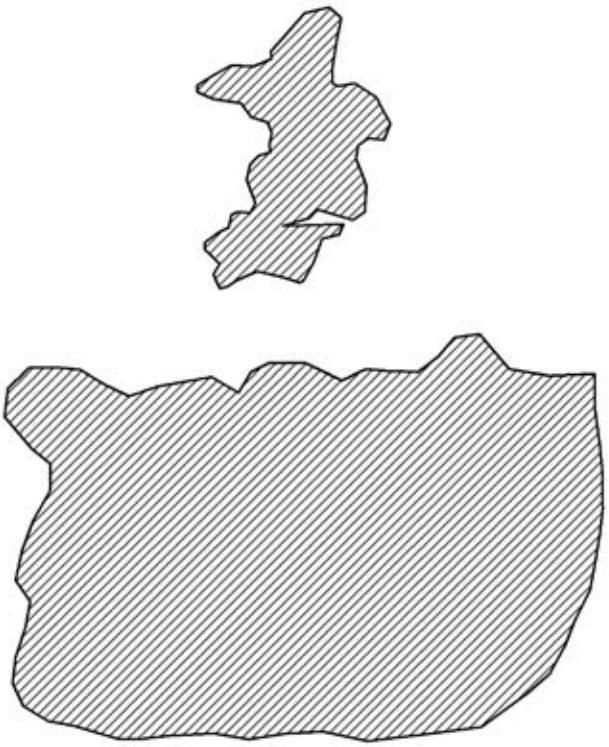
O06/023 Taita Road Bush

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

WEKAWEKA BUSH

Survey no. O06/024

Survey date 9 December 1994

Grid reference O06 587 248

Area 7.5 ha

Altitude 160–220 m asl

Ecological unit

(a) Kahikatea-towai forest on midslope landslide (60%)

(b) Taraire forest on midslope landslide (30%)

(c) Kanuka/manuka forest on midslope landslide (10%)

Landform / geology

Part of the lower northern slope of the Parataiko Range in an area underlain by a large landslide of Waipoua Basalt material.

Vegetation

(a) Kahikatea and towai are common with frequent rewarewa. Nikau is occasional.

(b) Taraire is common with frequent northern rata, kahikatea, and totara. Occasional species include puriri, rewarewa, kauri and totara.

(c) The remaining area is dominated by kanuka/manuka.

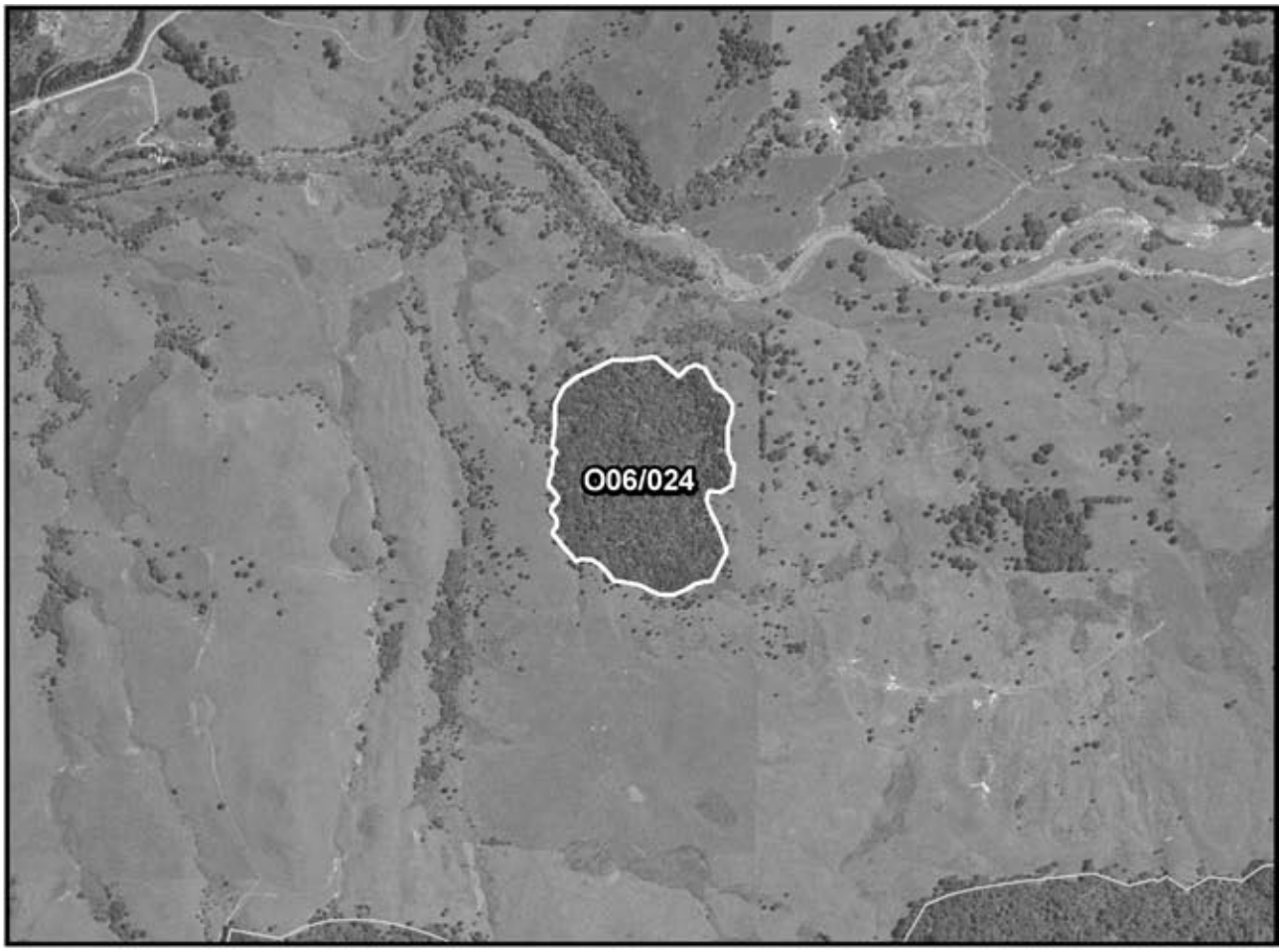
Fauna

Not surveyed.

Significance

Located within close proximity to the large forest tracts which may help it maintain a higher level of biological diversity than would otherwise be possible.

Representative site for type (a) and (b) with type (a) only recorded in one other site in the Ecological District.



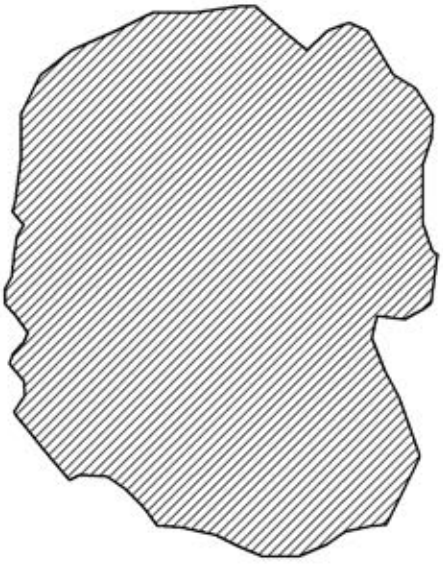
O06/024 Wekaweka Bush

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

TE RIU LAGOON

Survey no.	O06/025
Survey date	2 November 1994
Grid reference	O06 559 138
Area	17.8 ha (approximately 7 ha open water and 10.8 ha reedland) (The original 1994 area of this site (11 ha) was adjusted to fit 2006 aerial photography. The main change resulted is an increase to the eastern arm of this site)
Altitude	<10 m asl

Ecological unit

(a) Open water in dune lake

(b) *Baumea articulata* reedland on dunelake margin

(c) Raupo reedland in swamp

(d) *Eleocharis sphacelata* reedland on dunelake margin

Landform / geology

A small dune lake ponded by Holocene dunes in a valley cut into weakly consolidated Pleistocene dune sands.

Vegetation

(a) Open water.

(b) Abundant *Baumea articulata* with occasional wheki and other rush species dominates vegetation on the lake margin.

(c) Dominant raupo with frequent wheki and occasional manuka and pampas.

(d) Abundant *Eleocharis sphacelata* occurs in remaining areas.

Pines have established where the substrate is less saturated.

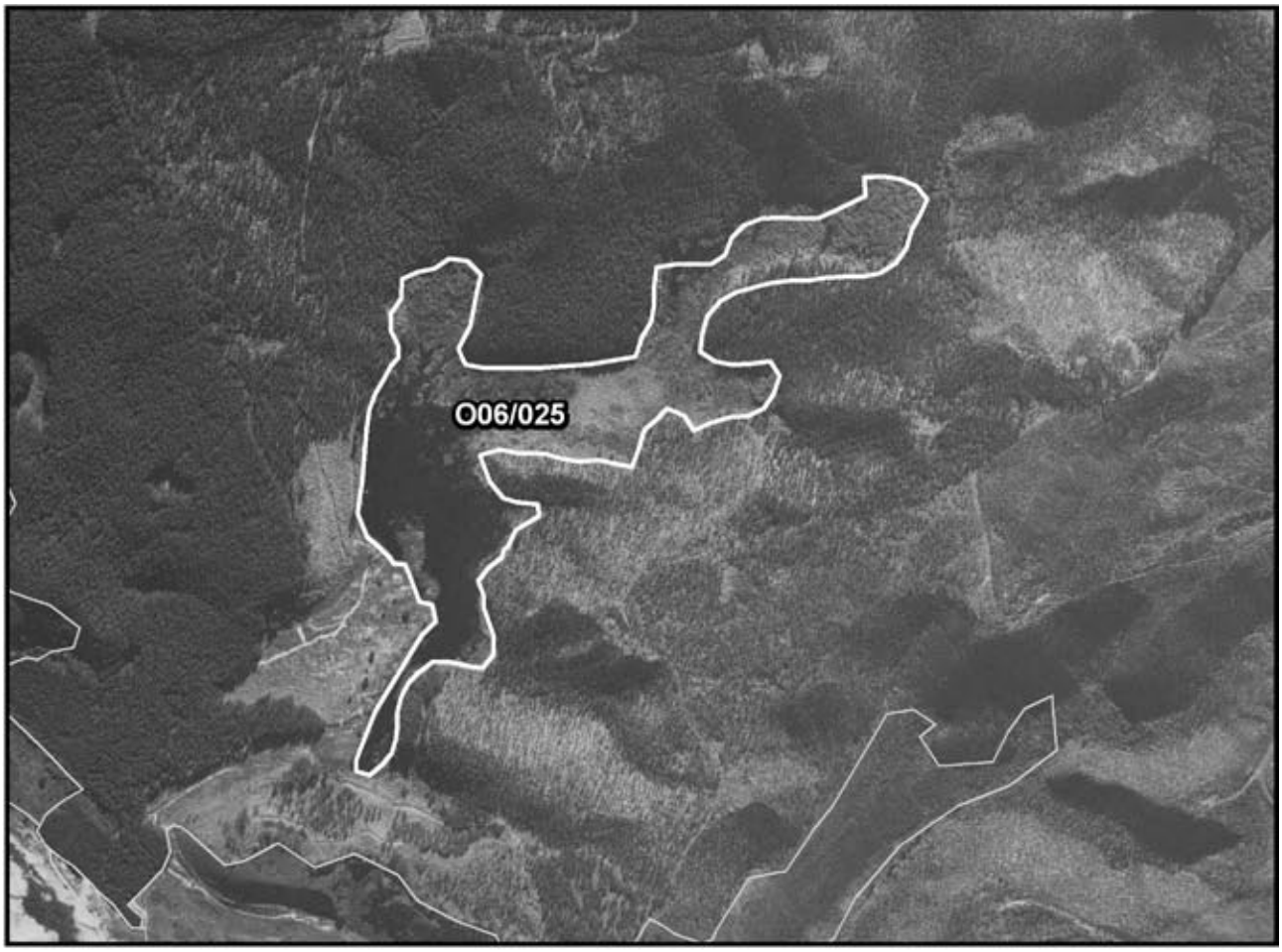
Fauna

Birds

Grey duck (Nationally Endangered), mallard duck, little shag, welcome swallow and black swan (1978 survey). Pair of NZ dabchick (Sparse) (2000 survey), NI fernbird (Sparse) and Australasian little grebe (Regionally significant species) recorded from the lake during this survey. The threatened Australasian bittern (Nationally Endangered) are known from the Muriwai Stream swamp less than one kilometre to the south.

Fish

Shortfin eel and common bully.



O06/025 Te Riu Lagoon

0 250 500

Metres

Habitat type

Forest

Shrubland

Wetland

Duneland/Sandfield

Aerial photography flown 2006

Significance

Te Riu Lagoon is the largest of two dunelakes recorded in the Tutamoe Ecological District including the only record in the Ecological District of the Nationally Endangered water plant *Utricularia australis*. In 2006 NIWA noted that the water levels in Te Riu Lagoon were low compared to the past and that the adjacent exotic foresty was the likely cause (Wells et. al. 2006). Presence of threatened species, including three wetland bird species that are under severe development pressure in Northland. Representative site for all three ecological units. Only record of type (a) and (c) in the Ecological District.

Muriwai Conservation Area, public conservation land is currently administered by the Department of Conservation and protects 10.4 ha (58.4%) of this site. Ownership of part of this site is being transferred to Te Iwi O Te Roroa on completion of their Treaty settlement agreement.

MURIWAI STREAM SWAMP

Survey no.	O06/026
Survey date	27 October 1994
Grid reference	O06 585 125
Area	118 ha (2 remnants) (20.6 ha forest, 97.4 ha wetland) (This site was adjusted slightly to fit 2006 aerial photography)
Altitude	<20–180 m asl

Ecological unit

(a) Rush sp.-raupo reedland in swamp

(b) Manuka-ti kouka-mamaku shrubland in swamp

(c) Raupo reedland in swamp

(d) Bracken-*Coprosma* spp. association in swamp

(e) *Muehlenbeckia* sp. shrubland in swamp

(f) *Eleocharis* sp.-raupo reedland in swamp

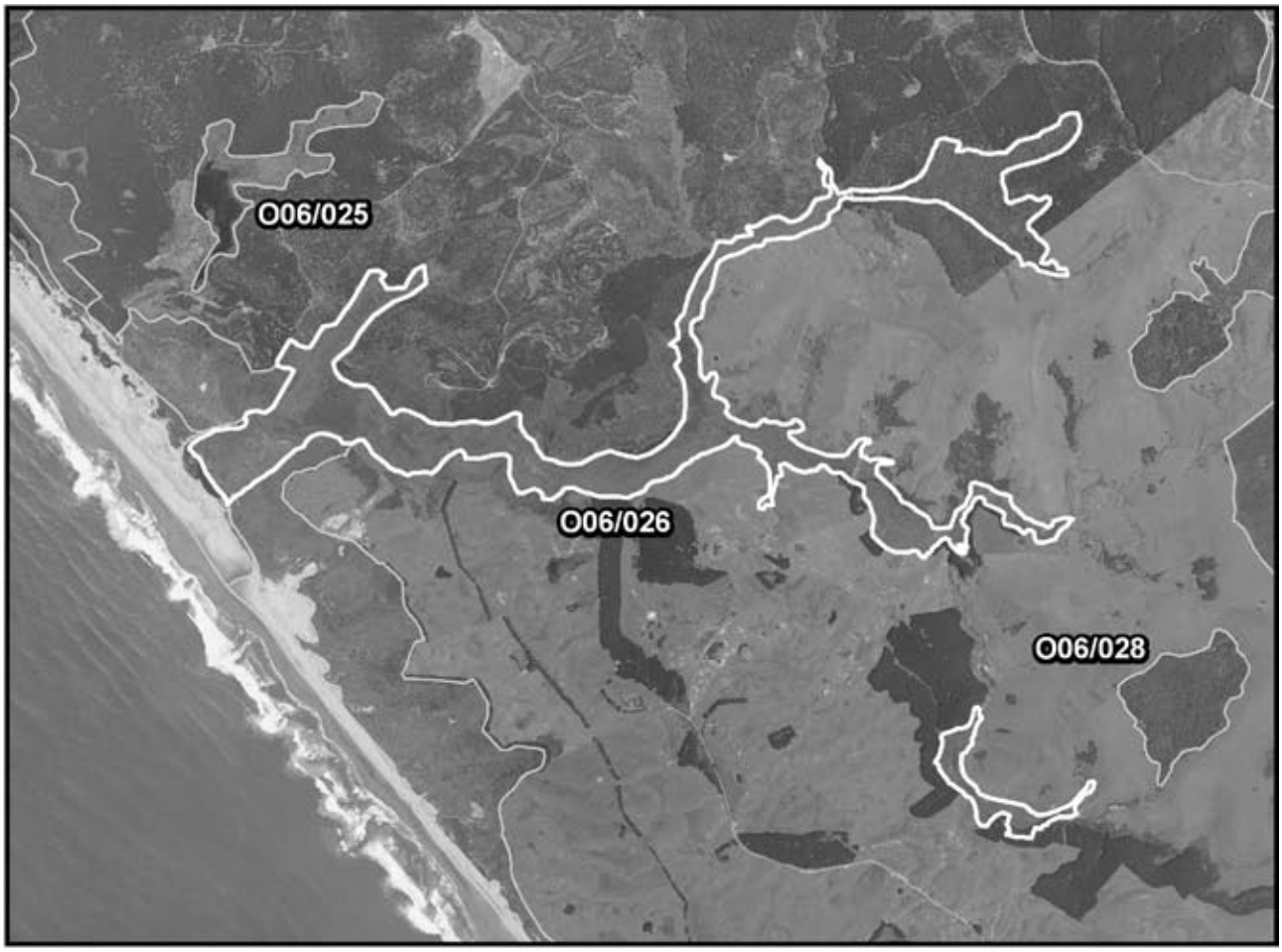
(g) Harakeke flaxland in swamp

(h) Ti kouka-harakeke association in swamp

(i) Puriri-taraire forest on hillslope

Landform / geology

A wetland ponded by Holocene coastal foredunes backed by low coastal cliffs cut into weakly consolidated Pleistocene dune sand, including swamp deposits extending up the Muriwai Stream valley.

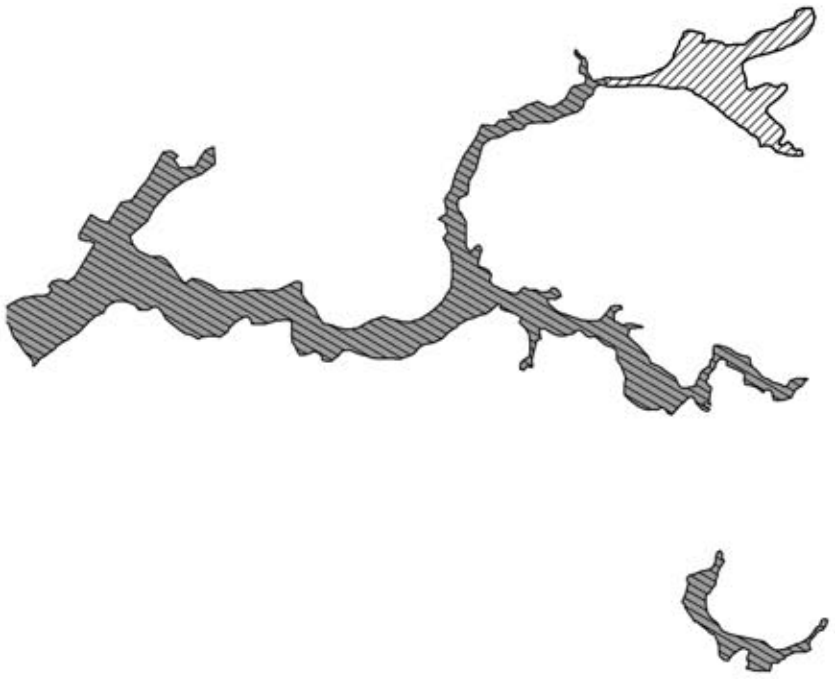


O06/026 Muriwai Stream Swamp

0 750 1,500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

Vegetation

Mosaic of vegetation types reflecting hydrology and fertility of sites.

(a) Abundant *Baumea* sp. with common raupo occurring throughout most of the site. Occasional species include ti kouka, harakeke, and manuka.

(b) In a small area, manuka is abundant with ti kouka and mamaku common.

(c) An area of abundant raupo with occasional ti kouka.

(d) An area of abundant bracken and common *Coprosma* spp. Manuka is frequent.

(e) *Muelenbeckia* sp. are abundant within an area in the swamp.

(f) Co-dominant *Eleocharis* sp. and raupo.

(g) Area of abundant harakeke (around 20% of the site) with occasional ti kouka and raupo in the mid-section of the site.

(h) Ti kouka and harakeke are common in a separate wetland south of the main site.

(i) In the north east, a small area of puriri and taraire is contiguous with the wetland habitat. Towai is frequent and kohekohe, kahikatea and kauri occur occasionally.

Significant flora

The large sundew *Drosera binata* (Regionally significant species) was recorded in 1986/87.

Fauna

Birds

Australasian bittern (Nationally Endangered), 1994 record of northern NZ dotterel (Nationally Vulnerable), NI fernbird (Sparse), and pied stilt. Australasian little grebe (Regionally significant species) and little shag frequent the tidal lagoon near the mouth of Muriwai Stream.

Spotless crake (Sparse) where recorded as being in high numbers in 1986 (Forester and McKenzie 1986).

Fish

Giant bully (Regionally significant species), banded kokopu (Regionally significant species), shortfin eel, longfin eel (Gradual Decline), inanga and bully species.

Significance

As it is the biggest freshwater wetland remaining in this Ecological District, the Muriwai Swamp system and associated tidal lagoon/dune complex is the best representative example of its type.

The contiguous riparian forest in the upper catchment performs an important buffer between the effects of adjacent exotic forestry. Some small dune lakes and ponds remain on farmland to the south of this wetland which enhances the species diversity of the area, adding an open water component utilised by waterbirds.

Presence of several threatened and regionally significant species.

Representative site for all 9 ecological units. Sole record in this survey of 7 ecological units, type (a), (b), (d), (e), (f), (g), and (h) in the Ecological District.

A portion of this site is public conservation land, 49.4 ha (41.8%), administered by the Department of Conservation via Stewardship Land and Conservation Covenant. Ownership of part of this site is being transferred to Te Iwi O Te Roroa on completion of their Treaty settlement agreement.

WAIPOUA COASTAL STRIP AND TAHA MOANA SCENIC RESERVE

Survey no.	O06/027
Survey date	5 May 1995, 25 August 2000 (SSBI survey: O06/H014)
Grid reference	O06 536 155
Area	523.6 ha (2 remnants) (386.1 ha shrubland, 129.9 ha duneland/sandfield, 7.6 ha wetland) (This site boundary was redrawn from the original 1995 survey to fit 2002 and 2006 aerial photography. As a result the site increased by 259 ha mainly from an increase to the shrubland area and the inclusion of sandfield)
Altitude	0–60 m asl

Ecological unit

(a) *Baumea* sp. reedland in dune slacks

(b) Manuka-*Gleichenia* sp. association in dune complex

(c) Harakeke-manuka-toetoe association on dune complex

(d) Toetoe-knobby clubrush association on dune complex

(e) Pohutukawa forest on dune complex

(f) Oioi rushland on dune complex

(g) Sand bindweed-*Spinifex* association on foredune

(h) *Spinifex* grassland on foredune

(i) *Carex* sp. sedgeland on lagoon margin

(j) Marsh clubrush-raupo reedland in lagoon

(k) Oioi-knobby clubrush rushland in lagoon

(l) Umbrella fern-manuka-sedges association in elevated infertile coastal wetlands

(m) Sandfield on beach

Landform / geology

Holocene coastal foredunes and interdune flats, backed by low cliffs cut into weakly consolidated Pleistocene dune sands.

Vegetation

The area contains examples of several coastal ecotones and associated vegetation types to semi-tidal lagoon and dune complexes. Rocky shore ecosystems are not represented.

Towards the coast these vegetation types occur:

(a) Abundant *Baumea* sp. with frequent harakeke and occasional manuka.

(b) Abundant manuka and *Gleichenia* sp. occurs with frequent *Blechnum* sp. and occasional harakeke, hangehange and the exotic parasitic plant *Cassytha pubescens*.

(c) A harakeke, manuka and toetoe association with frequent hangehange and *Cassytha pubescens*. Occasional bracken, pohuehue and *Coprosma* sp. are also present.

Towards the foredune these vegetation types occur:

(d) Toetoe is abundant with common knobby clubrush. Pohuehue, *Leucopogon fraseri* and harakeke occur frequently. tauhinu, *Coprosma acerosa*, bracken, lupin and shore bindweed are all occasional.

(e) An area of pohutukawa occurs within the dune complex. Understorey/ groundcover species include kowharawhara with occasional *Coprosma rhamnoides, C. macrocarpa,* hangehange and *Tetragonia* sp.

(f) Oioi is common with frequent toetoe, pohuehue and *Leucopogon fraseri.* Occasional species include harakeke, *Coprosma acerosa, Pimelea prostrata* and fleabane.

(g) Sand bindweed and *Spinifex* occur commonly amongst sand with frequent pohuehue and knobby clubrush and occasional tauhinu, pingao and toetoe.

Foredune

(h) Abundant *Spinifex* occurs on the foredune with occasional pingao. Lupin, pohuehue, knobby clubrush and *Coprosma acerosa* are prevalent within this vegetation type at Taha Moana Scenic Reserve.

Saltmarsh/herbfield

(i) *Carex* sp. dominated herbfield with frequent *Isolepis prolifer* and occasional *Eleocharis acuta,* raupo, *Lotus major, Selliera radicans, Triglochin striata* and *Lobelia anceps*. The *Carex* sp. referred to is probably *Carex pumila*.

Lagoon

(j) Abundant marsh clubrush associated with raupo occurs adjacent to the foredunes at Grid Ref: O06 548 136.

(k) Oioi and knobby clubrush association with occasional harakeke, manuka and toetoe also occurs in this area.

(l) Elevated infertile wetland areas occur within Taha Moana Scenic Reserve and are defined by umbrella fern, manuka and sedge species.

(m) Sandfield was not part of the original 1995 survey.

Significant flora

Pingao (Gradual Decline) and *Fuchsia procumbens* (Sparse).

Coprosma acerosa, *Drosera peltata*, *Myriophyllum votschii* and *Triglochin striata* (recorded from this survey) (all Regionally significant species). Of note is the presence of *Coprosma acerosa* × *C. repens* (L. J. Forester pers. comm.).

Fauna

Birds

Reef heron (Nationally Vulnerable), Caspian tern and northern NZ dotterel (both Nationally Vulnerable), white-fronted tern and banded dotterel (both Gradual Decline), NI fernbird and black shag, (both Sparse), variable oystercatcher (Regionally significant species) little shag, white-faced heron and other common bird species were recorded between Hokianga South Head and the Waipoua River in 1992 by Ornithological Society members.

The site is known to support a large breeding colony of northern NZ dotterel (Nationally Vulnerable) and up to 9 Australasian bittern (Nationally Endangered) have been observed from this site.

Lizards

Shore skink (2003 record: SSBI O06/H014).

Significance

An intact habitat with sequential linkage to the Waipoua/Matataua/Waima forest tract supporting uncommon vegetation types and many threatened and regionally significant species. Kiwi were known to come out on to the beach here and may do so still (R. J. Pierce pers. comm.).

Representative site for all 12 ecological units with 11 unrepresented elsewhere in the Ecological District (excluding pohutukawa forest, which occurs at two other sites).

The *Cassytha pubescens* mentioned in ecological units (b) and (c) is exotic thought to have arrived from Australia as a result of forestry operations (L. J. Forester pers. comm.) where it is only known from Waipoua Forest (Webb, Sykes, Garnock-Jones 1988).

Taha Moana Scenic Reserve (located in the southern tip of this site) is a soil site of national importance for:

(i) A good example of a sequence of podzolised soils on beach sand.

(ii) Contains good examples of Te-Kopuru soils which are uncommon. (Arand *et al.* 1993).

Within this site 301.3 ha or 57.5% is public conservation land predominantly protected by Taha Moana Scenic Reserve, Kawerua Conservation Area

and Muriwai Conservation Area. Ownership of part of this site is being transferred to Te Iwi O Te Roroa on completion of their Treaty settlement agreement.

MURIWAI BUSH

Survey no.	O06/028
Survey date	27 October 1994
Grid reference	O06 600 115
Area	20 ha
Altitude	<60–160 m asl

Ecological unit

(a) Taraire forest on hillslope (80%)

(b) Kanuka/manuka-towai forest on hillslope (20%)

Landform / geology

Gullied hillside underlain by deeply weathered Waipoua Subgroup basaltic lava flows.

Cutover forest.

(a) The majority of the site is abundant taraire forest with frequent karaka and puriri. Occasional species include rewarewa, kohekohe, kauri, pukatea, kahikatea, towai and totara.

(b) Kanuka/manuka and towai occur in the remaining area mainly around the periphery. Rewarewa is frequent and kauri, kahikatea, emergent northern rata, puriri and karaka are occasional.

Fauna

The site supports NI brown kiwi (Serious Decline) and kauri snail (Gradual Decline).

Significance

Adjacent to large forest tract of Waipoua/Mataraua/Waima, providing habitat for threatened species. This site performs a riparian protection function for the Muriwai Stream wetland.

Representative site for type (a) taraire forest.

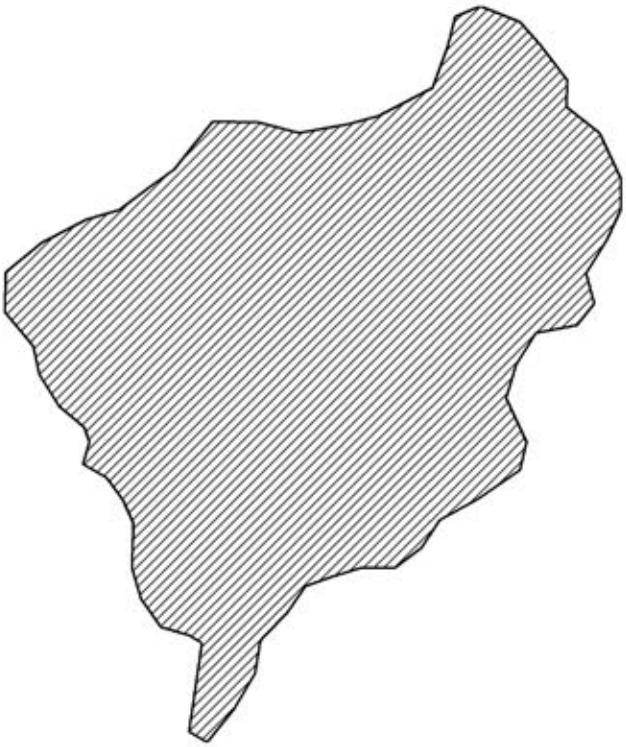
O06/028 Muriwai Bush

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

MARLBOROUGH ROAD FOREST

Survey no.	O06/029
Survey date	1 November 1994
Grid reference	O06 635 112
Area	51.9 ha (2 remnants) (This site was slightly adjusted from the 1994 survey to fit 2006 aerial photography)
Altitude	240–360 m asl

Ecological unit

(a) Taraire forest on moderate hillslope (50%)

(b) Towai forest on moderate to steep hillslope (45%)

(c) Maire tawake swamp forest on alluvium (5%)

Landform / geology

Gullied hillslopes underlain by deeply weathered Waipoua Subgroup basaltic lava flows.

Vegetation

(a) Taraire forest is abundant over approximately half of the site. Towai and rewarewa are frequent. Occasional species include, rimu, miro, matai, puka, hinau, tawa, houhere, totara and mamaku.

(b) Abundant towai occurs in most of the remaining area. Kahikatea and manuka are frequent and hinau, totara, rimu, houhere, kohuhu, black maire and makamaka are all occasional.

(c) Maire tawake is common in a small area along with frequent pukatea and supplejack. Kahikatea and towai are also present.

Significant Flora

Black maire (Regionally significant species).

Fauna

Birds: NI brown kiwi (Serious Decline), kukupa (Gradual Decline) and common forest birds.

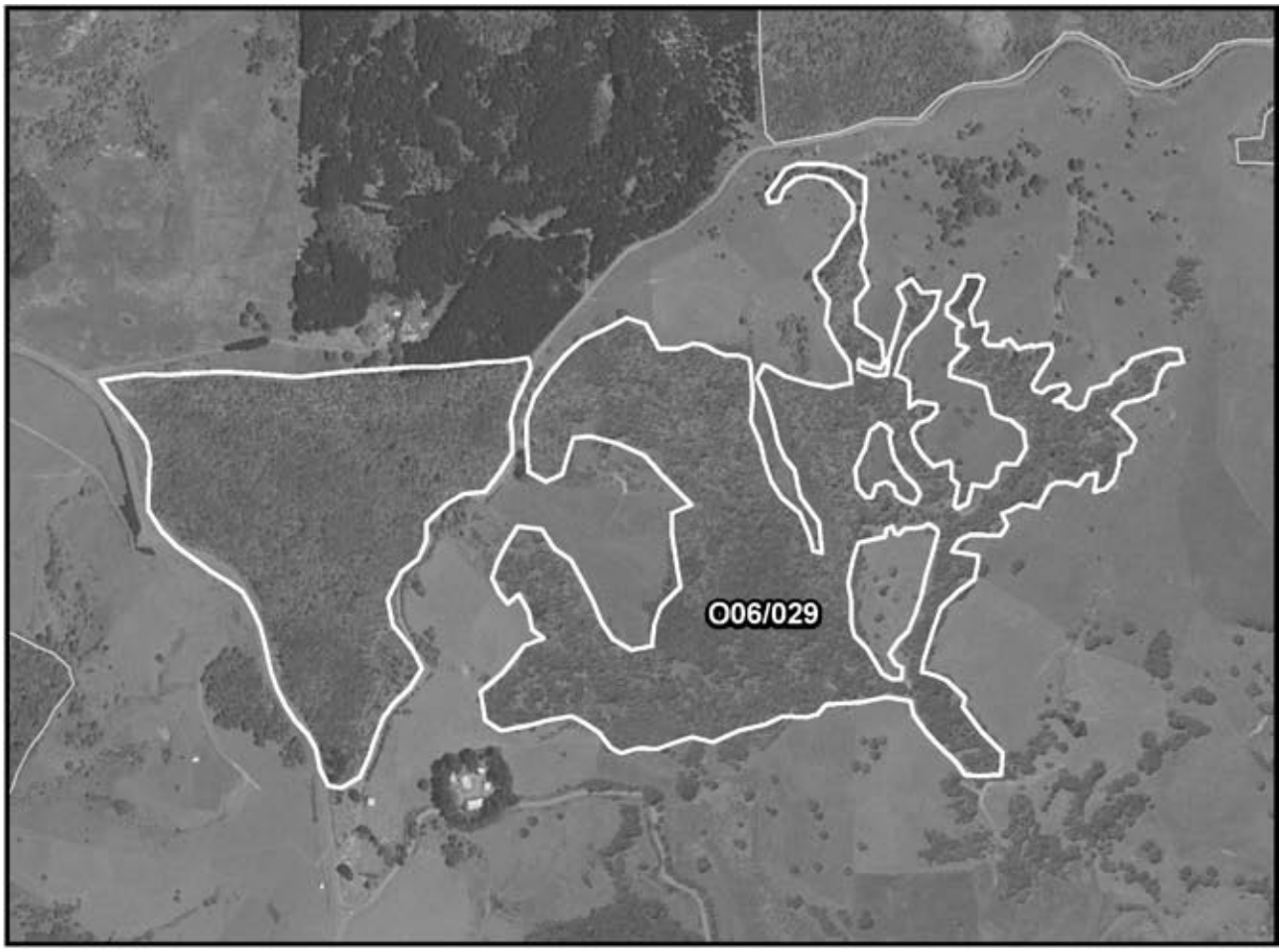
Land snails

Kauri snail (Gradual Decline).

Significance

This site is comprised of two remnants adjacent to a southern edge of the greater Waipoua Forest, providing corridor linkages for species including kiwi.

Presence of threatened and regionally significant species. Representative site for and only one of two records of type (c) maire tawake forest recorded in the Ecological District.



O06/029 Marlborough Road Forest

0 250 500

Metres

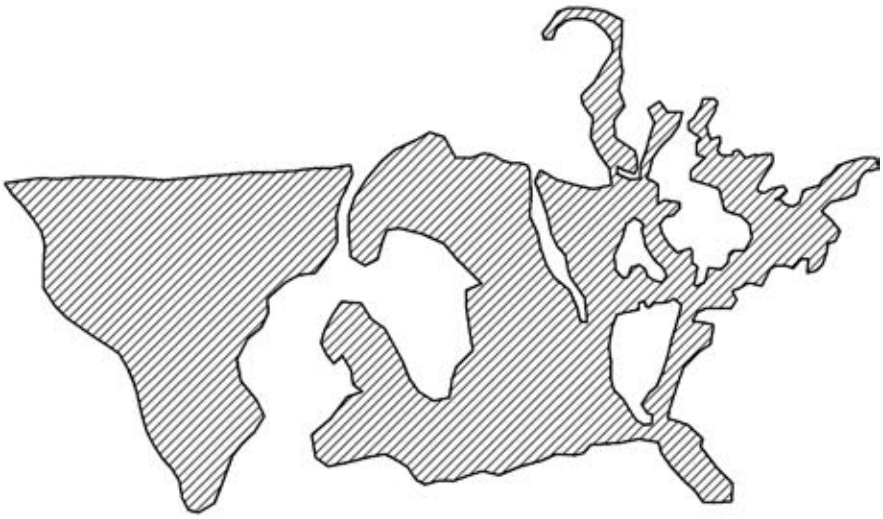
Habitat type

Forest

Shrubland

Wetland

Duneland/Sandfield



Aerial photography flown 2006

A Queen Elizabeth II open space covenant, which includes a small peaty swamp, protects 14.3 ha at the headwaters of the Waima River.

The Waipoua Forest Trust through a Queen Elizabeth II National Trust covenant administers approximately an additional 16 ha, together resulting in the protection of 60.3% of this site.

JONES ROAD/MANGATU BUSH REMNANTS

Survey no.	O06/030
Survey date	2 November 1994
Grid reference	O06 689 115
Area	177.3 ha (6 remnants) (167.2 ha forest, 10.1 ha shrubland) (Small adjustments were made to the original 1994 boundary of this site to fit with 2002 aerial photography)
Altitude	c. 300–540 m asl

Ecological unit

(a) Taraire-tawa-towai forest on hillslope

(b) Makamaka-*Olearia* sp. forest on hillslope

(c) Kanuka/manuka shrubland on moderate hillslope

(d) Towai forest on hillslope

(e) Wheki fernland on hillslope

(f) Kahikatea forest on hillslope

(g) Taraire forest on hillslope

Landform / geology

Gullied hillslopes in deeply weathered Waipoua Subgroup basaltic lava flows.

Vegetation

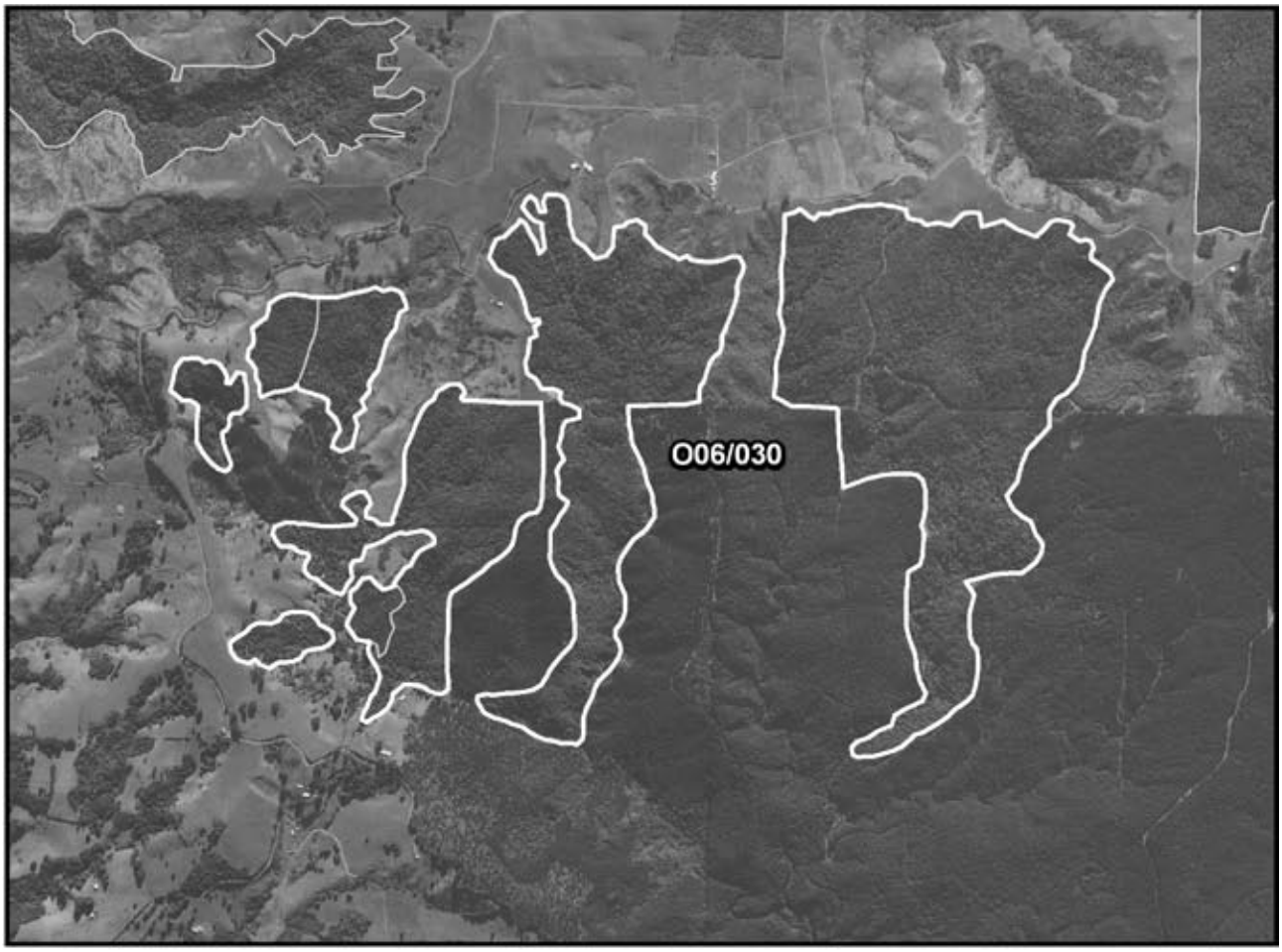
Type (a) and type (b) describe the vegetation types in the far western remnant.

(a) Association of taraire, tawa and towai occurs with frequent miro and hinau. A diverse range of species are present including, puka, pukatea, tawari, rewarewa, makamaka, *Nestegis montana*, maire tawake, rimu, northern rata and totara.

(b) Abundant makamaka associated with *Olearia* sp. occurs with frequent puka, *Coprosma* sp. and wineberry.

Type (c) to type (g) describe the remaining site.

(c) An area of shrubland in the west is kanuka/manuka abundant (c. 2%) with frequent *Acacia* sp. and occasional wheki and towai.

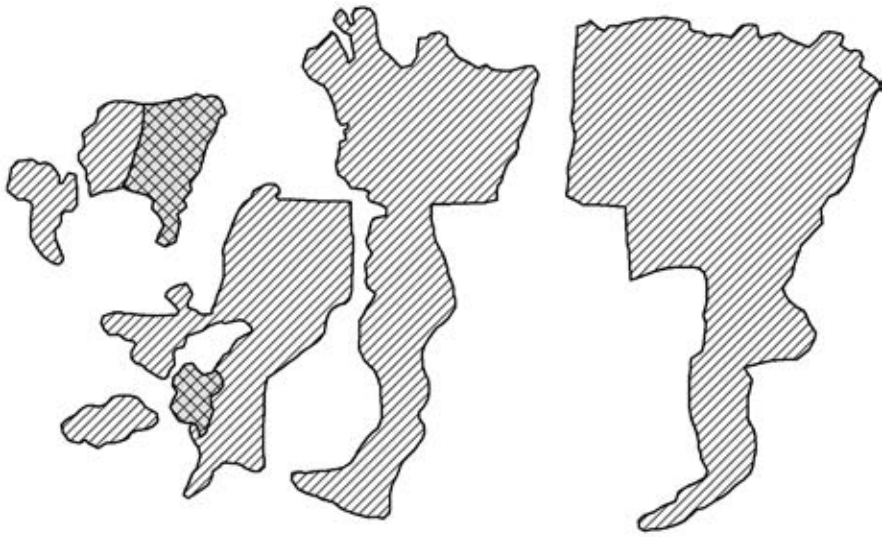


O06/030 Jones Road/Mangatu Bush Remnants

0 500 1,000
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

(d) Abundant towai forest covers approximately 80% of the site. Kahikatea is frequent and taraire, whau, rimu, rewarewa, tawa and pukatea are all occasional.

(e) Wheki is abundant in a small area (5%) with frequent towai and occasional mamaku.

(f) Kahikatea is abundant in less than 2% of the site with occasional rimu and rewarewa.

(g) Approximately 15% is abundant taraire with frequent tawa and hinau. Other species present include, pukatea, rewarewa, rimu, northern rata, miro and towai.

Fauna

1992 presence of NI brown kiwi (Serious Decline). Past surveys, 1985 of kukupa (Gradual Decline), NI tomtit (Regionally significant species) and common forest birds.

Significance

Corridor linkage between Waipoua/Mataraua/Waima forest tract and the Marlborough Forest. Presence of threatened species. In 1985 good numbers of kiwi and NI tomtit were reported in the eastern half of the site (Jones Road).

Representative site for four ecological units, type (b), (c), (f) and (g). Type (c), (f) and (g) are unrecorded elsewhere in the Ecological District.

TUTAMOE DOMAIN RECREATION RESERVE AND SURROUNDS

Survey no.	O06/031
Survey date	1 November 1994
Grid reference	O06 695 162
Area	9.3 ha (2 remnants) (Small adjustments were made to the original 1994 boundary of this site to fit with 2002 aerial photography)
Altitude	460–480 m asl

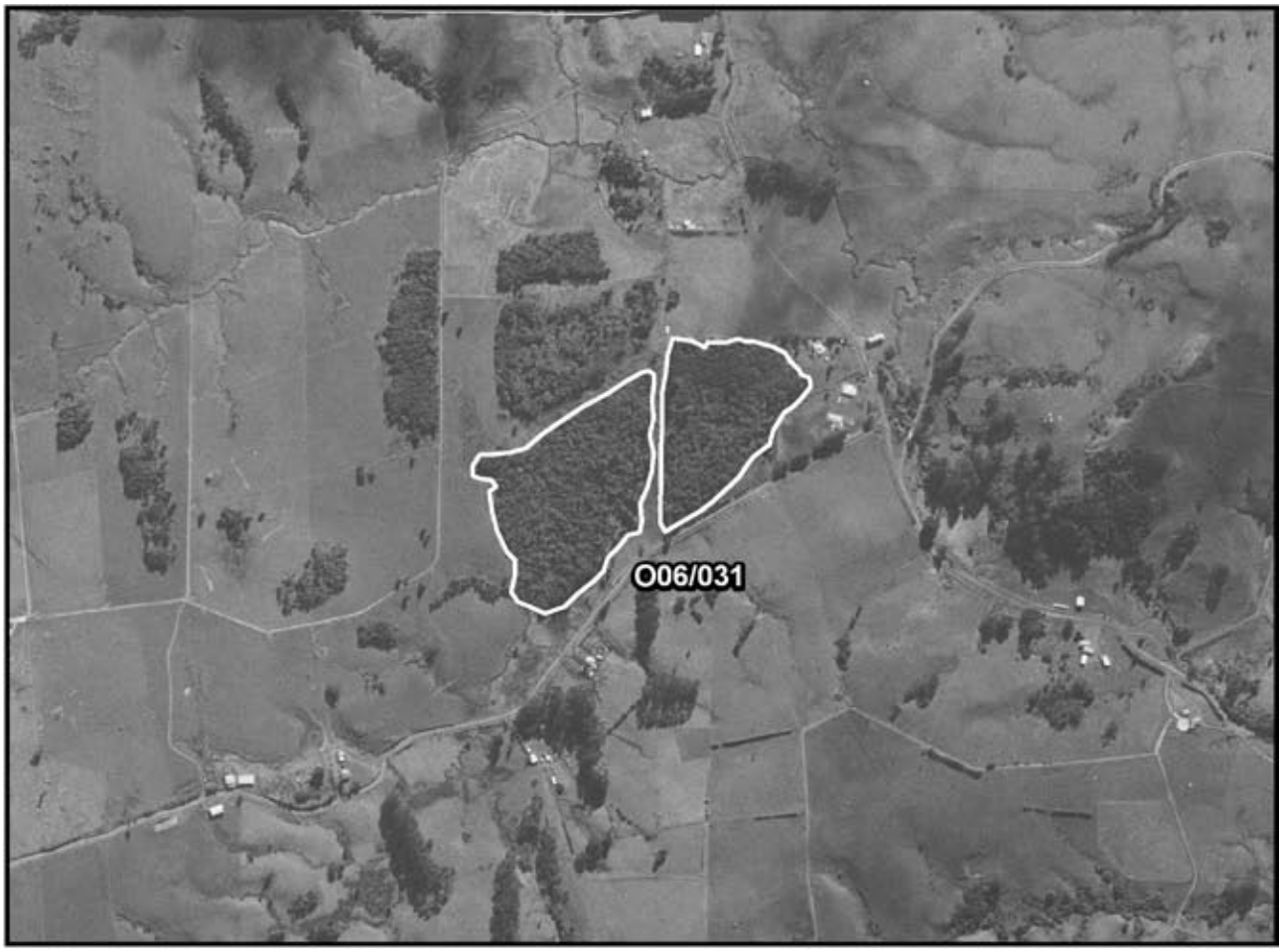
Ecological unit

(a) Towai swamp forest on alluvium (90%)

(b) Kahikatea-maire tawake swamp forest on alluvium (10%)

Landform / geology

Gently sloping surface on deeply weathered Waipoua Subgroup basaltic lava flows.

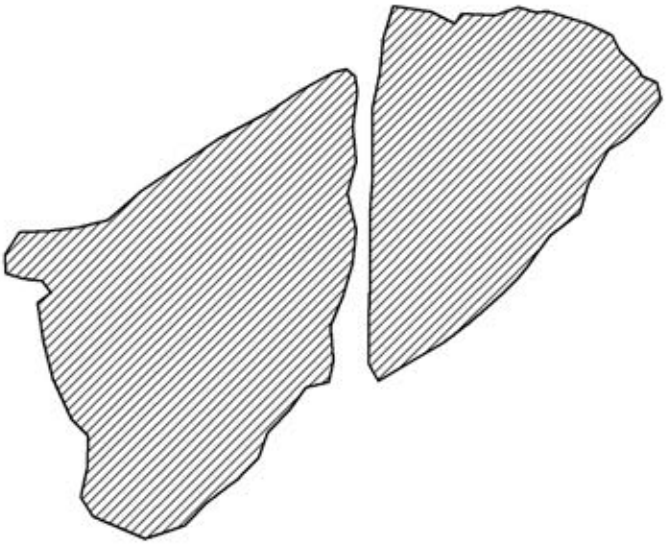


O06/031 Tutamoe Domain Recreation Reserve and Surrounds

0 250 500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

Vegetation

(a) The site is dominated by partly cutover towai forest, which is common with frequent maire tawake. A range of occasional species occur including emergent kahikatea, northern rata and miro, rimu, hinau, pukatea, tawa, and totara.

(b) Kahikatea and maire tawake are co-dominant in the remainder of the site. Other species present include rimu, totara, miro, white maire and towai.

Significant Flora

This survey recorded *Pittosporum kirkii* (Serious Decline), *Brachyglottis kirkii* var. *kirkii* (Serious Decline) and raukawa (Gradual Decline) with the later noted as occurring in good numbers.

Fauna

Not surveyed.

Significance

The Tutamoe Reserve contains old growth swamp forest, provides habitat for threatened plants and provides corridor linkage between the large forest tract and the Tutamoe range to the south.

Representative site for both ecological units which are also unrecorded elsewhere in the Ecological District.

The Tutamoe Domain Recreation Reserve of 4.06 ha protects 43.6% of this site and is administered by the Kaipara District Council.

LAKE WAINGATA NORTH

Survey no.	O06/036
Survey date	SSBI (1986 Survey by Lisa Forester and Don McKenzie) O06/H018; NIWA survey, Wells, Champion, Winton, Edwards and Whiting 2006
Grid reference	O06 536 157
Area	2.9 ha (0.8 ha open water, 2.1 ha shrubland)
Altitude	<20 m asl

Ecological unit

(a) Open water in dunelake

(b) *Eleocharis sphacelata-Baumea articulata* reedland on lake fringe

(c) *Baumea arthrophylla-Baumea juncea* reedland on lake fringe

(d) Kanuka/manuka shrubland on lake fringe

Landform / geology

Dunelake nestled amongst Pleistocene consolidated parabolic dunes.

Vegetation

(a) Open water.

(b) In the NIWA 2006 survey the fringe vegetation was described as being dominated by a 2–5 m wide band of *Eleocharis sphacelata* with a 5 m bed of *Baumea articulata* occurring at one end and a 10 m wide bed of type (c) *B. arthrophylla*, *B. juncea*, and swamp millet occurring at the other end.

In 1986 Forester and McKenzie recorded a fringe of sedges including *Baumea articulata* on the damp lake margins. The swamp dwelling orchid *Spiranthes novae-zelandiae* was recorded and is probably still there (L. J. Forester pers. comm.).

(d) From this zone the 1986 survey recorded a canopy of kanuka/manuka with some mamaku and the occasional emergent self-sown pines.

Significant Flora

Spiranthes novae-zealandiae and *Pratia angulata* (both Regionally significant species) were recorded in the 1986 survey.

Fauna

NI kingfisher, NI fantail, grey warbler, welcome swallow, mallard duck, skylark, blackbird, song thrush, chaffinch and goldfinch were recorded in 1986 (SSBI O06/H028).

Native leeches were also present in 1986.

Significance

A representative dunelake with an excellent zonation of vegetation on the lake margins. NIWA describes the lake as an all native plant lake. Lake Waingata North is remote and is not easily accessed which makes it less vulnberable to many pest plant introductions (Wells et. al. 2006). The open water and marginal vegetation provides good feeding and nesting areas for wetland birds, potentially including threatened species.

The lake is surrounded by plantation pines.

Kawerua Conservation Area (public conservation land) protects most of this site 2.5 ha or 86.9% and is currently administered by the Department of Conservation. Ownership of this protected area is being transferred to Te Iwi O Te Roroa on completion of their Treaty settlement agreement.

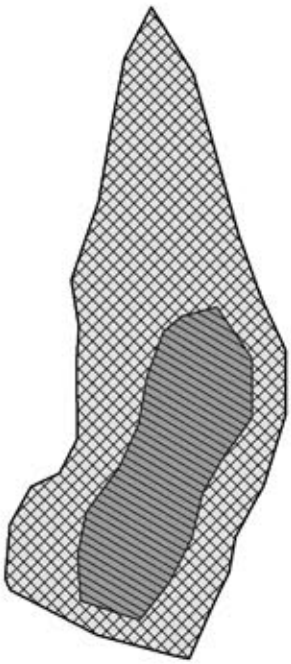
O06/036 Lake Waingata North

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2006

KATUI SCENIC RESERVE AND SURROUNDS

Survey no.	O07/001
Survey date	27 October 1994
Grid reference	O07 608 104
Area	367.5 ha (363.1 ha forest, 4.4 ha shrubland (vegetation type unknown)) (This site was slightly adjusted from the original 1994 survey to fit 2002 aerial photography)
Altitude	160–280 m asl

Ecological unit

(a) Manuka shrubland on hillslope

(b) Kanuka/manuka forest on hillslope

(c) Kanuka/manuka-rewarewa-towai forest on hillslope

(d) Taraire forest on hillslope

(e) Nikau-taraire-towai forest on hillslope

(f) Towai forest on hillslope

(g) Kauri-kanuka/manuka forest on hillslope

(h) Pohutukawa-towai forest on hillslope

(i) Ti kouka-kanuka/manuka-towai forest on hillslope

Landform / geology

Steep dissected hill country and stream valley in deeply weathered Waipoua Subgroup basaltic lava flows.

Vegetation

(a) Manuka shrubland occurs on the periphery.

(b) Kanuka/manuka-dominant forest occurs with frequent towai. Kauri, rewarewa, kahikatea, and karaka are occasional.

(c) Kanuka/manuka, rewarewa and towai occurs with frequent kohuhu and occasional toru, kauri and mamangi.

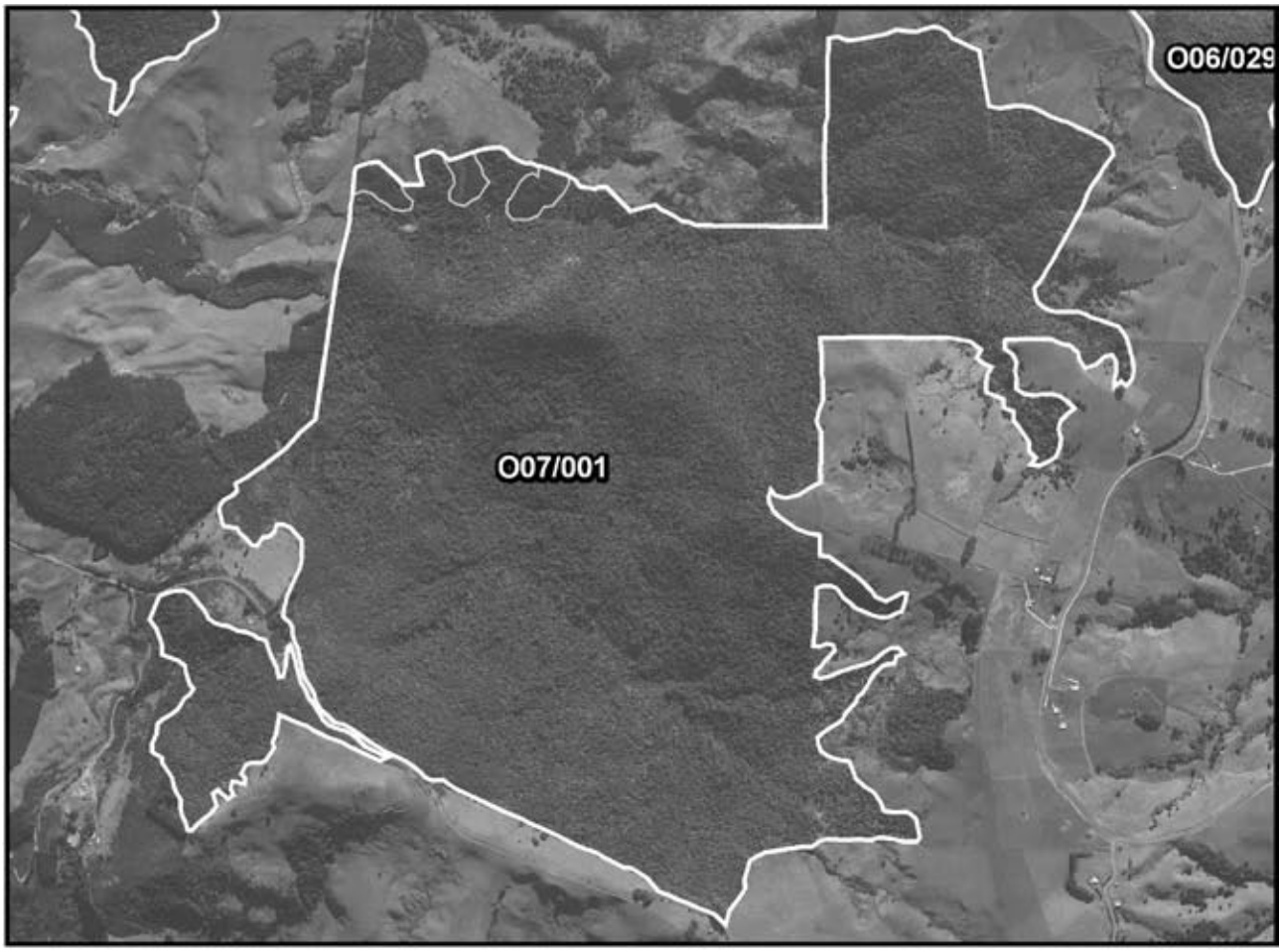
(d) Taraire forest is abundant with frequent puriri and kohekohe. Rewarewa, karaka, kahikatea, emergent northern rata, matai, pukatea, tawa and towai are also present.

(e) Nikau, taraire and towai are co-dominant. Rewarewa, karaka and mamangi occur frequently and puriri is occasional.

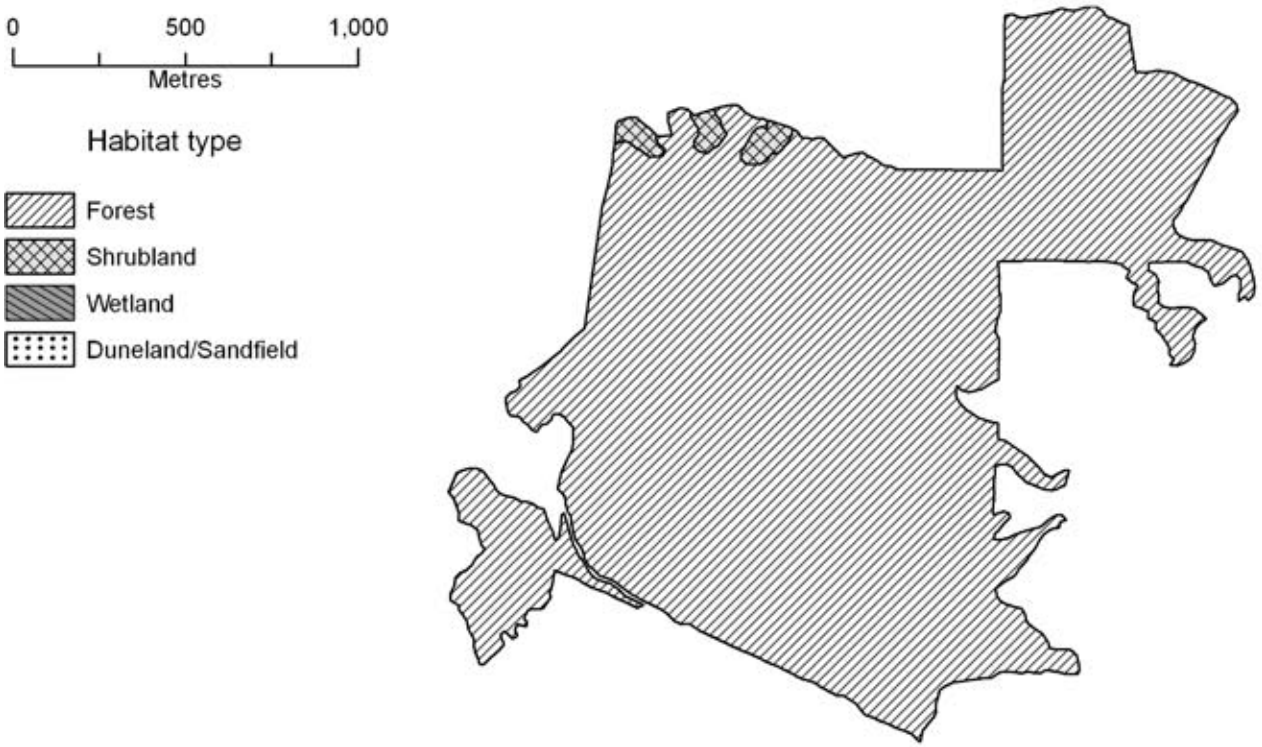
(f) Abundant towai is present.

(g) Abundant kauri associated with kanuka/manuka is present with occasional rewarewa and rimu.

(h) Co-dominant pohutukawa and towai occurs with frequent taraire and rewarewa occurs in the south western corner of the site. Mangaeo, karaka and kauri are also present.



O07/001 Katui Scenic Reserve and Surrounds



Aerial photography flown 2002

(i) In the south wast extension from the main area of forest; a small area of ti kouka, kanuka/manuka and towai occurs with frequent mamangi and other *Coprosma* spp. and occasional hangehange.

An area of shrubland in the north-west was mapped however not surveyed in 1994. The 2002 aerial photography still shows three pockets of shrubland in this area.

Metrosideros robusta × *excelsa* is present along the road edge.

Significant flora

Pellaea falcata (Gradual Decline), *Metrosideros carminea*, *Hebe flavida* and *Metrosideros excelsa* x *robusta* (all Regionally significant species).

Fauna

Birds: 1992 record of very high numbers of NI brown kiwi (Serious Decline); annual monitoring at this site shows that numbers have reduced but are still moderately high call counts (R. J. Pierce pers. comm.). Other forest birds include kukupa (Gradual Decline), morepork and common forest birds.

Land snails

Kauri snail (Gradual Decline).

Fish

Banded kokopu (Regionally significant species).

Significance

Katui Scenic Reserve and Surrounds has a strong coastal influence with high plant and animal values. The Reserve provides corridor linkage between Maunganui Bluff and Waipoua Forest.

Presence of threatened and regionally significant species and large kahikatea are to be found within the site. The headwaters of the Muriwai Stream are protected within this site.

Representative site for 7 ecological units, type (b), (c), (d), (e), (g), (h) and (i). Sole record of five types in the District, type (c), (e), (g), (h), and (i).

Katui Scenic Reserve is a soil site of regional importance for:

(i) Contains good examples of Katui Soils which are uncommon.

(ii) The majority of Katui Soils have been developed for sheep and diary farming.

(Arand *et al.* 1993)

Public conservation land, Scenic Reserve, protects 294.7 ha and is administered by the Department of Conservation. A further 21 ha is protected by a Queen Elizabeth II Open Space Covenant at the headwaters of the Muriwai Stream, together protecting 85.9% of this site.

HOOD ROAD FOREST REMNANT

Survey no. O07/002

Survey date 27 October 1994

Grid reference O07 630 076

Area 6.9 ha

Altitude 260–340 m asl

Ecological unit

(a) Taraire-towai forest on moderate hillslope (90%)

(b) Kahikatea forest on moderate hillslope (10%)

Landform / geology

Hillslope and stream valley in deeply weathered Waipoua Subgroup basaltic lava flows.

Vegetation

(a) Abundant taraire associated with towai (cutover) dominates the site with frequent kahikatea and rewarewa. Karaka, puriri, tawa, pukatea, matai, houhere and rimu are all occasional.

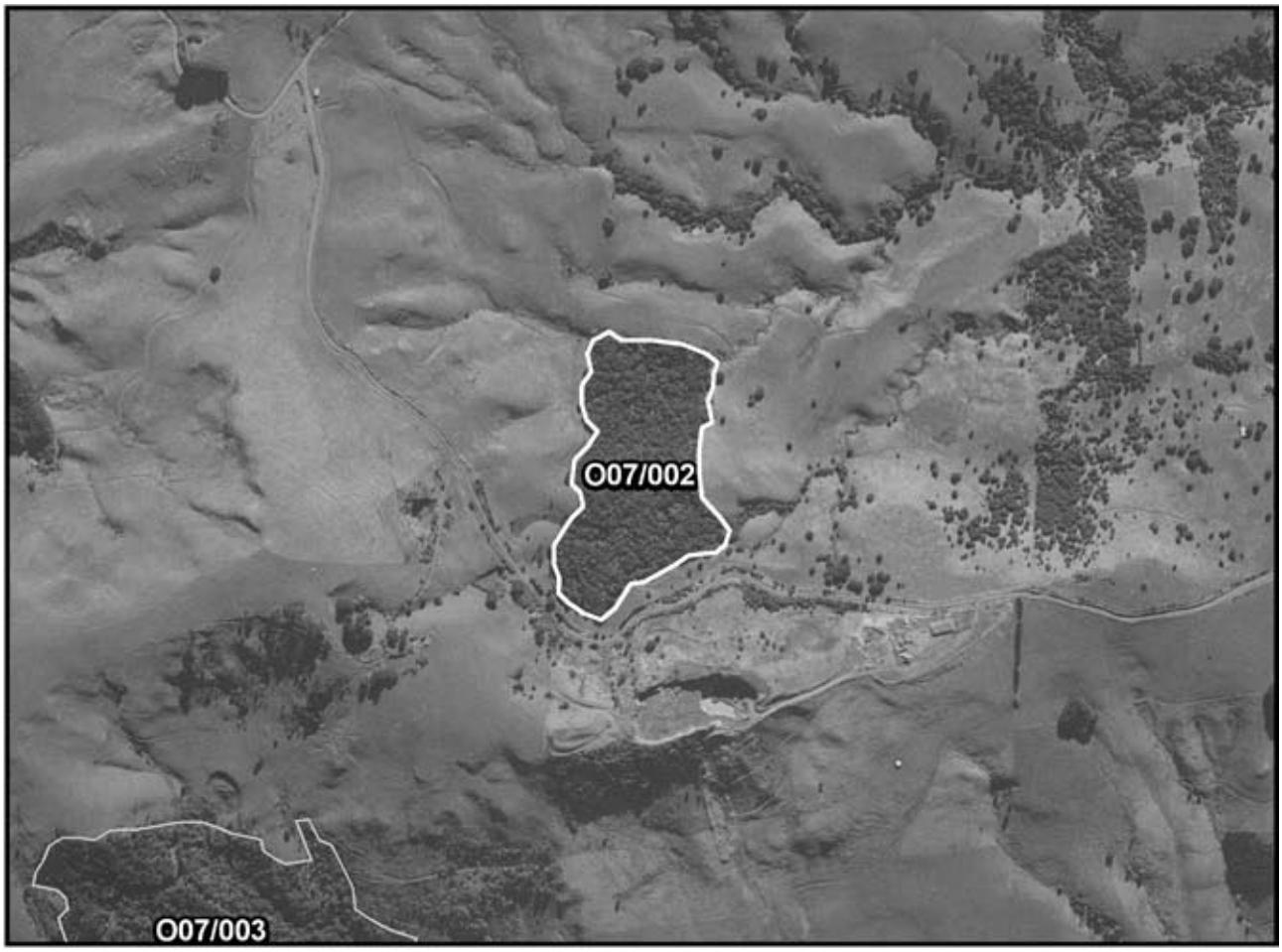
(b) The remaining area is kahikatea forest. Pukatea and maire tawake are frequent and rimu, hinau and totara are occasional.

Fauna

Not surveyed.

Significance

A small habitat providing corridor linkage between larger forests, Maunganui Bluff Scenic Reserve, Katui Scenic Reserve and Surrounds and Trounson Kauri Park Scenic Reserve. Representative site for both ecological units. Taraire-towai forest is unrecorded elsewhere in the Ecological District.



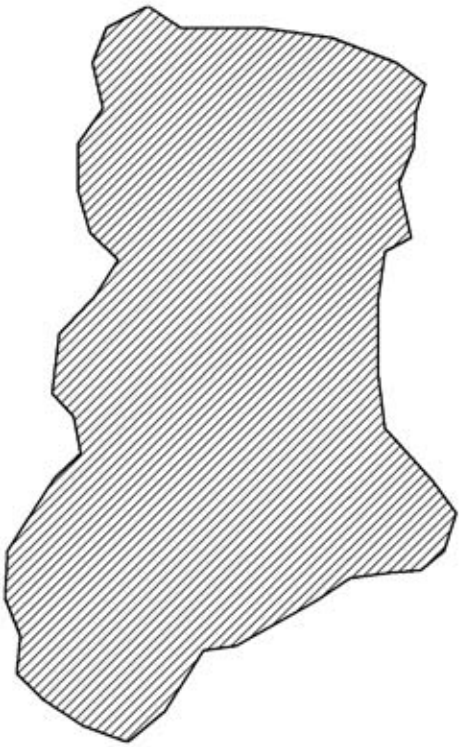
O07/002 Hood Road Forest Remnant

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

MAUNGANUI OUTLIER FOREST REMNANT

Survey no.	O07/003
Survey date	3 October 1994
Grid reference	O07 623 069
Area	11.8 ha (This site was slightly adjusted from the original 1994 survey to fit 2002 aerial photography).
Altitude	240–340 m asl

Ecological unit

(a) Taraire forest on hillslope (70%)

(b) Houhere-mamaku forest on hillslope (30%)

Landform / geology

Gullied hillslope in deeply weathered Waipoua Subgroup basaltic lava flows.

Vegetation

(a) Taraire forest dominates the remnant with frequent karaka and rewarewa. Puriri, kohekohe, mamaku, pukatea, houhere and totara are also present.

(b) Co-dominant houhere and mamaku occur over the remainder of the site with frequent rewarewa and occasional mahoe, karaka and nikau.

At the time of the survey this site was being grazed by livestock.

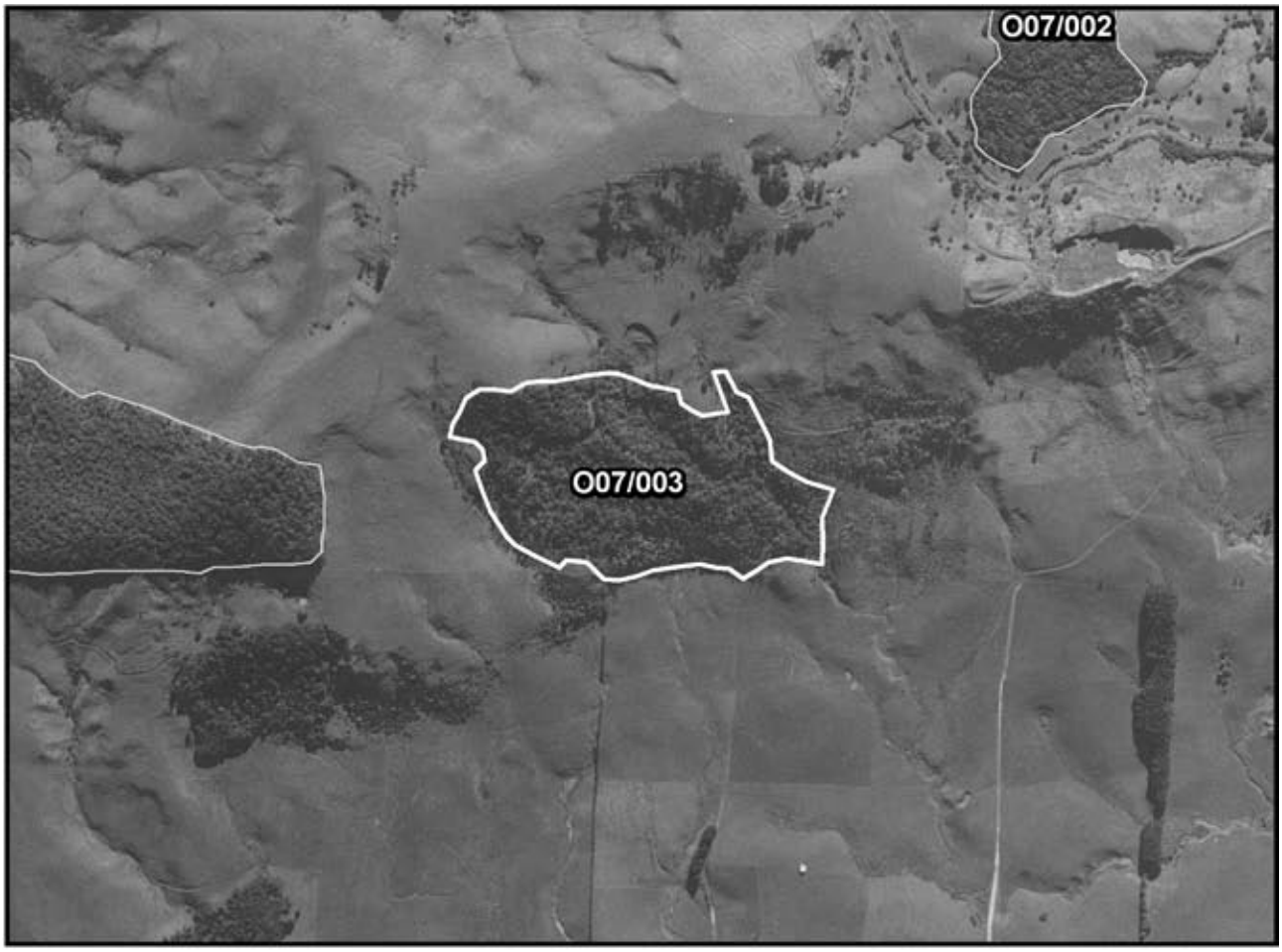
Fauna

Not surveyed.

Significance

Close proximity to Maunganui Bluff Scenic Reserve.

Representative site for both ecological units. Type (b), houhere-mamaku forest is unrecorded elsewhere in the District.

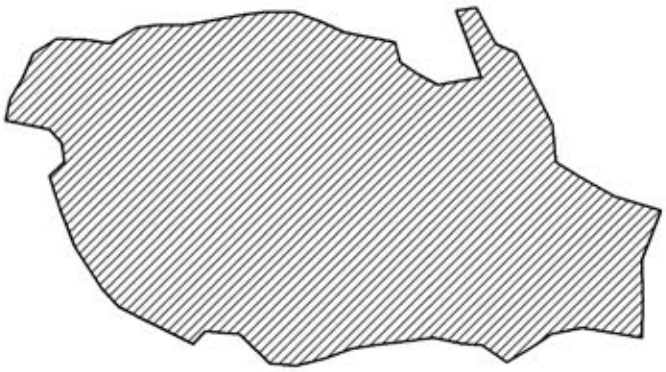


O07/003 Maunganui Outlier Forest Remnant

0 250 500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

HOOPER ROAD BUSH

Survey no.	O07/004
Survey date	27 October 1994
Grid reference	O07 653 085
Area	20.5 ha
Altitude	160–260 m asl

Ecological unit

(a) Totara-tanekaha forest on hillslope (70%)

(b) Taraire forest on hillslope (30%)

Landform / geology

Hillslope of deeply weathered Waipoua basalt lava flows.

Vegetation

(a) Totara is abundant and tanekaha is common. Occasional species include kauri, kahikatea, rewarewa, northern rata and kohuhu.

(b) Secondary taraire forest is common over the remaining area with frequent towai, rewarewa and totara. Puriri, pukatea, tanekaha and kauri are occasional.

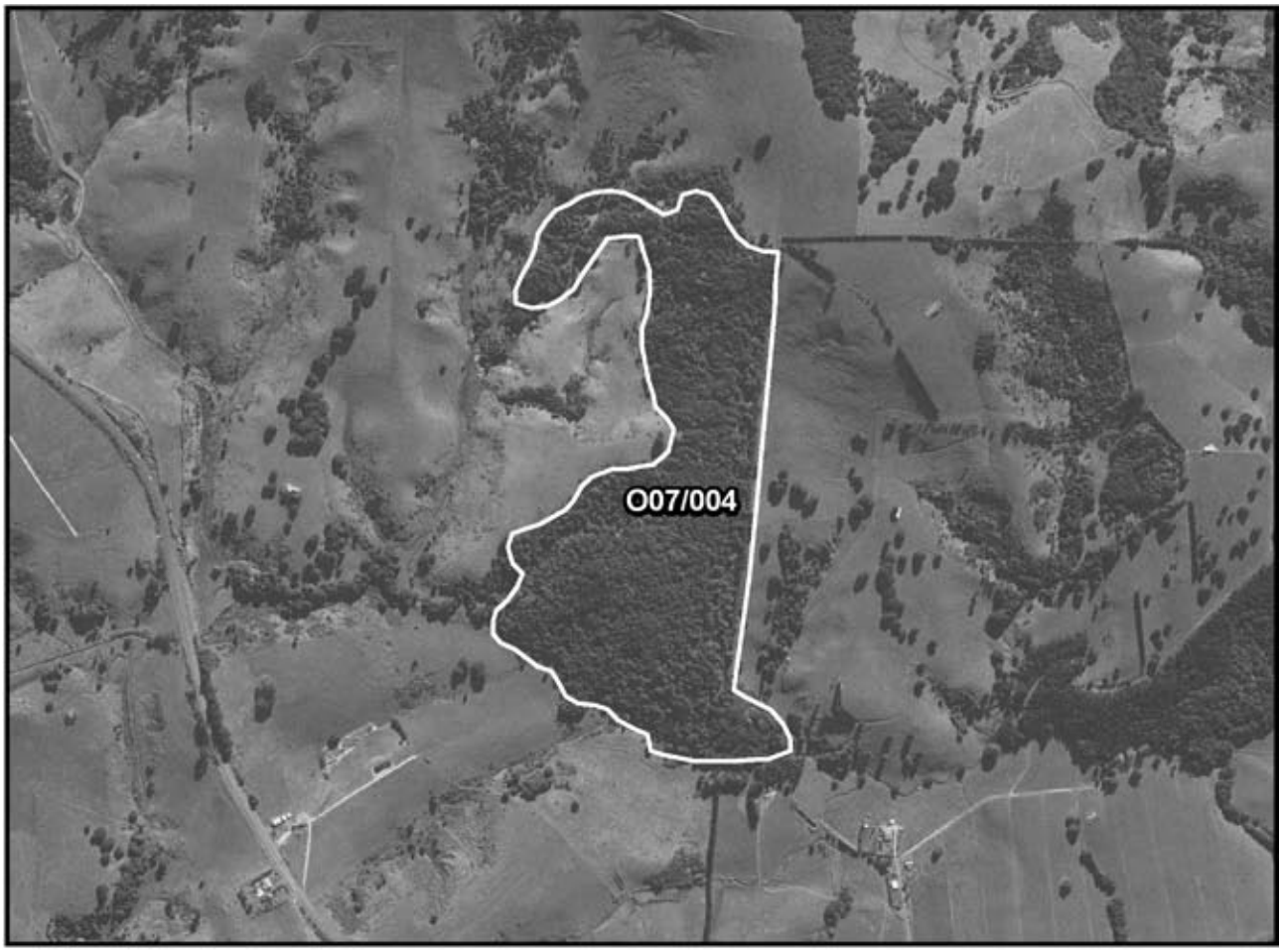
Fauna

Not surveyed.

Significance

Provides corridor linkage between larger forests, Trounson Kauri Park, Katui and Maunganui Bluff Scenic Reserves.

Representative site for and only record of type (a) totara-tanekaha secondary forest in the Ecological District.



O07/004 Hooper Road Bush

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield

Aerial photography flown 2002

TROUNSON KAURI PARK SCENIC RESERVE

Survey no.	O07/005
Survey date	3 October 1994
Grid reference	O07 688 091
Area	412.1 ha (3 remnants) (379 ha forest, 33.1 ha shrubland) (This site was slightly adjusted from the original 1994 survey to fit 2002 aerial photography)
Altitude	70–279 m asl

Ecological unit

(a) Kauri-taraire forest on hillslope (40%)

(b) Towai forest on hillslope (20%)

(c) Mapou shrubland on hillslope (<2%)

(d) Kahikatea-kauri forest on flats (2%)

(e) Manuka shrubland on hillslope (30%)

(f) Taraire-totara riverine forest on alluvium

Landform / geology

Rolling hill country in deeply weathered Waipoua Subgoup basaltic lava flows.

Vegetation

(a) Unmodified co-dominant kauri and taraire occur in just under half of the site with frequent towai and rewarewa. Other species present include tawa, northern rata, matai, miro and totara.

(b) Abundant towai secondary forest occurs with frequent rewarewa. and occasional kauri and kahikatea.

(c) Mapou is common in a very small area. Mahoe is frequent and *Coprosma* sp., pigeonwood and Japanese cedar are occasional.

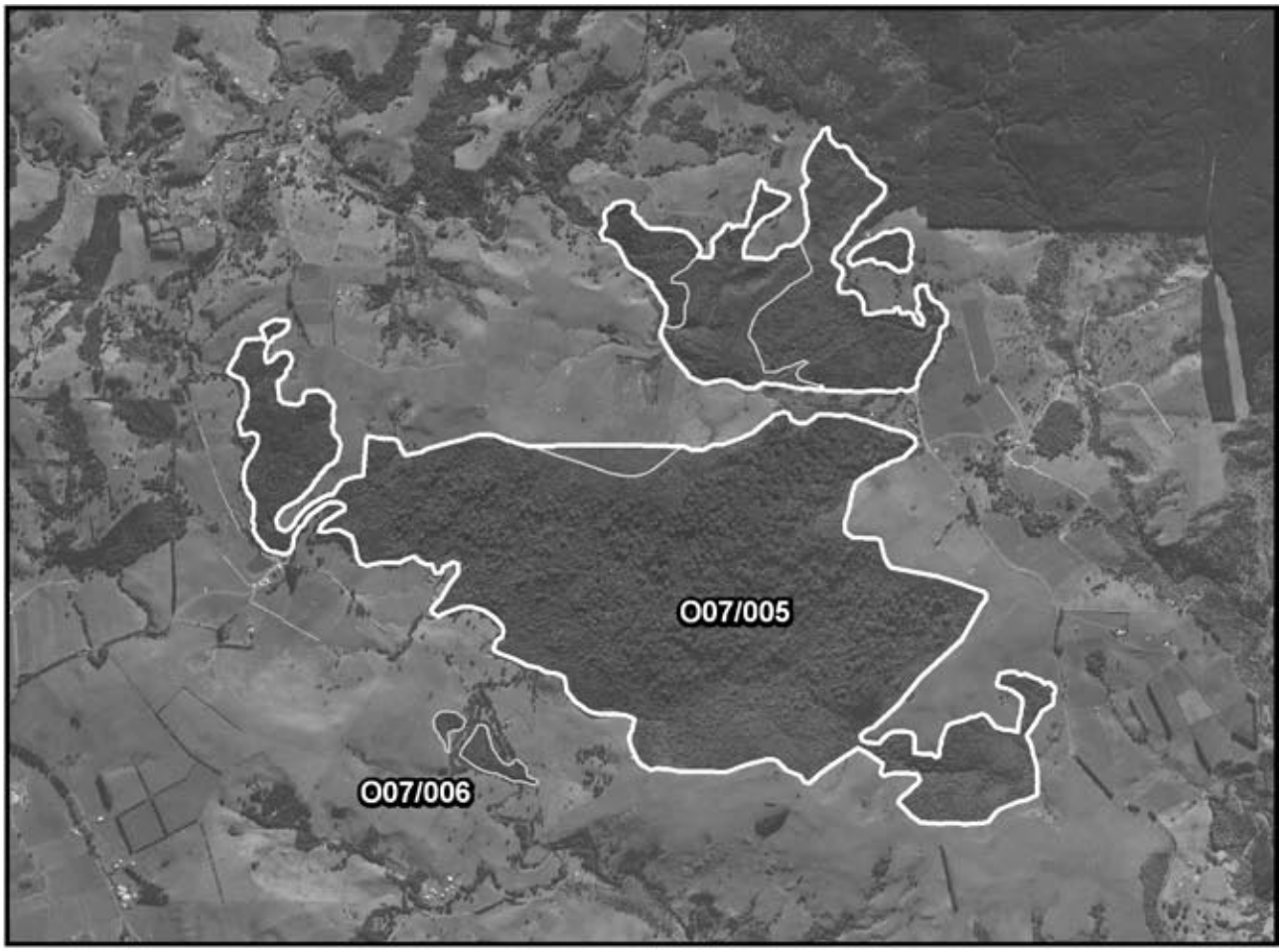
(d) Abundant kahikatea with common emergent kauri occurs in a small area with occasional rimu, kauri and totara.

(e) Manuka is abundant within the shrubland areas in the north of the site.

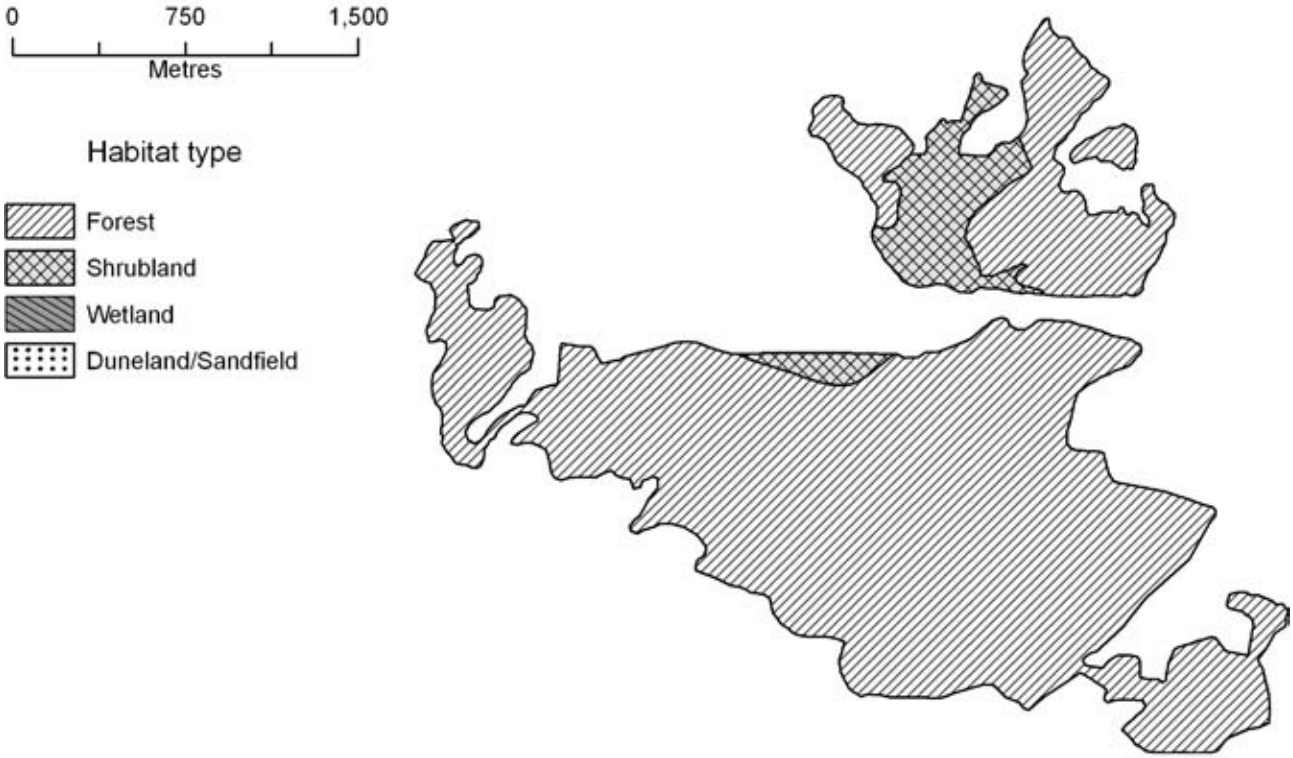
(f) Unmodified riverine forest of abundant taraire with totara occurs in a lower valley. Kahikatea is frequent and rimu, rewarewa, matai and tawa are occasional.

Significant Flora

Kirk's daisy (Serious Decline), willow-leaved maire (Gradual Decline), kawaka, monoao and *Microlaena carsei* (all Sparse) with an historical record of *Thismia rodwayi* (Sparse) from 1963. Black maire, *Brachyglottis kirkii* var. *angustoir*, *Collospermum microspermum*, *Dicksonia lanata*, *Grammitis billardierei*, horopito, *Metrosideros colensoi*, tawari and whaririki (all Regionally significant species).



O07/005 Trounson Kauri Park Scenic Reserve



Aerial photography flown 2002

Fauna

Birds

NI kaka and Australasian bittern (both Nationally Endangered), NI brown kiwi (Serious Decline), kukupa (Gradual Decline), NI tomtit (Regionally significant species), and common forest birds.

1990 record of red-crowned kakariki (Regionally significant species) and an historic record of yellow-crowned kakariki (Gradual Decline). Unspecified kakariki recorded in recent years (R. J. Pierce pers. comm.).

Mammals

Long-tailed bat (Nationally Vulnerable) recorded at a number of sites around the Park in 1997.

Fish

Longfin eel (Gradual Decline), shortfin eel, inanga, banded kokopu (Regionally significant species), Cran's bully, common bully, red-finned bully, common smelt, koura.

Lizards

Copper skink (P. J. Anderson pers. comm.).

Land snails

Kauri snail (Gradual Decline), which have increased in recent years. Athoracophorus sp. 7 – native slug (Range Restricted).

Weta

Northland tusked weta (Sparse).

Significance

During the in the height of the kauri timber industry in 1890, the Government of the day set aside 3.34 hectares at Trounson. James Trounson added another 22 hectares and a further 364 hectares (sold to the Government) resulting in the creation of Trounson Kauri Park Scenic Reserve. The Reserve was officially opened in 1921. Since 1995 the reserve has been intensively managed as a mainland island, creating a refuge for threatened and regionally significant species. Kiwi and kukupa numbers are particularly high and dispersal of both species occurs to outside areas.

Outside the large forest tract of Waipoua/Mataraua/Waima, this forest contains the best examples of kauri-taraire and taraire-totara forest in the Ecological District.

To date several bird species have been translocated to Trounson including NI robin, NI kokako and pateke however these have not been successful.

Representative site for all 6 ecological units with three, (c), (d) and (f) unrecorded elsewhere in the Ecological District.

Trounson Kauri Park Scenic Reserve is a soil site of international importance for:

(i) Undisturbed soil-kauri forest associations featuring unmodified kauri forest.

(ii) Only example of Whatoro soils in this inventory. (Arand *et al.* 1993)

Trounson Kauri Park Scenic Reserve is public conservation land administered by the Department of Conservation. Approximately 391.7 ha or 95.1% of this reserve is contained within this site.

WAIMA RIVERINE FOREST REMNANT

Survey no.	O07/006
Survey date	3 October 1994
Grid reference	O07 677 074
Area	4.5 ha (2 remnants) (This site was slightly adjusted from the original 1994 survey to fit 2002 aerial photography)
Altitude	40–60 m asl

Ecological unit

(a) Taraire riverine forest on alluvium (80%)

(b) Totara forest on flat (20%)

Landform / geology

Alluvial flats and adjoining hillslope in deeply weathered Waipoua Subgroup Basaltic lava flows.

Vegetation

At the time of survey this remnant was in poor health with nikau and karaka competing to replace the fallen taraire.

(a) Old-growth abundant taraire with frequent nikau and karaka. Totara and rewarewa are also present.

(b) Abundant secondary totara forest comprises the remaining canopy area with frequent towai.

Fauna

Not surveyed.

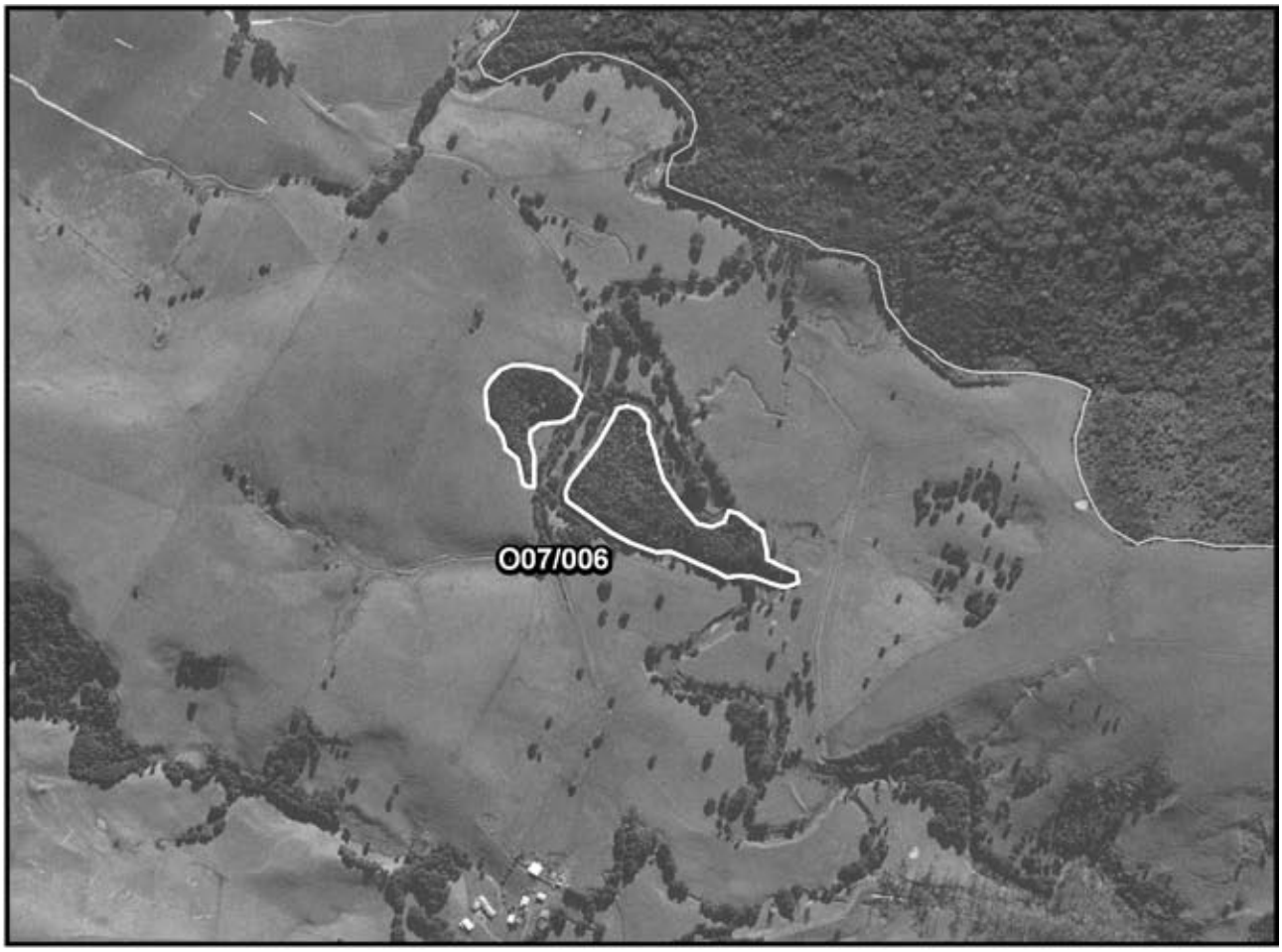
Significance

Old growth alluvial remnant within close proximity to Trounson Kauri Park Scenic Reserve, this small remnant provides a corridor for migratory species such as kukupa.

Riverine forest is under-represented within the Northland region.

Representative site for type (a) taraire riverine forest.

A very small area (0.1 ha) of stewardship land protects 1.7% of this site.

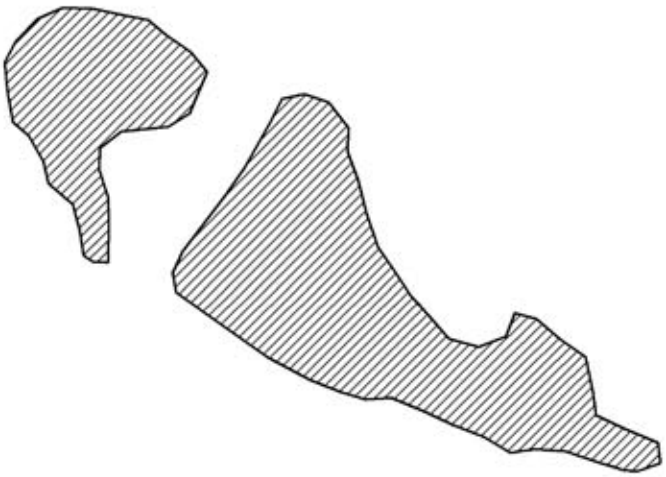


O07/006 Waima Riverine Forest Remnant

0 250 500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

WAITAPU ROAD BUSH

Survey no.	O07/008
Survey date	3 October 1994
Grid reference	O07 656 043
Area	75.5 ha (6 remnants) (This site was adjusted from the original 1994 site boundary to fit with 2002 aerial photography)
Altitude	40–100 m asl

Ecological unit

(a) Taraire-karaka-puriri forest on hillslope

(b) Puriri-taraire-totara forest on hillslope

(c) Rewarewa-totara-towai secondary forest on hillslope

(d) Totara-manuka forest on hillslope

(e) Rimu-totara forest on hillslope

(f) Kahikatea-totara forest on hillslope

(g) Taraire forest on moderate hillslope

(h) Towai forest on hillslope

(i) Totara-towai forest on hillslope

(j) Totara forest on moderate hillslope

(k) Gorse scrubland on hillslope

Landform / geology

Incised stream valleys and headwaters in deeply weathered Waipoua basaltic lava flows.

Vegetation

The north-western remnants include the following vegetation types:

(a) In a small area taraire is abundant with associated karaka and puriri. Kauri and rewarewa are frequent.

(b) Logged puriri, taraire and totara are co-dominant with several frequent species including kahikatea, kauri, rewarewa and titoki. Towai, karaka, tanekaha and nikau are scattered.

(c) Secondary rewarewa, totara and towai occur with frequent mamaku and kanuka/manuka. Kohuhu is also present.

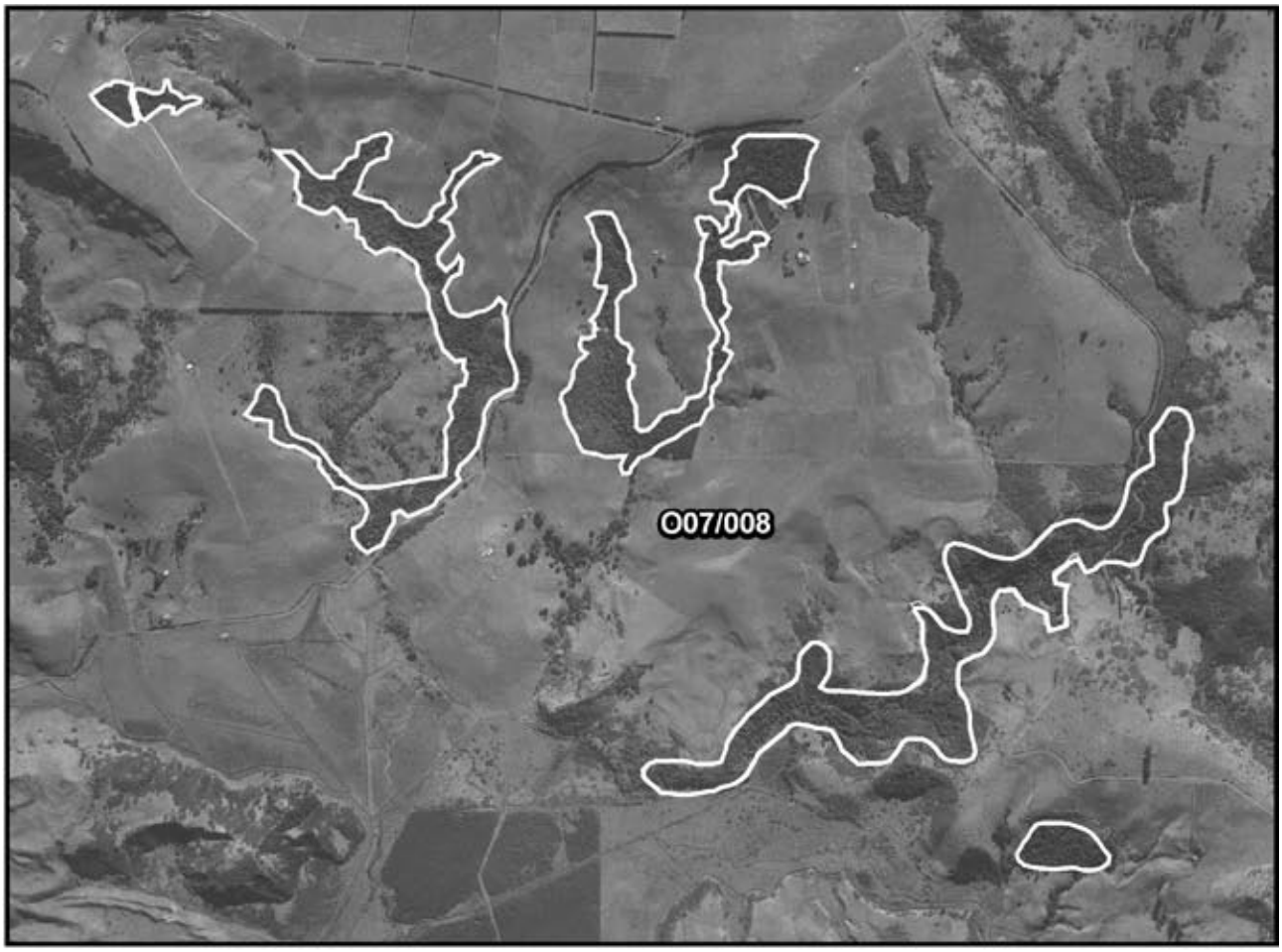
(d) Abundant totara with common manuka are associated with occasional pohutukawa, karaka and kohuhu.

The central remnants include the following vegetation types:

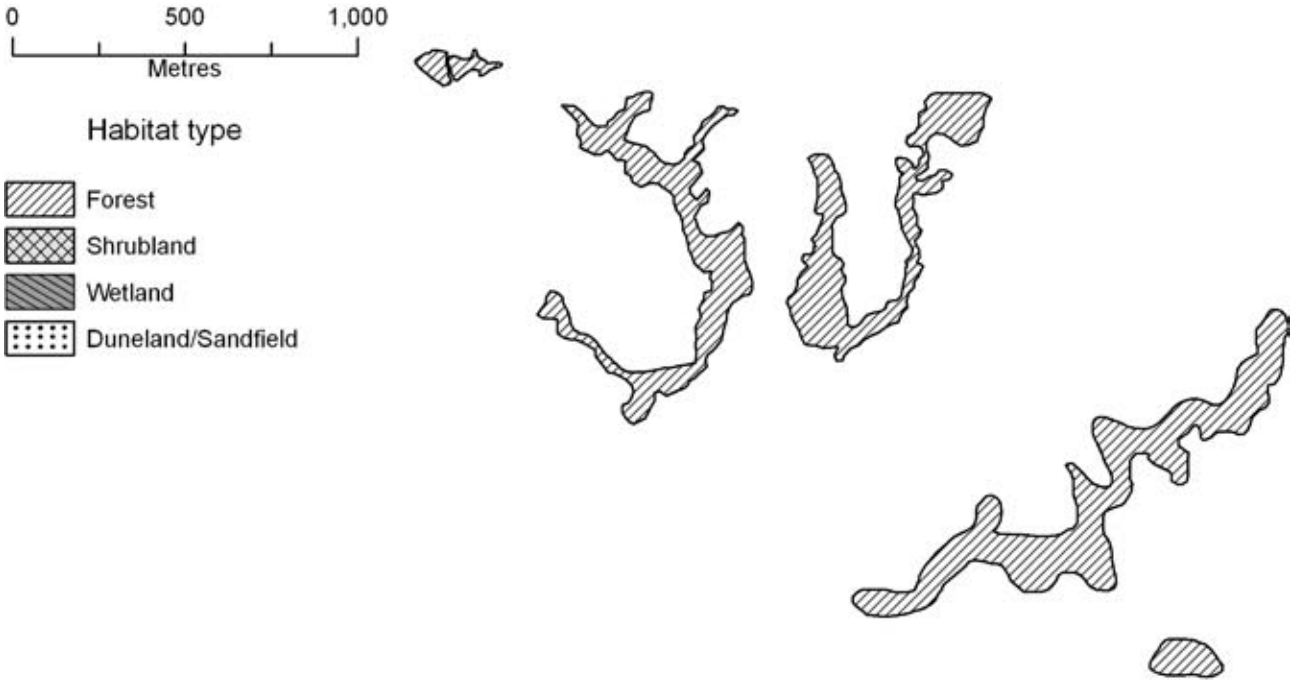
(e) Co-dominant rimu and totara with occasional kahikatea, taraire, rewarewa and towai.

(f) Co-dominant kahikatea and totara with frequent taraire and puriri and the occasional towai.

(g) Abundant taraire with occasional puriri, kahikatea and towai.



O07/008 Waitapu Road Bush



Aerial photography flown 2002

(h) Common towai with frequent taraire and nikau. Kahikatea, kauri, tanekaha, rewarewa and totara are also present.

(i) Co-dominant totara and towai with frequent manuka and occasional kohuhu, rewarewa and kauri.

The largest south-eastern remnant includes these vegetation types:

Type (g) taraire forest with frequent titoki, totara, kauri, and towai. Rewarewa, tawa, tanekaha and puriri are occasional.

(j) A canopy of totara is the main vegetation type in this area. Puriri, tanekaha, towai and kanuka/manuka are frequent. A range of occasional species occur including kahikatea, karaka, titoki, pukatea, rewarewa, kauri, nikau and ti kouka.

(k) Gorse occurs on the periphery.

The canopy of the small south-eastern remnant is not known.

Fauna

Not surveyed.

Significance

A cluster of largely secondary forest remnants concentrated in the lower catchment valleys of the Waihaupai Stream that contribute to water and soil protection in the catchment.

Representative site for type (a), (b), (c), (d) (e) and (f). Only record of type (a), (b), (c), (d), (e), (f) and (i) in the Ecological District.

MAUNGANUI BLUFF SCENIC RESERVE

Survey no.	O07/009
Survey date	3 October 1994
Grid reference	O07 612 054
Area	425.9 ha (2 remnants) (319.1 ha forest, 106.8 ha shrubland (coastal associations))[10] (This site was slightly adjusted from the original 1994 mapping to fit with 2002 aerial photography)
Altitude	0–459 m asl

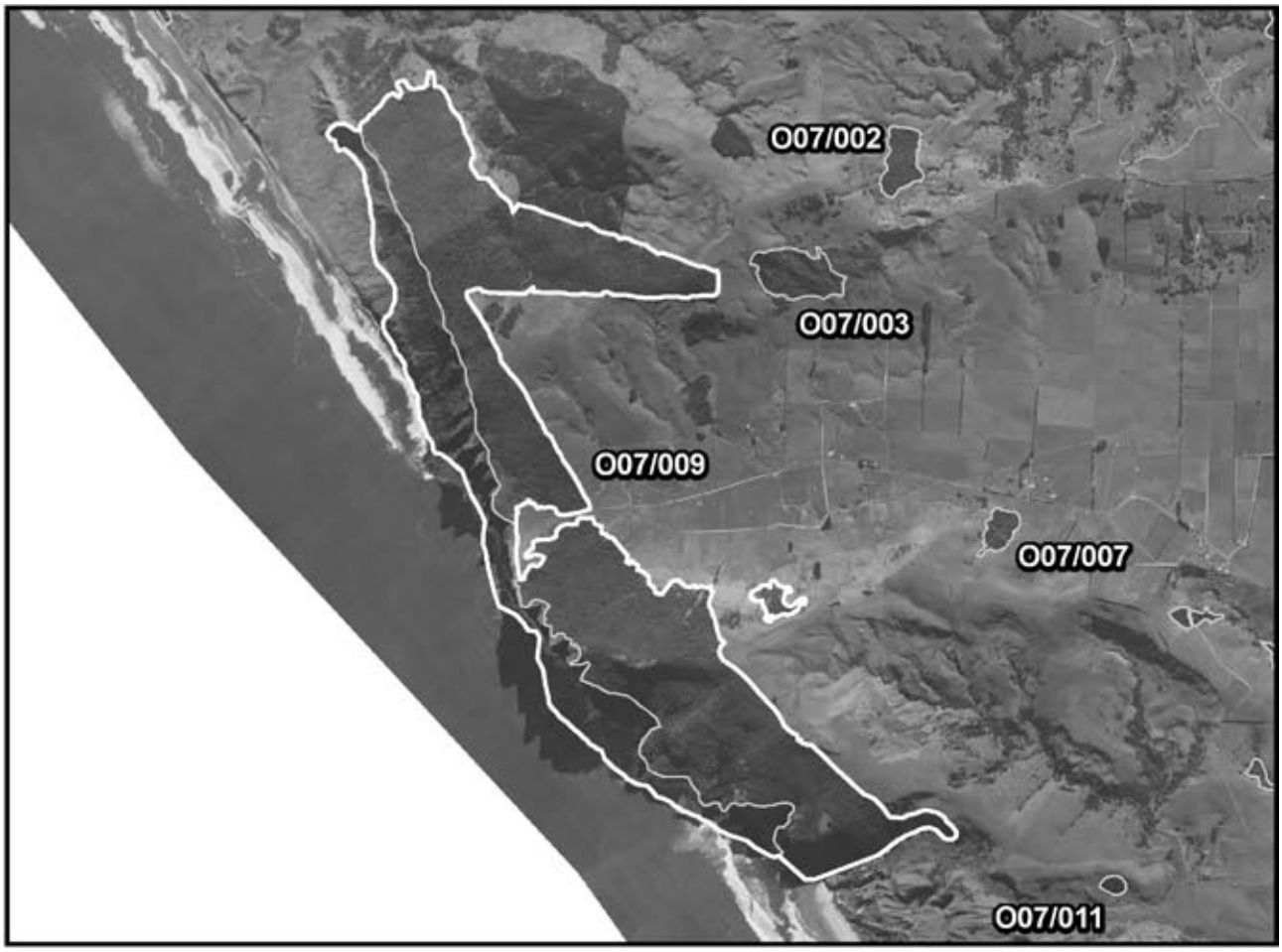
Ecological unit

(a) Taraire-nikau forest on coastal hillslope

(b) Taraire forest on coastal hillslope

(c) Pohutukawa forest on coastal hillslope

10 The shrubland category had to be used as coastal associations is not a broad category for mapping purposes in this report.

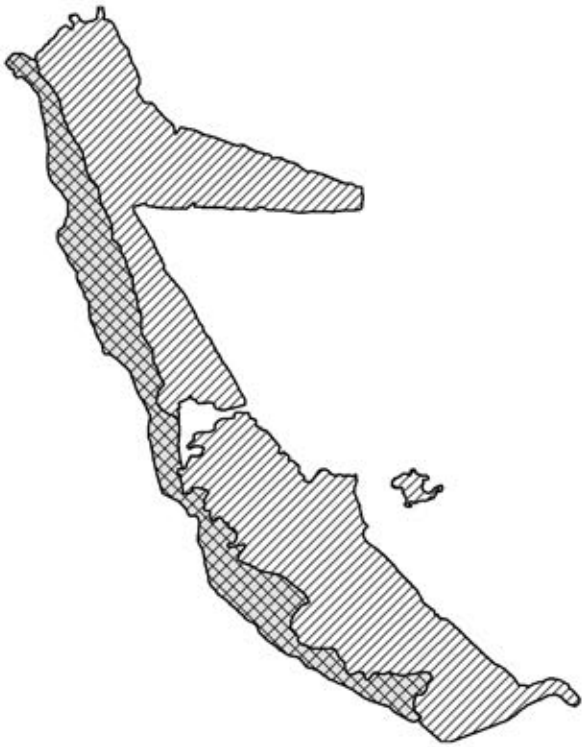


O07/009 Maunganui Bluff Scenic Reserve

0 1,000 2,000
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

(d) Kohekohe-pohutukawa-puriri-taraire forest on coastal hillslope

(e) Harakeke-toetoe association on steep coastal slopes

(f) Kowharawhara-*Astelia solandri* association on dry coastal rocky outcrops

(g) Kohekohe-mapou-*Olearia albida*-pohutukawa forest association on steep coastal cliff ledge

(h) *Astelia solandri-Chionochloa bromoides*–harakeke association on steep coastal cliff ledge

Landform / geology

Coastal bluffs, steeply sloping hillslopes, and talus deposits of Waipoua Subgroup basaltic lava flows.

Vegetation

(a) Abundant taraire with associated nikau occurs in inland forest areas with frequent houhere. Species recorded occasionally include tawa, hinau, rewarewa along with several emergent species, kahikatea, rimu, kauri, and miro.

Type (b) through to type (h) are largely derived from Esler and Dobbins 1977.

(b) Taraire is the main canopy species throughout the forested habitat. Kohekohe and karaka feature strongly in the canopy. Emergent rewarewa is obvious in several areas.

(c) Pohutukawa is dominant in more exposed sites. Puriri, kohekohe, karaka, ngaio, kowhai and *Coprosma macrocarpa* are present. This forest type occurs in the southern part of the habitat.

(d) In the northern part of the reserve, northwards of the 369 m trig, kohekohe, pohutukawa, puriri and taraire are dominant.

(e) Harakeke and toetoe are widespread on the coastal slopes. In the creeks and seepages giant umbrella sedge, *Macherina sinclairii* and kiokio also occur. The main shrubs present include rangiora, hangehange, titirangi, kawakawa, mingimingi, *Helichyrsum lanceolatum* and five-finger. Bracken is scattered throughout. Dwarfed pohutukawa, karaka, kohekohe and mapou can be found in depressions and on rocky outcrops.

(f) Kowharawhara and *Astelia solandri* are apparent on dry rocky outcrops.

(g) Kohekohe, mapou, *Olearia albida* and pohutukawa form a pocket of forest on a cliff ledge.

(h) Smaller ledges contain *Astelia solandri, Chionochloa bromoides* and harakeke.

Significant flora

Titirangi (Nationally Endangered), *Leptinella rotundata, Pomaderris phylicifolia* (both Nationally Vulnerable), *Brachyglottis kirkii* var. *kirkii* (Serious Decline), *Colensoa physaloides*, pingao, *Sonchus kirkii* and *Sophora fulvida* (all Gradual Decline). *Chionochloa bromoides* and *Coprosma neglecta* (both Range Restricted), kawaka and *Fuchsia procumbens* (both Sparse), and *Pimelea* (f) (Data Deficient).

Regionally significant species

Australina pusilla, *Calystegia tuguriorum*, *Collospermum microspermum*, *Coprosma parviflora*, *Hebe flavida*, *Helichrysum lanceolatum*, kaikomako, *Olearia albida, Metrosideros carminea*, *Myrsine divaricata* and *Rubus squarrosus*, *Scleranthus biflorus.*

Fauna

Birds

NI brown kiwi (Serious Decline), kukupa (Gradual Decline), NI fernbird (Sparse) morepork and common forest birds; 1978 record of NI tomtit (Regionally significant species).

Land snails

Kauri snail (Gradual Decline).

Punctidae sp. 5 and Punctidae sp. 21 (both Range Restricted), Punctidae sp. 4 (Data Deficient).

Significance

Maunganui Bluff Scenic Reserve is an outstanding, diverse coastal ecosystem and unique landform which ranks as the best west coast coastal forest in Northland and possibly Auckland (P. J. Anderson and L. J. Forester pers. comm.). The Reserve has high biodiversity values supporting many threatened species including kiwi and kauri snail which have both been recorded as being in high numbers, three site endemic Land snails and 13 threatened and 12 regionally significant plants including the nationally endangered titirangi which only occurs in this Ecological District in Northland. Maunganui Bluff is also the only recorded west coast site for *Chionochloa bromoides*.

Representative site for all 8 ecological units, 6 of which are unrecorded elsewhere in the District, type (a), (d), (e), (f), (g) and (h).

Most of this site, 411.2 ha (96.6%) is public conservation land currently administered by the Department of Conservation. Ownership of the protected area of this site is being transferred to Te Iwi O Te Roroa on completion of their Treaty settlement agreement.

ARANGA BEACH FOREST REMNANT

Survey no. O07/011

Survey date 27 October 1994

Grid reference O07 642 033

Area 1.3 ha

Altitude 20–80 m asl

Ecological unit

Taraire forest on gentle hillslope

Landform / geology

Hillslope on Waipoua Subgroup basaltic lava flows.

Vegetation

A very small remnant comprising abundant taraire with frequent karaka. Puriri, ti kouka and *Astelia* sp. are present.

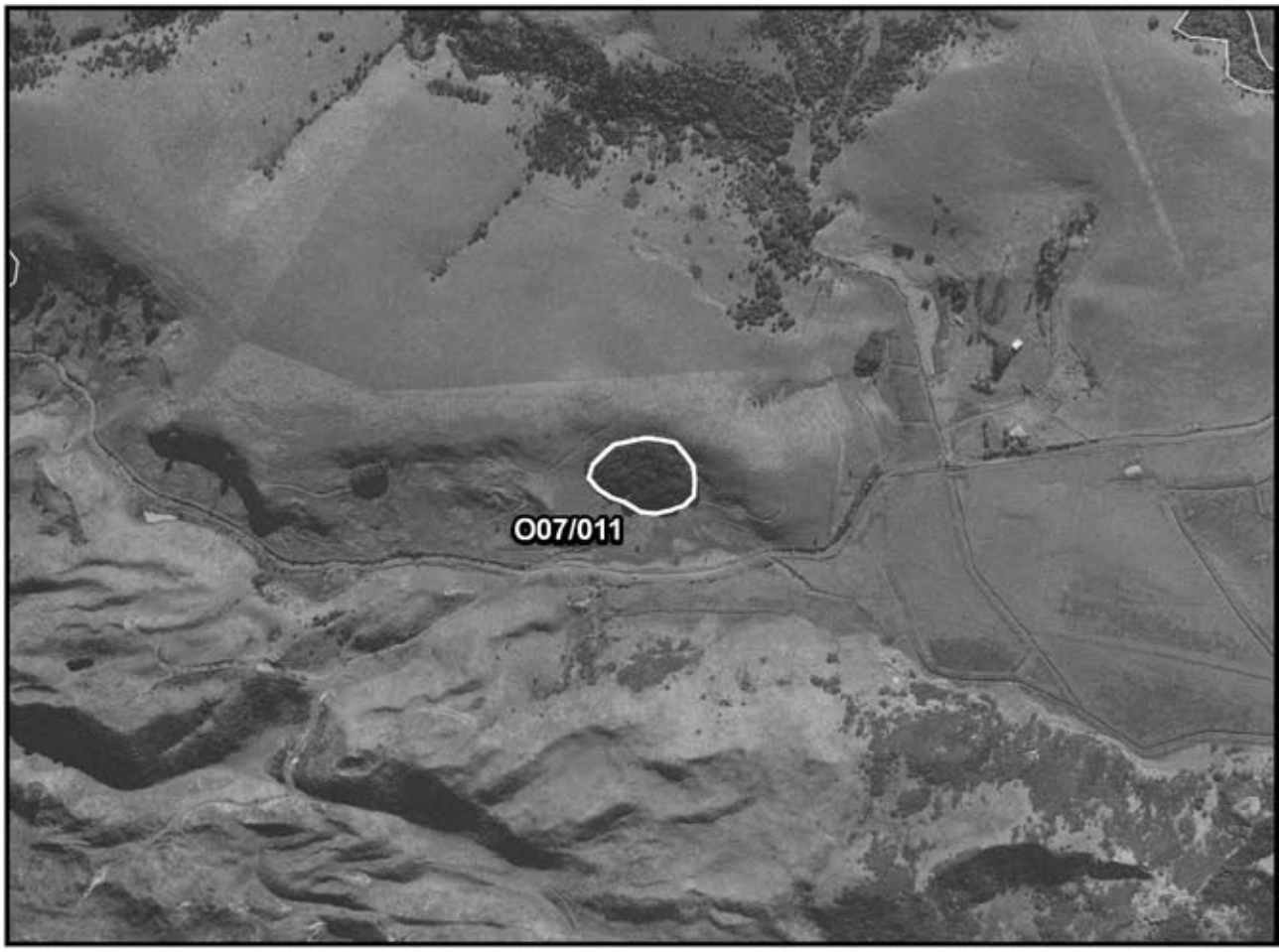
Fauna

Not surveyed.

Significance

A broadleaf remnant in close proximity to the coast just south-east of Maunganui Bluff.

Even though this site is small it remains a Level 1 site because of the paucity of such remnants in the surrounding area.



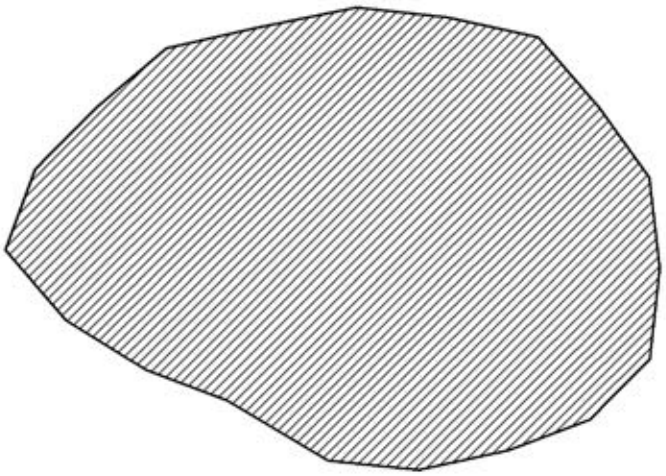
O07/011 Aranga Beach Forest Remnant

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

KAIKOHE ROAD FOREST REMNANT

Survey no.	P06/041
Survey date	2 November 1994
Grid reference	P06 700 146
Area	45.2 ha (3 remnants) (This site was slightly adjusted from the original 1994 mapping to fit with 2002 aerial photography)
Altitude	<400–480 m asl

Ecological unit

(a) Towai forest on hillslope (90%)

(b) Kahikatea forest on hillslope (5%)

(c) Kotukutuku-wheki-wineberry shrubland on hillslope (<1%)

Landform / geology

Dissected hillside in deeply weathered Waipoua Subgroup basaltic lava flows.

Vegetation

(a) Towai forest is the dominant vegetation type.

(i) In the east, abundant towai occurs with frequent tawa and occasional emergent northern rata, tawari, rewarewa, miro and pukatea.

(ii) Towai (cutover) also forms a common canopy cover with frequent kahikatea and rewarewa. Many species are occasional including maire tawake, miro, rimu, *Nestegis montana*, taraire, totara and lancewood.

(b) In the west a small area of abundant kahikatea is presentx. Rimu is frequent and maire tawake and towai are occasional.

Type (a), towai forest occurs in the west with frequent kahikatea. Maire tawake, hinau, miro, wineberry and pukatea are all occasional.

(c) In a very small area (<1%), kotukutuku, wheki and wineberry are co-dominant.

Significant flora

Raukawa (Gradual Decline) was reported at the time of this survey as being common throughout.

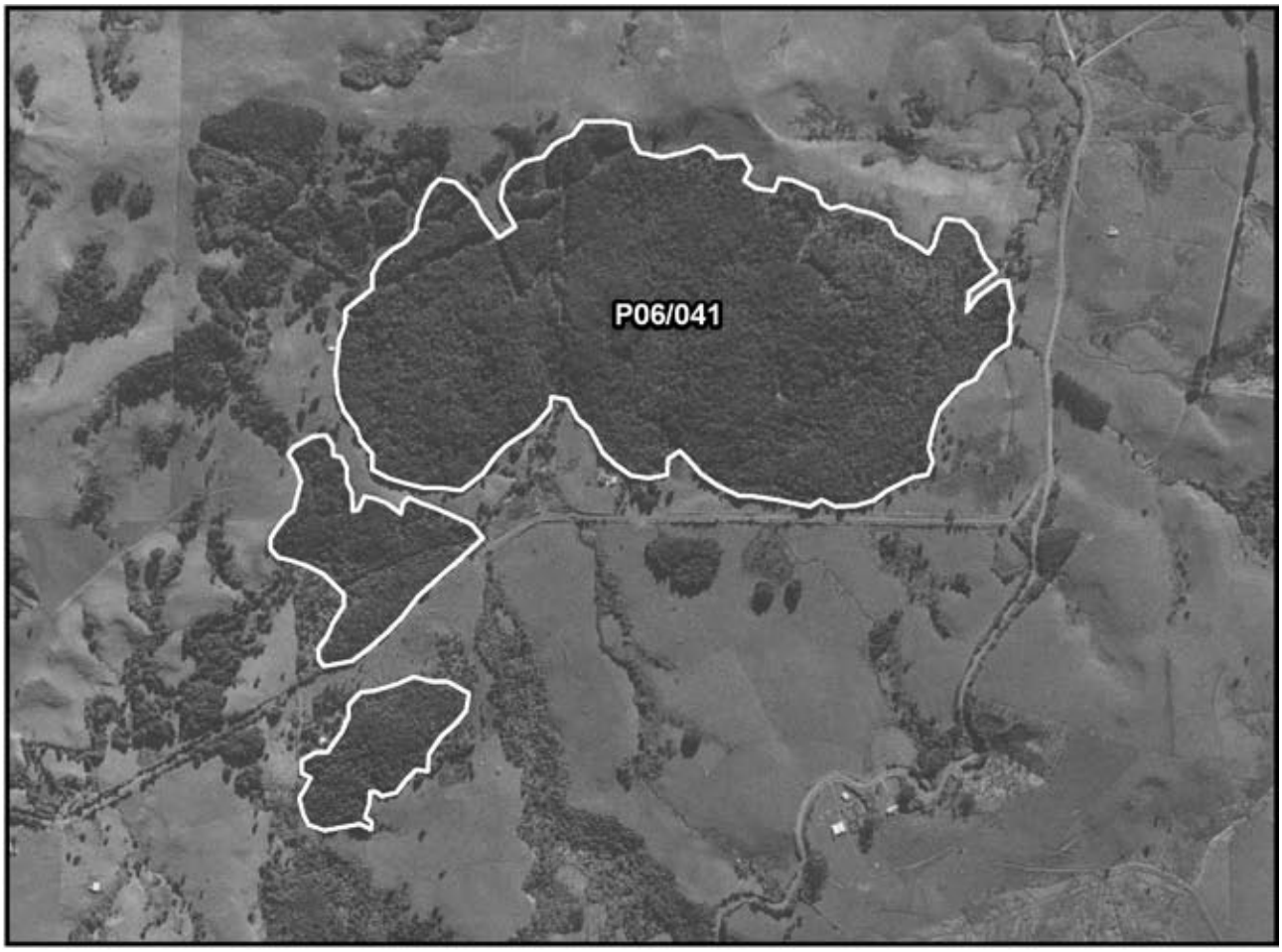
Fauna

Not surveyed.

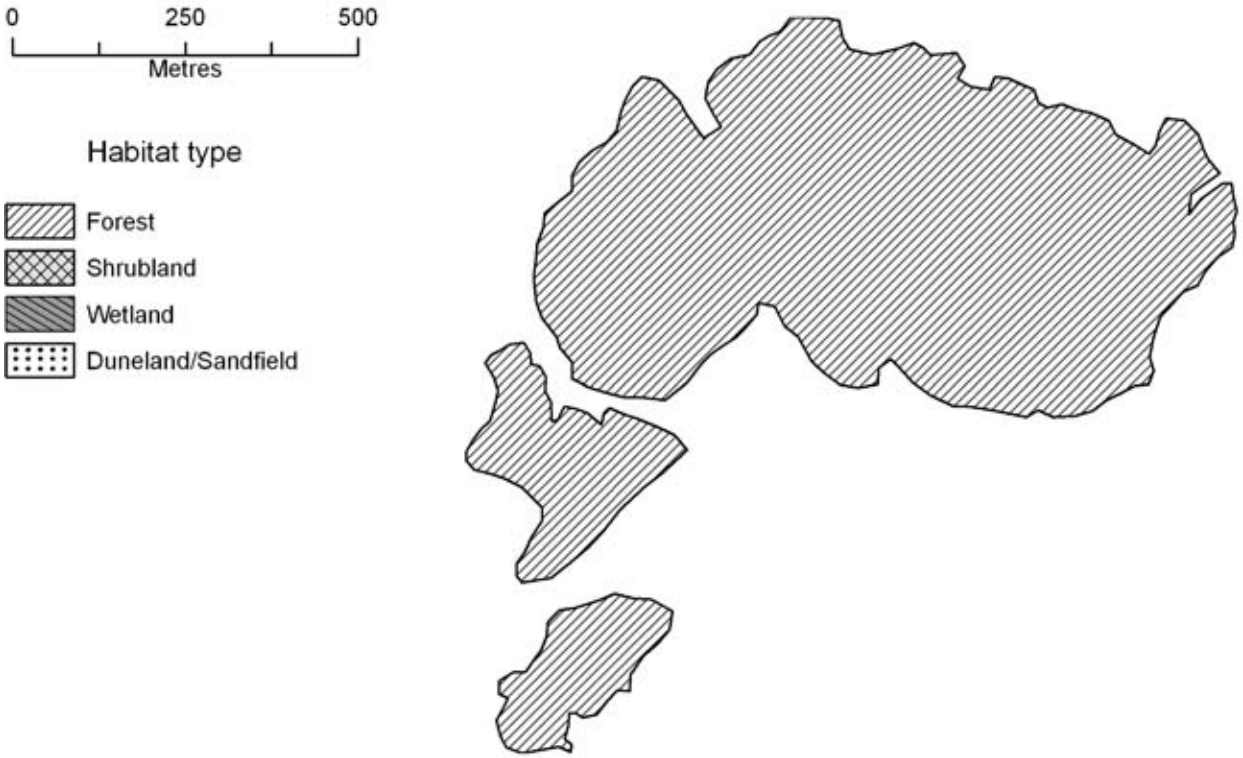
Significance

Providing corridor linkage between the Waipoua/Mataraua/Waima Forest tract in the west and the Marlborough Forest to the east.

Representative site for all three ecological units with type (c) kotukutuku-wheki-wineberry shrubland unrecorded elsewhere in the District.



P06/041 Kaikohe Road Forest Remnant



Aerial photography flown 2002

MARLBOROUGH FOREST

Survey no.	P06/042
Survey date	3 August 1994 Additional information also obtained from NZ Forest Service 1986; Nicholls 1976
Grid reference	P06 773 153
Area	5,985.4 ha (forest and 4 outliers) (5,675.9 ha forest, 303.7 ha shrubland) (Small changes were made to this site from the 1994 mapping to fit the 1999, 2002 and 2006 aerial photography)
Altitude	183–640 m asl

Ecological unit

(a) Towai-taraire forest on moderate hillslope

(b) Kanuka/manuka-towai shrubland on moderate hillslope

(c) Taraire-tawa forest on moderate hillslope

(d) Towai forest on moderate hillslope and high altitude plateau

(e) Tawa-tawari-towai forest on hillslope

(f) Kohekohe-taraire-tawa-towai forest on hillslope

Landform / geology

Dissected plateau of Waipoua Subgroup basaltic lava flows underlain in the northeast by Tangihua Complex igneous rocks.

Vegetation

The following vegetation descriptions refer to the north-eastern arm of the forest.

(a) Abundant towai with common taraire (cutover). Emergent northern rata and rewarewa are frequent. Miro, pukatea, puka and tawa are occasional.

(b) In the shrubland area south of this kanuka/manuka and towai are common with frequent rewarewa. Kauri, kohuhu and ti kouka are also present.

Type (a), which is co-dominant occur in the forested area south of this with frequent emergent miro and tawa. Several species occur occasionally including emergent rimu, northern rata and kauri, rewarewa, pukatea and mamaku.

(c) Taraire and tawa are common with frequent towai and miro. Emergent kauri, pukatea and epiphytic puka are occasional.

Type (d) through to type (f) are from *A Revised Classification of the North Island Indigenous Forest* by J. Nicholls (1976).

Marlborough Forest contains the northern part of the Tutamoe Range which is a gently sloping tableland at around 600 m asl.

The plateau vegetation is characterised by type (d), abundant towai forest with occasional emergent rimu, miro, and northern rata, hinau, rewarewa, pukatea, maire tawake and tawari.

Above 450 m asl type (e), tawa, tawari and towai occur with occasional hinau and rewarewa and emergent rimu, miro, and northern rata.

Between 300–450 m asl type (f), kohekohe, taraire, tawa and towai occur within the canopy with occasional hinau, rewarewa and pukatea and emergent rimu, miro and northern rata.

General vegetation description of Marlborough Forest from the *Northland Forest Park Management Plan* (draft only) (New Zealand Forest Service 1986).

"*The central part of the southern block is unmodified hardwood/ podocarp forest with emergent rimu and northern rata over Hall's totara, towai, hinau, maire tawake, white maire, kohekohe, kawaka, makamaka and rewarewa. In places, there are dense swards of kiekie and toikiwi, and tangles of supplejack in the undergrowth*."

"*The western side of the forest has been burnt and has patches of almost pure large pole towai on the ridges. Saplings of rimu, miro, kahikatea and totara are scattered throughout. Areas to the south and east have modified hardwood/podocarp type after logging*."

Significant Flora

Pittosporum kirkii (Serious Decline), willow-leaved maire and raukawa (both Gradual Decline), *Hymenophyllum atrovirens*, *Trichomanes strictum,* kawaka and monoao (all Sparse), *Nematoceras rivulare* (Data Deficient).

Regionally significant species include:

Anaphalioides trinervis, *Astelia nervosa*, *Blechnum fluviatile*, *Brachyglottis kirkii* var. *angustoir*, *Collespermum microspermum*, *Coprosma rotundifolia, Cyathea cunninghamii, Dicksonia lanata*, *Grammitis billardierei*, *Griselinia littoralis*, *Helichrysum lanceolatum*, horopito, *Hymenophyllum armstrongii*, *H. nigrum*, *Hypolepis rufobarbata, Loxsoma cunninghamii*, *Metrosideros carminea,* pokaka, *Raukaua anomalus*, tawari, *Uncinia distans* and *Urtica incisa.*

Fauna

Birds: NI brown kiwi, (reported) (Serious Decline), kukupa (Gradual Decline), NI kaka, 1983 survey (Nationally Endangered), NI fernbird (Sparse), NI tomtit (Regionally significant species), and common forest birds. NI kokako (Nationally Endangered) "escaped" from Trounson Kauri Park and were traced to Marlborough Forest. Historically black petrels were recorded nesting on the western flanks of this forest (P. J. Anderson pers. comm.).

Land snails

Kauri snail (Gradual Decline).

Significance

Marlborough Forest contains areas of mature modified kauri and broadleaf-podocarp forest (as a result of fires and logging) as well as unmodified broadleaf-podocarp forest. This forest is one of the best examples of northern upland plateau west coast forest in Northland. Marlborough Forest is situated between the large forest tract of Waipoua/Mataraua/Waima to the north-west and Kaihu Forest directly to the south and supports threatened and regionally significant species.

The forest is particularly important for kiwi and many Trounson subadult birds disperse to this site. High densities of kiwi occur east to Hokonui Road (Pierce 2004) where predators are being controlled by Carter Halt Harvey Forests (R. J. Pierce pers. comm.).

Representative site for all 7 ecological units. Sole record of five types in the Ecological District, type (a), (b), (d), (f) and (g).

Public conservation land of 4,022.7 ha or 67.2% of Marlborough Forest is protected by Conservation Park and is administered by the Department of Conservation.

KAIHU FOREST

Survey no.	P07/001
Survey date	22 August 1994 Additional information obtained from Forester and Cummings 1984
Grid reference	P07 781 029
Area	5,262.4 ha (forest and 2 outliers) (5,155.7 ha forest, 106.7 ha shrubland) (This site was slightly adjusted from the 1994 survey to fit with the 2002 aerial photography)
Altitude	40–770 m asl

Ecological unit

(a) Kanuka/manuka-towai forest on hillslope

(b) Kanuka/manuka-totara forest on hillslope

(c) Totara-kahikatea forest on hillslope

(d) Taraire forest on hillslope

(e) Towai forest on moderate hillslope

(f) Kiekie-supplejack-towai forest on high altitude plateau

(g) Makamaka-tawa forest on steep hillslope

(h) Northern rata-rimu-taraire-tawa forest on steep hillslope

(i) Tawa-towai forest on steep hillslope

(j) Kanuka/manuka forest on hillslope

(k) Kauri-northern rata-tawa-towai forest on hillslope

(l) Kauri-rimu-tawa-tawari forest on hillslope

Landform / geology

Dissected plateau of Waipoua Subgroup basaltic lava flows underlain by Tangihua Complex igneous rocks and Mangakahia Complex mudstone and sandstone.

Vegetation

(a) Abundant kanuka/manuka and towai occur with frequent rewarewa in the east of the site.

(b) Abundant kanuka/manuka also occurs in this area but is associated with totara and occasional tanekaha.

(c) Totara is abundant with common kahikatea and frequent rewarewa.

(d) Taraire forest is common with frequent rewarewa and nikau. Occasional species include matai, miro and tawa.

(e) The separate remnant in the south comprises abundant towai with occasional rewarewa, kahikatea and *Pinus radiata*.

The following vegetation descriptions are derived from a report on the Kaihu Ecological Area by Forester and Cummings (1984).

Plateau Vegetation

(f) The plateau in the middle of the Kaihu Forest is swampy comprised of kiekie, supplejack and towai with maire tawake and emergent rimu (up to 30m) frequent in the canopy. Occasional species include kahikatea, northern rata and pukatea, which are all emergent and pukatea, tawheowheo, tawari and southern rata.

Other forest types

(g) Makamaka and tawa occur in a band adjacent to the plateau area on the steep upperslopes of the north east lying hillslope. Five-finger, wineberry, tawheowheo, pate, hinau, maire tawake and southern rata are occasional.

(h) Emergent northern rata and rimu over a canopy of taraire, tawa, miro and makamaka occur downslope from type (g) along the north-east and southern slopes. Towai, toru, mamaku, rewarewa, northern rata and kohekohe are occasional.

(i) Tawa and towai forest occur on the steep upper, south facing slopes adjacent to the plateau. Occasional emergent northern rata and rimu occur, with tawari and makamaka occasional in the canopy.

(j) Regenerating kanuka/manuka forest occurs in the south-east while towai, Halls totara, ponga and kahikatea are frequent in the canopy. Lancewood, mingimingi, rewarewa, tanekaha, putaputaweta and mapou are occasional. Kahikatea and rewarewa are occasional emergents.

Kauri are only found in small isolated groups, the following forest types have been recorded in the Kaihu Ecological Area.

(k) To the east of Tutamoe Trig emergent kauri and northern rata occurs over a canopy of tawa and towai. Tanekaha and kawaka are occasionally emergent and pigeonwood also occurs in the canopy.

(l) Emergent kauri over a canopy of rimu, tawa and tawari occur northwest of Tutamoe trig. Hall's totara and kauri are occasional in the canopy. It is commented that this probably the highest stand of kauri (640m asl) in Northland (J. Nicholls pers. comm. sighted in Forester and Cummings 1984).

Significant flora

Kirks daisy, *Pittosporum kirkii* (Nationally Vulnerable), willow-leaved maire and raukawa (all Gradual Decline), *Hymenophyllum atrovirens*, *Trichomanes strictum* and kawaka (all Sparse), *Nematoceras rivulare* (Data Deficient).

Historical record of *Rorippa divaricata* (Endangered) recorded by T. F. Cheesman in 1875.

Regionally significant species

Astelia nervosa, hutu, *Blechnum colensoi, Blechnum fluviatile*, creeping clubmoss, *Brachyglottis kirkii* var. *angustoir*, *Collespermum microspermum, Dicksonia lanata*, *Dracophyllum traversii, Grammitis billardierei*, *Griselinia littoralis*, horopito, *Hymenophyllum armstrongii*, *H. lyallii, H. nigrum*, *Isopterygium limatum*, mairehau, mountain horopito, pokaka, *Raukaua anomalus*, southern rata, tawari, toatoa, *Urtica incisa, Viola filicaulis,* whatariki and *Zoopsis nitida*.

Fauna

NI kaka (Nationally Endangered) (heard within the forest in 1999), NI brown kiwi (Serious Decline), kukupa (Gradual Decline), kauri snail (Gradual Decline), NI tomtit (Regionally significant species) and common forest birds.

Significance

Kaihu Forest is one of the best examples of northern upland plateau west coast forest in Northland (P. J. Anderson and L. J Forester pers. comm.) The forest and associated shrubland areas are defined by a steep-sided swampy plateau containing the second highest point in Northland, the Tutamoe summit (770 m asl). The forest displays a large floral diversity including unmodifed kauri which includes possibly the highest altitude stand (640 m asl) of kauri in Northland (pers. comm. J. Nicholls, sighted in Forester and Cummings 1984). The largest kauri ever recorded, Kairaru, occurred south-east of Mt Tutamoe however this tree was burnt during the fires of the late 1800s. Logging was confined to the southeastern portion of the Kaihu Forest (Forester and Cummings 1984).

The forest supports several threatened and regionally significant flora and fauna species. NI brown kiwi are present in moderately high densities in the upper Waingarara Stream catchment (Whatoro) (Pierce 2004).

Representative site for all 10 ecological units. Sole record of (b), (f) and (g) and one of two records of (a), (c), (h) and (i) in the Ecological District.

Public conservation land of 2,385 ha (45.3%) protects Kaihu Forest as

Conservation Park which also has the additional protection of Ecological Area. In addition a small area, 2.3 ha, of Stewardship Land also occurs within this site. Both areas are administered by the Department of Conservation.

KAIHU BUSH REMNANT

Survey no. P07/003

Survey date 1 September 1994

Grid reference P07 729 027

Area 23.6 ha

Altitude 160–280 m asl

Ecological unit

(a) Taraire forest on steep hillslope (90%)

(b) Totara forest on steep hillslope (5%)

(c) Mahoe-totara forest on steep hillslope (5%)

Landform / geology

Escarpment of Waipoua Subgroup basaltic lava flows.

Vegetation

(a) Abundant cutover taraire with frequent puriri and tawa. Karaka, rewarewa, totara, kohekohe and nikau are occasional.

(b) Secondary totara occurs with frequent tawa and kowhai. Occasional species include kohekohe, karaka and nikau.

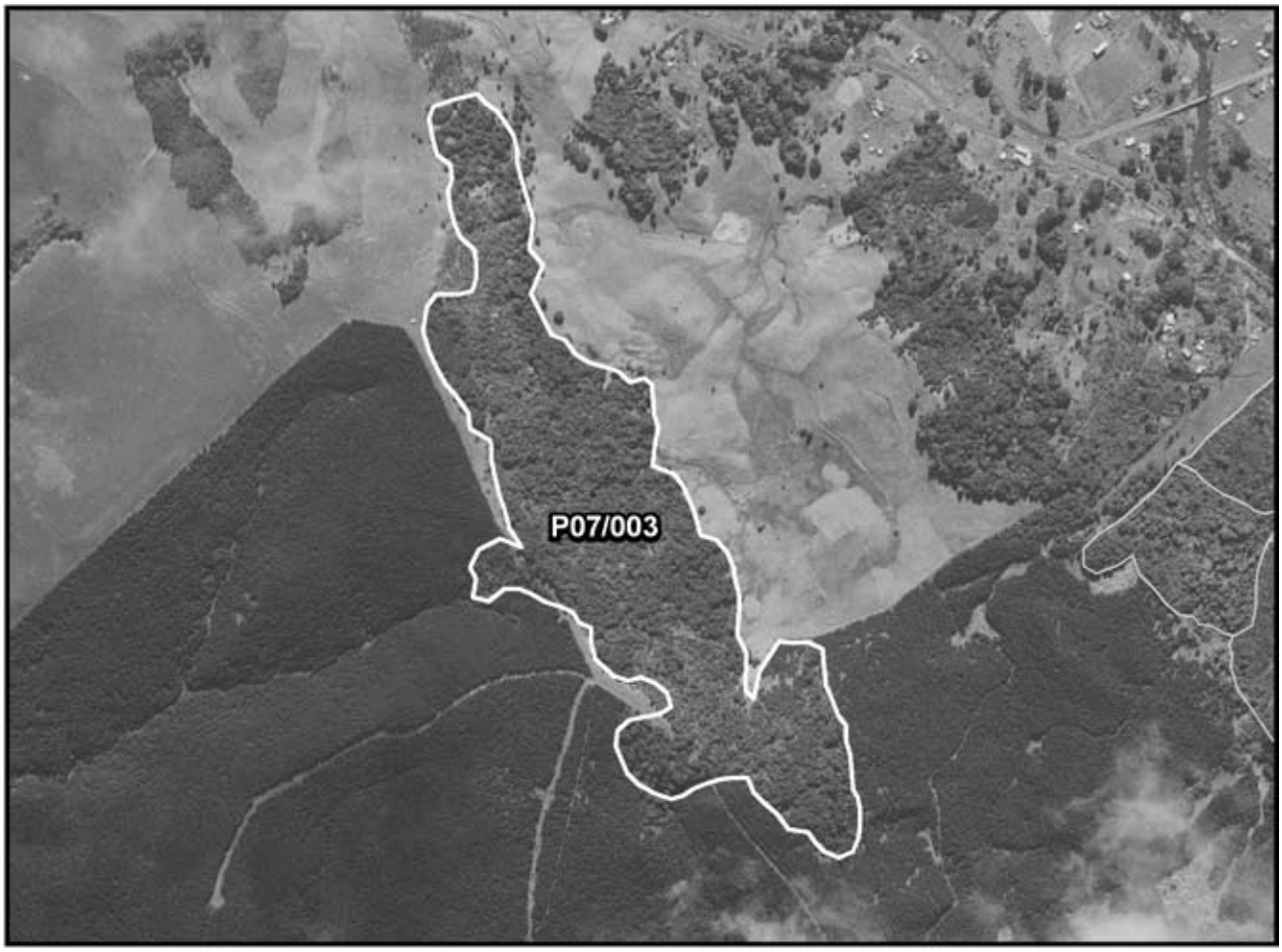
(c) Co-dominant mahoe and totara occurs in the remaining area. Karaka, kohekohe and titoki are frequent while nikau is occasional.

Fauna

Not surveyed.

Significance

Representative site for all three ecological units and type (c) is unrecorded elsewhere in the Ecological District.



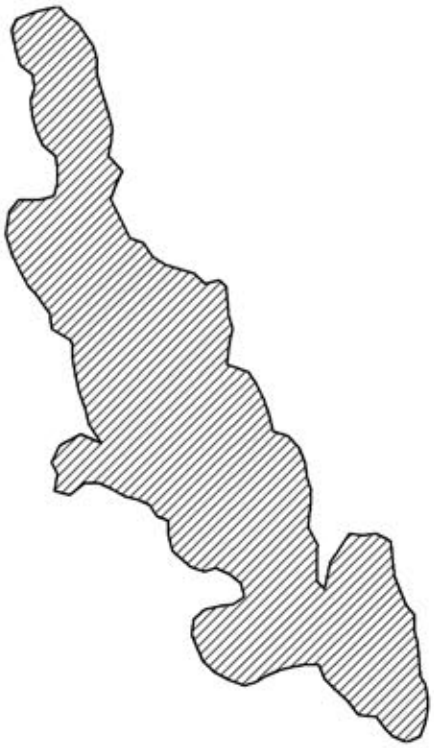
P07/003 Kaihu Bush Remnant

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

WAINGARARA STREAM BUSH

Survey no.	P07/004
Survey date	1 September 1994
Grid reference	P07 728 051
Area	31.5 ha (This site boundary was adjusted from the original 1994 mapping to fit 2002 aerial photography)
Altitude	c. 100–180 m asl

Ecological unit

(a) Kahikatea forest on hillslope (40%)

(b) Towai forest on moderate hillslope (50%)

(c) Mamangi-totara forest on moderate hillslope (10%)

Landform / geology

Hillslopes of Mangakahia Complex mudstone and sandstone.

Vegetation

(a) Secondary kahikatea forest with occasional rewarewa, kauri, pukatea and totara.

(b) Half of the site is secondary towai forest, which is common with frequent taraire, kahikatea, tawa and rewarewa. Other species present include emergent northern rata, rimu, pukatea, karaka and nikau.

(c) Common mamangi and totara occurs in the remaining area. Frequent species include mapou, nikau, mamaku and towai. Karaka is occasional.

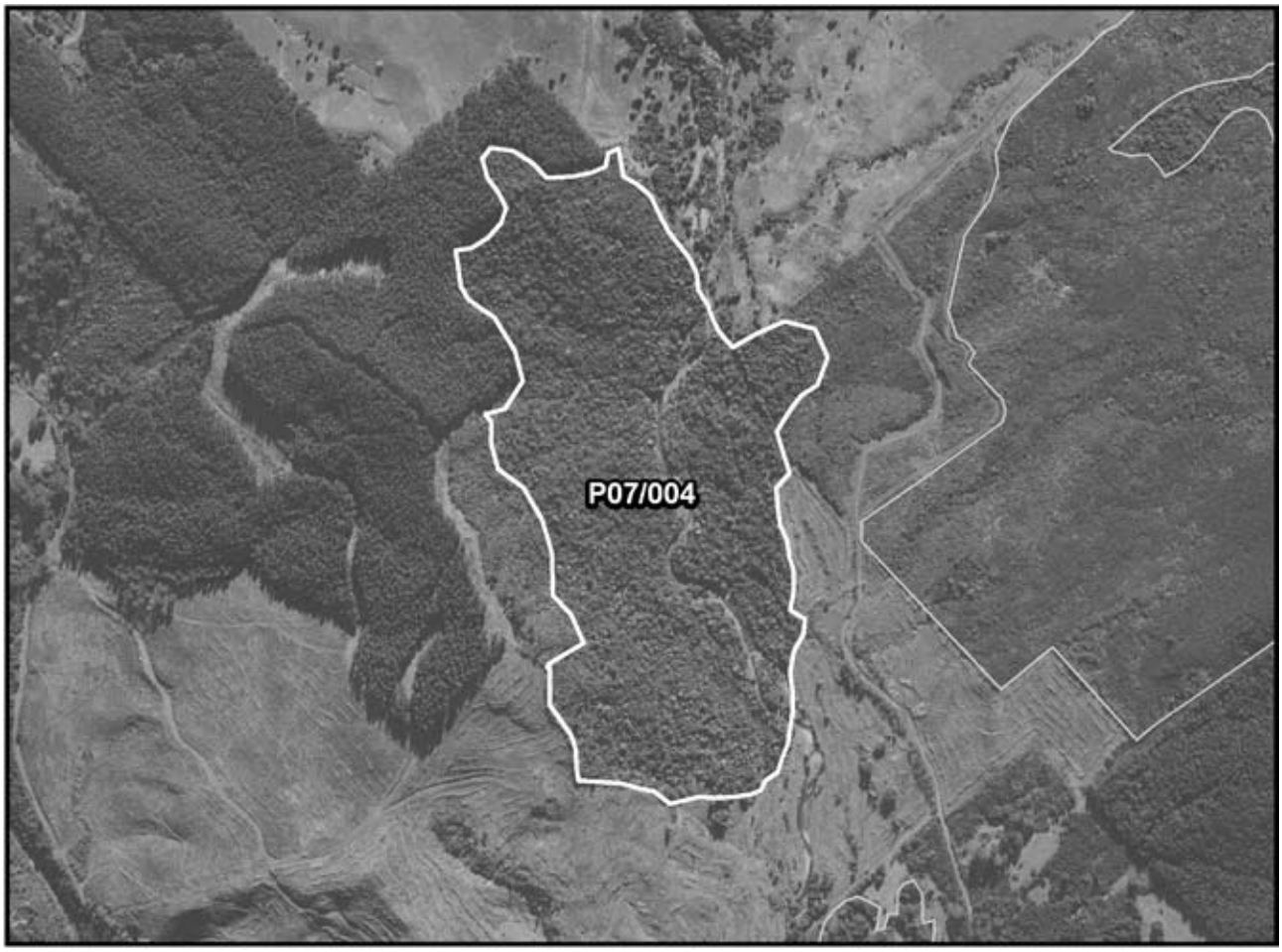
Fauna

Not surveyed.

Significance

A sizeable remnant within close proximity to the Kaihu Forest that provide important corridors for species like kiwi.

Representative site for type (a) and type (c) and only record of type (c) in the Ecological District.

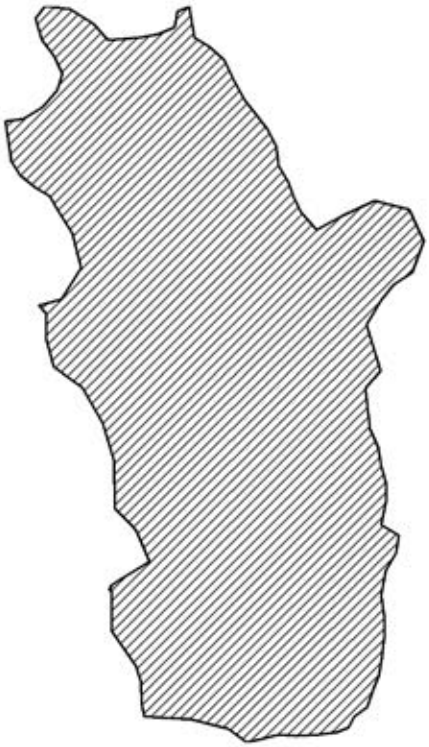


P07/004 Waingarara Stream Bush

0 250 500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

TUTAMOE MAIRE TAWAKE FOREST REMNANT

Survey no.	P07/006
Survey date	19 August 1994
Grid reference	P07 783 089
Area	0.6 ha (This site was adjusted from the original 1994 survey to fit 2002 aerial photography)
Altitude	400 m asl

Ecological unit

Maire tawake swamp forest on alluvium

Landform / geology

Gully in deeply weathered Tangihua Complex igneous rocks.

Vegetation

Abundant maire tawake forest with occasional makamaka, kahikatea, pukatea and towai.

Fauna

Not surveyed.

Significance

Swamp forest is a rare forest type within this Ecological District and throughout Northland. This remnant is close to Kaihu Forest and can provide important corridor habitat for species such as kiwi.

Although very small this site is representative for maire tawake swamp forest with this forest type recorded only twice in the Ecological District; the other occurring within Marlborough Road Forest (O06/029).

4.2 LEVEL 2 SITES

TABLE D. LIST OF LEVEL 2 SITES

SITE NAME	SURVEY NO.	GRID REF.
Access Road Bush	O07/007	O07 635 054
Ngakiriparauri Stream Hillslope Remnant	O07/013	O07 698 011
Montieth South Road Shrubland	P07/002	P07 715 021
Baker Road Forest	P07/005	P07 731 043
State Highway 12 Forest Remnant	P07/026	P07 739 027

ACCESS ROAD BUSH

Survey no. O07/007

Survey date 3 October 1994

Grid reference O07 635 054

Area 3.9 ha

Altitude <180–220 m asl

Ecological unit

Taraire-totara forest on hillslope

Landform / geology

Gently sloping stream valley in deeply weathered Waipoua Subgroup basaltic lava flows.

Vegetation

Cutover secondary taraire and totara remnant with frequent kahikatea and puriri. Occasional species include kauri, pukatea, rewarewa, rimu and nikau.

Fauna

Not surveyed.

Significance

A small remnant providing corridor linkage between large forest habitats.

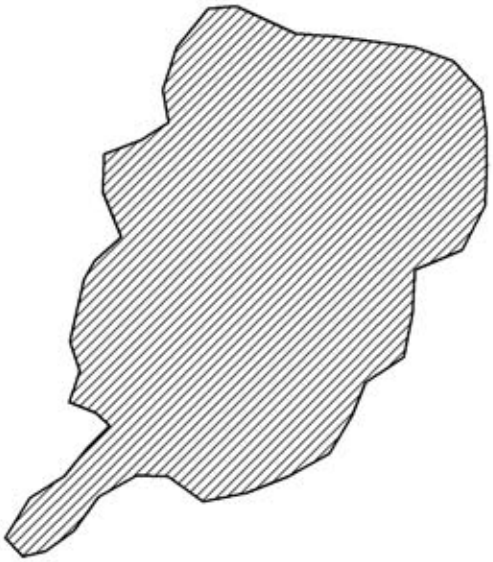
O07/007 Access Road Bush

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

NGAKIRIPARAURI STREAM HILLSLOPE REMNANT

Survey no.	O07/013
Survey date	Not surveyed
Grid reference	O07 698 011
Area	20.6 ha (19 ha forest, 1.6 ha shrubland)
Altitude	20–180 m asl

Ecological unit

Forest on hillslope

Landform / geology

Steep gullies and hillslopes on weathered basaltic lava flows of the Lower Miocene Waipoua Basalt.

Vegetation

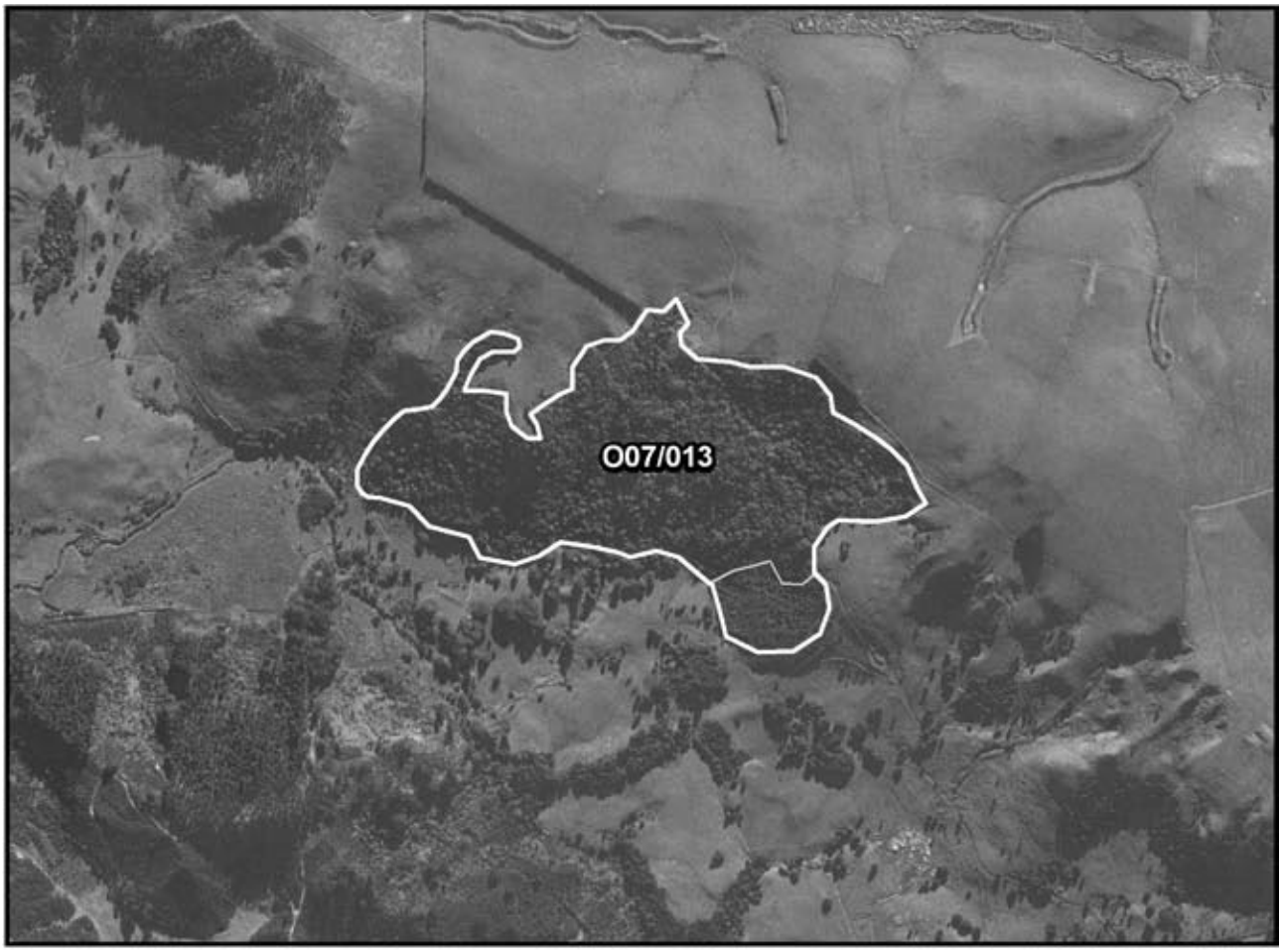
Small broadleaf-podocarp forest possibly with some kauri.

Fauna

Not surveyed.

Significance

A small remnant the hillslopes above Ngakiriparauri Stream which had not been PNAP surveyed. However it is an SSBI site (O07/H006), albeit from 1978, and the 2002 aerial photography clearly shows this remnant still exists and so it has been included but remains a Level 2 site until further survey work provides a more accurate assessment.

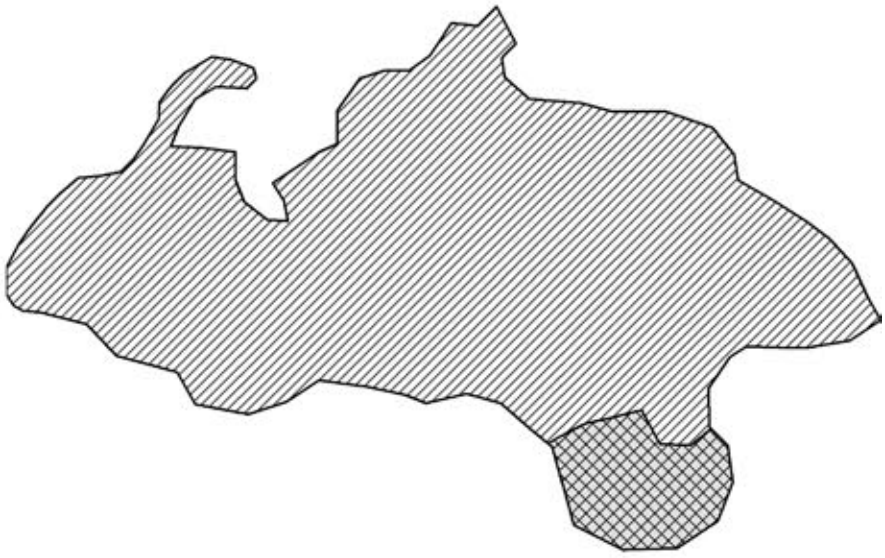


O07/013 Ngaikiriparauri Stream Hillslope Remnant

0 250 500
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

MONTEITH SOUTH ROAD SHRUBLAND

Survey no.	P07/002
Survey date	1 September 1994
Grid reference	P07 715 021
Area	32.5 ha (31.1 ha shrubland, 1.4 ha wetland) (The 2002 aerial photography shows that this site has changed significantly from the original 1994 mapping which mapped the site at 91.5 ha)
Altitude	100–200 m asl

Ecological unit

(a) Kanuka/manuka shrubland on moderate hillslope (99%)

(b) Open water

(c) *Eleocharis sphacelata-Baumea* sp. reedland on alluvium

Landform / geology

Valley in deeply weathered Waipoua Subgroup basaltic lava flows.

Vegetation

(a) This site is almost entirely kanuka/manuka shrubland (99%). Towai is frequent while kohuhu, mamaku, ti kouka, and *Pinus radiata* are occasional.

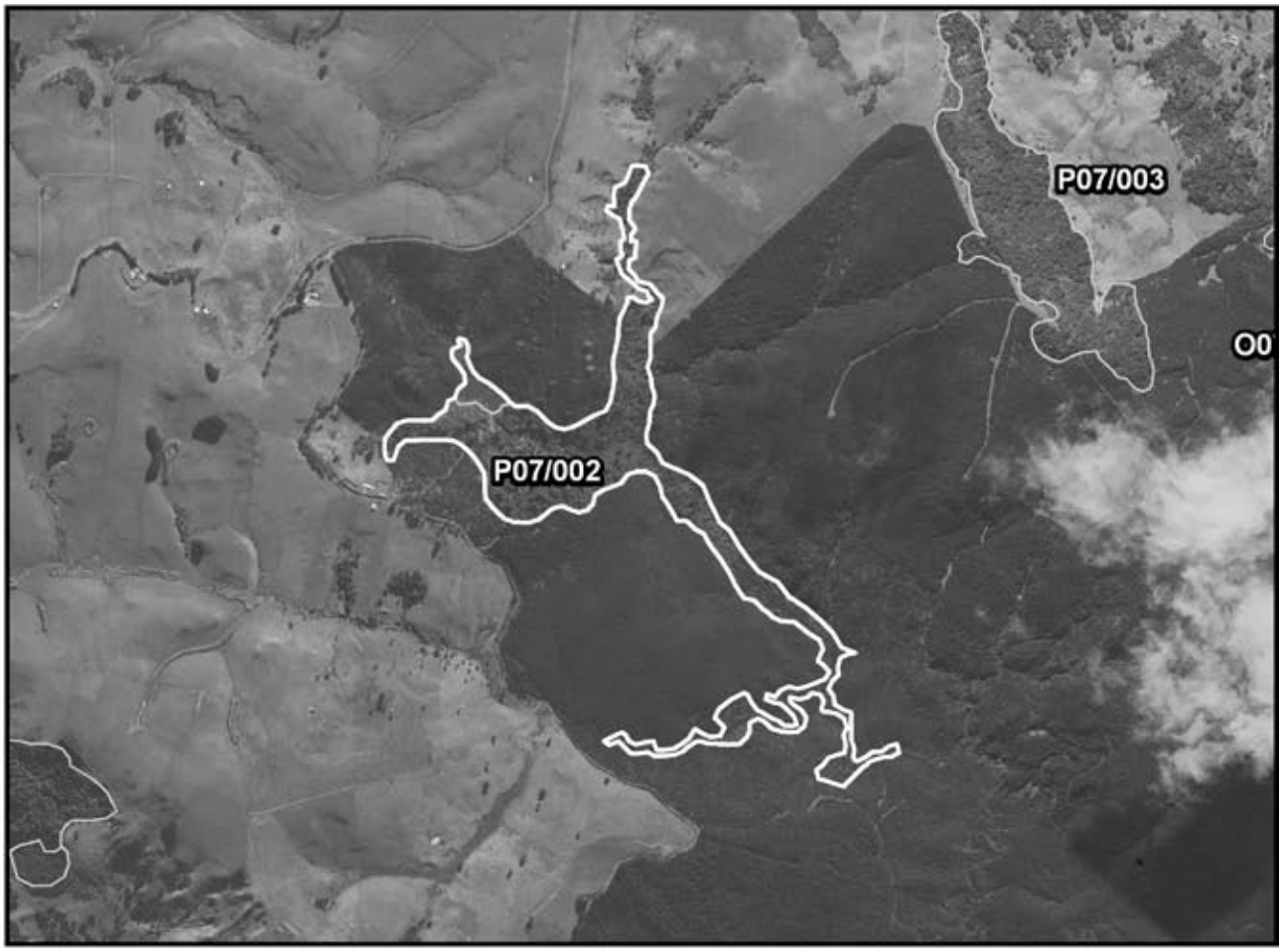
(b) A pond in the north-west contains abundant *Eleocharis sphacelata* with *Baumea* sp., type (c) on the pond edges.

Fauna

Not surveyed.

Significance

This site is much reduced in size from the original 1994 survey, and until the full significance of this site is known it remains a Level 2.

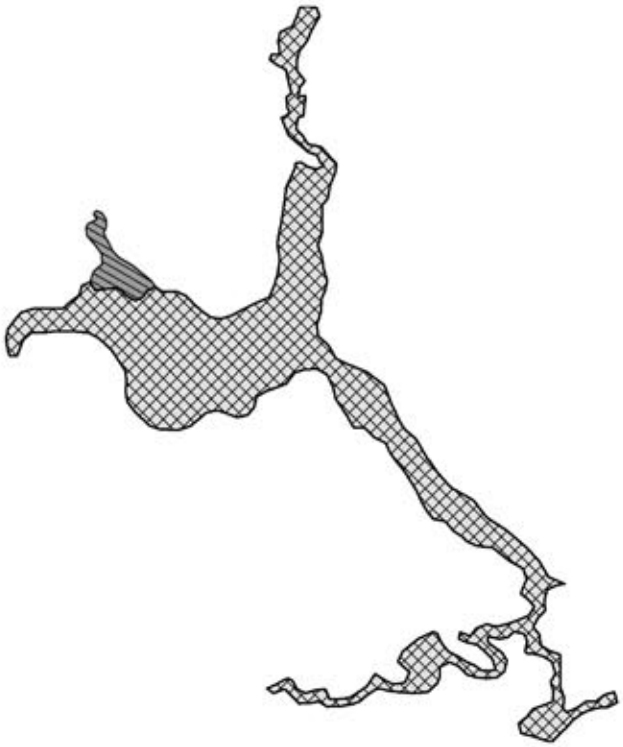


P07/002 Montieth South Road Shrubland

0 500 1,000
Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

BAKER ROAD FOREST

Survey no.	P07/005
Survey date	27 September 1994
Grid reference	P07 731 043
Area	5.4 ha (This site has significantly reduced in extent, almost by half, from the original 1994 mapping (10.4 ha) compared to the 2002 aerial photography. In 1994 a linear piece of forest was mapped moving west from the remnant presented here along the Kaihu River)
Altitude	<60 m asl

Ecological unit

(a) Kahikatea-totara riverine forest on alluvium

Landform / geology

Holocene alluvial deposits.

Vegetation

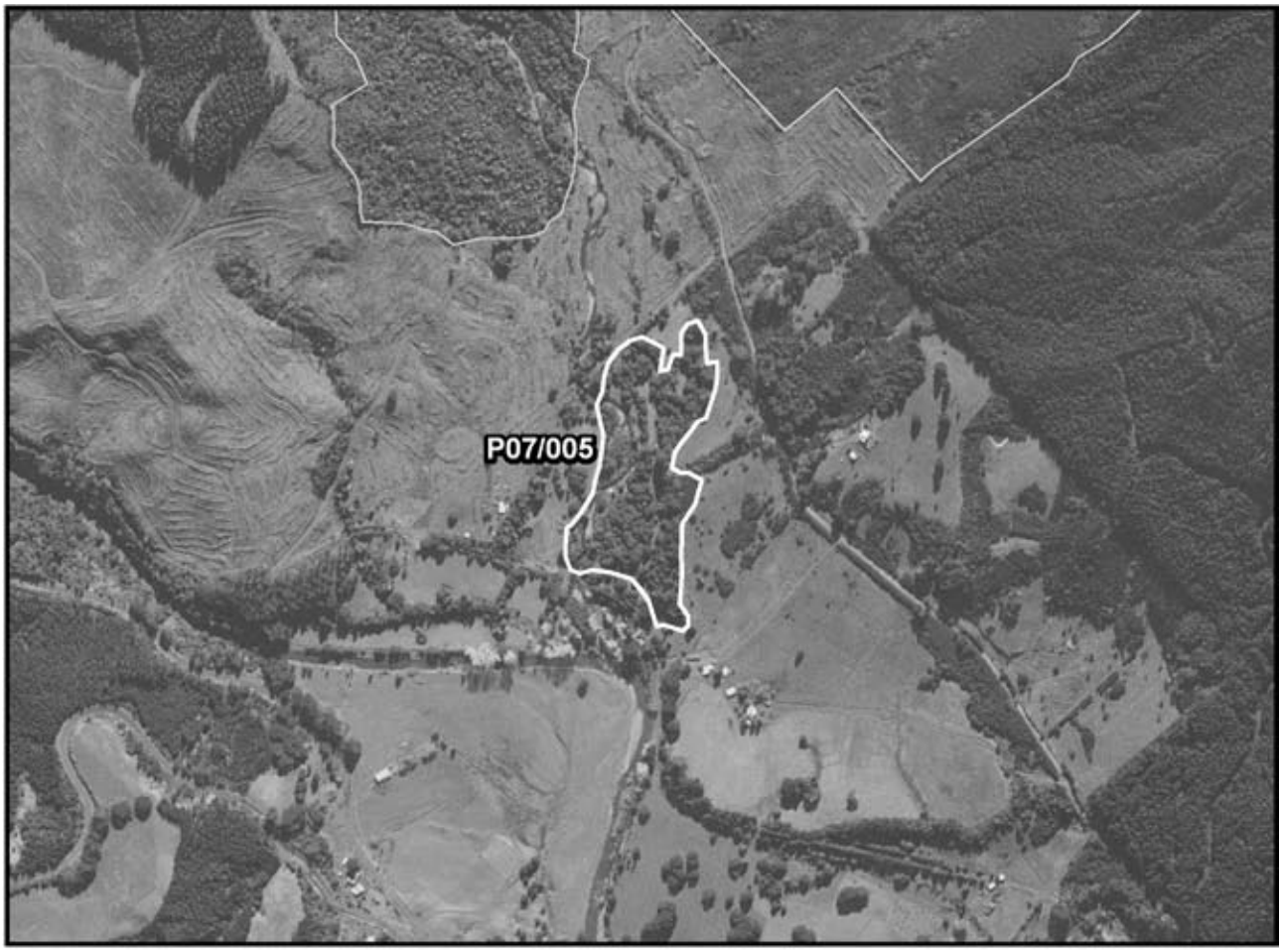
Remnant defined by common kahikatea and totara. Occasional species include kauri, rewarewa, matai, puriri and towai.

Fauna

Not surveyed.

Significance

The original 1994 survey recommended this site as a Level 1 as riverine forest is an under-represented habitat type in this ED and throughout Northland. However 2002 aerial photography shows this site has reduced greatly in extent and the above vegetation description may no longer apply therefore further survey work is needed to fully assess this site.



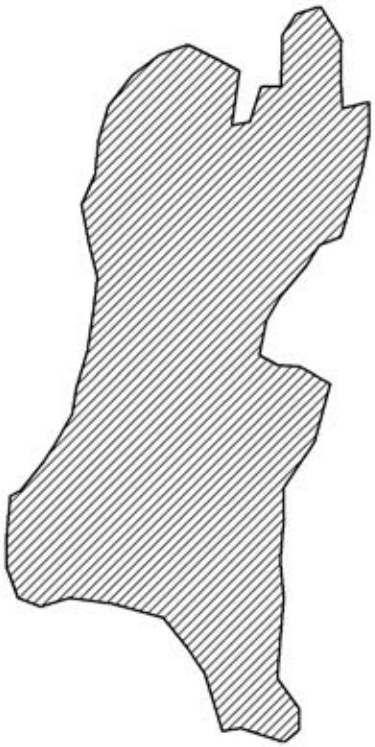
P07/005 Baker Road Forest

0 250 500

Metres

Habitat type

- Forest
- Shrubland
- Wetland
- Duneland/Sandfield



Aerial photography flown 2002

STATE HIGHWAY 12 FOREST REMNANT

Survey no.	P07/026
Survey date	24 April 2001
Grid reference	P07 739 025
Area	17 ha (3.9 ha forest, 13.2 ha shrubland; the small wetland area is not mapped) (This site was slightly adjusted from the 2001 survey to fit 2002 aerial photography)
Altitude	60–120 m asl

Ecological unit

(a) Raupo-swamp millet wetland on alluvium

(b) Kanuka/manuka-mamaku-totara shrubland on gentle hillslope

(c) Kahikatea-totara forest on gentle hillslope

Landform / geology

Gentle hillslope on surface of Pleistocene landslide deposit comprised predominantly of material derived from the Lower Miocene Waipoua Basalt.

Vegetation

(a) A small raupo and swamp millet wetland occurs as a fringe (unmapped) along State Highway 12 (SH12). Manuka is frequent and harakeke, maire tawake, *Baumea* sp., swamp kiokio, and *Carex* sp. are occasional.

(b) The site is predominantly regenerating kanuka/manuka, mamaku and totara with occasional tanekaha, kahikatea, and mahoe. Pockets of pure mamaku occur.

(c) Mixed, small diameter kahikatea with totara occurs in a small area around the north-west corner of the site.

Fauna

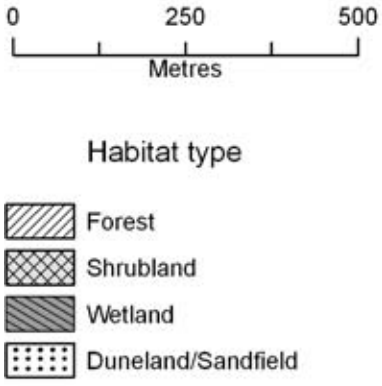
Kauri snail (Gradual Decline).

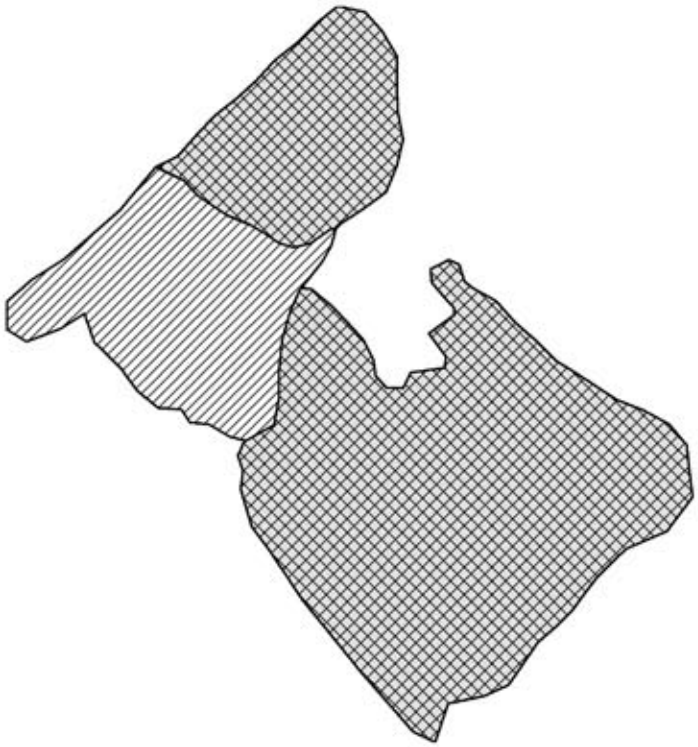
Banded kokopu (Regionally significant species).

Significance

A small area of regenerating lowland bush supporting kauri snail and banded kokopu, however the quality of the habitat at the time of survey does not warrant Level 1 status.

P07/026 State Highway 12 Forest Remnant





Aerial photography flown 2002

5. Summary and conclusions

The Protected Natural areas network in the Tutamoe Ecological District is summarised in Table 1 (p. 158). Approximately 69.4% of the natural areas in the Tutamoe Ecological District have some form of formal protection. This is equivalent to 39.7% of the total area of the Ecological District.

A list of ecological units recorded in the Tutamoe Ecological District and their current protection status is set out in Table 2 (p. 159) and a summary of the site evaluations in given in Table 3 (p. 173).

5.1 PRIORITY NATURAL AREAS FOR PROTECTION IN TUTAMOE ECOLOGICAL DISTRICT

The purpose of this section is to identify the unprotected natural areas documented in this report that best supplement the existing protected areas network, to make it more fully representative of the ecological diversity and character of the Ecological District.

Nationally under-represented habitat types

1. Coastal habitats including dunes, wetlands, shrubland and forest including:

- Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip O06/015—(6.9% protected).
- Muriwai Stream Swamp O06/026—(41.8% protected).
- Waipoua Coastal Strip and Taha Moana Scenic Reserve O06/027—(57.5% protected).

2. Broadleaf, podocarp and broadleaf-podocarp forest on alluvial soils including:

- Tutamoe Maire tawake Forest Remnant P07/006
- Waimamaku Riverine Forest Remnant O06/020—(34.6% protected)
- Hansen Road Forest Remnant O06/022

Sites supporting acutely threatened or chronically threatened plants and animals

- Waipoua/Mataraua/Waima Forest Tract O06/001 (77.1% protected). This site supports 10 acutely threatened (Undescribed fungus, *Schistochila nitidissima*, turoa onamata, *Coprosma waima*, *Fissidens integerrimus*, *F. strictus*, *Olearia crebra*, Bartletts koromiko, *Picris burgidgae*, *Todea barbara*); 7 chronically threatened plants (Kirks daisy, raukawa, *Colensoa physaloides*, *Pittosporum kirkii*, *Pimelea tomentosa*, *Doodia squarrosa*, willow-leaved maire) and 7 acutely threatened (NI kaka, NI kokako, northern NZ dotterel, Caspian tern, reef heron, *Phrixgnathus murdochi*, long-tailed bat) and 11 chronically threatened animals (NI brown kiwi, kukupa, long-tailed cuckoo, banded dotterel, Northern little blue penguin, white-fronted

tern, short-jawed kokopu, longfin eel, kauri snail, Auckland green gecko, forest ringlett butterfly).

- Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip O06/015—(6.9% protected). This site supports two acutely threatened (*Hebe speciosa* and *Leptinella rotundata*) and one chronically threatened plants (*Euphorbia glauca*) and two acutely threatened (reef heron, Caspian tern) and three chronically threatened birds (white-fronted tern, banded dotterel, northern little blue penguin).
- Marlborough Forest P06/042—(67.2% protected) supports three chronically threatened plant (*Pittosporum kirkii,* raukawa and willow-leaved maire) and one acutely threatened (NI kaka) and three chronically threatened animals (NI brown kiwi, kukupa, kauri snail).

Enclaves, extensions or buffers to existing protected areas and ecological sequences

Buffers, linkages and enclaves for Waipoua/Mataraua/Waima Forest complex, Marlborough and Kaihu Forests including:

- Waipoua/Mataraua/Waima Forest Tract O06/001—Although nearly 77.1% of the large forest tract is already protected, enclaves and buffers are important in maintaining the integrity of the forest. To highlight this, a new tree species, *Ackama nubicola*, turoa onamata was discovered in an unprotected enclave within the Waima Forest. This enclave is now protected.
- Marlborough Forest P06/042—(67.2% protected)
- Kaihu Forest P07/001—(45.3% protected)
- Waiotemarama Gorge Forest O06/013—(2.7% protected)—adjacent to Waima Forest
- Waiwhatawhata Bush O06/014—(23.6% protected)—corridor between Waipoua and Waima Forest
- Marlborough Road Forest O06/029—(60.3% protected)—corridor between Katui Scenic Reserve and Waipoua Forest
- Jones Road/Mangatu Bush Remnants O06/030—corridor between Trounson Kauri Park Scenic Reserve and Marlborough and Waipoua Forest
- Kaikohe Road Forest Remnant P06/041—corridor between Waipoua and Marlborough Forest

TABLE 1. PROTECTED NATURAL AREAS NETWORK IN THE TUTAMOE ECOLOGICAL DISTRICT (AREA GIVEN IN ha)

Key: QEII=Queen Elizabeth II National Trust Covenant; NWR=Nga Whenua Rahui CP=Conservation Park; SR=Scenic Reserve; RR=Recreation Reserve; SL=Stewardship Land; CC=Conservation Covenant; KDC=Kaipara District Council; LPR=Local Purpose Reserve; MS=Marginal Strip

SITE	SURVEY NO.	QEII	NWR	CP	SR	RR	SL	CC	KDC	LPR	MS	TOTAL PROTECTED AREA	TOTAL SITE AREA
Waipoua/Waima/ Mataraua Forest Tract	O06/001	367	840	22,218.8	941.2		215.5	31.6			17.7	24,631.8	31,934.1
Waiotemarama Gorge Forest	O06/013						11.6					11.6	421.2
Waiwhatawhata Bush	O06/014	90.9										90.9	384.6
Te Kaiatewhetu Shrublands and Arai te Uru Coastal Strip	O06/015		15	0.1		44.2	0.6				1.6	61.5	671.7
Te Wai-O-Te Marama Scenic Reserve and Surrounds	O06/018				12.8							12.8	18.4
Waimamaku Scenic Reserve	O06/019				5.4							5.4	5.7
Waimamaku Riverine Forest Remnant	O06/020						1.8					1.8	5.2
Te Riu Lagoon	O06/025						10.4					10.4	17.8
Muriwai Stream Swamp	O06/026						27.6	21.8				49.4	118
Waipoua Coastal Strip and Taha Moana Scenic Reserve	O06/027			4.7	114.8		173.7				8.1	301.3	523.6
Marlborough Road Forest	O06/029	31.3										31.3	51.9
Tutamoe Domain Recreation Reserve and Surrounds	O06/031								4.06			4.06	9.3
Lake Waingata North	O06/036						2.5					2.5	2.9
Katui Scenic Reserve and Surrounds	O07/001	21			294.7							315.7	367.5
Trounson Kauri Park Scenic Reserve	O07/005				391.7							391.7	412.1
Waima Riverine Forest Remnant	O07/006						0.1					0.1	4.5
Maunganui Bluff Scenic Reserve	O07/009				411.2							411.2	425.6
Marlborough Forest	P06/042			3,957.5	7.5		46.8			1.9	9.1	4,022.7	5985.4
Kaihu Forest	P07/001			2,385			2.3					2,387.3	5,262.4
TOTAL		510.2	855	28,566.1	2,179.3	44.2	492.9	53.4	4.06	1.9	36.5	32,743.56	45,881.3

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

Key: *=Level 2 site; **Bold pna numbers**=representative site; part of =the site is made up of more than one landform/geology type; pt=part of site is protected but unknown whether the ecological unit falls within the protected area; QEII=Queen Elizabeth II National Trust Covenant; NWR=Nga Whenua Rahui CP=Conservation Park; SR=Scenic Reserve; RR=Recreation Reserve; SL=Stewardship Land; CC=Conservation Covenant; KDC=Kaipara District Council; LPR=Local Purpose Reserve; MS=Marginal Strip

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
WETLAND								
Baumea articulata				**O06/025** (part of, ptSL)		**O06/025** (part of, ptSL)		
Baumea arthrophylla-Baumea juncea				**O06/036** (ptSL)				
bracken-*Coprosma* spp.			**O06/026** (part of, ptSL)	**O06/026** (part of, ptSL)		O06/026 (part of, ptSL)		
Carex sp.				**O06/027** (part of, ptSR/SL/MS)		O06/027 (part of, ptSR/SL/MS)		
Eleocharis sphacelata				**O06/025** (part of, ptSL)		**O06/025** (part of, ptSL)		
Eleocharis sphacelata-Baumea sp.								P07/002
Eleocharis sphacelata-Baumea articulata				**O06/036** (ptSL)				
Eleocharis sp.-raupo			**O06/026** (part of, ptSL)	**O06/026** (part of, ptSL)		**O06/026** (part of, ptSL)		
harakeke			**O06/026** (part of, ptSL)	**O06/026** (part of, ptSL)		**O06/026** (part of, ptSL)		

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
manuka-ti kouka-mamaku			**O06/026** (part of, ptSL)	**O06/026** (part of, ptSL)		**O06/026** (part of, ptSL)		
marsh clubrush-raupo				**O06/027** (part of, ptSR/SL/MS)		O06/027 (part of, ptSR/SL/MS)		
Muehlenbeckia sp.			**O06/026** (part of, ptSL)	**O06/026** (part of, ptSL)		**O06/026** (part of, ptSL)		
oioi-knobby clubrush				O06/027 (part of, ptSR/SL/MS)		O06/027 (part of, ptSR/SL/MS)		
open water				**O06/025** (part of, ptSL) **O06/036** (ptSL)		**O06/025** (part of, ptSL)		P07/002
raupo			**O06/026** (part of, ptSL)	**O06/015** (part of, ptRR/MS/R), **O06/025** (ptSL), **O06/026** (part of, ptSL)		**O06/026** (part of, ptSL), **O06/025** (ptSL)	**O06/015** (part of, ptRR/MS/R)	**O06/015** (part of, ptRR/MS/R)
raupo-swamp millet								P07/026
rush sp.-raupo			**O06/026** (part of, ptSL)	**O06/026** (part of, ptSL)		**O06/026** (part of, ptSL)		
ti kouka-harakeke			**O06/026** (part of, ptSL)	**O06/026** (part of, ptSL)		**O06/026** (part of, ptSL)		

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
umbrella fern-manuka-sedge				**O06/027** (part of, ptSR/SL/MS)		**O06/027** (part of, ptSR/SL/MS)		
COASTAL ASSOCIATIONS AND COASTAL SHRUBLAND								
Astelia solandri-Chionochloa bromoides-harakeke								O07/009 (ptSR)
Baumea sp.				O06/027 (part of, ptSR/SL/MS)		**O06/027** (part of, ptSR/SL/MS)		
shore bindweed-*Spinifex sericeus*				O06/027 (part of, ptSR/SL/MS)		**O06/027** (part of, ptSR/SL/MS)		
Carex sp.				O06/027 (part of, ptSR/SL/MS)		O06/027 (part of, ptSR/SL/MS)		
harakeke-toetoe								O07/009 (ptSR)
harakeke-manuka-toetoe				**O06/027** (part of, ptSR/SL/MS)		**O06/027** (part of, ptSR/SL/MS)		
kowharawhara-*Astelia solandri*								O07/009 (ptSR)
manuka				**O06/015** (part of, ptRR/MS/R)			**O06/015** (part of, ptRR/MS/R)	**O06/015** (part of, ptRR/MS/R)
manuka-*Baumea* sp.-*Gleichenia* sp.				**O06/015** (part of, ptRR/MS/R)			**O06/015** (part of, ptRR/MS/R)	**O06/015** (part of, ptRR/MS/R)
manuka-*Gahnia* sp.				**O06/015** (part of, ptRR/MS/R)			**O06/015** (part of, ptRR/MS/R)	**O06/015** (part of, ptRR/MS/R)

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
manuka-*Gleichenia* sp.				**O06/027** (part of, ptSR/SL/MS)		**O06/027** (part of, ptSR/SL/MS)		
oioi				**O06/027** (part of, ptSR/SL/MS)		O06/027 (part of, ptSR/SL/MS)		
oioi-harakeke-hangehange-knobby clubrush-manuka-toetoe				**O06/015** (part of, ptRR/MS/R)			**O06/015** (part of, ptRR/ MS/R)	O06/015 (part of,ptRR/ MS/R)
Spinifex sericeus				O06/027 (part of, ptSR/SL/MS)		**O06/027** (part of, ptSR/SL/MS)		
toetoe-knobby clubrush				**O06/027** (part of, ptSR/SL/MS)		**O06/027** (part of, ptSR/SL/MS)		
COASTAL FOREST								
karaka				**O06/015** (part of, ptRR/MS/R)			**O06/015** (part of, ptRR/MS/R)	O06/015 (part of, ptRR/MS/R)
kohekohe-mapou-*Olearia albida*-pohutukawa								O07/009 (ptSR)
kohekohe-pohutukawa-puriri-taraire								O07/009 (ptSR)
mamangi	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	O06/001 (part of, ptQEII/CP/SA/SR/ SL/MS)

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
pohutukawa				O06/015 (part of, ptRR/MS/R), **O06/027** (part of, ptSR/SL/MS)		**O06/027** (part of, ptSR/SL/MS)	**O06/015** (part of, ptRR/MS/R)	**O07/009** (ptSR), **O06/015** (part of, ptRR/MS/R)
taraire-nikau								O07/009 (ptSR)
SHRUBLAND AND ASSOCIATIONS								
Baumea spp.-umbrella fern	O06/001 (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)
Chinese privet	O06/021 (part of)		O06/021 (part of)					
Dracophyllum lessonianum-umbrella fern-manuka	O06/001 (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)
gorse								O07/008
kanuka/ manuka	O06/001 (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/ CP/SA/SR/SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), O06/030, P07/002
kanuka/ manuka-towai	**P06/042** (part of, ptCP/SR/SL/MS)							**P06/042** (part of, ptCP/SR/SL/MS)
kanuka/ manuka-mamaku-totara								P07/026
kotukutuku-wheki-ponga-wineberry								**P06/041**

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
manuka	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), O07/001 (ptQEII/ SR), **O07/005** (ptSR)
mapou								**O07/005 (ptSR)**
pate-wineberry	O06/001 (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)
towai	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/ CP/SA/SR/SL/MS)		**O06/001** (partof, (ptQEII/ CP/SA/SR/SL/MS)	**O06/001** (part of, ptQEII/ CP/SA/SR/SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)
FERNLAND								
bracken	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)
wheki-ponga								**O06/030**
BROADLEAF FOREST								
crack willow			O06/020 (ptSL)					
hangehange-mahoe							**O06/014** (ptQEII)	
houhere-mamaku								O07/003

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
kanuka/ manuka	**P07/001** (part of, ptCP)	O06/016, P07/001 (part of, ptCP)					**O06/014** (ptQEII)	O06/024, P07/001 (part of, ptCP), O07/001 (ptQEII/ SR)
kanuka/ manuka-mamangi							**O06/014** (ptQEII)	
kanuka/ manuka-rewarewa-towai								**O07/001** (ptQEII/ SR)
kanuka/ manuka-towai	P07/001 (part of, ptCP)	P07/001 (part of, ptCP)					**O06/018** (ptSR)	P07/001 (part of, ptCP), O06/023, O06/028
kanuka-taraire-towai	O06/013 (ptSL)							
karaka-kowhai	O06/021 (part of)		**O06/021** (part of)					
karaka-kowhai-taraire	O06/013 (ptSL)							
kiekie-supplejack-towai	P07/001 (part of, ptCP)	**P07/001** (part of, ptCP)						P07/001 (part of, ptCP)
kohekohe-taraire-tawa-towai	**P06/042** (part of, ptCP/SR/ SL/MS)							**P06/042** (part of, ptCP/SR/ SL/MS)
kowhai-puriri-taraire							**O06/019** (ptSR)	

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
maire tawake	**P07/006**							**O06/029** (ptQEII)
makamaka-*Olearia* sp.								O06/030
makamaka-tawa	P07/001 (part of, ptCP)	P07/001 (part of, ptCP)						P07/001 (part of, ptCP)
manuka	O06/013 (ptSL)							
nikau-taraire-towai								**O07/001** (ptQEII/ SR)
pohutukawa-taraire							**O06/018** (ptSR)	
pohutukawa-towai								**O07/001** (ptQEII/ SR)
puriri-taraire	O06/021 (part of)	O06/016, **O06/017** (part of)	**O06/020** (ptSL), **O06/021** (part of), **O06/026** (part of, ptSL)	**O06/026** (part of, ptSL)		**O06/026** (part of, ptSL)	O06/014 (ptQEII), **O06/017** (part of), **O06/018** (ptSR)	

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
taraire	**O06/001** (part of, ptQEII/ CP/SA/SR/SL/MS), P07/001 (part of, ptCP)	P07/001 (part of, ptCP)	O06/022	**O06/001** (part of, ptQEII/ CP/SA/SR/SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), **O06/024, O06/028,** O06/029 (ptQEII), O06/030, O07/001 (ptQEII/ SR), O07/003, O07/004, **O07/006** (ptQEII), O07/008, O07/011, P07/001 (part of, ptCP), **P07/003**
taraire-karaka-puriri								O07/008
taraire-puriri								
taraire-tawa	**P06/042** (part of, ptCP/SR/ SL/MS)							P06/042 (part of, ptCP/SR/ SL/MS)
taraire-tawa-towai								O06/030

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
taraire-towai	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), P06/042 (part of, ptCP/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), **O06/023, P06/042** (part of, ptCP/SR/ SL/MS) **O07/002**
tawa-tawari-towai	**P06/042** (part of, ptCP/SR/ SL/MS)							**P06/042** (part of, ptCP/SR/ SL/MS)
tawa-towai	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), P07/001 (part of, ptCP)	P07/001 (part of, ptCP)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), P07/001 (part of, ptCP)
tawari-towai	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)
ti kouka-kanuka/ manuka-towai								**O07/001** (ptQEII/SR)

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
towai	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), **P06/042** (part of, ptCP/SR/ SL/MS), P07/001 (part of, ptCP)	P07/001 (part of, ptCP)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), O06/029 (ptQEII), O06/030, O07/001 (ptQEII/SR), **O06/031 (ptKDC),** O07/005 (ptSR), O07/008, P06/041, **P06/042** (part of, ptCP/SR/ SL/MS), P07/001 (part of,(ptCP), P07/004
towai-puriri							O06/014 (ptQEII)	
BROADLEAF-PODOCARP FOREST								
Unknown								O07/013
kahikatea-manuka		**O06/017** (part of)					**O06/017** (part of)	
kahikatea-puriri		**O06/017** (part of)					**O06/017** (part of) **O06/019** (ptSR)	

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
kahikatea-maire tawake								O06/031 (ptKDC)
kahikatea-towai	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, (ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, (ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), **O06/024**
kanuka-tanekaha-towai	O06/013 (ptSL)							
kanuka/ manuka-totara	**P07/001** (part of, ptCP)	**P07/001** (part of, ptCP)						**P07/001** (part of, ptCP)
mahoe-totara								P07/003
mamangi-totara								**P07/004**
northern rata-rimu-taraire-tawa	P07/001 (part of, ptCP)	P07/001 (part of, ptCP)						P07/001 (part of, ptCP)
puriri-taraire-totara								**O07/008**
rewarewa-totara-towai								**O07/008**
taraire-totara								O07/005 **(ptSR)** O07/007
totara-manuka								O07/008
totara-towai								O07/008
PODOCARP FOREST								
kahikatea	**O06/021** (part of)	**O06/016**	**O06/021** (part of)					O06/030, O07/002, P06/041, P07/004

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
kahikatea-totara					P07/005			**O07/008** P07/026
rimu-totara								**O07/008**
totara								O07/006 (ptQEII), **O07/008, P07/003**
totara-kahikatea	P07/001 (part of, ptCP)	P07/001 (part of, ptCP)						**P07/001** (part of, ptCP),
totara-tanekaha								O07/004
KAURI/KAURI CO-DOMINANT FOREST								
kahikatea-kauri								**O07/005** (ptSR)
kanuka /manuka-kauri							**O06/014** (ptQEII)	O07/001 (ptQEII/ SR)
kauri	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), O06/013 (ptSL)			**O06/001** (part of, ptQEII/ CP/SA/SR/SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)
kauri-northern rata-tawa-towai	P07/001 (part of, ptCP)	P07/001 (part of, ptCP)						P07/001 (part of, ptCP)
kauri-rimu-tawari-towai	P07/001 (part of, ptCP)	P07/001 (part of, ptCP)						P07/001 (part of, ptCP)

	GEOLOGY							
	Tangihua Complex Igneous rocks	Mangakahia Complex mudstone/ sandstone	Alluvial flats/ swamp deposits	Pleistocene consoli-dated sands	Holocene		Otaua Group sandstone & conglo-merate	Waipoua basalt
					alluvial deposits	dunes		
kauri-tanekaha	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)
kauri-taraire	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS), **O07/005** (ptSR)
toikiwi-kauri-manuka	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)			**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)		**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)	**O06/001** (part of, ptQEII/CP/SA/SR/ SL/MS)

TABLE 3. SUMMARY OF SITE EVALUATIONS

(e.u.s. = ecological units)

SITE	REPRE-SENTATIVNESS[1]	RARITY[2]/SPECIAL FEATURES	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE/ CORRIDOR	SIZE & SHAPE
LEVEL ONE SITES						
Waipoua/Mataraua/Waima Forest Tract O06/001	Rep for all e.u.s.	Largest tract of forest north of Auckland, including old growth forest. Soil site of international and regional significance. Flora: 35 threatened and. 2 historical, 64 regionally significant and 1 historical Fauna: 47 threatened, 4 regionally significant.	18 e.u.s. Coastal/kauri/ broadleaf forest/ shrubland.	Largest forest tract in Northland and contains the largest tract of old growth kauri forest in NZ.	Dominates the ED	31,934.1 ha 3 remnants [3]
Waiotemara-ma Gorge Forest O06/013	Rep site for 4 e.u.s.	Fauna: 1 threatened; 1 regionally significant.	5 e.u.s.		Adjacent to Waima Forest, corridor linkage.	421.2 ha
Waiwhatawhata Bush O06/014	Rep site for all e.u.s.	Fauna: 1 threatened, 1 regionally significant. Flora: 1 threatened.	6 e.u.s.	Portion of cutover forest.	Links to O06/014 & O06/001.	384.6 ha
Te Kaiate-whetu Shrublands and Arai te Uru Coastal Strip O06/015	Rep site for all 7 e.u.s.	Contains nationally significant geopreservation site. Flora: 2 threatened, 2 regionally significant, 1 notable. Fauna: 8 threatened, 2 regionally significant.	8 e.u.s. Coastal shrubland/ forest/ freshwater wetland.		Steep coastal ridge, links to coastal area of Waipoua & coastal habitat extending south.	671.7 ha 4 remnants
Smoothy Road Bush O06/016	Rep site for 2.e.u.s.	Fauna: Not surveyed.[4]	3 e.u.s.		Corridor linkage between several sites.	15.5 ha 2 remnants
Waiotemarama Stream Bush O06/017	Rep site for all e.u.s.	Riverine forest. Fauna: Not surveyed.	3 e.u.s.	Pine present. Grazing stock. Portion fenced?	Corridor linkage, several sites.	8.1 ha 3 remnants
Te Wai-O-Te Marama Scenic Reserve and Surrounds O06/018	Rep site for 2 e.u.s.	Fauna: Not surveyed.	3 e.u.s. Coastal broadleaf forest.	Pine present, kahili ginger dominant ground-cover.	Corridor linkage, several sites.	18.4 ha 2 remnants

1. 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.
2. 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 all sites would reveal additional data on threatened and rare species, and in the case of Level 2 sites, a change in ranking.
3. Remnants in this column refers to the number of separate areas of habitat within the site.
4. Not surveyed: The Department of Conservation, Northland Conservancy, has not to date (December 2005) specifically surveyed for threatened species at this site.

SITE	REPRE-SENTATIVNESS[1]	RARITY[2]/SPECIAL FEATURES	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE/ CORRIDOR	SIZE & SHAPE
Waimamaku Scenic Reserve O06/019	Rep site for both e.u.s.	Fauna: Not surveyed.	2 e.u.s.			5.7 ha
Waimamaku Riverine Forest Remnant O06/020	Rep site for 1 e.u.	Old growth riverine forest. Fauna: Not surveyed.	2 e.u.s.	Exotic e.u. Weeds present.	Just south of O06/019.	5.2 ha 6 remnants
Te Moho Rock Bush O06/021	Rep site for 3 e.u.s.	Flora: 1 notable Fauna: Not surveyed.	4 e.u.s.	Exotic e.u.	Adjacent to O06/020.	3 ha
Hansen Road Forest Remnant O06/022	Rep site.	Old growth riverine forest. Fauna: Not surveyed.	1 e.u.	Grazed, little understorey.	Adjacent to Waima forest.	1 ha
Taita Road Bush O06/023	Rep site for both e.u.s.	Some old growth trees.	2 e.u.s.	Cutover. Fenced since 1978.	Just south of Waima Forest.	23.7 ha 2 remnants
Wekaweka Bush O06/024	Rep site for 2 e.u.s.	Not surveyed.	3 e.u.s.		Between Waima and Waipoua Forest.	7.5 ha
Te Riu Lagoon O06/025	Rep site for all e.u.s.	Dune lake/swamp. Fauna: 2 threatened and 1 historical.	4 e.u.s.	Enclave within exotic forestry. Pine, pampas present.		17.8 ha
Muriwai Stream Swamp O06/026	Rep site for all e.u.s.	Large freshwater wetland. Fauna: 4 threatened, 1 historical, 2 regionally significant. Flora: 2 regionally significant.	9 e.u.s swamp mosaic, riverine forest.	Northern forestry border.	Links to coast. O06/027 abutts.	118 ha 2 remnants
Waipoua Coastal Strip and Taha Moana Scenic Reserve O06/027	Rep site for all e.u.s.	Diverse dune complex. Flora: 2 threatened, 4 regionally significant. Fauna: 9 threatened, 2 regionally significant.	13 e.u.s.	Forestry border along north eastern boundary.	Sequential linkage to large forest tract O06/001.	523.6 ha
Muriwai Bush O06/028	Rep site for 1 e.u.	Fauna: 2 threatened.	2 e.u.s.	Cut-over forest.	Corridor linkage between several sites.	20 ha
Marlborough Road Reserve Bush O06/029	Rep site for 1 e.u.	Swamp forest. Flora: 1 regionally significant. Fauna: 3 threatened species.	3 e.u.s.		Adjacent to Waipoua Forest.	51.9 ha 2 remnants
Jones Road/ Mangatu Bush Remnants O06/030	Rep site for 4 e.u.s.	Fauna: 2 threatened, 1 regionally significant.	7 e.u.s.	Weed component.	Corridor link between two large forests.	177.3 ha, 6 remnants
Tutamoe Domain Recreation Reserve and Surrounds O06/031	Rep site for both e.u.s.	Old growth swamp forest. Flora: 2 threatened. Fauna: Not surveyed.	2 e.u.s.	Cutover.	Corridor linkage between large forest tract and Tutamoe Range to the south.	9.3 ha 2 remnants

SITE	REPRE-SENTATIVNESS[1]	RARITY[2]/SPECIAL FEATURES	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE/ CORRIDOR	SIZE & SHAPE
Lake Waingata North O06/036	Rep site.	Dune lake Flora: 2 regionally significant	4 e.u.s	All native dunelake.	Enclosed by pine forestry	2.9 ha
Katui Scenic Reserve and Surrounds O07/001	Rep site for 7 e.u.s.	Soil site of regional importance. Flora: 1 threatened, 3 regionally significant. Fauna: 3 threatened, 1 regionally significant.	9 e.u.s.		Corridor linkage between Maunganui Bluff and Waipoua.	367.5 ha 2 remnants
Hood Road Forest Remnant O07/002	Rep site for both e.u.s.	Fauna: Not surveyed.	2 e.u.s.	Majority of site is cutover.	Corridor linkage between larger forests.	6.9 ha
Maunganui Outlier Forest Remnant O07/003	Rep site for both e.u.s.	Not surveyed.	2 e.u.s.	Grazed by stock at time of survey.	Close to O07/009.	11.8 ha
Hooper Road Bush O07/004	Rep site for 1 e.u.	Not surveyed.	2 e.u.s.		Corridor linkage between larger forests.	20.5 ha
Trounson Kauri Park Scenic Reserve O07/005	Rep site for all e.u.s.	Mainland Island. Soil site of inter-national importance. Flora: 5 threatened, 1 historical ; 9 regionally significant Fauna: 9 threatened, 1 historic, 2 regionally significant.	6 e.u.s.	Mainland Island intensively managed.	Corridor linkage between larger forests.	412.1 ha 3 remnants
Waima Riverine Forest Remnant O07/006	Rep site for 1 e.u.	Old growth riverine forest. Not surveyed.	2 e.u.s.		Corridor linkage.	4.5 ha 2 remnants
Waitapu Road Bush O07/008	Rep site for 6.e.u.s.	Not surveyed.	11 e.u.s.	Areas cutover. Weed e.u.	Corridor linkage, riparian buffer.	72.5 ha, 6 remnants
Maunganui Bluff Scenic Reserve O07/009	Rep site for all e.u.s.	Diverse coastal habitat. Flora: 13 threatened, 12 regionally significant. Fauna: 7 threatened, 1 regionally significant (historical).	8 e.u.s.		Coastal.	425.9 ha 2 remnants
Aranga Beach Forest Remnant O07/011		Not surveyed.	1 e.u.	Small.	Close to O07/009.	1.3ha
Kaikohe Road Forest Remnant P06/041	Rep site for all e.u.s.	Not surveyed. Flora: 1 threatened.	3 e.u.s.		Corridor linkage between larger forests.	45.2 ha 3 remnants
Marlborough Forest P06/042	Rep site for all e.u.s.	High altitude forest. Flora: 8 threatened, 22 regionally significant. Fauna: 5 threatened, 1 regionally significant.	7 e.u.s.	Cutover in some areas.	Corridor linkage between large forest tract and Kaihu Forest.	5,985.4 ha 5 remnants

SITE	REPRE-SENTATIVNESS[1]	RARITY[2]/SPECIAL FEATURES	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE/ CORRIDOR	SIZE & SHAPE
Kaihu Forest P07/001	Rep site for all e.u.s.	High altitude plateau swamp forest and kauri. Flora: 8 threatened and 1 historical, 27 regionally significant Fauna: 4 threatened, 1 regionally significant	12 e.u.s.			5,262.4 ha 3 remnants
Kaihu Bush Remnant P07/003	Rep site for all e.u.s.	Not surveyed.	3 e.u.s.	Majority of habitat is cutover.	Corridor linkage.	23.6 ha
Waingarara Stream Bush P07/004	Rep site for 2 e.u.s.	Not surveyed.	3 e.u.s.		Corridor linkage.	31.5 ha
Tutamoe Swamp Maire tawake Forest Remnant P07/006	Rep site.	Swamp forest. Not surveyed.	1 e.u.	Pine forest border.	Adjacent to Kaihu Forest.	0.6 ha
Totals						**47,089.2ha**
LEVEL TWO SITES						
Access Road Bush O07/007		Not surveyed.	1 e.u.	Small cutover.	Corridor linkage.	3.9 ha
Ngakiriparauri Stream Hillslope Remnant O07/013		Not surveyed	Not surveyed			20.6ha
Montieth South Road Shrubland P07/002	Rep site for 1 e.u.s.	Not surveyed.	3 e.u.s. Shrubland and wetland.	Pine present. Pine forest on southern boundary.	Corridor linkage.	32.5 ha 2 remnants
Baker Road Forest P07/005	Rep site.	Riverine forest. Not surveyed.	1 e.u.	Partially borders pine forest.	Riparian buffer.	5.4 ha
State Highway 12 Forest Remnant P07/026		Fauna: 1 threatened, 1 regonally significant.	3 e.u.s	Small, regenerating.	Adjacent SH12.	17 ha
Totals						**79.4 ha**
Total area of Level 1 and Level 2						**47,168.6 ha**

6. Acknowledgements

We thank the landowners who co-operated with this survey, in particular those who cheerfully provided access on to their properties.

The Protected Natural Area survey was conducted by Nigel Miller between 1994 and 1995. An initial draft report was produced by Nigel and other biodiversity staff of Northland Conservancy at that time. Wendy Holland expanded and updated the first draft and produced the report for publication.

Peter Anderson was a constantly positive and encouraging supervisor and provided considerable editorial comment in particular to the fauna sections.

Linda Conning had a large input into the writing of this report, as she compiled, along with Peter Anderson the generic introductory sections of the PNAP reports Northland has produced to date as well as parts of the appendices.

Dr. Fred Brook compiled and wrote the geomorphological data for each site and the Land snail section in 3.4.4.

Dr. Ray Pierce provided expert advice and assistance with regard to fauna distribution and status and other invaluable editorial comment.

Lisa Forester provided general editorial comment and along with Ewen Cameron gave expert plant identification and botanical advice.

Aerial orthophotography was provided courtesy of Northland Regional Council and Kaipara District Council. Terry Conaghan, Kaye Seymour and Loraine Wells prepared the maps and areas using ArcView GIS.

The Queen Elizabeth II National Trust and the New Zealand Native Forests Restoration Trust provided information on covenants they administer within the Ecological District.

7. References

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

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

Arand, J.; Basher, L.; Wardle, R.; Wardle, K. 1993: Inventory of New Zealand Soil Sites of International, National and Regional importance. Part Two – North Island and northern offshore islands (1st edition). New Zealand Society of Soil Science Occasional Publication 2. Lincoln University.

Beever, J. 1987: A dictionary of Maori plant names. *Auckland Botanical Society Bulletin 16.*

Beever, J.E.; Beever, R.E. 1989: Report on Waima-Waipoua-Mataraua forests field trip. January 1989. *Auckland Botanical Society Journal, July 1989.*

Beever. J.; Allison, K.W.; Child, J. 1992: (second edition). The mosses of New Zealand. University of Otago Press, Dunedin, New Zealand.

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

Brook, F.J. 1996: Classification of the Ecological Districts of Northland. (Unpublished Report). Department of Conservation, Northland Conservancy, Whangarei.

Brook, F.J. 2002: Uncommon and rare Land snails in the Northland region of New Zealand, and an assessment of conservation management priorities. Department of Conservation, Northland Conservancy, Whangarei.

Brownsey, P.; Smith-Dodsworth, J.C. 2000: New Zealand Ferns and Allied Plants. David Bateman, Auckland.

Bull, P.C.; Gaze, P.D.; Robertson, C.J.R. 1985: The Atlas of Bird Distribution in New Zealand. Ornithological Society of New Zealand Inc., Wellington.

Burns, B.R.; Leathwick, J.R. 1992: Vegetation map of the Waipoua Forest sanctuary and environs, Northland, New Zealand. Scale 1:25 000. *Ministry of Forestry, FRI Bulletin No. 143.1 map + notes.*

Cameron, E.K. 2000: Native sow thistle, *Sonchus kirkii*, rediscovered in the Auckland Region. *Auckland Botanical Society Journal and Index 55(1).* January 1988 to June 2000.

Campbell, E. 1968: An investigation of *Thismia rodwayi* F. Muell. and its associated fungus. *Transactions Royal Society New Zealand Botany. 3*(14): 209–219.

Courtney, S. 1999: A Checklist of Indigenous Vascular Plants of New Zealand. (10th Revision). Updated and expanded from A.P. Druce's 9th Revision, September 1993. Department of Conservation, Nelson/Marlborough Conservancy.

de Lange, P.J.; Norton, P. J.; Heenan, D.A.; Courtney, S.P.; Molloy, B.P.J.; Ogle, C.C.; Rance, B.D.; Johnson, P.N.; Hitchmough, R. 2004: Threatened and uncommon plants of New Zealand. *New Zealand Journal of Botany 42*: 45–76.

de Lange, P.J.; Sawyer, J.W.D.; Rolfe, J.R. 2006: New Zealand Indigenous Vascular Plant Checklist. New Zealand Plant Conservation Network.

Department of Conservation: Bioweb Threatened Plants Database. Accessed 2006 and 2007.

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

Department of Conservation. 1991: An Internal Review of the Protected Natural Areas Programme. Internal Unpublished Report, Wellington.

Department of Conservation. 1994: Protected Natural Areas Programme Draft Discussion Document. Internal Unpublished Report, Wellington.

Department of Conservation. 1999: Conservation Management Strategy. Northland Conservancy 1999–2009. Volume one & Volume two. Northland Conservancy, Whangarei.

Department of Conservation. 2005: New Zealand large galaxiid recovery plan, 2003–13: Shortjaw kokopu, giant kokopu, banded kokopu, and koaro. *Threatened Species Recovery Plan 55*. Science & Technical Publishing, Department of Conservation, Wellington, New Zealand. 32 p.

Dopson, S.R.; de Lange P.J.; Ogle, C.C.; Rance, B.D.; Courtney, S.P.; Molloy, J. 1999: The Conservation Requirements of New Zealand's Nationally Threatened Vascular Plants. Biodiversity Recovery Unit, Department of Conservation, Wellington, New Zealand.

Druce, A.P. 1989: *Coprosma waima* (Rubiaceae) – a new species from northern New Zealand. *New Zealand of Botany 27*: 119–128.

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

Eadie, F.; Burns, B.; Leathwick, J. 1987: Waipoua Ecological Survey 1984–85. Department of Conservation, Auckland and Forest Research Institute, Rotorua.

Esler, A.E.; Dobbins, A.G. 1977: Plant life of Maunganui Bluff Scenic Reserve. Botany Divison, DSIR and Lands and Survey Department.

Forester, L. 1989: Rare plants of Waima Forest. *Forest and Bird, Volume 20, Number 4.*

Forester, L.; McKenzie, D. 1987 (Draft only): Indigenous Enclaves within Northland's Exotic State Forests. New Zealand Forest Service, Kaikohe.

Forester, L.; Cummings, D. 1984: Kaihu Ecological Area. NZ Forest Service, Auckland Conservancy, Auckland, New Zealand.

Forester, L.; Townsend, A. 2004: Threatened plants of Northland Conservancy. Department of Conservation, Wellington, New Zealand.

Gill, B.; Whitaker T. 1996: New Zealand Frogs and Reptiles. David Bateman, Auckland, New Zealand.

Glenny, D.; Braggins, J.; Schuster, R.M. 1997: *Zoopis nitida* (Hepaticae: Lepidoziaceae), a new species from New Zealand. *Journal of Bryology 19*: 775–780.

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. New Zealand Forest Service. Reed Methuen.

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

Heather, B.; Robertson, H. 2000: The Field guide to the Birds of New Zealand. Penguin Books (NZ) Ltd, Auckland, New Zealand.

Heenan, P.B.; de Lange, P.J. 2007: Two new species of *Dianella* (Hemerocallidaceae) from New Zealand. *New Zealand of Botany 45*: 269–285.

Hitchmough, R. (comp.) 2002: New Zealand Threat Classification System lists–2002. *Threatened species occasional publication 23*. 210 p.

Hitchmough, R., Bull, L., Cromarty, P. (compilers) 2007: New Zealand Threat Classification System Lists 2005. Science and Technical Publishing, Department of Conservation, Wellington, New Zealand.

Johnson, P.; Brooke, P. 1998: Wetland Plants in New Zealand. Manaaki Whenua Press, Lincoln, Canterbury, New Zealand.

Johnson, P.J.; Gerbeaux, P. 2004: Wetland Types in New Zealand. Department of Conservation, Wellington.

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

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.

Lux, J.; Martin, T.; Beadel, S. 2007: Natural areas of Waipu Ecological District. Department of Conservation, Northland Conservancy, Whangarei.

Maxwell, B. 1996: Ecological Assessment. Nga Whenua Rahui Application for the Ambler Coastal Strip, West Coast, South Hokianga. (DOC Internal Files).

McCluggage, A.P. 2000: New location of *Baumea complanata* at Shenstone, Te Paki, northern New Zealand. *Auckland Botanical Society 55(2).*

McDowall, R.M. 1990: New Zealand Freshwater Fishes. A Natural History and Guide. Heinemann Reed and MAF Publishing Group, New Zealand.

McGuinness, C.A. 2001: The Conservation Requirements of New Zealand's Nationally Threatened Invertebrates. Threatened Species Occasional Publication No. 20. Biodiversity Recovery Unit, Department of Conservation, Wellington.

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.

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

Myers, S.; Park, G.; Overmars, F. 1987: A Guidebook for the Rapid Ecological Survey of Natural Areas. New Zealand Biological Resources Centre. Publication No. 6.

NIWA: New Zealand Freshwater Fish Database. National Institute of Water & Atmospheric Research. http://fwdb.niwa.cri.nz

New Zealand Forest Service c.1986: Northland Forest Park Management Plan. (Unpublished Draft Report).

Nicol, E. R. (compiled by) 1997: Common Names of Plants in New Zealand. Manaaki Whenua Press, Lincoln, Canterbury.

Nicholls, J.L. 1976: A revised classification of the North Island indigenous forest. *NZJF 21(1)*: 105–132.

NZPCN 2006 and 2007: New Zealand Plant Conservation Network website. www.nzpcn.org.nz.

Ogle, C. 1982: Wildlife and Wildlife Habitat Values of Northland. Fauna Survey Unit Report No. 30. New Zealand Wildlife Service, Wellington.

Payton, I.J.; Forester, L.J.; Frampton, C.M.; Thomas, M.D. 1996: Response of selected tree species to culling of introduced Australian brushtail possums *Trichosurus vulpecula* at Waipoua Forest, Northland, New Zealand. *Biological Conservation* 81 (1997) 247–255, Elsevier Science Ltd.

Pierce, R.J; Atkinson, R.; Smith, E. 1993: Changes in Bird Numbers in Six Northland Forests 1979–93. *Notornis* 40: 285–293.

Pierce, RJ.; Graham P.J. 1995: Ecology and Breeding Biology of Kukupa (*Hemiphaga novaeseelandiae*) in Northland. Science & Research Series No.91. Department of Conservation, Wellington.

Pierce, R.J. 2004: Surveys of kiwi in Carter Holt Harvey forests in Northland, April–June 2004. Wildland Consultants Contract Report No. 895 prepared for Carter Holt Harvey 16pp.

Poole, L.; Adams, N. 1990: (Revised Edn.) Trees and Shrubs of New Zealand. DSIR Publishing, Wellington, and Landcare Research, Lincoln.

Reed, A.H. 1964: The new story of the kauri. A.H & A.W. Reed, New Zealand.

Salmon, J.T. 1980: The Native Trees of New Zealand. AH & AW Reed, New Zealand.

Seitzer, S. 1996: A macroinvertebrate assessment of the Waipoua River. (Draft Report). Department of Conservation, Northland Conservancy, Whangarei.

Shaw, W.B. 1994: Botanical Ranking for Nature Conservation. Science and Research Series.

Spencer, H.G.; Marshall, B.A.; Willan, R.C. (in press). Phylum Mollusca. *In* Gordon, D. P. (ed.) The New Zealand inventory of biodiversity: a species 2000 symposium review. Canterbury Press, Christchurch.

St George, I. 1999: The Nature Guide to New Zealand Native Orchids. Godwit, Auckland, New Zealand.

Technical Advisory Group. 1986: The New Zealand Protected Natural Areas Programme. A Scientific Focus. *New Zealand Biological Resources Centre Publication No. 4*. New Zealand Department of Scientific and Industrial Research, Wellington.

Turbott, E.G. (convenor). 1990: Checklist of the birds of New Zealand and the Ross Dependency, Antartica by the Checklist Committee, Ornithological Society of New Zealand, Auckland.

Ward, D.F.; Harris, R.J. 2005: Invasibility of native habitats by Argentine ants, *Linepithema humile* in New Zealand. *New Zealand Journal of Ecology 29(2)*: 215–219.

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

Webb, C.J.; Sykes, W.R.; Garnock-Jones, P.J. 1988: Flora of New Zealand Vol. IV. Botany Division, Christchurch.

Wells, R., Champion, P., de Winton, M., Whiting, M. 2006: Northland Lakes Status 2006. Prepared for the Northland Regional Council. National Institute of Water and Atmospheric Research Ltd, Hamilton.

Wilson, C.M.; Given, D.R. 1989: Threatened Plants of New Zealand. Department of Scientific and Industrial Research Publishing, Wellington.

Wilson , H.; Galloway, T. 1993: Small-leaved shrubs of New Zealand. Manuka Press, Christchurch, New Zealand.

Winterbourn, m. 1983: Freshwater Life. Streams, ponds, swamps, lakes and rivers. Mobil New Zealand Nature Series. A.H. & A.W. Reed, Christchurch.

Young, M.; Smith, S.; Benham, S.; Wesley, A. 1997: Field trip to Waipoua Forest and Tutamoe Easter (June) 1997. *Auckland Botanical Society Journal*.

Appendix 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)

Appendix 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.

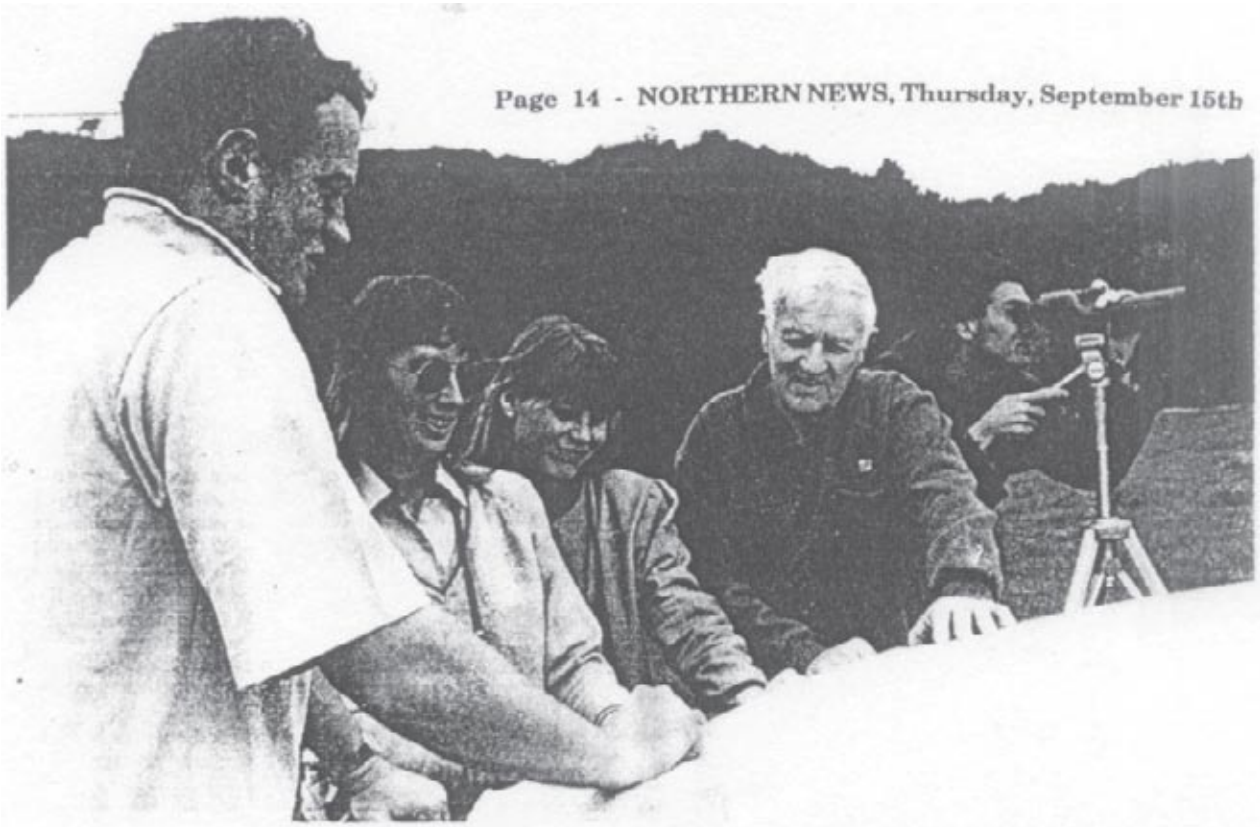
The Resource Management Act 1991 requires District Councils to consider the natural areas they administer when preparing the District Plan. The information compiled from this survey will be given to the Far North District Council to provide them with a "snapshot" of the distribution and condition of 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.**

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, dunelands, 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 Resource 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.

Appendix 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).

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

Classification structure and categories

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

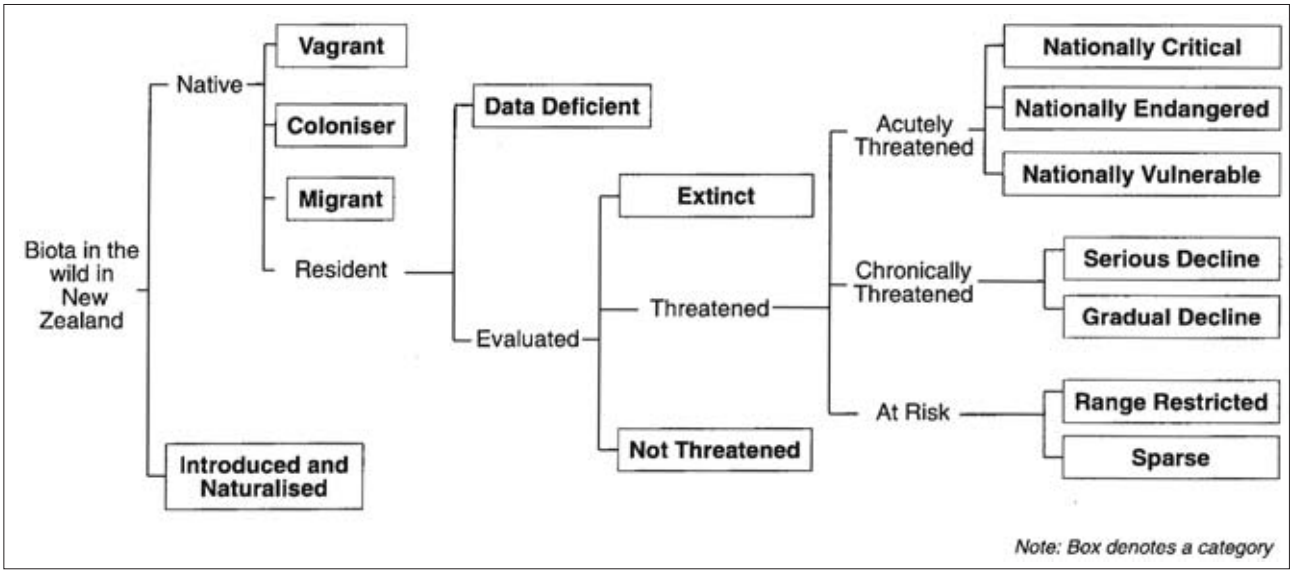


Figure 1. Structure of the New Zealand Threat Classification System.

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 hyssopifolium* 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 *Tecomanthe 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 lUCN 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 subpopulations, 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.

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 km^2).

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 km^2).

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 km^2).

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 km^2).

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 km^2).

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 km^2).

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 fisted 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 km^2).

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.

Appendix 4

CATEGORIES OF IMPORTANCE FOR GEOLOGICAL AND SOIL SITES

Arand *et al.* (1993) Categories of Importance

Importance

Importance of the site is ranked in three categories:

1 = International

- contains the best example of a soil (generally 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.

2 = National

- contains the best or a "classic" example of a soil (either a soil group or a mapping unit) or a soil-vegetation or soil-landform association in New Zealand
- contains a soil or soil-vegetation or 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.

3 = Regional

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

Kenny & Hayward (1996) Categories of Importance

Sites are listed in this inventory under three levels (A–C) of significance. The importance assessment given to each site has been assessed by those informants familiar with the site:

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.

Appendix 5

CHECKLIST OF FAUNA SPECIES RECORDED IN THE TUTAMOE ECOLOGICAL DISTRICT

Birds

Checklist of birds compiled by the authors and Dr Ray Pierce with notes from Department of Conservation Sites of Special Biological Interest (SSBI) information system and corresponding SSBI site number. Nomenclature follows Heather and Robertson (2000).

Key

*=introduced

COMMON NAME	OTHER NAME	SCIENTIFIC NAME	
NI brown kiwi	Kiwi	*Apteryx australis mantelli*	
NZ dabchick	Weweia	*Poliocephalus rufopectus*	
Australian little grebe		*Tachybaptus n. novaehollandiae*	
Yellow-nosed mollymawk		*Diomedea chlororhynchos*	Wreck of juvenile found between South Hokianga Head-Waipoua River coast (SSBI O06/H014)
Buller's shearwater		*Puffinus bulleri*	Sighted off shore on South Hokianga Head-Waipoua River coast (SSBI O06/H014)
Sooty shearwater	Titi	*P. griseus*	Three dead birds found on South Hokianga Head-Waipoua River coast (SSBI O06/H014)
Fluttering shearwater	Pakaha	*P. gavia*	One dead bird found on South Hokianga Head-Waipoua River coast (SSBI O06/H014)
Black petrel	Taiko	*Procellaria parkinsoni*	Historic
Fairy prion	Titi wainui	*Pachyptila turtur*	Two dead birds found on South Hokianga Head-Waipoua River coast (SSBI O06/H014)
Grey-faced petrel	Oi	*Pterodroma macroptera gouldi*	
Northern little blue penguin	Korora, little blue penguin	*Eudyptula minor*	
Australasian gannet	Takapu	*Morus s. serrator*	
Black shag	Kawau	*Phalacrocorax carbo novaehollandiae*	
Pied shag	Karuhiruhi	*P. v. varius*	
Little shag	Kawaupaka	*P. melanoleucos brevirostris*	
White-faced heron	Matuku-moana	*Ardea novaehollandiae*	
Reef heron	Matuku moana	*Egretta s. sacra*	
Australasian bittern	Matuku	*Botaurus poiciloptilus*	
Black swan*		*Cygnus atratus*	

COMMON NAME	OTHER NAME	SCIENTIFIC NAME
Paradise shelduck	Putangitangi	*Tadorna variegata*
Mallard*		*Anas platyrhynchos*
Grey duck	Parera, karakahia	*A. s. superciliosa*
Grey teal	Tete	*A. gracilis*
Brown teal	Pateke	*A. chlorotis*
Australasian harrier	Kahu	*Circus approximans*
California quail*		*Callipepla californica*
Brown quail*		*Synoicus ypsilophorus*
Wild turkey*		*Meleagris gallopavo*
Spotless crake	Puweto	*Porzana tabuensis plumbea*
Pukeko	Purple swamphen	*Porphyrio porphyrio melanotus*
Pied oystercatcher	Torea	*Haematopus ostralegus finschi*
Variable oystercatcher	Torea	*H. unicolor*
Pied stilt	Poaka	*Himantopus himantopus leucocephalus*
Northern NZ dotterel	Tuturiwhatu	*Charadrius obscurus aquilonius*
Banded dotterel	Tuturiwhatu	*C. b. bicinctus*
Spur-winged plover	Masked lapwing	*Vanellus miles novaehollandiae*
Arctic skua		*Stercoarius parasiticus*
Southern black-backed gull	Karoro	*Larus dominicanus*
Red-billed gull	Tarapunga	*L. novaehollandiae scopulinus*
Caspian tern	Taranui	*Sterna caspia*
White-fronted tern	Tara	*S. striata*
NZ pigeon	Kukupa, kereru	*Hemiphaga novaeseelandiae*
NI kaka		*Nestor meridionalis septentrionalis*
Eastern rosella*		*Platycercus eximius*
Red-crowned parakeet	Kararíki	*Cyanoramphus novaeseelandiae*
Shining cuckoo	Pipiwharauroa	*Chrysococcyx lucidus*
Long-tailed cuckoo	Koekoea	*Eudynamys taitensis*
Morepork	Ruru	*Ninox n. novaeseelandiae*
NZ kingfisher	Kotare	*Todiramphus sanctus vagans*
Skylark*		*Alauda arvensis*
Welcome swallow		*Hirundo tahitica neoxena*
NZ pipit	Pihoihoi	*Anthus n. novaeseelandiae*
Dunnock*	Hedge sparrow	*Prunella modularis*
Blackbird*		*Turdus merula*
Song thrush*	Piopio	*T. philomelos*
NI fernbird	Matata	*Bowdleria punctata vealeae*
Grey warbler	Riroriro	*Gerygone igata*
NI fantail	Piwakawaka	*Rhipidura fulignosa placabilis*

COMMON NAME	OTHER NAME	SCIENTIFIC NAME
NI tomtit	Miromiro, pied tit	*Petroica macrocephala toitoi*
NI robin	Toutouwai, pitoitoi	*P. australis longipes*
Silvereye	Tauhou, whiteye	*Zosterops l. lateralis*
Tui		*Prosthemadera n. novaeseelandiae*
Yellowhammer*		*Emberiza citrinella*
Cirl bunting*		*E. cirlus*
Chaffinch*		*Fringilla coelebs*
Greenfinch*		*Carduelis chloris*
Goldfinch*		*C. carduelis*
Redpoll*		*C. flammea*
House sparrow*		*Passer domesticus*
Starling*		*Sturnus vulgaris*
Common myna*		*Acridotheres tristis*
NI kokako	Blue-wattled crow	*Callaeas cinerea wilsoni*
Australian magpie*		*Gymnorhina tibicen*

Native invertebrates

Black katipo spider	*Latrodectus atritus*
Forest ringlet butterfly	*Dodonidia helmsii*
Earthworm	*Rhododrilus agathis*
Northland tusked weta	*Anisonra nicobarica*
Ground weta	*Hemiandrus* "Otekauri"
Beetle	*Strphetodes* sp. "Waipoua"
Beetle	*Euconnus microcilipes*
Beetle	*Euconnus paracilipes*
Peace's weevil	*Nothaldonus peacei*
Stag beetle	*Paralissotes mangonuiensis*
Beetle	*Maorinus hunuaeformis*
Beetle	*Maorinus* sp.
Beetle	*Maorinus toronouii*
Weevil	*Megacolabus bifurcatus*
Weevil	*Megacolabus obesus*
Darkling beetle	*Menimus clarkei*
Beetle	*Sciacharis yakasensis*
Land snail	*Amborhytida forsythi*
Slug	*Athoracophorus* sp. 7
Land snail	*Charopidae* sp. 8
Land snail	*Charopidae* sp. 12

Land snail	*Charopidae* sp. 13
kauri snail	*Paryphanta busbyi busbyi*
Land snail	*Phrixgnathus murdochi*
Land snail	*P. waipoua*
Land snail	*Punctidae* sp. 4
Land snail	*Punctidae* sp. 5
Land snail	*Punctidae* sp. 21
Land snail	*Punctidae* sp. 28
Land snail	*Punctidae* sp. 29
Land snail	*Punctidae* sp. 31
Land snail	*Punctidae* sp. 32
Land snail	*Punctidae* sp. 33
Land snail	*Punctidae* sp. 34

Native mammals

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

Native reptiles

Auckland green gecko	*Naultinus elegans elegans*
Copper skink	*Cyclodina aenea*
Shore skink	*Oligosoma smithi*

Native fish and freshwater invertebrates

Yelloweye mullet	*Aldrichetta forsteri*
Longfin eel	*Anguilla dieffenbachii*
Shortfin eel	*A. australis*
Torrentfish	*Cheimarrichthys fosteri*
Banded kokopu	*Galaxias fasciatus*
Inanga	*G. maculatus*
Koaro	*G. brevipinnis*
Short-jawed kokopu	*G. postvectis*
Lamprey	*Geotria australis*
Common bully	*Gobiomorphus cotidianus*
Crans bully	*G. basalis*
Giant bully	*G. maculatus*
Red-finned bully	*G. huttoni*
Grey mullet	*Mugil cephalus*
Koura	*Parenephrops planifrons*
Common smelt	*Retropinna retropinna*
Native caddisfly	*Oxythira waipoua*

Introduced fish

Catfish	*Ameiurus nebulosus*
Goldfish	*Carassius auratus*
Gambusia	*Gambusia affinis*
Rainbow trout	*Oncorhynchus mykiss*
Brown trout	*Salmo trutta*

Introduced mammals

House mouse	*Mus musculus*
Black (ship) rat	*Rattus rattus ratus*
Norway rat	*R. norvegicus*
Weasel	*Mustela nivalis*
Stoat	*M. erminea*
Ferret	*M. furo*
European rabbit	*Oryctolagus cuniculus*
House cat	*Felis catus*
Dog	*Canis familaris*
Cattle	*Bos taurus*
Goat	*Capra hircus*
Brushtail possum	*Trichosurus vulpecula*
Pig	*Sus scrofa*
European hedgehog	*Erinaceus europaeus*
Other	
Argentine ant	*Linepithema humile*

Appendix 6

COMMON AND SCIENTIFIC PLANT NAMES

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

INDIGENOUS PLANTS	
Bartlett's koromiko	*Hebe perbella*
black maire	*Nestegis cunninghamii*
bracken	*Pteridium esculentum*
five-finger	*Psuedopanax arboreus*
Hall's totara	*Podocarpus hallii*
hangehange	*Geniostoma rupestre*
harakeke	*Phormium tenax*
hinau	*Elaeocarpus dentatus*
horopito	*Psuedowintera axillaris*
hutu	*Ascarina lucida*
kahikatea	*Dacrycarpus dacrydioides*
kaikomako	*Pennantia corymbosa*
kanuka	*Kunzea ericoides*
karaka	*Corynocarpus laevigatus*
kauri	*Agathis australis*
kawaka	*Libocedrus plumosa*
Kirks daisy	*Brachglottis kirkii* var. *kirkii*
knobby clubrush	*Ficinia nodosa*
kohekohe	*Dysoxylum spectabile*
kohuhu	*Pittosporum tenuifolium*
kotukutuku	*Fuchsia excorticata*
kowhai	*Sophora microphylla*
kowharawhara	*Astelia banksii*
houhere	*Hoheria populnea*
lancewood	*Pseudopanax crassifolius*
mahoe	*Melicytus ramiflorus*
maire tawake	*Syzygium maire*
makamaka	*Ackama rosifolia*
mamaku	*Cyathea medullaris*
mamangi	*Coprosma arborea*
mangeao	*Litsea calicaris*

manuka	*Leptospermum scoparium*
mapou	*Myrsine australis*
marsh clubrush	*Bolboschoenus fluviatilus*
matai	*Prumnopitys taxifolia*
mingimingi	*Leucopogon fasciculatus*
miro	*Prumnopitys ferruginea*
monoao	*Halocarpus kirkii*
mountain horopito	*Pseudowintera colorata*
native iceplant	*Disphyma australe*
native passion vine	*Passiflora tetrandra*
NZ spinach	*Tetragonia tryna*
nikau	*Rhopalostylis sapida*
northern rata	*Metrosideros robusta*
oioi	*Apodasmia similis*
ongaonga	*Urtica ferox*
pate	*Schefflera digitata*
pigeonwood	*Hedycarya arborea*
pingao	*Desmoschoenus spiralis*
pohutukawa	*Metrosideros excelsa*
pokaka	*Elaeocarpus hookerianus*
ponga	*Cyathea dealbata*
puka	*Griselinia lucida*
pukatea	*Laurelia novae-zelandiae*
puriri	*Vitex lucens*
putaputaweta	*Carpodetus serratus*
rangiora	*Brachyglottis repanda*
raukawa	*Raukaua edgerleyi*
raupo	*Typha orientalis*
rewarewa	*Knightia excelsa*
rimu	*Dacrydium cupressinum*
rohutu	*Neomyrtus pedunculata*
shore bindweed	*Calystegia soldanella*
silver pine	*Manoao colensoi*
southern rata	*Metrosideros umbellata*
Spinifex	*Spinifex sericeus*
supplejack	*Ripogonum scandens*
tanekaha	*Phyllocladus trichomanoides*
taraire	*Beilschmiedia tarairi*
tarata	*Pittosporum eugenioides*
tauhinu	*Ozothamnus leptophyllus*

taupata	*Coprosma repens*
tawa	*Beilschmiedia tawa*
tawari	*Ixerba brexioides*
tawheowheo	*Quintinia serrata*
ti kouka, cabbage tree	*Cordyline australis*
titirangi, napuka	*Hebe speciosa*
titoki	*Alectryon excelsus*
toatoa	*Phyllocladus toatoa*
toetoe	*Cortaderia* sp.
toikiwi	*Gahnia xanthocarpa*
toru	*Toronia toru*
totara	*Podocarpus totara*
towai	*Weinmannia silvicola*
turoa onamata	*Ackama nubicola*
umbrella fern	*Gleichenia dicarpa*
wharangi	*Melicope ternata*
whaririki	*Phormium cookianum*
whau	*Entelea arborscens*
wheki	*Dicksonia squarrosa*
white maire	*Nestegis lanceolata*
willow-leaved maire	*Mida salicifolia*
wineberry	*Aristotelia serrata*

ADVENTIVE	
African clubmoss	*Selaginella kraussiana*
Chinese privet	*Ligustrum sinense*
crack willow	*Salix fragilis*
gorse	*Ulex europaeus*
fleabane	*Conyza albida*
Japanese cedar	*Cryptomeria japonica*
Kahili ginger	*Hedychium gardnerianum*
lupin	*Lupinus* sp.
Mexican devil	*Ageratum adenophora*
mistflower	*A. riparia*
pampas	*Cortaderia* sp.
pine	*Pinus radiata*
tutsan	*Hypericum androsaemum*
wandering willy	*Tradescantia fluminensis*
weeping willow	*Salix babylonica*

Appendix 7

CHECKLIST OF INDIGENOUS PLANT SPECIES RECORDED IN WAIPOUA/MATARAUA/WAIMA FORESTS IN TUTAMOE ECOLOGICAL DISTRICT.

This species list was compiled by the authors using records from the Department of Conservation's Site of Special Biological Interest (SSBI) information system and BIOWEB and herbaria records accessed for this report.

SSBI reference: Waipoua Conservation Forest O06/H015; Mataraua Forest O06/H013; Waima Forest O06/H010.

Many of the records from these forests were sourced from plant lists compiled by Peter Bellingham in 1985 based on his visits between 1983 and 1984 and additional records he gathered from unpublished lists and herbarium records.

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Ferns and fern allies				
Adiantum cunninghamii	common maidenhair	●		●
Adiantum diaphanum		●		
Adiantum fulvum		●		●
Adiantum hispidulum	rosy maidenhair	●		●
Adiantum viridescens		●	●	●
Anarthropteris lanceolata		●	●	●
Arthropteris tenella		●		●
Asplenium bulbiferum	hen and chicken fern, manamana	●	●	●
Asplenium flaccidum	hanging spleenwort, raukatauri	●	●	●
Asplenium lamprophyllum				●
Asplenium oblongifolium	shining spleenwort, huruhuruwhenua	●	●	●
Asplenium polyodon	sickle spleenwort, petako	●	●	●
Azolla filiculoides	nini, lance fern	●		
Blechnum chambersii	rereti, nini	●	●	●
Blechnum colensoi		●		●
Blechnum discolor	piupiu, crown fern	●	●	●
Blechnum filiforme	thread fern, paanako	●	●	●
Blechnum fluviatile		●	●	●
Blechnum fraseri		●	●	●

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Blechnum membranaceum		●	●	●
Blechnum nigrum		●	●	●
Blechnum novae-zelandiae	kiokio	●		●
Blechnum procerum	kiokio	●	●	●
Ctenopteris heterophylla		●	●	●
Cyathea cunninghamii	gully tree fern, puunui	●		●
Cyathea dealbata	ponga, silver tree fern	●	●	●
Cyathea medullaris	mamaku	●	●	●
Cyathea smithii	katote, soft tree fern	●	●	●
Deparia petersenii		●	●	●
Dicksonia lanata		●	●	●
Dicksonia squarrosa	wheki	●	●	●
Diplazium australe		●		●
Doodia australis	rasp fern	●		●
Doodia mollis		●		
Doodia squarrosa		●		
Gleichenia dicarpa	tangle fern	●		●
Gleichenia microphylla	waewaekaka	●		●
Grammitis billardierei		●	●	●
Grammitis ciliata		●		
Grammitis pseudociliata		●	●	●
Grammitis rawlingsii		●		
Histiopteris incisa	waterfern, matata	●	●	●
Huperzia varia	hanging clubmoss, iiwituna, matukutuku	●	●	●
Hymenophyllum armstrongii	filmy fern	●	●	●
Hymenophyllum atrovirens	filmy fern	●	●	
Hymenophyllum cupressiforme	filmy fern			●
Hymenophyllum demissum	irirangi, filmy fern	●	●	●
Hymenophyllum dilatatum	filmy fern, matua mauku	●	●	●
Hymenophyllum ferrugineum	rusty filmy fern	●	●	●
Hymenophyllum flabellatum	filmy fern	●	●	●
Hymenophyllum flexuosum		●	●	●
Hymenophyllum lyallii		●	●	●
Hymenophyllum multifidum	filmy fern	●	●	●
Hymenophyllum rarum	filmy fern	●	●	●
Hymenophyllum revolutum	filmy fern	●	●	●
Hymenophyllum sanguinolentum	filmy fern, piripiri	●	●	●

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Hymenophyllum scabrum	filmy fern	●	●	●
Hypolepis ambigua		●		
Hypolepis distans		●		
Hypolepis rufobarbata		●	●	
Lastreopsis glabella	smooth shield fern	●	●	●
Lastreopsis hispida	hairy shield fern	●	●	●
Lastreopsis microsora subsp. *pentangularis*		●		●
Lastreopsis velutina		●	●	●
Leptolepia novae-zelandiae		●		●
Leptopteris hymenophylloides		●	●	●
Leptopteris superba	heruheru	●		
Lindsaea linearis		●		
Lindsaea trichomanoides		●	●	●
Loxsoma cunninghamii		●		
Lycopodiella cernua		●		●
Lycopodium deuterodensum		●		●
Lycopodium lateralis		●		
Lycopodium volubile	club moss, waewaekoukou	●	●	●
Lygodium articulatum	mangemange, bushmans mattress	●	●	●
Microsorum pustulatum	Hound's tongue, kowaowao	●	●	●
Microsorum scandens	mokimoki, fragrant fern	●	●	●
Paesia scaberula	hard fern, matata	●	●	●
Pellaea rotundifolia				●
Pneumatopteris pennigera	gully fern, pakau-roharoha	●	●	●
Polystichum neozelandicum	black shield fern	●		●
Pteridium esculentum	bracken, raarahu	●	●	●
Pteris comans	coastal brake	●		
Pteris macilenta	sweet fern	●	●	●
Pteris saxatilis				●
Pteris tremula	shaking brake	●	●	●
Pyrossia eleagnifolia	leather-leaf fern	●	●	●
Rumorha adiantiformis	leathery shield fern	●	●	●
Schizaea bifida	fan fern	●		
Schizaea dichotoma	fan fern	●		
Schizaea fistulosa	fan fern	●		
Sticherus cunninghamii	umbrella fern	●	●	●

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Sticherus flabellatus		●		
Tmesipteris elongata	fork fern	●	●	●
Tmesipteris lanceolata	fork fern	●	●	●
Tmesipteris sigmatifolia	fork fern	●		●
Tmesipteris tannensis	fork fern	●	●	●
Todea barbara		●		
Trichomanes elongatum	bristle fern	●	●	●
Trichomanes endlicherianum		●	●	●
Trichomanes reniforme	kidney fern, raurenga	●	●	●
Trichomanes strictum		●	●	●
Trichomanes venosum		●	●	●
Gymnosperrms				
Agathis australis	kauri	●		●
Dacrydium cupressinum	rimu	●	●	●
Dacryocarpus dacrydioides	kahikatea	●	●	●
Halocarprus kirkii	monoao	●		
Libocedrus plumosa	kawaka	●	●	●
Manoao colensoi	silver pine	●		
Phyllocladus toatoa	toatoa	●		
Phyllocladus trichomanoides	tanekaha	●		●
Podocarpus hallii	Hall's totara	●	●	●
Podocarpus totara	totara	●		●
Prumnopitys taxifolia	matai	●	●	●
Stachyopitys ferriginea	miro	●	●	●
Dicotyledons				
Acaena anserinifolia	bidibidi	●	●	●
Acaena novae-zelandiae	bidibidi	●	●	●
Ackama nubicola	turoa onamata			●
Ackama rosifolia	makamaka	●	●	●
Alectryon excelsus	titoki	●		●
Alsueosmia banksii var. *banksii*	toropapa	●	●	
Alsueosmia macrophylla		●	●	●
Alsueosmia × *quercifolia*		●	●	●
Anaphaioides trinervis		●		
Apium prostratum subsp. *prostratum* var. *filiforme*		●		
Aristotelia serrata	makomako, wineberry	●	●	●
Ascarina lucida	hutu	●	●	●

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Australina pusilla				●
Beilschmiedia tarairi	taraire	●	●	●
Beilschmiedia tawa	tawa	●	●	●
Brachyglottis kirkii var. *angustoir*		●	●	●
Brachyglottis kirkii var. *kirkii*	Kirk's tree daisy, kohurangi	●	●	
Brachyglottis repanda	rangiora	●	●	●
Callitriche muelleri	starwort	●	●	●
Calystegia sepium subsp. *roseata*	bindweed	●		
Calystegia soldanella	shore bindweed, nihinihi	●		
Calystegia tugoriorum		●		
Cardimine debilis agg.	native cress	●		●
Carmichaelia australis	NZ broom	●	●	●
Carpodetus serratus	putaputaweta	●	●	●
Centella uniflora	centella	●	●	
Clematis cunninghamii	clematis	●	●	●
Clematis forsteri		●		
Clematis paniculata	puawhananga	●	●	●
Colensoa physaloides				●
Coprosma acerosa	sand coprosma	●		
Coprosma arborea	mamangi	●	●	●
Coprosma areolata		●	●	●
Coprosma grandifolia	kanono	●	●	●
Coprosma lucida	karamu, shining karamu	●	●	●
Coprosma macrocarpa	large seeded coprosma	●		●
Coprosma macrocarpa C. propinqua		●		
Coprosma parviflora		●		●
Coprosma propingua var. propingua		●		
Coprosma propingua var. propingua × *C. robusta*		●	●	
Coprosma repens	taupata	●		
Coprosma rhamnoides		●	●	●
Coprosma rigida			●	●
Coprosma robusta	karamu	●	●	●
Coprosma spathulata		●		●
Coprosma tenuicaulis		●	●	●

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Coprosma waima			●	●
Coriaria arborea	tutu	●		●
Corokia buddleioides		●		
Corynocarpus laevigatus	karaka	●		●
Cyathodes juniperina	mingimingi	●		●
Dichondra repens	Mercury Bay weed	●		
Dodonaea viscosa	akeake	●		●
Dracophyllum latifolium	neinei	●	●	●
Dracophyllum lessonianum		●		
Dracophyllum sinclairii		●		●
Drosera peltata	sundew orchid	●		
Drosera binata	sundew orchid	●		●
Dysoxylum spectabile	kohekohe	●	●	●
Elaeocarpus dentatus	hinau	●	●	●
Elaeocarpus hookerianus	pokaka	●	●	●
Elatosema rugosum	paritaniwha	●	●	●
Entelea arborescens	whau	●		●
Epacris pauciflora		●		
Epilobium billardiereanum		●		
Epilobium hirtigerum	hairy willowherb	●		
Epilobium nerteroides		●		
Epilobium nummulariifolium		●		
Epilobium pallidiflorum		●		
Epilobium pedunculare		●		●
Epilobium pubens				●
Epilobium rotundifolium		●	●	●
Euchiton collinus				●
Euchiton collinus		●	●	●
Fuchsia excorticata	kotukutuku, tree fuchsia	●	●	●
Fuchsia procumbens		●		
Galium propinquum		●	●	●
Gaultheria antipoda	snowberry	●	●	●
Geniostoma rupestre	hangehange	●	●	●
Geranium homeanum		●		
Geranium potentilloides		●		
Gonocarpus incanus	piripiri	●		
Gonocarpus micranthus		●		●
Gonocarpus montanus		●		

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Gratiola sexdentata		●	●	●
Griselina littoralis		●	●	●
Griselina lucida	puka	●	●	●
Gunnera monoica		●	●	
Haloragis erecta subsp. erecta	toatoa	●	●	●
Hebe diosmifolia		●		
Hebe flavida		●		●
Hebe ligustrifolia		●		
Hebe perbella	Bartlett's hebe			●
Hebe sp. (*H. parviflora* agg.)		●		
Hebe stricta var. stricta		●	●	●
Hedycarya arborea	pigeonwood, porokaiwhiri	●	●	●
Helichrysum lanceolatum				●
Hoberia populnea	houhere, lacebark	●	●	●
Hydrocotyle dissecta		●	●	
Hydrocotyle elongata		●		
Hydrocotyle moschata		●	●	●
Hydrocotyle novae-zelandiae		●		
Hypericum japonicum			●	●
Ileostylus micranthus		●		●
Ixerba brexioides	tawari	●	●	●
Knightia excelsa	rewarewa	●	●	●
Kunzea ericoides	kanuka	●		●
Lagenifera lanata		●		
Lagenifera pumila		●		●
Laurelia novae-zelandiae	pukatea	●	●	●
Leionema nudum	mairehau	●		●
Leptospermum scoparium	manuka	●	●	●
Leptostigma setulosa		●	●	●
Leucopogon fasciculatus	mingimingi	●	●	●
Leucopogon fraseri	patotara	●		
Lilaeopsis novae-zelandiae		●		
Litsea calicaris	mangeao	●		●
Lobelia anceps	punakuru, shore lobelia	●	●	●
Lophomyrtus bullata	ramarama	●	●	●
Macropiper excelsum subsp. *excelsum* f. *excelsum*	kawakawa	●		●
Melicope simplex	poataniwha	●	●	

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Melicope ternata	wharangi	●		●
Melicytus macrophyllus	large-leaved mahoe	●	●	●
Melicytus micranthus		●		●
Melicytus ramiflorus	mahoe	●	●	●
Metrosideros albiflora	white rata, aka	●	●	●
Metrosideros carminea		●	●	●
Metrosideros colensoi			●	
Metrosideros diffusa		●	●	●
Metrosideros excelsa	pohutukawa	●		
Metrosideros excelsa x robusta		●		
Metrosideros fulgens	scarlet rata vine, akatawhiwhi	●	●	●
Metrosideros perforata	aka	●	●	●
Metrosideros robusta	northern rata	●	●	●
Metrosideros umbellata	southern rata	●	●	●
Mida salicifolia	willow-leaved maire, sandelwood	●	●	●
Muehlenbeckia australis		●	●	●
Muehlenbeckia complexa		●		
Myporum laetum	ngaio	●		●
Myrsine australis agg.	mapou	●	●	●
Myrsine salicina	toro	●	●	●
Neomyrtus pedunculata	rohutu	●		
Nertera depressa		●	●	●
Nertera dichondrifolia	hairy nertera	●	●	●
Nestegis cunninghamii	black maire	●		
Nestegis lanceolata	white maire	●	●	●
Nestegis montana	narrow-leaved maire	●		●
Olearia albida		●		
Olearia crebra				●
Olearia furfuracea	akepiro	●		●
Olearia rani	heketara	●	●	●
Olearia waima				●
Oxalis exilis	creeping oxalis	●		
Oxalis magellanica		●		
Ozothamnus leptophyllus	tauhinu	●		
Parsonsia capsularis var. *capsularis*	native jasmine, kaihua	●		●
Parsonsia heterophylla	native jasmine, kaihua	●		

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Parsonsia sp.	native jasmine, kaihua		●	
Passiflora tetrandra	kohia	●		
Pelargonium inodorum		●		
Pennantia corymbosa	kaikomako		●	●
Peperomia urvilleana		●		●
Picris burbidgeae		●		
Pimelea prostrata	NZ daphne	●		
Pimelea tomentosa		●		
Pittosporum cornifolium		●	●	●
Pittosporum ellipticum				●
Pittosporum eugenoides	tarata	●		●
Pittosporum kirkii		●		●
Pittosporum pimeleoides subsp. *pimeleoides*		●		
Pittosporum tenuifolium	kohuhu	●	●	●
Polygonum salicifolium		●	●	
Pomaderris aff. *phylicifolia*		●		
Pomaderris kumerahou	kumerahou	●		
Pomaderris phylicifolia		●		
Pomaderris prunifolia var. *edgerleyi*		●		
Pratia angulata		●	●	●
Pseudognaphalium luteoalbum agg.		●		
Pseudopanax arboreus	fivefinger	●	●	●
Pseudopanax crassifolius	lancewood	●	●	●
Pseudopanax lessonii	houpara	●		
Pseudowintera axillaris	horopito	●		●
Pseudowintera colorata	mountain horopito	●		●
Quintinia serrata	tawheowheo	●		●
Ranunculus acaulis	waoriki	●		
Ranunculus amphitrichus	native buttercup, waoriki	●	●	
Ranunculus reflexus	hairy buttercup,maruru	●	●	●
Ranunculus urvilleanus		●		
Raukaua anomalus		●	●	●
Raukaua edgerleyi	raukawa	●	●	●
Rhabdothamnus solandri	taurepo	●	●	●
Rubus australis	bush lawyer	●	●	●
Rubus cissoides	bush lawyer	●	●	●

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Rubus squarrosus	bush lawyer			●
Rubus australis × *R. cissoides*	bush lawyer	●		
Samolus repens var. *repens*	sea primrose	●		
Schefflera digitata	pate	●	●	●
Schizeilema trifoliolatum		●		
Selliera radicans	remuremu	●		
Senecio glomeratus		●		●
Senecio lautus var. *lautus*		●		
Senecio minimus		●	●	●
Senecio quadridentatus		●		
Senecio scaberulus		●		
Solanum americanum		●		●
Solanum aviculare f. *aviculare*	poroporo	●		●
Sophora microphylla	kowhai	●		●
Stellaria parviflora				●
Streblus heterophyllus	small leaved milk tree	●		●
Syzygium maire	maire tawake, swamp maire	●	●	●
Tetragonia implexicoma	NZ spinach	●		
Toronia toru	toru	●		●
Urtica ferox	ongaonga		●	●
Utricularia delicatula		●		
Viola filicaulis		●	●	
Vitex lucens	puriri	●		●
Wahlenbergia sp.		●		
Wahlenbergia violacea				●
Weinmannia silvicola	towai	●	●	●
Monocotyledons				
Acianthus sinclairii	orchid	●	●	●
Adelopetalum tuberculatum		●		
Apodasmia similis	oioi	●		
Arthropodium cirratum	rengarenga lily	●		●
Astelia banksii	kowharawhara	●		
Astelia nervosa		●	●	●
Astelia solandri	perching astelia	●	●	●
Astelia trinervia	kauri grass	●		●
Baumea tenax	sedge	●		
Baumea articulata	jointed twig rush	●		

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Baumea complanata		●		
Baumea juncea		●		
Baumea rubiginosa		●		
Baumea. huttonii		●		
Baumea. teretifolia		●		
Bolboschoenus ? fluviatilis	marsh clubrush	●		
Carex breviculmis		●		
Carex dissita		●	●	●
Carex fascicularis		●		
Carex flagellifera				●
Carex forsteri		●		●
Carex geminata		●		
Carex lambertiana		●	●	
Carex lessoniana		●	●	
Carex ochrosaccus		●		●
Carex secta			●	
Carex solandri		●	●	
Carex spinirostris			●	●
Carex subdola		●		
Carex testacea		●		
Carex virgata		●	●	
Chionochloa conspicua subsp. *cunninghamii*		●		
Collespermum hastatum	kahakaha, perching lily	●	●	●
Collespermum microspermum		●	●	●
Cordyline australis	ti-kouka, cabbage tree	●	●	●
Cordyline banksii	ti ngahere, forest cabbage tree	●	●	●
Cordyline pumilo		●		●
Cortaderia fulvida	toetoe	●	●	●
Cortaderia splendens		●		
Corunastylis pumila	orchid	●		
Corybas cheesemanii				●
Cyperus ustulatus	giant umbrella sedge	●	●	●
Desmoschoenus spiralis	pingao	●		
Deyeuxia quadriseta		●		
Dianella lattissima				●
Dianella nigra	turutu, blueberry	●	●	●
Dichelachne crinita	short-hair plume grass	●		

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Dichelachne micrantha		●		
Diplodium brumalis	orchid	●		
Diplodium trullifolium	orchid	●		
Drymoanthus adversus		●	●	●
Earina autumnalis	Easter orchid, raupeka	●	●	●
Earina mucronata	peka-a-waka, NZ bamboo orchid	●	●	●
Echinopogon ovatus		●		
Eleocharis acuta	sharp spike sedge	●		●
Eleocharis gracilis		●		●
Ficinia nodosa	knobby clubrush	●		
Freycinetia banksii	kiekie	●	●	●
Gahnia lacera	gahnia	●	●	●
Gahnia pauciflora	gahnia	●		●
Gahnia setifolia	gahnia	●	●	●
Gahnia xanthocarpa	toikiwi	●		●
Gastrodia cunninghamii				●
Ichthyostomum pygmaeum	pygmy orchid	●	●	●
Isachne globosa	swamp millet	●		
Isolepis cernua		●		
Isolepis inundata		●		
Isolepis prolifera		●		
Isolepis reticularis		●	●	●
Isolepis reticularis			●	●
Juncus edgariae		●	●	●
Juncus pallidus		●		
Juncus planifolius		●	●	●
Juncus prismatacarpus		●	●	
Lachnagrostis billardieri	long-hair plume grass	●		
Lachnagrostis filiformis		●		
Lemna minor	duckweed	●		
Lepidosperma australe		●		
Lepidosperma laterale		●		
Libertia grandiflora		●	●	●
Libertia ixioides		●		●
Libertia micrantha		●	●	●
Luzula picta var. *picta*	painted woodrush	●		
Machaerina sinclairii				●

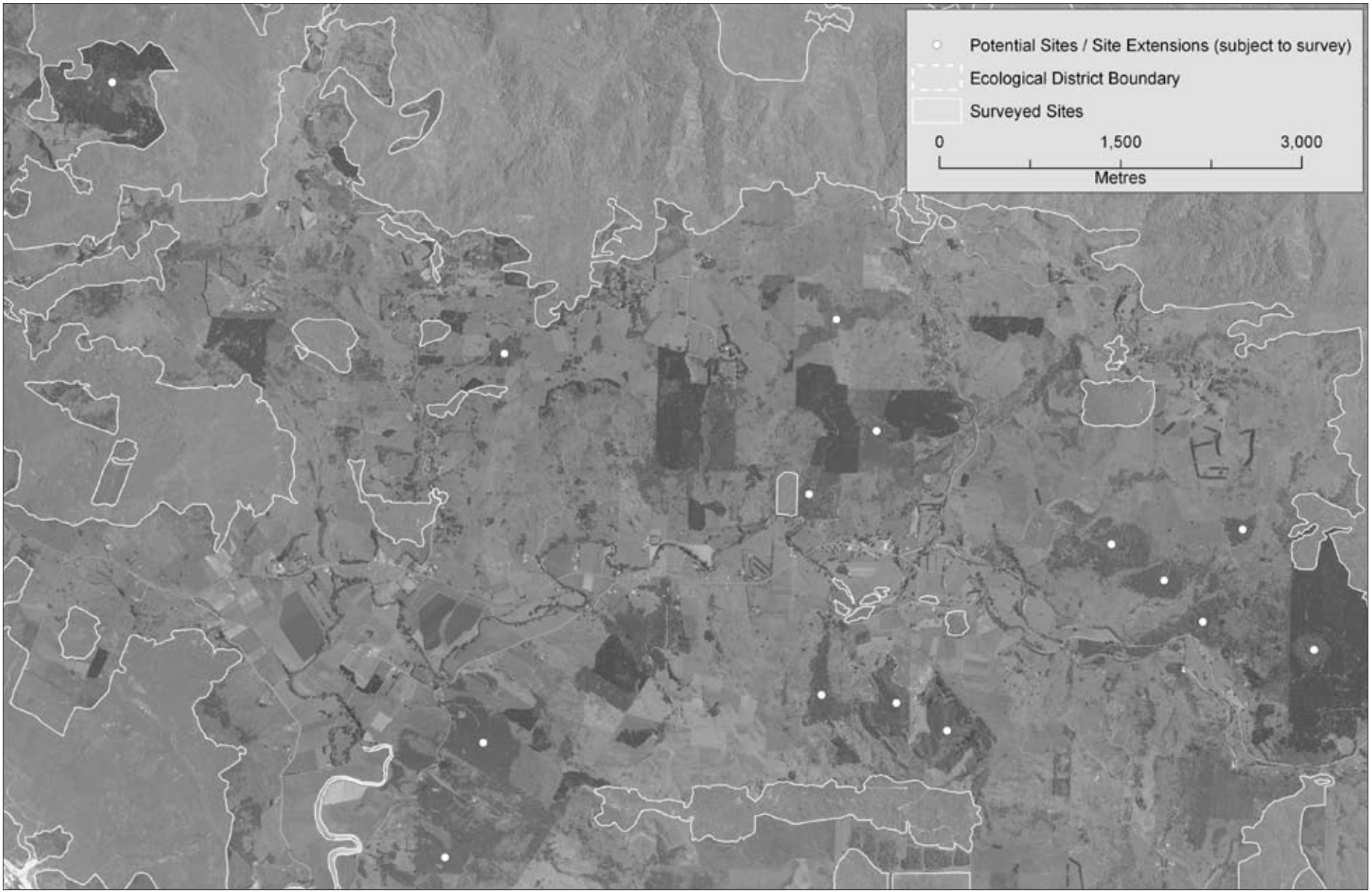
BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Microlaena avenacea	bush rice grass	●	●	●
Microlaena carsei		●		
Microlaena stipoides	meadow rice grass, patiti	●	●	●
Microtis parviflora	onion orchid	●		
Microtis uniflora	onion orchid	●		●
Morelotia affinis		●		
Nematoceras acuminatum	orchid	●	●	●
Nematoceras cryptanthus	orchid			●
Nematoceras macrantha	orchid			●
Nematoceras macranthum	orchid	●		●
Nematoceras oblonga	orchid		●	●
Nematoceras orbiculatum	orchid			●
Nematoceras rivulare	orchid	●	●	●
Nematoceras trilobum	orchid	●	●	●
Oplismenus hirtellus subsp. *hirtellus*	native grass	●	●	●
Oplismenus hirtellus subsp. *imbecillis*	native grass	●		●
Orthoceras novae-zeelandiae	orchid			●
Petalochilus chlorostylus	orchid	●		
Petalochilus saccastus	orchid	●		
Phormium cookianum	whaririki, mountain harakeke	●		●
Phormium tenax	harakeke	●		●
Poa anceps		●		●
Poa pusilla		●		
Potamogeton cheesmanii		●		
Pterostylis banksii	tutukiwi, green hooded orchid	●	●	●
Pterostylis graminea agg.	orchid	●		●
Rhopalostylis sapida	nikau	●	●	●
Ripogonum scandens	supplejack, kareao	●	●	●
Rytidosperma biannulare		●		
Rytidosperma gracile		●	●	●
Rytidosperma sp.				●
Rytidosperma unarede		●		●
Schoenoplectus tabernaemontani	kuta, kapungawha	●		
Schoenus apogon	sedge	●		●
Schoenus brevifolius	sedge	●		

BOTANICAL NAME	COMMON NAME	WAIPOUA FOREST	MATARAUA FOREST	WAIMA FOREST
Schoenus maschalinus	sedge	●	●	●
Schoenus tendo		●		
Simpliglottis cornuta	orchid			●
Simpliglottis cornuta		●		●
Singularybas oblongus	orchid	●		
Sparganium subglobosum		●		
Tetraria capillaris		●		
Thelymitra ? carnea	orchid			●
Thelymitra aemula	orchid	●		
Thelymitra longifolia	orchid	●		●
Thelymitra pauciflora	orchid	●		
Thelymitra pulchella	orchid	●		
Thismia rodwayi				●
Triglochin striata		●		
Typha orientalis	raupo	●	●	●
Uncinia banksii		●		●
Uncinia distans		●		
Uncinia uncinata		●	●	●
Uncinia zotovii		●	●	●
Winika cunninghamii		●	●	●
Zoysia pauciflora		●		

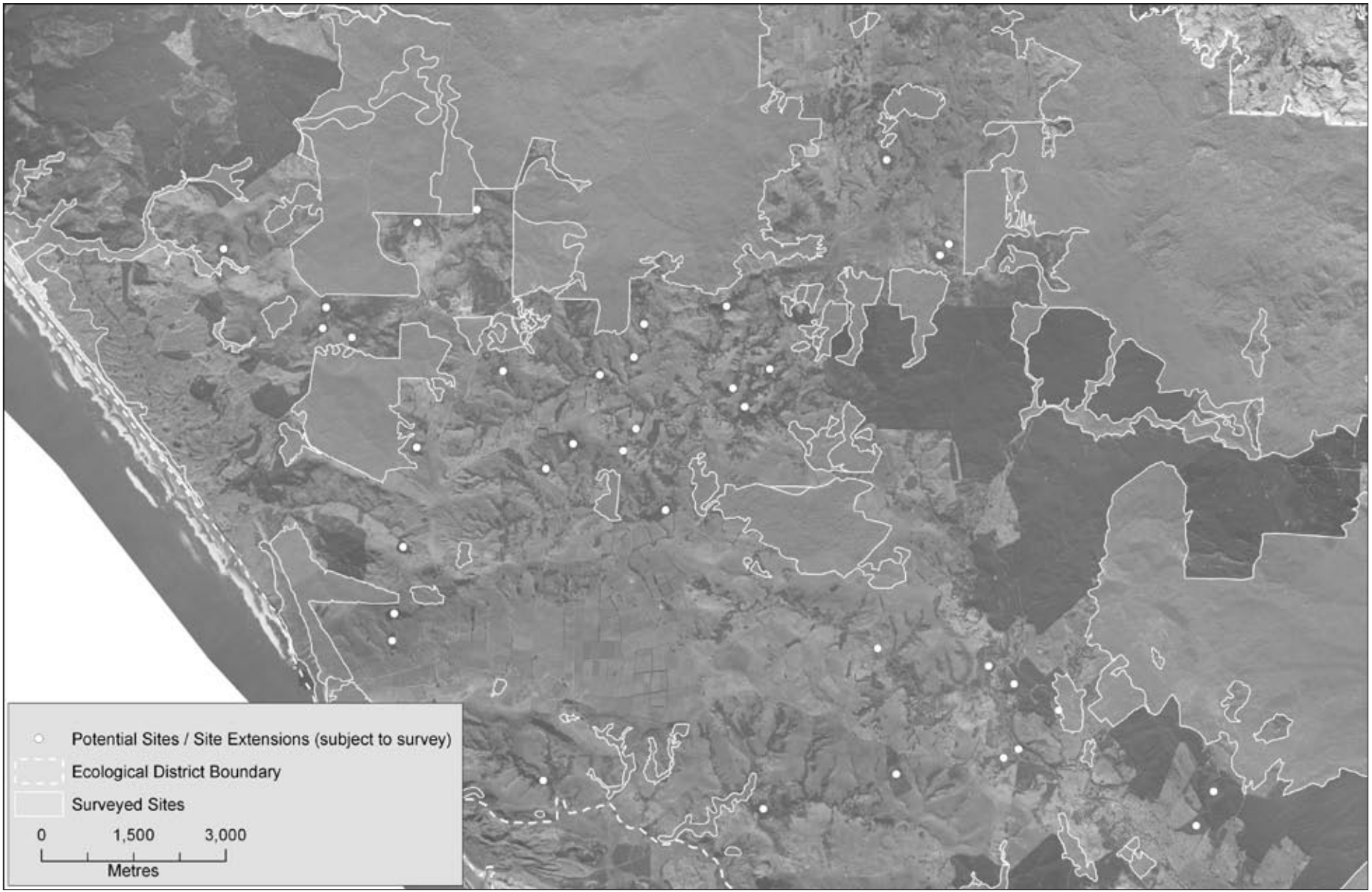
Appendix 8

POTENTIAL PNAP SITES/SITE EXTENSIONS IDENTIFIED IN RECENT AERIAL PHOTOGRAPHY

Recent aerial photography from 1999, 2002, and 2006 was used to produce the site maps as a check against the original 1994/95 survey which used topographical maps. In a few cases, the site boundaries have changed significantly due to loss of habitat or inclusion of habitat that should have been identified in the original survey. Generally sites changed very little or not at all whilst the site boundary of some sites was improved upon by the benefit of an aerial view compared to the topographical interpretation used for the original survey. It was not possible to re-survey the District so this map was produced to indicate potential sites which after survey could be categorised as Level 1 or Level 2 sites or which are possible habitat extensions to existing sites (habitat type was not known). Therefore this map is a guide only.



Map 3. Potential PNAP sites and site extensions in the northern Tutamoe Ecological District.



Map 4. Potential PNAP sites and site extensions in the southern Tutamoe Ecological District.

Appendix 9

GLOSSARY OF TERMS

Association

Association is used in the ecological unit (see below) where the canopy species have a mixed growth form, e.g. Oioi-harakeke-hangehange-knobby clubrush-manuka-toetoe association on consolidated dunes.

Biodiversity

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

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.

Duneland/Sandfield

Duneland/Sandfield is land which the area of bare sand exceeds the area covered by any one class of plant growth form.

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 all 1987).

Endemic

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

Exotic

Introduced to New Zealand; not indigenous.

Fernland

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

Flaxland

Refers to harakeke (flax) where the canopy (20–100%) exceeds that of any other species (Johnson and Gerbeaux 2004, adapted from Atkinson 1985).

Forest

A tall, predominantly closed canopy consisting mainly of tree species (a tree being a woody plant which attains a 10cm 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 New Zealand including species which occur naturally in New Zealand and other places (e.g. migratory bar-tailed godwits which return to New Zealand from Siberia every summer).

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

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 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

Reedlands comprise 20–100% cover of reeds, which are tall erect herbs emergent from shallow water, having branched leaves or stems that are either hollow or have very spongy pity, e.g. raupo, *Baumea articulata* (Johnson and Gerbeaux 2004, adapted from Atkinson 1985).

Refuge

Native bush enclaves in production 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.

Rushland

Rushs form the canopy (20–100%) e.g. *Juncus* that have stiff, erect stems or similarly non-flattened leaves including species like *Apodasmia similis* (oioi), *Ficinia nodosa* (knobby clubrush) etc (Johnson and Gerbeaux 2004, adapted from Atkinson 1985).

Representativeness

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

Riparian functions

Riparian vegetation performs important functions such as providing corridors linking habitats and providing shading to streams. This is important in Northland, as many streams have small catchments and the

water temperature can rise depleting the available oxygen, leading to the death of aquatic life. Litter debris enters the nutrient cycle and supports invertebrates such as mayfly, caddisfly and stonefly feeding on it. Riparian vegetation also acts as a buffer for non-point water discharges.

Riparian zone

An area of land immediately adjacent to a watercourse.

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 etc e.g. Gumland manuka shrubland, *Muehlenbeckia* shrubland on dunes.

Site

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

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

Succession

The process of change in the appearance, composition and structure of a community 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.

Treeland

A tree canopy of 20–80% however the tree cover is discontinuous above a lower canopy of predominantly non-woody vegetation or bare ground (Atkinson 1985).

Vegetation Type

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

Viability

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

Wetland

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

Appendix 10

INDEX OF SITES

SITE NAME	SURVEY NO.	LEVEL	PAGE
Waipoua Coastal Strip and Taha Moana Scenic Reserve	O06/027	1	98
Waipoua/Mataraua/Waima Forest Tract	O06/001	1	61
Waitapu Road Bush	O07/008	1	126
Waiwhatawhata Bush	O06/014	1	70
Wekaweka Bush	O06/024	1	91

ISBN: 978-0-478-14203-7

newzealand.govt.nz