Natural areas of Aupouri Ecological District

Reconnaissance Survey Report for the Protected Natural Areas Programme

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Department of Conservation
Te Papa Atawhai

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NEW ZEALAND PROTECTED NATURAL AREAS PROGRAMME

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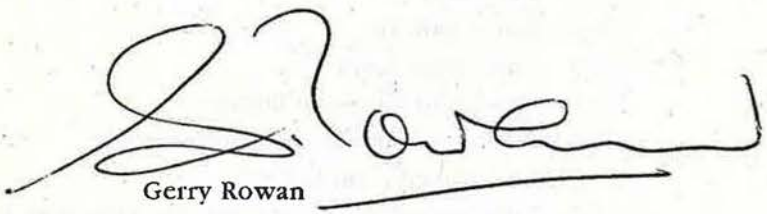
Foreword

This study has collected a large amount of information on the natural areas of the Aupouri Ecological District, and is a valuable guide to the Department of Conservation and other interested agencies and individuals as to the natural values of the Ecological District. This is useful, both for reference as well as setting conservation priorities.

Aupouri is a unique habitat, consisting of one long and a second smaller sand peninsula dotted with dune lakes and wetlands; kanuka/manuka shrublands; semi-wild coastal dune fringes; and three shallow harbours internationally important for their wildlife values. These habitats are home to a rich diversity of species including large numbers of threatened species, many of which, especially wetland dwellers, are seldom seen by people. Another distinctive feature is that there is very little indigenous forest left in this Ecological District—just a few minute remnants of pohutukawa and broadleaf forest.

In view of the overwhelming loss of wetland habitat throughout New Zealand (estimated at 85% since European settlement, Taylor and Smith 1997), and the rarity of dunefields and their associated vegetation, the preservation of these remaining areas is of vital importance for protecting indigenous biodiversity. Since the field surveying began, several areas have either been reduced in size or even disappeared, and ongoing threats, particularly from exotic forestry and other development are likely to further impact on many of the areas.

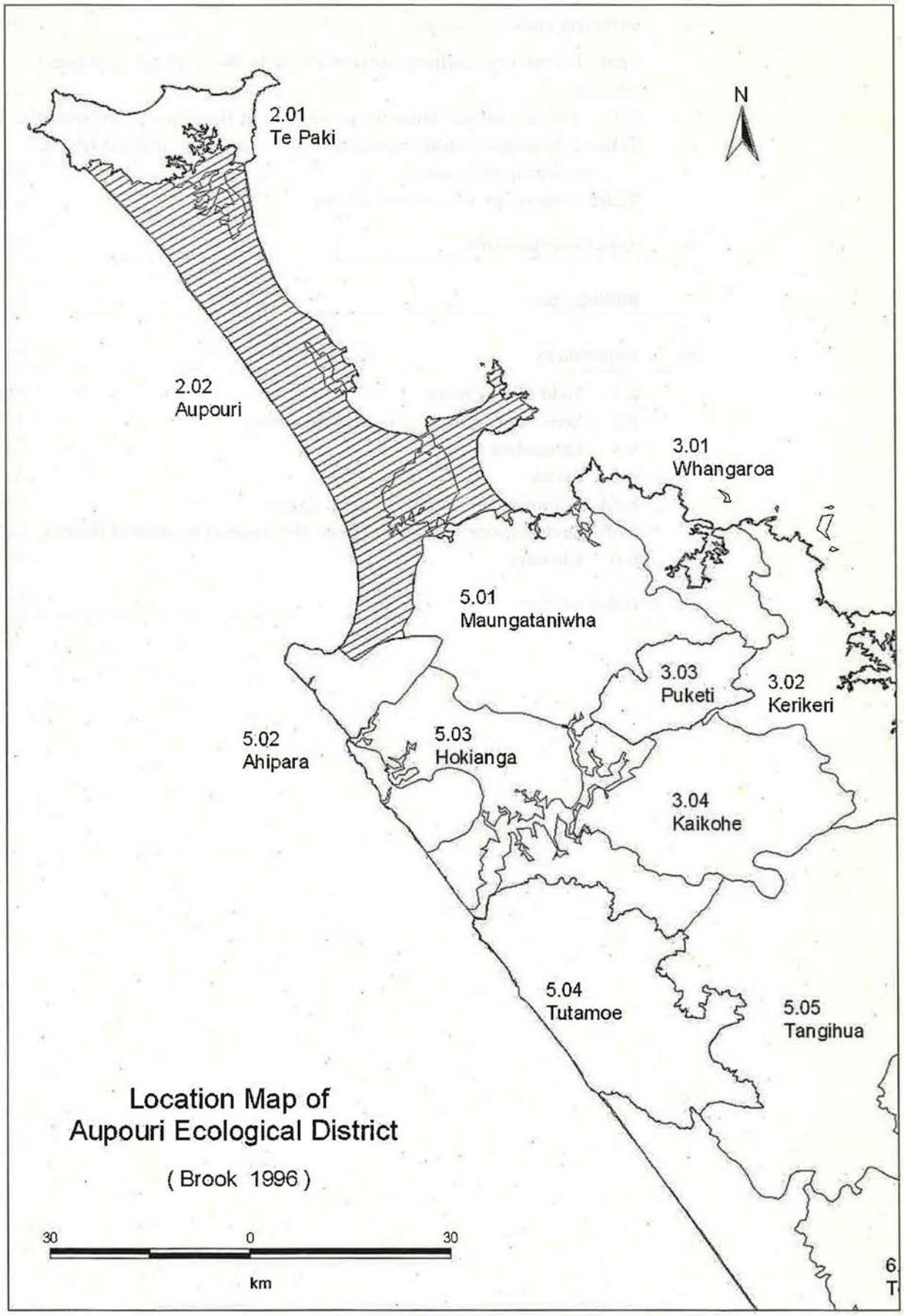
The challenge for users of this report is to implement effective protection for the natural areas identified before they are lost.



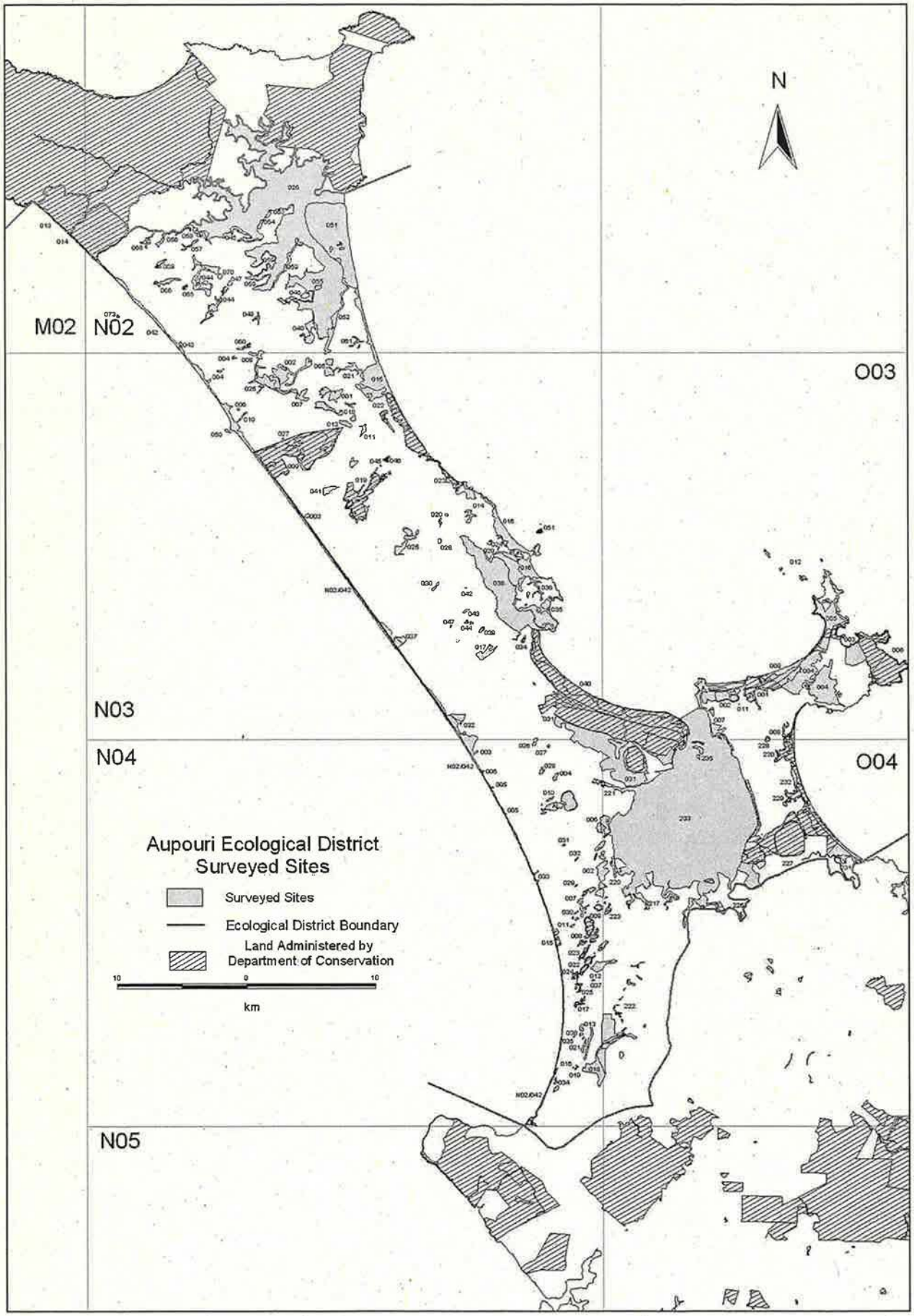
Gerry Rowan

Northland Conservator

CONTENTS



Map 1. Location map of Aupouri Ecological District.



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

Abstract

The Aupouri Ecological District consists of the narrow sand tombolo isthmuses of the Aupouri and Karikari Peninsulas and is connected in the north to a wide club-like head of the Te Paki Ecological District and in the south to the Ahipara and Maungataniwha Ecological Districts.

The District is characterised by shifting and consolidated dunes interspersed with small lakes, marshy hollows and peat swamps, and three large shallow harbours.

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

The Ecological District contains distinctive, nationally rare habitat types such as gumland, dunelands and wetlands, including habitats for a large number of threatened species. The three harbours and Kaimaumau-Motutangi Wetlands are exceptional ecosystems of international importance. These large wetlands contain diverse habitat types that support many threatened flora and fauna species. Kanuka-manuka shrubland is common, but indigenous forest in this Ecological District is represented by only a few small remnants.

Out of 134 natural areas described in this report, 111 are known to contain natural values of regional and national significance. This high proportion reflects the high number of threatened species and habitats present in this Ecological District.

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 for regions and districts outside of Northland in that it is based mainly on reconnaissance survey reports and existing published and unpublished data, and includes descriptions of most natural areas within the Ecological District boundaries.

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

This approach was adopted so that the survey report better meets the broader information requirements of the Department of Conservation arising from the Resource Management Act 1991 (RMA), the Convention on Biological Diversity (1992), and the New Zealand Biodiversity Strategy (2000).

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

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

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

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

1.2 ECOLOGICAL REGIONS AND DISTRICTS

New Zealand's physical environment is very diverse and this is reflected in the diversity of indigenous plant and animal communities. In recognition of the biogeographic differences between various parts of New Zealand, a

classification of Ecological Regions and Districts has been established (McEwen 1987).

An Ecological District is a local part of New Zealand where the topographical, geological, climatic, soil and biological features, 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 PNAP survey of the Aupouri Ecological District. It includes maps and brief descriptions of most of the indigenous natural areas within the Ecological District, together with an analysis of the main vegetation types and information on threatened species and other taxa of scientific interest.

The natural areas described have been assessed according to ecological criteria outlined in Section 2.4.

Soil sites of international, national or regional significance are derived from Arand et al 1993. Important geological sites and landforms of international, national and regional significance are derived from Kenny & Hayward (1996) (see Appendix 8.3).

1.4 AUPOURI ECOLOGICAL DISTRICT

The Aupouri Ecological District covers 119,422 ha (including the Parengarenga, Houhora, and Rangaunu Harbours, which total 18,168 ha) and is part of the Northern Northland Region. It is located north and east of Kaitaia, and runs from the Ahipara settlement to Scotts Point and Karatia in the north, taking in the Awanui River floodplain, the Karikari Peninsula, and Parengarenga, Houhora and Rangaunu Harbours. It adjoins the Ahipara Ecological District to the south-west, Maungataniwha Ecological District to the south, and Te Paki Ecological District to the north.

Whilst sharing some similarities with the adjoining Te Paki Ecological District and the Ahipara Ecological District, Aupouri is unique. It consists of a major isthmus (Aupouri) and a smaller one (Karikari). Geologically, it comprises

mainly dune sands, both consolidated and mobile, with swampy depressions and chains of dune lakes.

The peninsula topography contributes strongly to the importance of coastal habitats in this Ecological District, and provides much of its character, although only a fraction of the original dunes remain in natural vegetation.

Despite grazing to the shoreline in some places, and the dominance of exotic forestry on the western coast, the coastal margins are generally free of building development. Ninety Mile Beach on the west coast is the longest sandy beach in New Zealand. This beach, together with a series of long sandy beaches on the east coast and on the Karikari Peninsula, provides several sites of threatened plants and a coastal margin which is habitat for a large number of bird species, including the threatened northern NZ dotterel.

The chains of dune lakes and wetlands along the Aupouri Peninsula, although discontinuous, give the area a distinctive character and provide extremely important habitat for a number of threatened and regionally significant fauna species including NZ dabchick, Australasian bittern, spotless crake, banded rail, NI fernbird, and black mudfish. The dune lakes in particular give value as a "collective habitat", being greater than the individual rankings accorded to each individual wetland. Collectively, the entire chain, in conjunction with the three harbours, may qualify for international status due to the rarity of this habitat type today, and because of the range of threatened flora and fauna they support (P. Anderson pers. comm.). For example, the threatened Australasian bittern may require up to 49 ha of wetland to meet its full habitat and breeding requirements and may range over many kilometres of home range length (Ogle & Cheyne 1981). This may consist of several small wetlands within close proximity to each other to accommodate one pair. Also waterbirds, particularly ducks and the threatened NZ dabchick, depend on several individual lakes for their annual habitat requirements (DOC 1991b). It is therefore important to retain the remaining habitat linkages and "stepping stones" if these populations are to remain.

Nationally the Aupouri Peninsula is thought to provide habitat for 3–4% of the total NZ dabchick and Australasian bittern populations (Collier 1996).

Many wetlands in Aupouri Peninsula support populations of the threatened black mudfish and the Peninsula is the stronghold for this species in Northland (V. Kerr pers. comm.).

Lake Waiparera & Wetlands (N04/010) is the most significant wetland in Northland for the long-term survival of the threatened black mudfish due to the extensive size of the wetland, its stable hydrology, and high density of fish surveyed showing a complete age structure (V. Kerr pers. comm.). Due to recent black mudfish work in Northland, significant native aquatic fauna have also been identified in many wetlands, such as the threatened banded kokopu and regionally significant giant bully.

The wetlands represent some of New Zealand's rarest remaining natural ecosystems.

This has contributed to the very high number of threatened wetland species in the District. Since European settlement it has been estimated that only around 15% of New Zealand's original palustrine wetlands remain (Taylor & Smith 1997).

A graphic example of historic wetland habitat loss in Northland is accounted in Ogle (1984):

> *"Carse (1911) described "Lake Tangaonge" [sic.] as the largest of a chain of lakes situated on the west side of the Awanui River and estimated it to have been 5 km long and 2.5 km wide and surrounded by a much larger area of raupo swamps. "Lake Tangaonge" [sic.] is now completely drained and converted to farmland."*

Wetlands continue to be modified or completely lost today. The entire western Motutangi wetlands were destroyed in the 1970s (P. Anderson pers. comm.) and land development is still continuing in the Kaimaumau area. Since 1978 nearly all of the temporary pan wetlands within the natural sand dunes of Aupouri have disappeared.

It is likely that exotic plantations and drainage of adjoining land is contributing to a slow drying out of many lake and wetland areas, modifying or destroying the edge areas, allowing invasion of pampas and other weed species. The peripheral swampy margins and shrubland buffers of wetlands and dune lakes have often been modified by stock or removed altogether during land development.

This District is (or previously was) habitat for more than 46 threatened plant species (excluding vagrants) listed in de Lange et al. (1999a). This very high number is indicative of the sensitivity of the habitats within the Ecological District to modification, as well as the degree of habitat loss which has occurred.

Fragmented shrubland areas, many currently dominated by aggressive colonising exotic species, offer an opportunity for the regeneration of forests virtually absent in the Ecological District (only a few isolated remnants of pohutukawa and coastal broadleaf forest remain). Some shrubland areas are also habitat for threatened species such as the fern *Todea barbara*, but most have never been adequately examined to determine their full ecological value.

Small areas of marine volcanics and sedimentary rock occur at Mt Camel and at Karikari, contributing to the distinctiveness of the Ecological District. Most of the mature coastal forest has been lost from these sites.

Mangroves, saltmarsh and eelgrass beds occur in the three harbours of the District (Parengarenga, Houhora and Rangaunu Harbours), providing some of the richest wildlife areas in the country.

Parengarenga Harbour has the greatest bird diversity of any habitat in Northland (Ogle 1984) and is one of the least modified warm temperate/subtropical harbours in the world (Sewell 1985), with little evidence of pollution from human-related activities (Hayward et al. 2001).

The Parengarenga Harbour is the most important harbour in New Zealand for wintering banded dotterel.

This harbour is also an important feeding area for Northern Hemisphere migrants such as turnstones, with 50% of New Zealand's population recorded at Parengarenga. Rangaunu Harbour has known to support around 50% of New Zealand's population of eastern little terns (R. Pierce pers. comm.).

Several islands occur in this Ecological District, some of which are predator-free and offer a refuge for many species. Some are remote or distant enough to be outside the dispersal range of many weed species.

Of the natural areas identified in the Aupouri Ecological District, 44% are estuarine and harbours, 28.8% are shrubland, 17.6% are dunelands, 9% are wetlands, 0.46% are forest and 0.002% are islands. This represents approximately 34% of the area of the Ecological District.

2. Methodology

2.1 GENERAL APPROACH

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

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

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

In the writing of this report, extensive use was made of information from existing biological databases such as the Sites of Special Biological Interest (SSBI) Database, Threatened Plants Database, NIWA Freshwater Fish Database, Amphibians and Reptiles Database, Bio-sites, Geopreservation and Soils Inventories, published information and DOC internal reports. The SSBI database in the Northland Conservancy was the source of a considerable amount of information, particularly concerning fauna. Herbarium records from Auckland Institute and Museum, and Landcare Research, Lincoln, were also consulted, and the Northland branch of the Ornothological Society of New Zealand provided year 2000 bird records for many of the lakes recorded in this report as well as classified summarised notes from previous years. 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 contraints, some important natural areas may have been overlooked.

2.2 CONSULTATION WITH LANDOWNERS

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

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

Iwi consultation was undertaken between the Te Aupouri Maori Trust Board, the then Conservation Manager (Protection) and the Kaupapa Atawhai Manager at a meeting in Kaitaia.

2.3 DATA ACQUISTION AND ANALYSIS

A rapid, reconnaissance field survey was carried out to record and map the ecological and geomorphological characteristics, habitat type and canopy vegetation of each identified natural area. Most of this work was carried out from roads, foreshores or high points, using telescopes and binoculars.

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

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

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

Canopy composition based on percentage cover abundance is widely considered to be a valuable approach for description of forest stands. This technique, as well as variations of the technique, have been used to describe canopy composition both within New Zealand (see Atkinson 1962, 1985; Leathwick & Rogers 1996; Park & Walls 1978) and in other parts of the world

(see Kershaw & Looney 1985; Mueller-Dombois & Ellenberg 1974). The specific technique for vegetation description at each site is based on the approach set out in Myers et al. (1987).

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

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

Plant species present in the "abundant" and/or "common" columns of the survey sheets were used to define each ecological unit. Each site was entered into an ACCESS database, and each ecological unit recorded at that site was listed. A search on each ecological unit gave information on the frequency of the different ecological units remaining in the Ecological District. This information was used to determine the representativeness of each ecological unit (see Section 5. Summary and conclusions, Table 2 (p. 300). Ecological units recorded in the Aupouri 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.

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

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

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

2.4 CRITERIA FOR ASSESSING HABITAT SIGNIFICANCE

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

- They are of predominantly indigenous character, by virtue of physical dominance or species composition.
- They provide habitat for a threatened indigenous plant or animal species.

- They include an indigenous vegetation community or ecological unit, in any condition, that is nationally uncommon or much reduced from its former extent.

The conservation values of these areas were assessed using a two-level classification of habitat significance based on the PNAP ecological criteria of representativeness, rarity and special features, diversity and pattern, naturalness, habitat structure and characteristics important for the maintenance of ecosystems (buffer, linkage or corridor, size and shape) (see Table 3, p. 328).

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

Level 1 sites

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

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

Level 2 sites

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

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

LINKS BETWEEN THE PNAP CRITERIA AND LEVELS 1 AND 2.

PNAP CRITERIA	LEVEL 1	LEVEL 2
Representativeness[1]	Contain the best representative examples in the Ecological District of a particular ecological unit or combination of ecological units. (3) Support 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	Contain 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). Contain or is regularly used by indigenous or endemic taxa that are threatened, rare, or of local occurrence in Northland or in the Ecological District (2). Contain habitat types that are rare or threatened in the Ecological District or regionally or nationally (6). Are important for endemic and indigenous migratory taxa (8).	Do not regularly contain, or there is no currently known threatened, rare, or species of local occurrence. Contain common habitat types. No currently known special features.
Diversity and Pattern	Have 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	Exhibit a higher level of naturalness than other examples of its type.	Exhibit a lower level of naturalness than other examples of its type.
Buffering/corridors and Linkages	Form 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	Cover a large geographic area relative to other similar habitat types within the Ecological District. (9)	Are 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).

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

2.5 UPDATING OF DATA

Natural ecosystems and habitats are dynamic and are forever changing, both physically and biologically and this is of particular relevance in this District with its large number of wetlands and dunelands. The status and composition of

species also changes over time and this could result in changes to the value of some sites.

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

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

3. Ecological character

The Aupouri Ecological District is one of the most distinctive Ecological Districts in New Zealand. This is because of its topography, particularly the length of coastline relative to land area with the large number of dune lakes and wetlands, three of New Zealand's least modified harbours and because of the dominance of sand peninsulas.

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

Strikingly obvious, even to the untrained eye, is the northern native hemi-parasitic vine, *Cassytha paniculata,* seen sprawling across large areas of manuka shrubland in both this and the adjoining Te Paki Ecological District.

3.1 TOPOGRAPHY/GEOLOGY

Topography

Aupouri Peninsula is a major dune-sand tombolo of low relief (up to 236 m asl at Mt Camel), linking hill country in the Te Paki, Te Kao, and Houhora areas with the rest of Northland. The west coast of the tombolo is a long sand beach broken only by a low rocky headland at Te Wakatehaua (The Bluff) Island. The east coast has two long sand beaches (Great Exhibition Bay and East Beach) separated by a stretch of cliffed rocky coast and short sand beaches. There are three large estuaries on the east side of the tombolo, namely Parengarenga Harbour (6,449 ha), Houhora Harbour (1,315 ha) and Rangaunu Harbour

(10,185 ha). Rangaunu Harbour is bounded in the east by a dune sand tombolo that links rocky headlands and dissected hill country of Karikari Peninsula with mainland Northland. The north-eastern part of Karikari Peninsula has a steep rocky coastline with small sand and gravel pocket beaches.

The Awanui River, one of the few rivers of any size in the Aupouri Ecological District, discharges into Rangaunu Harbour. This river, which arises in the Maungataniwha Range to the south, has been channellised in much of its lower catchment. During the course of its earlier history it formed a wide flood-plain of alluvial sediments northward and westward of Kaitaia, an area now almost entirely devoid of natural areas.

The District includes several islands including Matapia Island on the west coast, Motu Puruhi and Terakautuhaka Island (Simmonds Island) and the Moturoa Group on the east coast, Kaipohue Island in Parengarenga Harbour and the shellbanks of Walker Island in Rangaunu Harbour.

Geology

The Aupouri and Karikari tombolos are formed mainly of Pleistocene and Holocene dune sand. The oldest dune units outcrop in the north and east of the Aupouri tombolo and on north-eastern Karikari Peninsula. They have limonite pans and lack dune topography. Younger Pleistocene sand units include fields of consolidated parabolic to longitudinal dunes along the central part of the Aupouri tombolo and the western part of the Karikari tombolo, and belts of consolidated coastal foredunes inland from Ahipara Bay, in the east between Houhora and Rangaunu harbours, and inland from the northern and eastern coasts of the Karikari tombolo.

Holocene dune units include foredunes and deflation zones along the open coasts of both tombolos, rare remnants of fixed parabolic dunefields in the central parts of the Aupouri tombolo, and an extensive belt of large transverse dunes along the western side of that tombolo.

Low hill country extending from the western shores of Parengarenga Harbour south-east to Te Kao is formed of allochthonous Cretaceous-Paleocene Tangihua Complex ophiolitic rocks, Mangakahia Complex sandstone and mudstone, and overlying lower Miocene Parengarenga Group sandstone, conglomerate and volcanics. On Karikari Peninsula similar Houhora Terrane rocks are intruded by lower Miocene plutons and dikes. (Brook 1996)

3.2 CLIMATE

The climate of Aupouri Ecological District is dominated by a succession of anticyclones and intervening troughs of low pressure which approach from the west across the Tasman Sea. These weather systems give rise to climatic conditions characterised by very humid and warm summers and mild winters. In addition, the Ecological Region's northern maritime situation enables its lengthy coastlines to be swept by warm oceanic currents, from which sea breezes/wind ensure that temperatures on the land remain relatively constant.

The annual rainfall for the region varies from around 1180 mm to 1420 mm (Cape Reinga and Kaitaia Airport weather stations). Rainfall is influenced to a

large extent by subtropical depressions occurring during winter, with the result that the wettest months are May, June, July and August. The driest period usually extends from December to March except in years of summer cyclonic activity.

The Far North is regarded as a part of New Zealand which is exposed to much wind. The western coast experiences strong prevailing winds alternating from south-westerly to north-westerly directions. Frequent strong winds are also experienced along the short section of northern coast and compare to those of some of the most exposed areas elsewhere in New Zealand. Beaches extending along the eastern coast are subjected to the effects of occasional north-easterly gales.

The District experiences monthly temperatures ranging from 11°C in July to 20°C in February. Sunshine ranges on average from 2000 hours to 2200 hours per year. (Moir et al. 1986)

3.3 VEGETATION

3.3.1 Historical

This section draws on the work of Coster (1983) and Sale (1985). The large tombolo which comprises the Aupouri Peninsula is a dynamic system which has gone through many cycles of sand dunes and forest over thousands of years, along with climate change and sea level rise and fall.

More than 100,000 years ago, during the Ice Age, a marine strait existed between Awanui and Mt Camel as sea levels were up to 170 metres below their present level, and 80,000 years ago, the spit extended up to 30 kilometres to the west of the present shore. The tombolo was formed about 100,000 years ago. After 50,000 years or so, the sea level may have risen further, and then subsequently dropped to very low levels again. At the end of the Ice Age, between 20,000 and 4,000 years ago, the sea level rose to a peak of about two metres above its present level, until about 1,000 years ago. When the tombolo was at its greatest extent, inland kauri forest developed (Sale 1985).

Ancient kauri logs 30,000-40,000 years old remaining in Lake Ohia, extensive gumdigging, and pollen samples of rimu, beech, bog pine, kahikatea and kauri are testimony to earlier kauri-podocarp forests. Drilling at Coal Creek has revealed evidence of kauri at three different levels - 60 m, 30 m and 15 m - with signs that the lowest-level trees were subject to inundation by the sea, the middle level apparently toppled by wind, and the top level burned (Sale 1985). Estimated age of the three forests are up to 40,000 years, 5,000-10,000 years, and 1,000-5,000 years, respectively.

Studies of the landsnail fauna in existing areas of indigenous vegetation were used to reconstruct vegetation from the landsnail remains found in shell middens.

Indications are that "*within the last thousand years... sand dunes were covered in broadleaf forest (including species such as pohutukawa, puriri, karaka, taraire and kohekohe [and possibly tawa, totara and other podocarps])....[O]nly three small remnants of this forest cover, each less than*

a hectare in extent, now exist... within the Aupouri Ecological Region as a whole" (Coster 1983).

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

However, human settlement interrupted the natural sequence of sand accretion and the spread and retreat of vegetation. Sale expounds that "*the most significant change in the environment say 1000 years ago was not in climate...but the effect of the arrival in New Zealand of the major tide of human settlement...fire - deliberate, accidental or spontaneous - now became the major factor not only in completing the destruction of the natural forest but in rendering its recovery ever less likely.*" In 1770, Joseph Banks on the *Endeavour* described the land as "*almost entirely occupied by vast sands*" (Sale 1985).

Millener (1981) identified many subfossil bird species from the Aupouri Peninsula, including NZ falcon, little spotted kiwi, takahe, kaka, weka, kakapo, parakeet, tui, saddleback and the now extinct huia (*Heterolocha acutirostris*), NZ crow (*Palaecorax moriorum*), NZ quail (*Coturnix novaeseelandiae*), little woodhen (*Gallirallus minor*) and several moa species, illustrating a rich avifauna long since gone, along with the habitat supporting it. However, William Colenso reported of Ninety Mile Beach in 1839, "*the shore was occupied by thousands of seabirds - gulls, and oystercatchers, sanderlings and many others*" (Sale 1985).

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

Meanwhile, marram planting began in 1922, although large-scale development for exotic foresty, beginning with the planting of marram and lupin, did not get under way until 1960s. The conversion of the sandfields to pine forest or farmland is almost total. Today approximately 25% of the land area on the Aupouri Peninsula comprises exotic forest (NRC 1991). The wetlands have undergone a similar fate, of either total destruction, or considerable reduction in extent. At the same time, exotic species, particularly pampas and Sydney golden wattle have aggressively invaded open habitats. The changes which have occurred in the last 50 years have attempted to halt the dynamics of this constantly changing pre-human habitat; only the future will judge their effects.

3.3.2 Broad pattern

Although there is no distinct coastal gradient as such, many of the sites are coastal, adjacent to the coast, or linked to the coast either by contiguity of habitat or by watercourse, and the predominant substrate is sand.

A distinctive aspect of this Ecological District is that there is now virtually no indigenous forest, but wetlands are frequent. Wire rush (*Empodisma minus*), a sedge common in both alpine and lowland bogs throughout much of New Zealand and in parts of Australia, is uncommon throughout most of Northland. The Aupouri Ecological District is the stronghold for this species in Northland (P. Anderson pers. comm. 1996).

Another distinctive feature is the predominance of exotic weed species - 46 out of 134 sites contain vegetation types which are defined by an exotic weed component.

3.3.3 Vegetation types

Sandfields

This Aupouri Ecological District is one of few Ecological Districts in New Zealand containing large areas of relatively natural dunelands with large expanses of open sand as well as vegetated dunes. Hard pans occur occasionally within these sandfields.

Dunes, which are mainly unvegetated, may have scattered toetoe, tauhinu, pingao and the sedges oioi and knobby clubrush.

On vegetated dunes, the foredunes are generally dominated by *Spinifex,* with pingao, *Carex pumila*, and in some areas, marram. Knobby clubrush, oioi, pohuehue, toetoe, harakeke, and on the Karikari Peninsula, *Coprosma acerosa* may be frequent. Other species likely to be present are tauhinu, *Pimelea arenaria* and NZ spinach.

Knobby clubrush and oioi are common in dune depressions, and knobby clubrush is locally dominant in many dune areas. Toetoe is dominant on parts of Ninety Mile Beach and at Lake Waikanae.

Exotic species such as marram, lupin, pampas, kikuyu, harestail, wattle and others occur in some areas.

Coastal shrublands

Older dunes may have manuka, kanuka, native broom, ti kouka, pohutukawa, mahoe, bracken and ngaio present. At Rarawa, Henderson Bay and Waipapakauri, harakeke dominant shrublands are found, generally in association with manuka, kanuka and sedges. Pohutukawa and toetoe are present and locally frequent.

Estuaries

(i) Mangrove forests

These occur in the Parengarenga, Houhora and Rangaunu Harbours, with Rangaunu being the largest mangrove forest in New Zealand (Ogle 1984). Manuka is frequent on the landward margins, with occasional saltmarsh ribbonwood, knobby clubrush, sea rush, harakeke and pampas.

Mangroves are also present in the Rarawa and Awapoko estuaries.

(ii) Saltmarsh

Saltmarsh comprising oioi and sea rush occurs in the three large harbours, grading into *Baumea juncea* in more brackish areas. Mangroves are often scattered with harakeke, saltmarsh ribbonwood, manuka and ti kouka occurring on higher ground.

Oioi is dominant at Rarawa, and sea rush at Awapoko.

On some islands in Rangaunu Harbour, oioi is abundant with emergent manuka, ti kouka, saltmarsh ribbonwood and *Hebe*.

(iii) Saltmeadows

Saltmeadows of glasswort, sea primrose and *Selliera radicans* are also present in the estuaries. NZ spinach and *Baumea juncea* may also be present.

(iv)Eelgrass beds

These occur extensively in the three large harbours. *Zostera capricorni* occurs in the Parengarenga Harbour and *Z. muelleri* occurs in Rangaunu Harbour (Shaw et al. 1990).

Islands

Distinct vegetation types are found only on the islands:

(i) Grasslands

- Buffalo grass, especially on disturbed sites.
- *Zoysia pauciflora*, with scattered shrubs.
- *Poa pusilla* with adventive herbs.

(ii) Herbfields

- Native iceplant either as a sole dominant or with knobby clubrush or Mercury Bay weed.
- Glasswort as a sole dominant or in isolated patches, sometimes in association with Mercury Bay weed or sea primrose.
- Cook's scurvy grass which occurs only on Matapia Island.

(iii) Sedgelands

- Giant umbrella sedge is dominant on Matapia Island.

(iv) Associations

- *Pimelea arenaria-Spinifex* occurs as a dominant vegetation type on Walker Island.

(v) Shrubland

- Taupata dominant, either solely or in co-dominance with *Melicytus novae-zelandiae*.
- Associations of coastal species including taupata, *Melicytus novae-zelandiae, Coprosma macrocarpa*, ti kouka, hangehange, pohuehue, harakeke, toetoe, bracken, sedges, and sometimes kanuka.

- Harakeke dominant solely or with giant umbrella sedge
- Manuka dominant with harakeke, ti kouka and mingimingi
- Karo
- Pohuehue

(vi) Forest

- Tawapou dominant coastal forest occurs on the Motu Puruhi Island & Terakautuhaka Island. It is low in height (< 6 m) with mahoe, houpara and karo.

Freshwater wetlands

Wetland types include:

(i) Dune lakes

There are more than 20 major dune lakes, and many smaller ones.

In addition, numerous other wetland areas contain open water, although the area concerned may be small and the open water seasonal.

(ii) Fertile wetlands

These wetlands are the most common, and are dominated by *Eleocharis sphacelata, Baumea articulata* and raupo.

Eleocharis sphacelata-dominant wetlands are the most numerous of this type, varying from a fringe on lake edges to extensive, dense reed beds. *Baumea articulata* occurs frequently in about a third of these areas, and raupo is frequent in about 20%. Other species which may be present within this type are kuta, giant umbrella sedge, harakeke, toetoe, water fern, kiokio, *Isolepis prolifer*, *Carex* and *Juncus* species.

Several of these areas contain the threatened plants *Hydatella inconspicua, Cyclosorus interruptus, Myriophyllum robustum* and *Thelypteris confluens.*

Eleocharis sp. and raupo may both be present at fertile wetland sites, but growing separately.

Raupo-dominant wetlands are also numerous in the Ecological District. Raupo may also occur on lake fringes or in dense swards. In about 25% of the sites, *Eleocharis sphacelata* occurs frequently. *Baumea articulata*, harakeke, manuka, ti kouka and kiokio may also be frequent. Other species sometimes present include kanuka, toetoe, karamu, houpara, hangehange, kuta, giant umbrella sedge, *Baumea rubiginosa, Carex secta,* brake fern, oioi, knobby clubrush, water fern, willow weed, mamaku, *Myriophyllum propinquum* and pampas.

The threatened *Thelypteris confluens* is found at several of these sites.

Raupo is found in association with *Baumea articulata* at two sites, and in association with harakeke at four sites. Other species usually present in the latter association are willow weed, toetoe, giant umbrella sedge and oioi.

There are only two sites in the Ecological District where harakeke is dominant (S Urlich Road Wetland, and Rotokawau Lakes & Puwheke Beach). At S Urlich Road Wetland, ti kouka and kanuka are frequent, with occasional taupata and mamaku. Harakeke is dominant, with frequent manuka and occasional species

including bracken, *Gleichenia dicarpa* and *Baumea teretifolia* in a small area at Rotokawau Lakes & Puwheke Beach.

The other main species of fertile wetlands, *Baumea articulata*, is dominant at eight sites. In about half of these, *Eleocharis sphacelata*, raupo, *Juncus pallidus*, and manuka may be frequent. At six other sites, *B. articulata* is co-dominant with *Eleocharis sphacelata*. Raupo, harakeke, *Juncus* sp., *Carex secta*, willow weed, brake fern and water fern may be present. The threatened *Myriophyllum robustum* occurs at two of these sites. None of these sites occur on the Karikari Peninsula.

Fertile swamp shrublands. At some sites, manuka occurs scattered or in clumps in a mosaic with *Eleocharis sphacelata*, *Baumea articulata*, harakeke, raupo, ti kouka, giant umbrella sedge, kiokio, willow weed and (rarely) *Coprosma tenuicaulis*. Some of these sites may have been induced by nutrient run-off from adjacent land use.

At Waiparera Creek on Rangaunu Harbour, giant umbrella sedge occurs with *Coprosma propinqua* and *C. tenuicaulis*.

(iii) Peat bogs

These areas may be drier than other wetland types and include swamp shrublands, which is the most common form, occurring at 19 sites.

Manuka, and sometimes kanuka (indicating dry and more fertile sites), often in clumps, is emergent over *Baumea* sp., *Schoenus* sp. and umbrella fern. Other species typical of these habitats are wire rush, *Epacris pauciflora*, *Cassytha*, mingimingi, bracken, turutu, *Lycopodium* sp., sundews and acid-loving orchids, especially *Thelymitra* species.

In peat hollows at Kaimaumau manuka is absent with sedges and umbrella fern dominating.

Sedges are dominant in a few areas:

At Lake Ohia, *Baumea* sp. and *Schoenus* sp. are co-dominant with umbrella fern, turutu, kumarahou, harakeke and *Dracophyllum lessonianum*.

Lepidosperma filiforme is locally dominant. *Baumea* sp. and *Schoenus* sp. also occur with *Epacris pauciflora*, manuka and *Dracophyllum lessonianum*.

At Lake Rotokawau, *Baumea juncea* is dominant, with oioi, *Schoenus brevifolius* and *Isolepis prolifer*. Elsewhere wire rush and *Schoenus tendo* form dense swards.

Further north, at Lake Te Kahika, wire rush is co-dominant with umbrella fern. Other sedges in association are *Baumea teretifolia*, oioi, *Schoenus* sp., *Morelotia affinis* and *Lepidosperma laterale*.

(iv) Intermediate wetlands

A few sites are neither truly fertile or acid:

- Raupo and oioi occur at the Coal Creek stream mouth on Ninety Mile Beach. Toetoe is frequent and harakeke present.
- Oioi is dominant in some wetlands on unconsolidated sands, mainly on the west coast. Raupo may also be present in these areas.

- Wire rush is common in an *Eleocharis sphacelata* dominant wetland at Karatia. Other species present (harakeke, raupo, *Baumea rubiginosa* and kiokio) are typical species of fertile wetlands.
- Knobby clubrush is dominant at the Te Ramanuka Lakes.
- *Isolepis prolifer* is dominant on lake shores at Lake Waikanae and Sandhills Rd Wetland No1, and occurs in association with *Eleocharis acuta* and *Juncus* sp. at Kowhai Swamp.

(v) Mixed coastal turfs

These occur on some sand flats where freshwater streams reach the coast, such as Te Arai and Te Paki Stream. This type is of limited extent and not commonly recorded but is likely to be present on Motu Puruhi and Terakautuhaka Islands (L. Forester pers. comm. 2002). Species likely to be present in these areas are *Lilaeopsis orbicularis*, *Limosella lineata* agg., *Cotula* sp., *Myriophyllum votschii and Epilobium pallidiflorum*. *Ophioglossum*, the Adders tongue fern can occur here too.

Shrublands

Manuka and kanuka comprise the main shrubland types in this Ecological District.

Kanuka-dominant shrubland is recorded at 31 sites. Manuka and toetoe are frequent within a third of these. Exotic species such as gorse, Sydney golden wattle and *Callistachys lanceolata* are common or frequent in about the same number. Other species likely to be present in these shrublands are the scrambling hemi-parasite *Cassytha*, ti kouka, bracken, mamaku, kumarahou, hangehange, mingimingi, *Coprosma rhamnoides*, houpara, kawakawa, *Lepidosperma laterale*, pohutukawa, and prickly hakea. At a few coastal locations, ngaio, mahoe, puriri, kohekohe and karaka are present.

Apart from the areas mentioned above where exotic species are common or frequent, at a few sites Sydney golden wattle is co-dominant with kanuka, but with an indigenous understorey of manuka, mingimingi, mapou, water fern, turutu, and *Lepidosperma laterale*.

Manuka-dominant shrublands are mainly associated with peat bogs (see swamp-shrublands above), and are otherwise few in number, in association with *Dracophyllum lessonianum, Baumea rubiginosa, B. juncea, Schoenus brevifolius, Lepidosperma laterale,* umbrella fern, mingimingi, kumarahou, bracken, and prickly hakea.

Manuka and kanuka occur together at numerous sites. Gorse is frequent or common in two thirds of these sites, and prickly hakea and Sydney golden wattle, also occur frequently. Other species occurring are similar to the other shrubland areas.

Forest

Very little forest occurs in this Ecological District. What is present consists of very small areas. These include:

(i) Coastal broadleaf forest

Pohutukawa

Pohutukawa occurs in two situations:

- On coastal cliffs as either pure stands or with puriri, kanuka, kohekohe, harakeke or ti kouka.
- On west coast sand dunes in pure stands or with kanuka, and sometimes as scattered trees. Understorey species include houpara, five-finger, *Pseudopanax ferox*, native broom, mapou, hangehange, kawakawa, ngaio, harakeke, toetoe, *Coprosma rhamnoides*, Hound's tongue, shining spleenwort and *Hebe diosmifolia*.

Pohutukawa-toetoe

On Ninety Mile Beach at Ninety Mile Beach Swamp, a small area of abundant pohutukawa to 3 m occurs and toetoe is common. Houpara, harakeke, and kanuka are also present.

Kanuka-pohutukawa

On the Karikari Peninsula, kanuka and pohutukawa occur on cliffs with ti kouka and harakeke and on the coastal margin at Brodies Creek (Karikari Peninsula), with kohekohe, ti kouka, tawapou, mahoe, tree ferns, macrocarpa and gum trees.

Kohekohe

Kohekohe-dominant forest has only been recorded at one site in this Ecological District, Brodies Creek on the Karikari Peninsula. Here it occurs with occasional pohutukawa, ti kouka, mahoe, kanuka, wheki and gum tree.

Kanuka

At a few sites on the Karikari Peninsula and in the north of the District, kanuka forest with puriri, taraire, kohekohe, karaka and ti kouka occurs.

Kanuka-puriri

One site of kanuka-puriri occurs on the Karikari Peninsula. Other species present include ti kouka, mahoe, kahikatea and mamaku.

(ii) Inland broadleaf forest

There are five sites of broadleaf forest, all consisting of small remnants:

- Kanuka forest beside Lake Kihona.
- Kohekohe-puriri-taraire forest beside Lake Kihona.
- Puriri forest on the Awanui plain.
- Puriri-taraire forest occurs on sand at Lake Waikanae, and on alluvial flats on the Awanui plain.
- Puriri-karaka forest occurs in a small remnant north of Te Arai.

(iii) Podocarp forest

A few small secondary kahikatea remnants occur on the Awanui plain.

Totara treeland emergent over divaricating shrubs occurs on the edge of the Rangaunu Harbour.

(iv) Podocarp-broadleaf forest

Along the Mangatete River, a thin fringe of kahikatea with kanuka occurs, with frequent totara and willow and occasional ti kouka and puriri.

3.3.4 Species of botanical interest

A high diversity of threatened and uncommon plants have been recorded in the Aupouri Ecological District (see below), including 12 regionally significant (determined by Northland Conservancy) and 39 threatened (de Lange et al. 1999a). A further 10 threatened plants have not been recorded for some time and are likely to be extinct in the Ecological District.

This District is the southern limit for *Christella* aff. *dentata,* and northern limit for *Pittosporum obcordatum*, *Cryptostylis subulata*, and *Thelymitra malvina.* Several plant specimens collected in the District in the late 19th century and early last century were used to describe and name those particular plant species. These collection points known as the type locality include *Petalochilus alatus* (known then as *Caladenia minor* var. *exigna), Pittosporum obcordatum* (known then as *P. obcordatum* var. *kaitaiaensis*) and *Utricularia delicatula.*

Over 30 species of native orchid occur in the Ecological District (see Appendix 8.5C), some of which are endemic to Northland or the Far North. Sixteen are classified as threatened (see below), of which six are historical records and a further three are regionally significant. Four are confined to northern Northland, *Thelymitra* (a), *T.* "darkie", *T.* "rough leaf" and *Spiranthes* aff. *novae-zelandiae* (although taxonomically unresolved, this orchid seems to be confined to Kaimaumau).

Corybas rotundifolius, formerly ranked Local by Cameron et al 1995, is a distinctive species in Northland as a component of gumland communities or sites of previous kauri forest.

3.3.5 Regionally significant species

Note: Regionally significant species status is determined by the Department of Conservation, Northland Conservancy.

Astelia grandis
A very large endemic *Astelia* with leaves extending up to two metres in length. It is found in swampy and peaty ground (Moore & Edgar 1970) being recorded from two sites in this Ecological District.

Adelopetalum tuberculatum
This species is found in trees and tree branches where it forms a tight clump and can be seen growing on conifers in association with lichen (St George 1999). Recorded from Foleys Bush.

Elaeocarpus hookerianus pokaka
This species is recorded at only a few sites in the Ecological Region and at only one in the Aupouri Ecological District.

Empodisma minus wire rush
This species is a major peat-former occurring in several habitats in this Ecological District. The Aupouri Ecological District is the stronghold for this species in Northland.

Hebe diosmifolia

Hebe diosmifolia occurs as scattered populations in Northland. Recorded from two sites in this District.

Hebe* aff. *pubescens

A distinctive *Hebe* with hairs on the underside of its leaves (Poole & Adams 1994), this form has been recorded from only one site in Northland, at Maitai Bay in this Ecological District.

Myriophyllum votschii

This semi aquatic to aquatic herb has been recorded from two dune wetlands in this District.

Nestegis cunninghamii black maire

Of uncommon distribution in Northland, black maire has been recorded from only one site in this Ecological District.

Pouteria costata tawapou

A coastal tree now uncommon on the mainland, with records from only two sites in the Ecological District, onlyone of which is on the mainland.

***Thelymitra* "darkie"** AK 231761

This is an unnamed orchid of uncommon distribution in Northland recorded from twosites in the Ecological District.

***Thelymitra* "rough leaf"** AK 229531

A robust plant, endemic to Northland, flowering in October. This orchid has been recorded from two sites in this Ecological District.

Utricularia delicatula

The bladderwort *Utricularia delicatula*, formerly ranked as Local by Cameron et al. (1995), has its stronghold at Kaimaumau and is also found at Lake Ohia.

3.3.6 Threatened plant species

(See Appendix 8.3 for Categories of Threat)

(i) Critically Endangered

Amphibromus fluitans

This native semi-aquatic grass has been recorded in Northland on Ninety Mile Beach (Gardner 2000) and was recorded by P.J. de Lange on Karikari Moana Peninsula in 1998 (P.J. de Lange pers. comm. 2000).

Atriplex hollowayi Holloway's crystalwort

Formerly known as *Atriplex* aff. *billardierei*, this prostrate annual herb is found on open beaches near the high tide mark, forming mounds with only the tips of the branchlets showing (Wilson & Given 1989).

Atriplex hollowayi is endemic to the North Island historically being found as far south as near Wellington. Within Northland it was historically recorded from Rangaunu Harbour, Houhora Bay and Karikari Moana. Populations of this plant in New Zealand however, are now totally restricted to the Te Paki Ecological

District. The most recent records in the Aupouri Ecological District are from 1971 by Esler (Threatened Plants Database, Houhora Harbour) and anecdotal records from East Beach around the same time (V. Hensley pers. comm.).

Mazus novaezeelandiae* subsp. *impolitus* f. *hirtus

This species was formerly considered to be *M. pumilio*, and was thought to have been widespread distribution from Cape Maria van Dieman to Canterbury (Barker 1991) , and Australia. This form, however, has a restricted distribution, occurring in only a few locations in the north and north-eastern areas of the North Island where it is found in lowland kahikatea forest (Heenan 1998). This form has distinct hairy margins and shiny leaves (Heenan 1998). The only record in this Ecological Region is from the Kaitaia area in the Aupouri Ecological District.

(ii) Endangered

Lepidium oleraceum Cook's scurvy grass

A small herb with fleshy leaves, with teeth around the leaf tip, it is restricted mainly to islands. It is present in low numbers on Matapia Island and possibly on the Karikari Islands (L.J. Forester pers. comm.).

Phylloglossum drummondii

This is a very small plant up to 7 cm high with small tubers and a rosette of up to 10 bright green, fleshy leaves. It has a very short growing season, only appearing above ground from May to October. The only species in its genus, this fern ally is also found in Australia and Tasmania. In New Zealand it is restricted to low, open manuka north of Auckland, growing with sedges on seasonally damp gumland sites (Wilson & Given 1989). It is recorded from two sites in this Ecological District, Lake Ohia and Kaimaumau.

(iii) Vulnerable

Hibiscus diversifolius

Also occurring in Australia and the Pacific, this prickly stemmed shrub is found in New Zealand in coastal seeps and boggy areas, often on the inland edge of sandy beaches (Wilson & Given 1989) between North Cape and Whangaroa Bay and at Bream Head. It is recorded from two sites in this Ecological District.

Lycopodiella serpentina

One of the smallest club mosses, it is also present in Australia and New Caledonia. In New Zealand it is known from a few populations in Northland, and several sites in the South Auckland and Hamilton regions (Wilson & Given 1989). It is found on open sites on gumland soils amongst umbrella fern and sundews in the Kaimaumau and Karikari Peninsula peat bogs. It has been recorded at eight sites in this Ecological District.

Ophioglossum petiolatum

An unusual herb-like fern up to 30 cm high with one or sometimes two leaves. Has been recorded from moist talus and grassy areas, sandy margins of coastal lagoons, herbfields near lake margins, swamps and streams, and rarely, podocarp forest. Recorded from three sites in this Ecological District.

Pomaderris polifolia

A low bushy shrub. The adult leaves have short petioles, and flowers are grouped in small clusters at branchlet tips and in leaf axils. It grows amongst stunted manuka on infertile gumland soils, and is found at a few sites from the Far North, and David Island in the Hauraki Gulf. It has been recorded recently from Lake Wahakari and from Te Kao in 1990.

Senecio scaberulus

This fireweed is found in open coastal and offshore island habitats from Auckland to Te Paki. Formerly widespread, it is now rare in the wild, with few recent records, one such being from Mt Camel in 1992 (CHR 482957 and 483113).

Thelypteris confluens

Commonly known as the marsh fern, this species grows amongst dense stands or swards of other wetland plants, e.g. sedges. It grows up to 60 cm in height, and is frost tender. Northland is the stronghold for this species. There are numerous records of marsh fern in this District. A 1991 survey found marsh ferns growing in six different sites including the Lake Ohia/Kaimaumau wetlands. Its favoured sites were in the intermediate and fertile wetlands, and on some margins of the dune lakes. Once widespread, this fern is now confined to north of Auckland and Bay of Plenty/Rotorua (Wilson & Given 1989). It is also found in South Africa, India, Asia and Australia.

Todea barbara

This is a large, erect fern with leathery fronds growing up to two metres tall and found on dry sites within gumland vegetation. It is recorded at numerous sites within the District on the margins of the oligotrophic lakes and wetlands sometimes as scattered individuals. This fern grows south to the Bay of Islands and is found on the Poor Knights Islands and also occurs in South Africa and Australia.

Utricularia protrusa

An endemic bladderwort found in peaty water with records from seven sites in this Ecological District.

(iv) Declining

Austrofestuca littoralis

Found on sandy and rocky places near the shore, this species is recorded from Kaimaumau, the west coast north of Kaitaia and on Karikari Peninsula. The most recent record in this District is from Karikari Moana in 1992.

Colensoa physaloides

This is a distinctive blue-flowered, shrubby plant with hydrangea-like foliage. It is a monotypic genus, endemic to Northland, some of its islands; and Rakitu Island, east of Great Barrier Island (P.J. de Lange pers. comm.). It is found scattered through forest areas, generally beside stream and tracksides, and on talus slopes. A highly palatable plant, *Colensoa physaloides* is very sensitive to browse from goats and possums. Recorded in this Ecological District from Whangatupere Bay on the Karikari Peninsula in 1999.

Cyclosorus interruptus

This fern grows in intermediate wetlands amongst other aquatic sedges and rushes, in very damp or shallow water. It has been found in the Kaimaumau, Karikari Peninsula and some Aupouri Forest wetlands. It requires a warm and frost-free environment with colonies occurring as far south as Taupo, although in the colder southern sites it is restricted to the warm waters of the geothermal areas (Wilson & Given 1989).

Eleocharis neozelandica

This small endemic sedge occurs on the sandy margin of dune lakes, damp sandy flats and dune hollows or coastal stream flats (Wilson & Given 1989).

Scattered records occur from Christchurch, Farewell Spit, Wellington, Manawatu, Auckland and in Northland from near Mitimiti, with its stronghold being at Pouto and to a lesser degree Te Paki (L. Forester pers. comm.). There are records from six sites in this District.

Euphorbia glauca

Sometimes known as New Zealand sea spurge, *Euphorbia glauca*, is a soft herb of sporadic distribution around the coast on sand dunes and coastal seeps. In this District it has been recorded from three sites.

Hydatella inconspicua

This is a small grass-like aquatic herb, which is found in Northland, Fiordland and Central Otago. In Northland *Hydatella inconspicua* is known from about 13 locations from the Aupouri, Kai iwi and Pouto dunelakes. It grows in water of one to two metres in depth (Wilson & Given 1989).

Isolepis fluitans

Recently rediscovered in Northland from Lake Wahakari. Last collections from this area were from Lake Tangonge and Houhora by Matthews (1913) and Cheeseman (1896) (permission granted by Northland Regional Council for use of this information from Champion et al. 2002).

Myriophyllum robustum

This aquatic water herb is an endemic species, which was once widespread throughout New Zealand. However, due to modification or loss of habitat it is known from only about eight individual sites in the North Island and from 15 sites along the west coast of the South Island (Wilson & Given 1989). This plant has been recorded from six of the dune lakes, all being located within the collective chain of lakes in the Awanui-southern Aupouri area. It is to be found around the shallow lake margins.

Pimelea arenaria

Known also as sand daphne, this sprawling cushion plant is found growing on coastal dunes and hollows. Relatively widespread in parts north of Auckland (Given 1981), it is however, decreasing in other parts of New Zealand and perhaps now extinct in the Canterbury/Westland region (Wilson & Galloway 1993). The northern populations differ from southern plants. There are numerous records of *Pimelea arenaria* in this Ecological District, with the largest population occurring on Walker Island, Rangaunu Harbour.

Pterostylis tasmanica

This is a distinctive orchid with rosette leaves and yellow hairs on the labellum. *Pterostylis tasmanica* has a patchy distribution in the Far North, Auckland, Wellington and Nelson (Hollard & Clements 1993), and widespread in Tasmania and Victoria, Australia. In this Ecological District it is found at the Kaimaumau-Motutangi Wetlands.

(v) Recovering—Conservation Dependent

Desmoschoenus spiralis pingao

An important sandbinder, pingao is now far less common along New Zealand's coastline than in former times. It is, however, recorded from several sites in the Ecological District.

Pittosporum obcordatum

This is a tall shrub or small erect tree up to five metres, with slender, divaricating and interlacing branchlets. Leaves of juvenile plants are different from those of adults, being up to 2.5 cm or more long, having broad petioles, and varying from linear to spathulate with entire to lobed margins. Habitat records are from shrubland and lowland podocarp forest on alluvial or swampy soils. The species seems to prefer river terraces and flats, especially areas which are swampy or subject to flooding. It is known in this Ecological Region from only one remnant near Kaitaia but would have been previously more widespread before the habitats were cleared.

(vi)Naturally Uncommon—Sparse

Calochilus paludosus

This is a bearded orchid of mainly swampy and poorly drained habitats. Its distribution is limited to the northern and central parts of the North Island, and the north-west of the South Island (B. Molloy pers. comm. 1996). It is found in Australia and considered by de Lange & Molloy (1995) as a vagrant in New Zealand. Recorded in this Ecological District from Lake Ohia.

Drosera pygmaea

This is a tiny herb found in peaty and boggy ground with scattered populations from Waikato north, Southland and also in Australia (Allan 1961). Found at a few sites around the Rangaunu Harbour (E. Cameron pers. comm. 2000).

Fuchsia procumbens

This prostrate, sprawling plant is found in open coastal habitats on the mainland from North Cape to Maunganui Bluff on the west coast, Coromandel on the east coast, and at Great Barrier Island (Godley & Berry 1995). It is recorded from two sites in this District.

Korthalsella salicornioides

This is a dwarf mistletoe, usually hemi-parasitic on manuka and kanuka (Poole & Adams 1990) and endemic to the North and South Islands. Found in this District on manuka at Kaimaumau-Motutangi Wetlands.

Pellaea falcata
This fern is restricted to coastal areas north of Auckland (Brownsey & Smith-Dodsworth 2000). It was found at Puwheke on the Karikari Peninsula in 1984.

Pseudopanax ferox
The so-called "fierce lancewood", named from the hooked teeth of the juvenile form, is of local distribution from Aupouri to the southern South Island (Poole & Adams 1994). In this Ecological District it is found in remnants of coastal forest and shrubland adjoining sand dunes at Te Arai Sandfields.

Senecio repangae* subsp. *repangae
This is a small herb found in coastal locations on Cuvier Island, Bay of Islands and Great Barrier Island. In this Ecological District it is known only from Te Wakatehaua Island (The Bluff) (de Lange 1996).

Thelymitra sanscilia
Considered to be distinct from *T. pauciflora* (B. Molloy pers. comm. 1996) and known only in Northland (St George 1999) from Ahipara, Kaimaumau and two sites at Peria.

(vii) Naturally Uncommon—Range Restricted

Cryptostylis subulata
Known as the duck-billed orchid, this tall, attractive orchid grows to 130 cm in height. It is known from the Karikari Peninsula and Kaimaumau-Motutangi wetland complex where it grows in seasonally wet and low-lying areas of peat bog. It is also found in Eastern Australia.

Thelymitra malvina
This is an attractive orchid (with "pink whiskers") recently discovered in New Zealand in Northland. It occurs on gumland soils, generally in proximity of old kauri stumps from three sites in this Ecological District. It also occurs in Australia in coastal New South Wales and Victoria, and near Kaikohe.

(viii) Naturally Uncommon—Vagrant

Gratiola pedunculata
A third species of *Gratiola* now found in New Zealand, originally from Australia. A sweet-smelling herb, sometimes submerged, at present recorded from only one site in New Zealand - Lake Waiporohita (de Lange 1997).

(ix)Taxonomically Indeterminate—Critically Endangered

Calochilus* aff. *herbaceous
This is a bearded orchid known only from Northland with recent records only in the Far North (P.J. de Lange, B. Molloy pers comm). It is recorded from two sites in this Ecological District. It is widespread in Australia and considered by de Lange & Molloy (1995) as a vagrant in New Zealand.

Christella* aff. *dentata
This soft fern has tufts of pale green, velvety-textured fronds arising from a very shortly creeping rhizome. It was found at several localities near Kaitaia in the

early 1900s, but in recent years it has been recorded from only four sites in this region. The only wild populations known in New Zealand grow in disturbed remnant kahikatea stands, sheltered in holes left by the rotting stumps of felled trees (Wilson & Given 1989). In 1978 Bartlett (Threatened Plants Database) recorded it from the lower reaches of the Mangatete River.

(x) Taxonomically Indeterminate—Endangered

***Thelymitra* (a)**

Previously tagged as *Thelymitra* "Ahipara" this sun orchid has yet to be described, but is distinctive in its tolerance to seasonal flooding and is considered endemic to this Ecological Region and is not found south of Kaikohe. It was transferred to the Ahipara gumfields and Lake Ohia from a site near Kaitaia in 1990 as a protective measure (de Lange et al. 1991).

(xi) Taxonomically Indeterminate—Insufficiently Known

Spiranthes* aff. *novae-zelandiae

This is a long-stemmed orchid not yet described, known from the damp, boggy areas of Kaimaumau-Motutangi Wetlands.

3.3.7 Threatened species not recorded for some time in the Ecological District

These species were previously recorded in the Ecological District but have not been recorded for some time and are likely to be extinct in the Ecological District

(i) Critically Endangered

Corybas carsei

This orchid was recorded at Lake Tangonge in 1919 but this lake was drained and no longer exists.

(ii) Endangered

Hebe speciosa

This bushy shrub grows to 2 m and has broad, glossy, dark green, leathery to almost fleshy leaves and reddish magenta' flowers. It was recorded from Houhora and the Mt Camel area in 1915 and is probably extinct in this Ecological Region (de Lange & Cameron 1992).

Pterostylis micromega

A small orchid with a large, pale flower, forward curving, and often has crinkled leaves. It occurs in wet areas in the North Island, Cobb Valley and has been recorded in the Chathams. Recorded from Tangonge in 1902 and probably now extinct in the Ecological Region.

(iii)Declining

Pimelea tomentosa

This is a small erect shrub with slender, hairy branchlets, dark brown bark and narrow, rather thin leaves, which are scarcely hairy on the upper surface but

densely hairy beneath when young. The flowers are densely hairy white and pink and the berry-like fruit can be white, dark red or black.

It is found in open shrubland from North Cape to Nelson/Marlborough (Poole & Adams 1994). This plant may be extinct in this Ecological Region (most recent record is 1911).

Sonchus kirkii

This is an endemic coastal sow thistle usually occurring in open wet sites. It was recorded at Te Wakatehaua Island (The Bluff) in 1990 but despite survey efforts it has not been found since 1996 (de Lange 1996) and is thought to be extinct there.

Sporodanthus ferrigineus

Originally known as S. traversii (which is now only known from the Chatham Islands), *S. ferrigineus* is a robust, tall plant (culms up to five metres) occurring on peat bogs. It was historically recorded from Lake Tangonge in 1912/13 (de Lange et al. 1999b).

(iv) Naturally Uncommon—Sparse

Thelymitra matthewsii

This is a tall orchid with a leaf which spirals around the stem. It is found rarely in Australia, with early New Zealand records from the coast north of Auckland, Lake Tangonge (1911) and near Waimimiha (1924). It was formerly found in swamps and bogs (Wilson & Given 1989) but isolated plants have been found in recent years on exposed sites at North Cape.

(v) Naturally Uncommon—Vagrant

Chiloglottis formicifera

This is an orchid which was found in damp gumland scrub (Hollard & Clements 1993). It was recorded from Tangonge in 1900, but is no longer known from New Zealand. It is now found only in New South Wales, Australia.

Caleana minor

This is a small duck orchid that grows on poor soils under manuka. It was previously recorded near Kaitaia in the early 1900s (Wilson & Given 1989) and most latterly by Esler at Tangonge in 1978 on a site which was reportedly destroyed. In New Zealand it is now known only from geothermal ground in Rotorua. It is not threatened in Australia.

Pterostylis nutans

This is a slender orchid with a solitary flower curled over. Records confined to Northern Auckland Region. The species was collected around Kaitaia between 1910 and 1920 and was last recorded from Whangaparoa Peninsula a few years later. It was usually found amongst shrubland.

3.4 FAUNA

Information on fauna in this report has been compiled from a variety of sources including SSWI (Special Sites of Wildlife Interest), SSBI databases, and other biological databases, including the Ornithological Society of New Zealand's classfied summarised notes, as well as from field observations during this survey. The conservation ranking of individual species is derived from Molloy & Davis (1994) and categories of threat and rarity for landsnails are based on the classification scheme of de Lange & Norton (1998) used by Brook (1999a) (See Appendix 8.3).

Nomenclature follows Turbott (1990) and Heather & Robertson (2000) for birds, and Gill & Whitaker (1996) for reptiles.

A comprehensive discussion and checklist of fauna, particularly invertebrates, is beyond the scope of the present study. The individual site descriptions generally detail known significant fauna only. However, it is recognised that the invertebrate fauna, both common and less common are a significant facet of indigenous ecosystems. With the present state of knowledge of these species, the protection of the whole range of habitat types is considered important to ensure populations of invertebrates are maintained. The recent discovery of the only known species in New Zealand of the parasitic wasp family Dryinidae in wattle scrub at Rarawa (John Early pers. comm. 1996) is indicative of the paucity of information about invertebrate species in New Zealand.

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 is included in Appendix 8.4.

There have been several other bird species rarely recorded, probably as vagrants or blown by storms or arrived by other means. These species include channel-billed cuckoo (*Scythrops novaehollandiae*), fan-tailed cuckoo (*Cacomantis flabelliformis*), white-capped noddy (*Anous tenuirostris*), and American golden plover (*Pluvialis dominica*) (Howell 1987; Medway 2000).

A species which has colonised New Zealand in relatively recent times (1970s) and frequents dunelakes in the Ecological District is the Australasian little grebe. The Aupouri Peninsula appears to be its stronghold in Northland, with up to 20 birds being observed at some sites. It has yet to be determined whether it is impacting on other species such as the NZ dabchick (R. Pierce pers. comm. 1996).

The three major harbours in this Ecological District (Parengarenga, Houhora and Rangaunu) are very important for indigenous resident species (the northern race of NZ dotterel, variable oystercatcher, Caspian tern), all of which are threatened, as well as for both New Zealand and northern hemisphere migratory species which use the harbours as feeding areas (see table on p.40). More than 30 such species have been recorded.

Matapia Island is the most significant NZ fur seal haul-out area in Northland, with in excess of 500 seals being recorded there between June and October in comparison to other haul-out sites which hold only 1–22 seals (R. Parrish pers. comm. 2002).

3.4.1 Threatened bird species

Category B threatened species

Kukupa *Hemiphaga novaeseelandiae*
Endemic

Kukupa have been found on the Karikari Peninsula, from Whangatupere Bay and on the Awanui River plain.

Northern NZ dotterel *Charadrius obscurus aquilonius*
Endemic

Found in small to moderate numbers along sandy beaches and in the Parengarenga, Houhora and Rangaunu Harbours where post-breeding concentrations occur. Recorded from many sites within the Ecological District. This Ecological District is an important stronghold for the northern subspecies of NZ dotterel.

Wrybill *Anarhynchus frontalis*
Endemic

After breeding in Canterbury and South Otago, small flocks move north, mainly to the Firth of Thames, Manakau and Kaipara Harbours. In the Ecological District they are mainly found in the Parengarenga, Houhora and Rangaunu Harbours, with the main Aupouri population of up to 150 at Parengarenga.

Category C threatened species

Banded dotterel *Charadrius bicinctus bicinctus*
Endemic

There are few breeding areas north of Auckland (Ogle 1984), but the species is known to breed at Parengarenga, Rangaunu, Kowhai Beach, and particularly on the Karikari Peninsula. The large numbers of birds present in summer-winter are mostly from the South Island, unlike the situation at other North Island harbours which attract birds from North Island breeding grounds (Pierce 1999).

NZ dabchick *Poliocephalus rufopectus*
Endemic

NZ dabchicks are found on more than a dozen dune lakes throughout the Ecological District. The Aupouri and Pouto populations are the only Northland dune lake localities where dabchicks still occur, however there is a non dune lake record of dabchick on an artifical pond in the Tutamoe Ecological District (R. Pierce pers. comm. 2000). NZ dabchicks are thought to be declining on the Aupouri dunelakes (Simpkin & Snell 2000).

Variable oystercatcher *Haematopus unicolor*
Endemic

Variable oystercatchers are found in moderate numbers along the coastline and in the Parengarenga, Houhora and Rangaunu Harbours. Post-breeding concentrations occur in the harbours.

NEW ZEALAND MIGRANTS (Numbers peak December-August (Sagar et al. 1999))		
Royal spoonbill	*Platalea regia*	Parengarenga and Rangaunu Harbours, breeding in small numbers near Parengarenga. Has increased during 1990s.
SI pied oystercatcher	*Haemotopus ostralegus*	Three large harbours and beaches, maximum counts low hundreds per site.
Wrybill	*Anarchynchus frontalis*	Three large harbours, maximum 271 birds on Parengarenga.
Banded dotterel	*Charadrius b. bicinctus*	Three large harbours, maximum counts 1500 on Parengarenga.
Pied stilt	*Himantopus h. leucocephalus*	Harbours and flood pasture. Low thousands.
TRANS-EQUATORIAL MIGRANTS (Numbers peak September-April (Sagar et al. 1999))		
Pacific golden plover	*Pluvalis fulva*	Three large harbours and Lake Ohia, up to 200 birds on each, maximum 250 on Parengarenga.
Turnstone	*Arenaria interpres*	Three large harbours and beaches, maximum c. 1500 on Parengarenga.
Lesser knot	*Calidris canutus rogersi*	Three large harbours, maximum 13,500 Parengarenga.
Curlew sandpiper	*C. ferruginea*	Mainly Parengarenga (maximum c. 50), Rangaunu and Waimango Swamp.
Sharp-tailed sandpiper	*C. accuminata*	Mainly Parengarenga, Rangaunu and Waimango Swamp.
Red-necked stint	*C. ruficollis*	Three large harbours and Waimango Swamp, maximum c. 50 on Parengarenga.
Asiatic whimbrel	*Numenius phaeopus variegata*	Three large harbours, maximum 53 on Parengarenga.
Bar-tailed godwit	*Limosa l. lapponica*	Three large harbours, thousands on each, maximum 7850 on Parengarenga.
Eastern little tern	*Sterna albifrons*	Mainly Rangaunu Harbour, maximum c. 100.
Note: Small numbers of many other species of plover, sandpiper and tern have been recorded in this Ecological District (see Appendix 8.4)		
OTHER MIGRANTS		
Cattle egret	*Bubulcus ibis coromandus*	Autumn and winter visitor from Australia to pasture particularly in the Unahi area but also north to Parengarenga.
Shining cuckoo	*Chrysococcyx lucidus*	Spring summer visitor from the Solomons and Bismarck Archipelago to forest and shrubland in New Zealand including the Aupouri Ecological District.
Long-tailed cuckoo	*Eudynamys taitensis*	Passage migrant in late summer.

White-fronted tern *Sterna striata*

Endemic

White-fronted terns are found along the coastline and in the Parengarenga, Houhora and Rangaunu Harbours. Numbers of this endemic species have been greatly reduced over the past 20 years. Breeds in colonies on islands, on an island in Rangaunu Harbour (Walker Island) and sometimes nesting is attempted on sandspits and beach dunes.

Category O threatened species

Reef heron Egretta sacra sacra
Reef herons are found in small numbers in the Parengarenga, Houhora and Rangaunu Harbours, the Awapoko Estuary and along the coastline.

White heron *Egretta alba modesta*
White herons occur rarely but regularly at Parengarenga and Houhora harbours and occasionally at other sites, e.g. Awapoko Estuary and Lake Ngatu.

Australasian bittern *Botaurus poiciloptilus*
Bittern are found in a variety of wetland areas, including swamp shrubland and mangroves, from Te Paki Stream to the Awanui River, and on the Karikari Peninsula. The Ecological District is an important stronghold for Australasian bittern in New Zealand.

Royal spoonbill *Platalea regia*
Royal spoonbill are found in Parengarenga and Rangaunu Harbours and on Ngatuwhete Lake and other wetlands.

Caspian tern *Sterna caspia*
Found along the coastline and in the Parengarenga, Houhora and Rangaunu Harbours, as well as some inland sites Lake Te Kahika, Lake Taeore and Lake Waiporohita. Breeds at Rangaunu, Parengarenga and Walker Island.

3.4.2 Bird species of regional and district significance

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

Australasian little grebe *Tachybaptus novaehollandiae novaehollandiae*
The Australasian little grebe has colonised New Zealand in relatively recent times (1970s) and frequents dunelakes in this Ecological District. The Aupouri Peninsula appears to be its stronghold in Northland, with up to 20 birds being observed at some sites.

Recorded from many wetlands in this Ecological District.

Banded rail *Rallus philippensis assimilis*
Indigenous

This species was once widespread in New Zealand, but now Northland is its national stronghold.

Important populations occur in mangroves and adjacent habitats in the Parengarenga, Houhora and Rangaunu Harbours and at Kaimaumau-Motutangi Wetlands.

Grey teal *Anas gracilis*
Indigenous

This species is of local distribution. In Northland it is recorded mainly from the Manganui River (Tokatoka Ecological District) and Pouto Peninsula area

(Kaipara Ecological District) (P Anderson pers. comm. 1998) and flocks of more than 100 in the Motatau area (R. Pierce pers. comm. 2002). In this Ecological District it is recorded from three sites, Wairahi Swamp & Lake Taeore, Lake Heather, and Jones Lake.

NZ scaup *Aythya novaeseelandiae*
Endemic

An endemic species confined to freshwater lakes. Most Northland birds are confined to dunelakes of Aupouri and Pouto Ecological Districts but are thought to be declining in Aupouri dunelakes (Simpkin & Snell 2000).

Marsh crake *Porzana pusilla affinis*
Indigenous

Although widely distributed in New Zealand marsh crake have been recorded only sparingly in Northland. In this Ecological District it is recorded from Lake Ohia and Rotokawau Lakes on the Karikari Peninsula. Other sites in Northland include Spirits Bay, Whangarei, Kaipara Harbour and Pouto.

NI fernbird *Bowdleria punctata vealeae*
Endemic

Nationally important populations occur at Kaimaumau and Lake Ohia. This species is widely distributed throughout the Ecological District including shrublands and harbour edges.

Spotless crake *Porzana tabuensis plumbea*
Indigenous

This species has a restricted distribution, confined on the mainland largely to dense reed beds. It is found at a variety of wetland sites throughout the Ecological District.

3.4.3 Invertebrates

Note: Threat rankings for landsnails listed below are based on the classification of Molloy et al. (2001).

Allodiscus fallax (Nationally Endangered)
This landsnail species is endemic to Karikari Peninsula, and is known from a single population restricted to a small remnant of coastal broadleaved forest at Whangatupere Bay. No information is available on current threats, but threats in the recent past have included habitat modification by pigs, cattle, possums and invasive weeds.

***Allodiscus* sp. "Houhora"** (Nationally Endangered)
This undescribed landsnail species is apparently endemic to Mt Camel, where it is restricted to a small remnant of coastal broadleaved forest. Most of the original native vegetation on Mt Camel has been cleared, which may have resulted in a marked decline in the population of *Allodiscus* sp. "Houhora". Existing threats to this species include continued modification and destruction of habitat (i.e., from damage by possums and live stock) and, possibly, predation by rats and mice. The sole population of *Allodiscus* sp. "Houhora" is

presently highly threatened, with its survival contingent on preservation of the remaining native forest habitat.

***Cytora* sp. "whangatupere"** (Nationally Endangered)
This landsnail species is apparently endemic to Karikari Peninsula and, like *Allodiscus fallax*, is known from a single population restricted to a small remnant of coastal broadleaved forest at Whangatupere Bay. No information is available on current threats, but threats in the recent past have included habitat modification by pigs, cattle, possums and invasive weeds.

Archey's dune snail *Succinea archeyi* (Serious Decline)
A threatened coastal landsnail species with a patchy distribution in the northern North Island between Cape Maria van Diemen and Bay of Plenty. In Aupouri Ecological District, populations of *S. archeyi* are present on coastal dunefields at Tokerau Beach and Puwheke Beach (Brook 1999b, 2000). There is also an unconfirmed record of this species from dunefields at Great Exhibition Bay.

Succinea archeyi was formerly widely distributed in northern and eastern Northland, and from the Hauraki Gulf to western Bay of Plenty. It declined markedly in historic time, mainly as a result of the impacts of pastoral farming on coastal habitats occupied by the snail (Brook 2000). The main existing threats to the species are modification and loss of habitat (e.g., through damage to dune vegetation by cattle, sheep and horses; replacement of native dune vegetation by exotic pasture grasses, plantation forests and weed species; residential development; dune erosion). Predation by introduced mammals (e.g., mice, rats, hedgehogs, possums) may also be important. Several of the remaining populations are highly threatened, and will probably become extinct if historical trends continue (Brook 1999b).

Climocella reinga (Range Restricted)
This landsnail is endemic to northern Aupouri Peninsula, with populations present as far south as Mt Camel. It lives in native shrubland and broadleaved forest (Goulstone 1996). *Climocella reinga* presently has a fragmented, relict distribution as a result of extensive habitat destruction caused by land clearance for gum-digging, pastoral farming and exotic forestry. The total population is probably still declining as a consequence of continued modification and loss of habitat, and there is a risk that some subpopulations could become extinct if historical trends continue. Existing threats include land clearance and catchment disturbance associated with forestry operations, and damage to native vegetation and soil structure by pigs, possums, goats, cattle and horses. There is also a potential risk of habitat destruction by fire.

Egestula pandora (Range Restricted)
This landsnail is endemic to northern Aupouri Peninsula, with populations present as far south as Te Kao. It lives in kanuka forest, broadleaved forest and conifer-broadleaved forest. *Egestula pandora* presently has a fragmented, relict distribution as a result of extensive habitat destruction caused by land clearance for gum-digging, pastoral farming and exotic forestry. The total population is probably still declining as a consequence of continued modification and loss of habitat, and there is a risk that some subpopulations could become extinct if historical trends continue. Existing threats include land clearance and

catchment disturbance associated with forestry operations, and damage to native vegetation and soil structure by pigs, possums, goats, cattle and horses. There is also a potential risk of habitat destruction by fire.

Serpho matthewsi (Range Restricted)
This landsnail is endemic to northern Aupouri Peninsula, with populations present as far south as Te Kao. It lives in kanuka forest, broadleaved forest and conifer-broadleaved forest. *Serpho matthewsi* presently has a fragmented, relict distribution as a result of extensive habitat destruction caused by land clearance for gum-digging, pastoral farming and exotic forestry. The total population is probably still declining as a consequence of continued modification and loss of habitat, and there is a risk that some subpopulations could become extinct if historical trends continue. Existing threats include land clearance and catchment disturbance associated with forestry operations, and damage to native vegetation and soil structure by pigs, possums, goats, cattle and horses. There is also a potential risk of habitat destruction by fire.

Unidentified onychophoran
A peripatus-type organism known from only one site in the Ecological District (Whangatupere Bay), and possibly at its northern limit (F.J. Brook pers. comm. 1996; D. Gleeson (pers. comm. 2002) verified probable northern limit status). These organisms are usually found inside or under rotten logs and sometimes in leaf litter and their appearance is purple/bluish and speckled with orange papillae (D. Gleeson pers. comm. 2002).

Black katipo spider *Latrodectus atritus*
Black katipo spiders are recorded in many locations around the coastline of Northland including the coastline of the Aupouri and Karikari Peninsulas in this Ecological District (J. Griffiths pers. comm.). Unlike the katipo spider, the black katipo does not exhibit the characteristic red stripe along its back.

3.4.4 Threatened lizards

Recent scientific study of the *Hoplodactylus pacificus* species group now includes *H. pacificus* and five species. Two of these five species are Te Paki and Aupouri endemics; *H.* "Matapia Island" (see below) and *H.* "North Cape Pacific gecko". *H.* "North Cape Pacific gecko" has been recorded from Matapia Island and on the Aupouri and Karikari Peninsulas.

Robust skink *Cyclodina alani*
Category B threatened species

Robust skinks are found on Matapia Island and Moturoa Islands. Robust skinks were translocated from Matapia Island to Motuopao Island (Te Paki Ecological District) in 1997.

***Hoplodactylus* "Matapia Island"**
Category B threatened species

Found on Matapia Island and the Aupouri and Karikari Peninsulas, this gecko is also found on Motuopao Island (Te Paki Ecological District) to where it was translocated in 1997.

Regionally significant species

Northland green gecko *Naultinus grayii*
A Northland endemic, with a distribution from the southern half of Aupouri Peninsula to the Bay of Islands. Recorded from several sites in this Ecological District.

Ornate skink *Cyclodina ornato*
Populations throughout the North Island, becoming more uncommon on the mainland. Recorded from several sites in this Ecological District.

Suter's skink *Oligosoma suteri*
Suter's skink is restricted to the North Island, being found on few mainland sites. Recorded from only two sites in this Ecological District.

3.4.5 Threatened fish

Banded kokopu *Galaxias fasciatus*
Category C threatened species

Recorded at several sites in the Ecological District.

Black mudfish *Neochanna diversus*
Category C threatened species

Black mudfish to date have been recorded at 10 sites in peat bogs in the District. The Aupouri Peninsula is the stronghold for this species in Northland (V. Kerr pers. comm. 2000)

3.4.6 Regionally significant fish species

Giant bully *Gobiomorphus gobioides*
Giant bully has an intermittent distribution around the New Zealand coast, with few records from Northland. They have been recorded at six sites in this Ecological District.

Inanga *Galaxias maculatus*
There are several wetlands containing genetically isolated populations of landlocked inanga (*Galaxias maculatus*). The taxonomy of these isolated populations is currently unresolved.

3.5 THREATS

The coastal dunes are under threat from invasion of weeds, off-road vehicles, conversion to exotic forestry, and, particularly on the Karikari Peninsula, residential subdivision.

Some of the rare and sensitive habitats on the Aupouri Peninsula and Karikari Peninsula (about 10% of the sites), especially herbfields, are threatened by grazing and trampling by cattle and wild horses, while orchids in open habitats are also threatened by rabbits and hares. Of note in this Ecological District is the

general absence of feral goats, although one or two goat farms do occur. Deer farming also occurs in this Ecological District, and escapes pose an ongoing threat.

Ferrets have been recently recorded from Victoria Valley and near Lake Ohia (B. Waddell pers. comm. 1996) and Ngataki (R. Pierce pers. comm.). Ferrets are a recent (1990s) arrival in the Ecological District, and together with cats, stoats, weasels, rats hedgehogs, dogs, and people and their vehicles, exert increased pressure on nesting shorebirds and other fauna species (R. Pierce pers. comm.).

Wetlands are particularly vulnerable to land drainage, pumping of ground water for horticulture, and use of adjacent land for exotic plantations posing uncertain but potentially high risk to their hydrology.

More than half the area of freshwater and estuarine wetlands on Karikari Peninsula were drained between 1978 and 1983 (Anderson et al. 1984). Persistent stock grazing is also steadily degrading some wetlands as well as effects from fertiliser use/spray drift and seepage.

Harbours are becoming increasingly pressured nationally from deteriorating water quality, development and disturbance to fauna.

The annual hunting and poaching of godwits and knots on harbours and duneland roosts is of considerable concern to the Department of Conservation, Northland Conservancy (R. Atkinson pers. comm.).

Habitats in general are constantly at risk from fire, as well as conversion for agriculture or forestry. In 1988 a fire swept through Kaimaumau, burning over 90% of the wetland (Hicks et al. 2001) and intermittent clearance of this habitat has continued throughout the preparation of this report.

Most habitat types, especially those with an open canopy, are under threat from the invasion of aggressive exotic species such as Sydney golden wattle, prickly hakea, wilding pines, gorse and pampas. Apart from eliminating or reducing human-related threats, the more open habitats need to be managed to control these plant pests, to ensure their long-term viability.

4. Schedule of sites

Records of threatened flora and fauna have been sourced from herbaria and other databases mentioned in Section 2.1, or were direct observations by Department of Conservation staff during the course of this survey.

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

See Appendix 8.4 for common fauna lists in the Aupouri Ecological District.

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

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

See Section 9 (p. 369) for alphabetical listing of sites.

4.1 LEVEL 1 SITES

SITE NAME	SURVEY NO.	GRID REF.
Te Paki Dunes	N02/013	N02 900 395
Te Paki Stream	N02/014	N02 899 407
Parengarenga Harbour	N02 026	N02 055 425
Ninety Mile Beach & Dunes	N02/042	N02 908 372-975 300 N03 975 300-190 000 N04 190 000-245 707 N02 908 372
Waikanae Stream Wetland	N02/043	N02 973 304
Lake Waikanae	N02/044	N02 000 344, N02 006 348, N02 009 348, N02 987 360, N02 006 346, N02 004 343
Ngatuwhete Wetland	N02/047	N02 012 354
Kokota Spit	N02/051	N02 090 395
Tangoake Shrubland	N02/052	N02 093 327
Te Pua Point Pohutukawa Remnant	N02/053	N02 058 413
Kaipohue Island	N02/055	N02 080 350
Karatia Wetland	N02/056	N02 975 395
Whakatereohao Stream Swamp	N02/057	N02 985 386
Emauhu Point Shrublands	N02/058	N02 987 392
Lake Kihona & Forest Remnants	N02/060	N02 021 304
Lake Te Kahika	N02/061	N02 110 308, N02 112 305
Waipara & Dead Lakes	N02/065	N02 977 351, N02 977 353
Pretty Lake	N02/066	N02 964 355
Upper Karatia Swamp	N02/068	N02 950 390
Lake Austria & Shrubland	N02/069	N02 957 370
Ngatuwhete Lake	N02/070	N02 003 358
Matapia Island	N02/073	N02 925 328
Te Ahu Rd	N03/002	N03 055 285
Wild Horse Wetland	N03/003	N03 072 173

SITE NAME	SURVEY NO.	GRID REF.
Pukekura Stream Wetlands	N03/004	N03 014 296, N03 016 296 N03 007 287, N03 003 287 N03 995 278
Te Arai Sandfields	N03/009	N03 065 225
Oromanga Rd Wetlands	N03/010	N03 019 248
Henderson Bay Shrubland	N03/014	N03 194 192, N03 207 188 N03 214 183, N03 196 174
Great Exhibition Bay	N03/015	N03 137 270
Henderson Bay & Kowhai Bay	N03/016	N03 235 150
Te Kao South Swamp	N03/018	N03 087 256, N03 107 248
Te Ramanuka Lakes & Shrubland	N03/019	N03 135 207, N03 112 183 N03 128 202, N03 119 182
Henderson Bay Rd Wetlands	N03/020	N03 173 170, N03 174 167, N03 178 174
Lake Morehurehu & Wetland	N03/021	N03 105 288, N03 112 285, N03 114 283
Wairahi Swamp & Lake Taeore	N03/022	N03 121 270, N03 130 253
Rarawa Beach	N03/023	N03 180 206
Wagener's Swamps	N03/024	N03 213 153, N03 224 155 N03 219 148, N03 228 146 N03 232 146, N03 234 145 N03 234 142, N03 236 144 N03 235 140
Lake Waihopo & Shrublands	N03/025	N03 149 162, N03 156 160 N03 145 150
Lake Wahakari	N03/026	N03 040 277
Puriri-Karaka Remnant	N03/027	N03 053 234
Jackson Point Shrubland	N03/029	N03 221 145, N03 236 123
Te Raite Wetland	N03/030	N03 170 119
Kaimaumau-Motutangi Wetlands	N03/031	N03 300 000
Hukatere Lookout	N03/032	N03 188 017, N03 183 013 N03 188 013, N03 195 005, N04 195 995
Houhora Heads Rd Wetland	N03/034	N03 239 078
Mt Camel	N03/035	N03 268 109, N03 262 108 N03 256 105, N03 256 090 N03 235 108, N03 232 107
Kowhai Swamps	N03/036	N03 250 118, N03 243 133 N03 241 104
Pohutukawa Remnant	N03/037	N03 143 075
Houhora Harbour	N03/038	N03 225 115
Arethusa Swamp	N03/039	N03 205 085, N03 204 083 N03 204 081, N03 206 082
East Beach	N03/040	O03 330 023, N03 275 044
Waikokopu Shrubland	N03/041	N03 090 195
Salvation Rd Swamp	N03/043	N03 193 099
Lambs Rd Swamp	N03/044	N03 197 090, N03 194 091
Salt Lake	N03/046	N03 132 217
Te Wakatehaua (The Bluff) Island	N03/050	N03 010 240
Motu Puruhi I. & Terakautuhaka Island	N03/051	N03 252 162
Far North Rd Shrublands & Wetlands	N04/002	N04 298 918, N04 300 910 N04 295 909, N04 299 895 N04 291 883, N04 285 881, N04 282 883, O04 302 877

SITE NAME	SURVEY NO.	GRID REF.
Compartment 65 Forest Remnant	N04/003	N04 202 991
Coal Creek Wetland	N04/005	N04 206 974, N04 214 963
		N04 224 943
Heath Rd Powerline Swamp	N04/006	N04 298 934, O04 303 933
Headquarters Pond	N04/007	N04 283 875
Lake Ngatu Complex	N04/008	N04 290 855, N04 294 891
		N04 286 847, N04 284 842
		N04 293 846, N04 294 844
		N04 300 840
Lake Rotokawau & Pond	N04/009	N04 296 869, N04 296 874
Lake Waiparera & Wetlands	N04/010	N04 265 950, N04 260 954
		N04 253 950, N04 254 943
West Coast Rd Lake	N04/011	N04 280 862
Waipapakauri Beach Coastal Shrubland	N04/015	N04 265 844
Sandhills Rd Swamp	N04/016	N04 277 746
Sweetwater Station Depressions	N04/017	N04 286 799, N04 284 798
		N04 283 794, N04 284 795
		N04 281 796, N04 282 795
		N04 286 795, N04 278 793
Tangonge Wetland	N04/018	O04 300 760, N04 214 755
Clarke Rd Wetland	N04/019	N04 280 746
Sandhills Rd Wetland No 1	N04/021	N04 284 768, N04 286 765
		N04 284 758
Lake Rotoroa & Wetlands	N04/022	N04 293 834, N04 293 832
		N04 287 225
Lake Heather	N04/023	N04 285 835
Split Lake Wetland	N04/024	N04 278 815
Mini & Round Lakes	N04/025	N04 283 807, N04 279 807
		N04 279 813
Turks Lake & Wetland	N04/026	N04 247 998
Bacica Rd Lake	N04/027	N04 258 995
Selwyn Flat Wetland	N04/028	N04 253 975
Herberts Swamp	N04/029	N04 279 886
Lake Ngakapua Complex	N04/030	N04 283 873, N04 285 868
		N04 280 866, N04 284 863
		N04 280 862, N04 276 862
		N04 286 865
Jones Lake	N04/031	N04 270 918
Gleeson's Lake	N04/032	N04 280 907
Ninety Mile Swamp	N04/033	N04 250 890
Waimimiha Lakes	N04/034	N04 264 730, N04 263 735
Kaikoura Farms	N04/035	N04 277 769
Woolshed Swamp	N04 037	N04 292 813
Sweetwater Station Peat Bowl	N04/038	N04 283 772
Waimango Swamp	O03/001	O03 430 044
Rotokawau Lakes & Puwheke Beach	O03/002	O03 390 035
Maitai Bay	O03/003	O03 495 085, O03 495 075
Taupiroroa Range Shrublands	O03/004	O03 455 050, O03 470 040
		O03 470 026, O03 476 022
		O03 483 037, O03 485 035
Cape Karikari Shrublands	O03/005	O03 474 127, O03 475 090
Whangatupere Bay	O03/006	O03 510 060
S Urlich Rd Wetland	O03/008	O03 444 001, O03 443 012
Karikari Moana	O03/009	O03 455 064

SITE NAME	SURVEY NO.	GRID REF.
Puheke Rd Wetland	O03/011	O03 406 027
Moturoa Islands	O03/012	O03 427 145, O03 437 133
		O03 440 128, O03 455 125
		O03 470 138
Waimanoni Creek Shrubland	O04/217	O04 334 873
Paparore Wetland & Shrubland	O04/220	O04 309 901, O04 309 895
Waiparera Creek Wetland	O04/221	N04 303 965, O04 306 964
Awanui River Forest Remnants	O04/222	O04 323 824, O04 327 824
		O04 328 815, O04 322 811
		O04 313 798, O04 312 794
		O04 308 793, O04 309 787
		O04 313 708, O04 313 785
		O04 314 783, O04 333 777
		O04 315 775, O04 315 774
		O04 316 772, O04 315 771
		O04 315 770, O04 322 770
West Coast Rd Shrubland	O04/223	O04 302 873, O04 306 872
		O04 304 871, O04 304 866
Mangatete River Bush	O04/226	O04 406 863
Lake Ohia	O04/227	O04 445 920
Lake Waiporohita	O04/228	O04 428 430
Southern Tokerau Swamp	O04/229	O04 448 956, O04 440 950
Northern Tokerau Swamp	O04/230	O04 441 989
Awapoko Estuary	O04/231	O04 486 907
Tokerau Beach	O04/232	O04 465 944
Rangaunu Harbour	O04/233	O04 360 950
Walker Island	O04/235	O04 375 993, O04 274 987

TE PAKI DUNES

Survey no. N02/013
Survey date 24 August 1995
Grid reference N02 900 395
Area 1,936 ha
Altitude 0–152 m asl

Ecological unit

Sandfield

Landform/geology

Coastal belt of large active unvegetated transverse dunes.

Vegetation

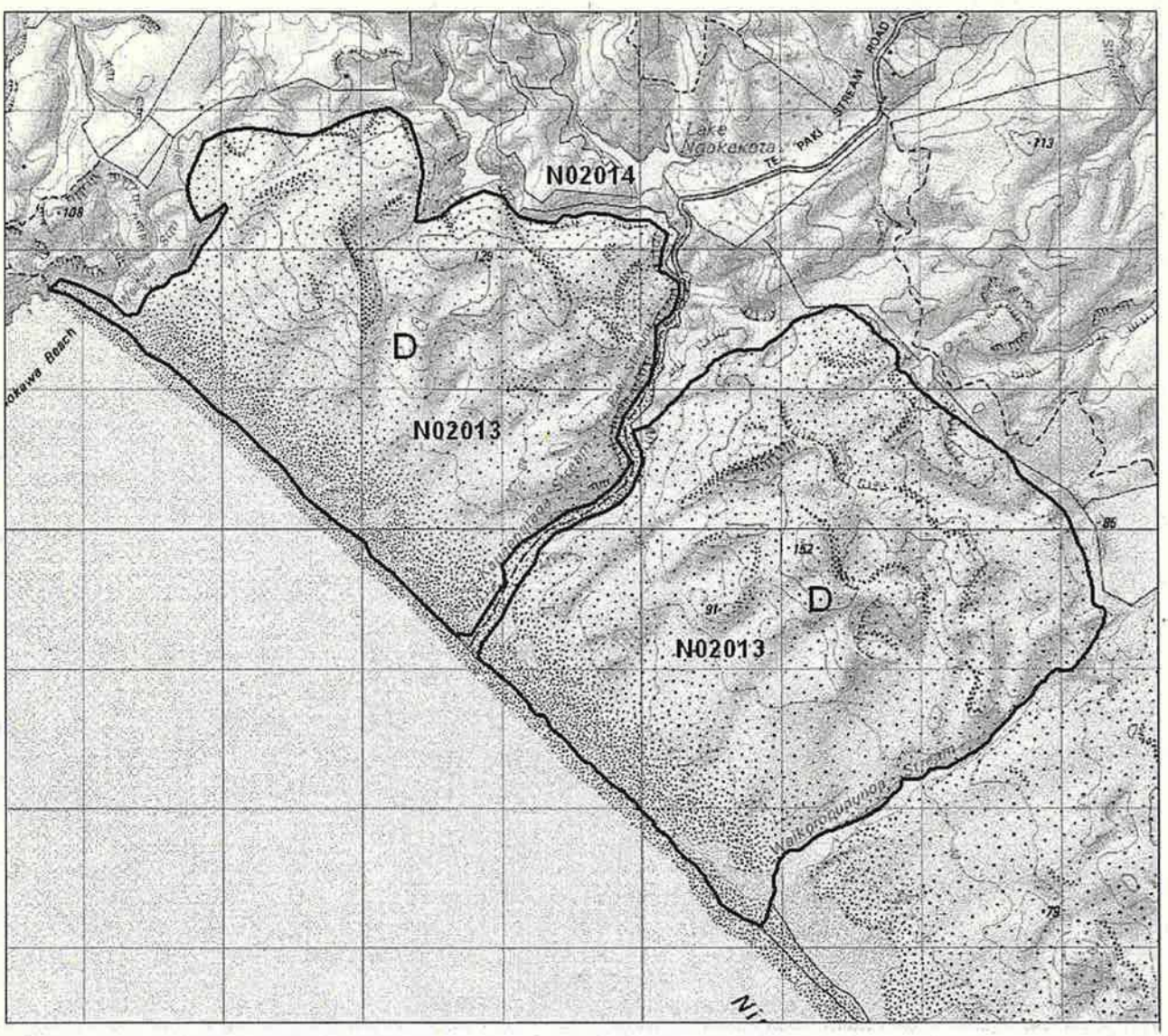
This is primarily a sandfield with scattered toetoe, pingao, tauhinu and sedges.

Significant flora

Pingao (Recovering-Conservation Dependent).

Fauna

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



Te Paki Dunes N02/013

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Significance

A large area of mobile dunes which have become increasingly rare as the west coast dune system has been converted into exotic forestry. This area is particularly notable for the absence of adventive species and is a representative site.

Contains the best preserved area of active dunes on the Aupouri Peninsula and is a geopreservation site of national importance (Kenny & Hayward 1996).

Recreation Reserve protects 1,871 ha (96.6%) of this site and it is administered by the Department of Conservation.

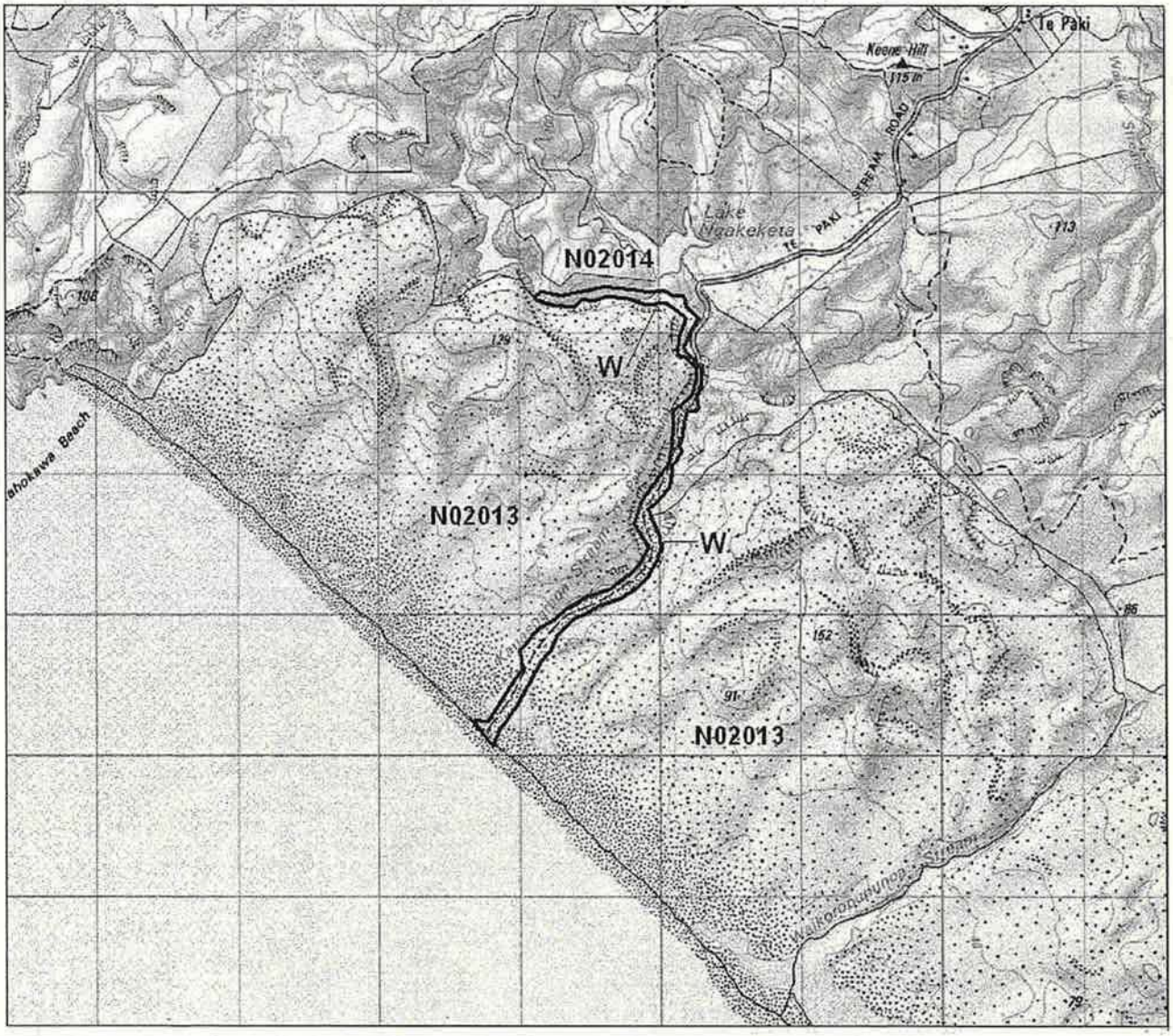
TE PAKI STREAM

Survey no.	N02/014
Survey date	25 August 1995
Grid reference	N02 899 407
Area	43 ha
Altitude	0–80 m asl

Ecological unit

(a) Oioi rushland on sandy stream bed

(b) Mixed coastal turf association on damp sandflats



Te Paki Stream N02/014

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Stream cutting through Holocene coastal dune belt.

Vegetation

(a) On the margin between the stream and the sand dunes, oioi is common with frequent raupo, *Juncus* sp. and kuta. Occurring in small numbers are toetoe, manuka, harakeke, ti kouka and *Eleocharis sphacelata*.

(b) A variety of small herbs occur on the damp sandflats including *Lilaeopsis novae-zelandiae, Limosella lineata, Cotula* sp., *Myriophyllum votschii, Epilobium pallidiflorum.*

Significant flora

Eleocharis neozelandica (Declining). Pingao (Recovering-Conservation Dependent) recorded from Te Paki stream margin in 1999 and *Myriophyllum votschii* (Regionally significant species).

Fauna

Northern NZ dotterel (Category B threatened species), banded dotterel (Category C threatened species), Australasian bittern (Category O threatened species), NI fernbird and Australasian little grebe (both Regionally significant species).

Significance

A freshwater stream with a large sandy bed, which is still in a relatively natural state despite heavy visitor use.

A good example of a dynamic natural system and a representative site for type (a) oioi rushland and type (b), coastal turf association on damp sandflats. Type (b) is one of twp records of thia type in the Ecological District, although likely to occur elsewhere.

Presence of threatened and regionally significant bird species.

Recreation Reserve administered by the Department of Conservation protects 41.5 ha (96%) of this site.

PARENGARENGA HARBOUR

Survey no.	N02/026
Survey date	24 August 1995
Grid reference	N02 055 425
Area	6,449 ha
Altitude	< 2 m asl

Ecological unit

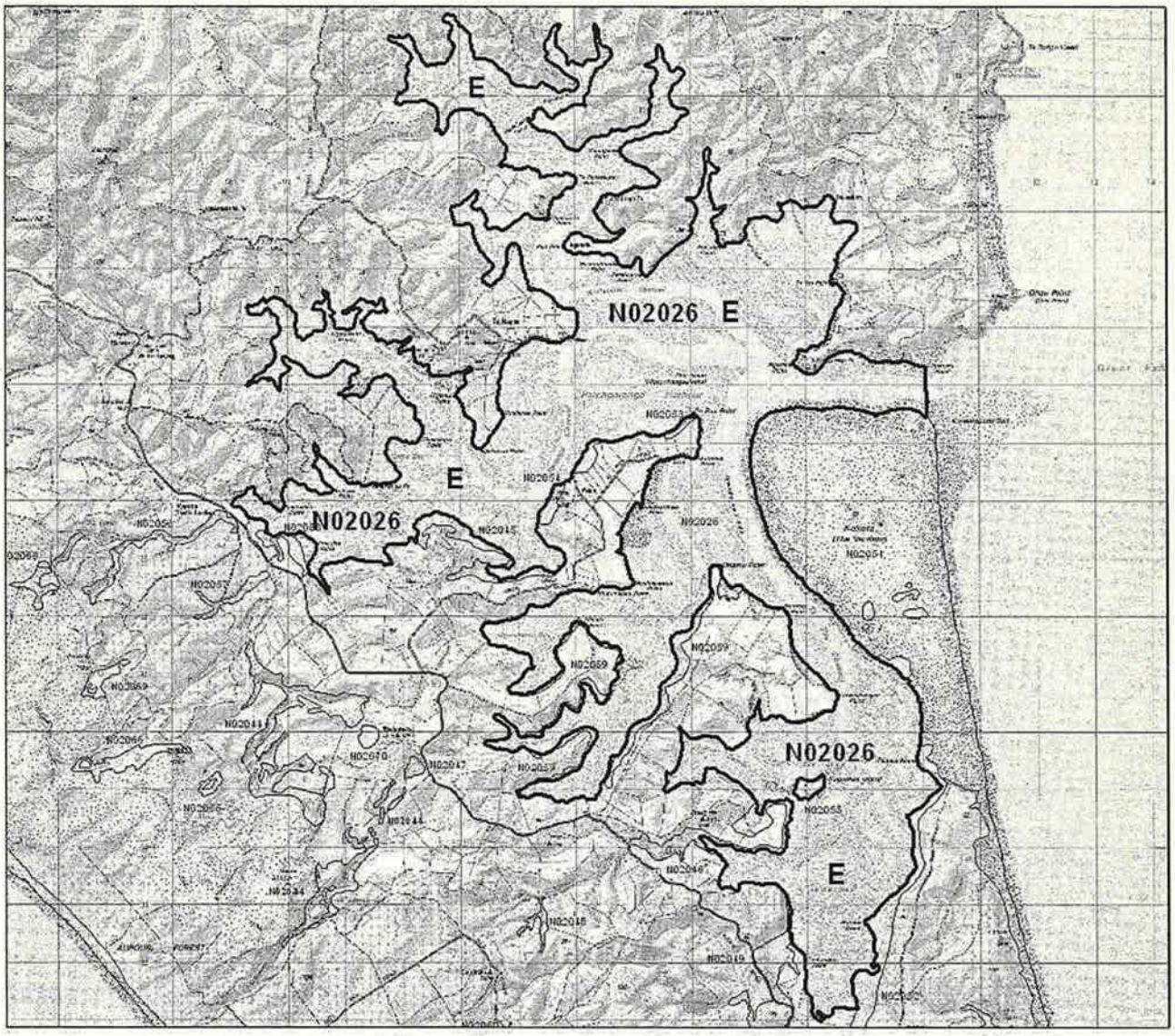
(a) Mangrove forest in estuary

(b) Oioi-sea rush saltmarsh in estuary

(c) Eelgrass beds on estuarine sands

Landform/geology

Harbour with an extensive sandspit controlling flow in drowned river valleys. Large intertidal flats.



Parengarenga Harbour N02/026

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Vegetation

(a) The mangrove forest makes up approximately 11% of the total area of the harbour. Some mangrove trees reach 10m in height (Shaw et al. 1990).

(b) The saltmarsh community is a mosaic of oioi and sea rush and has occasional harakeke, saltmarsh ribbonwood, mangrove, kanuka and ti kouka. *Baumea juncea* is present in the more brackish areas.

(c) Extensive eelgrass (*Zostera capricorni*) beds (covering 50% of the harbour area (Shaw et al. 1990)) occur from upper beaches of sand or silt to the low water level of tidal channels.

Significant flora

The threatened fern, *Todea barbara* (Vulnerable) has been recorded in the past.

Fauna

About 70 species of wetland or aquatic birds have been recorded, some in large numbers (see Section 3.4 and Appendix 8.4). The threatened species are northern NZ dotterel and wrybill (Category B threatened species); three Category C threatened species - variable oystercatcher, white-fronted tern and banded dotterel; five Category O threatened species - Caspian tern, Australasian bittern, white heron, reef heron, and royal spoonbill. Regionally significant species include NI fernbird, and banded rail. Important for many migratory bird species including bar-tailed godwit, SI pied oystercatcher, pied stilt, Pacific golden plover, turnstone, lesser knot, red-necked stint, Asiatic whimbrel, curlew sandpiper, and many others are also present.

Lizards: 1979 record of ornate skink (Regionally significant species).

Significance

Parengarenga Harbour is of international significance due to high numbers of migratory birds and high numbers of threatened species. Many wetland or aquatic birds use Parengarenga Harbour as a stop-off point on their migratory routes (e.g. bar-tailed godwit). Many others utilise the harbour as permanent or seasonal habitat. This harbour probably has the greatest bird diversity of any habitat in Northland (Ogle 1984) and is one of the least modified warm temperature/subtropical harbours in the world (Sewell 1985). The harbour has a very high water quality due to several factors including a considerable exchange of water between the harbour and outside ocean.

The whole northern side of the harbour catchment is vegetated (mostly in native shrubland cover and wetlands, but there are also some pine plantations) with good buffers around much of the remaining area. There is relatively little coastal foreshore development although the small peninsulas in pasture are used for both feeding and roosting by some species. The large Kokota Spit (N02/051) enhances the values of the harbour as a significant high-tide roost.

The extensive areas of eelgrass indicate a low silt and high oxygen content, which contribute to the pristine water quality. Together with the vast areas of mangroves, these factors contribute to a high degree of diversity and richness in the biota.

There are large populations of trevally, schnapper, kahawai, kingfish, grey and yellow-eyed mullet, eagle rays and school sharks with shellfish beds including pipi, Pacific oyster, scallop and especially cockles. Studies in New South Wales, Australia, show that 70% of coastal fisheries rely on estuarine mangroves for food and for protection, which emphasises the importance of Parengarenga Harbour as a nursery for commercial and recreational fish catches (Chapman, 1978).

Threats to the harbour include habitat loss due to the spread of *Spartina*, local modication from aquaculture, and siltation.

Representative site for the three Ecological units recorded at this site, mangrove forest, oioi-sea rush saltmarsh, and eelgrass beds.

The north side of the harbour contains geopreservation sites of national importance (Kenny & Hayward 1996) for:

(i) Sea cliffs containing the most complete early Miocene sequence in the northern half of the North Island, rich in macro and micro fossils.

(ii) Sea cliffs containing diverse, warm-water molluscan fauna.

(iii) Coastal cliff and shore platform containing best exposed sequence through most of the upper Parengarenga group of dipping fossiliferous siltstones and fine sandstones.

Scenic Reserve of 39.2 ha, administered by the Department of Conservation, is protected within this site.

NINETY MILE BEACH & DUNES

Survey no.	N02/042
Survey date	9 August 1995, 15 August 1995, 24 August 1995
Grid reference	Continuous band from: N02 908 372 - 975 300, N03 975 300 - 190 000, N04 190 000 - 245 707
Area	928 ha
Altitude	0-5 m asl

Ecological unit

(a) *Spinifex* grassland on foredunes

(b) Kikuyu-pohuehue association on dunes

(c) Toetoe shrubland association on dunes

(d) Knobby clubrush-oioi association in dune depressions

(e) Toetoe-harakeke-oioi association on dunes

Landform/geology

Holocene coastal foredunes.

Vegetation

A narrow band of dunes seaward of the Aupouri Forest.

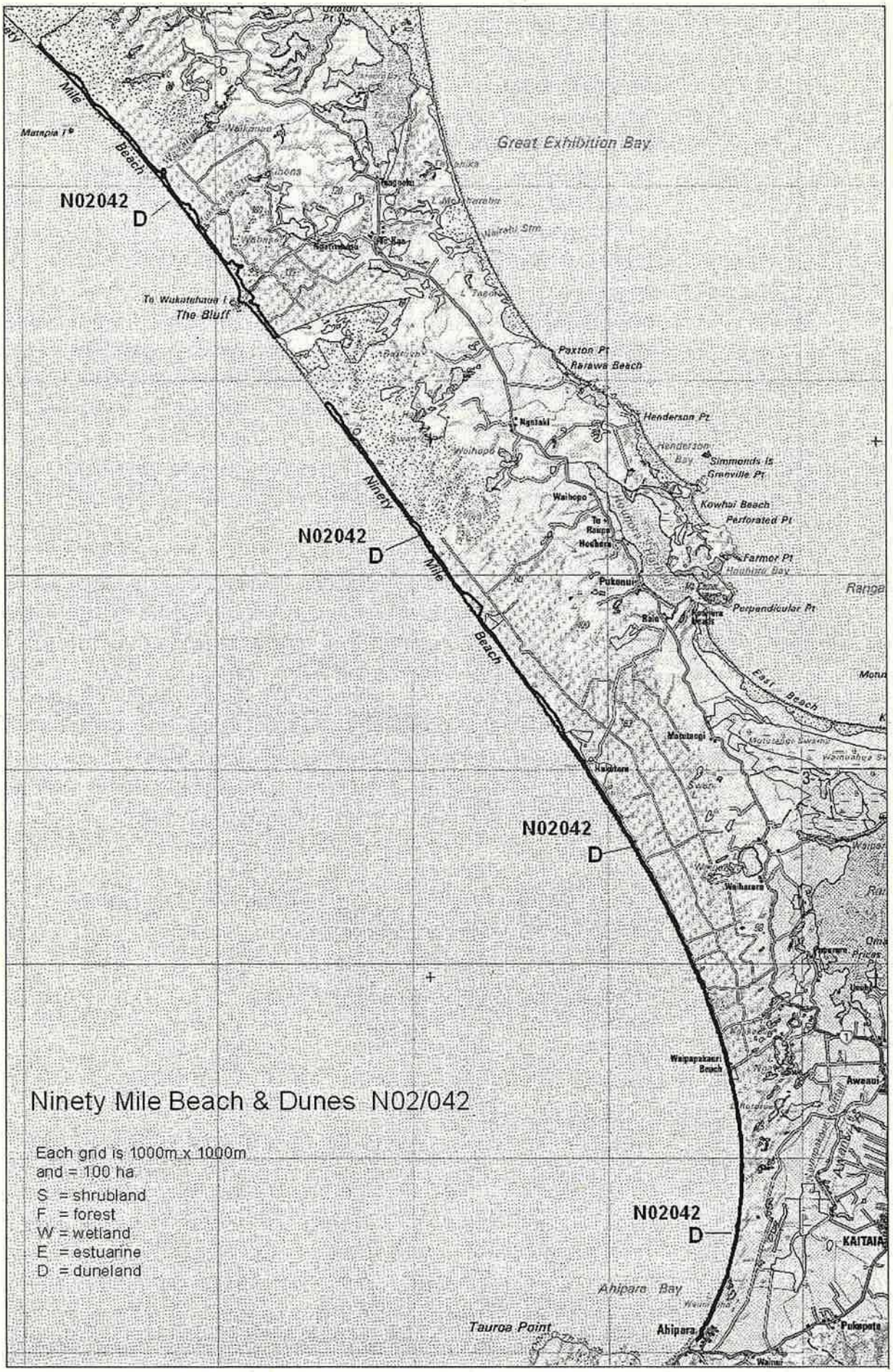
(a) The foredunes are mostly vegetated with abundant *Spinifex.* Harakeke and marram are locally frequent. Other species present are knobby clubrush, oioi, toetoe, pingao, tauhinu, pampas, kikuyu, pohuehue, *Pimelea arenaria,* ngaio, and boneseed. South of Hukatere, *Coprosma acerosa* is locally frequent. A few small pohutukawa occur near the ramp at Hukatere.

(b) Some sheltered areas behind the foredune, e.g. at Hukatere, are dominated by kikuyu and pohuehue intertwined, with occasional shore bindweed, knobby clubrush and *Coprosma acerosa.*

(c) South of Hukatere, toetoe is abundant, *Coprosma acerosa* frequent, and a greater diversity of species is present including karamu, karo, mingimingi, houpara, bracken, native iceplant and the exotics, lupin, pampas, buffalo grass, kikuyu, pine, macrocarpa and flame tree.

(d) In dune depressions, knobby clubrush and oioi are locally abundant, with toetoe locally frequent. Harakeke, giant umbrella sedge, pampas, pohuehue and pohutukawa occur rarely.

(e) Between Te Arai and Waikoropupunoa Stream, toetoe is abundant with harakeke, knobby clubrush and oioi common. Marram and *Spinifex* are locally


Great Exhibition Bay
Ninety Mile Beach
N02042
D
Paxton Pt
Rarawa Beach
Henderson Pt
Simmonds Is
Granville Pt
Kowhai Beach
Perforated Pt
Farmer Pt
Pukenui
Perpendicular Pt
East Beach
Waipapakauri Beach
Ahipara Bay
Tauroa Point
Ahipara
KAITAIA
Ninety Mile Beach & Dunes N02/042
Each grid is 1000m x 1000m
and = 100 ha
S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

frequent. *Coprosma acerosa*, tauhinu, pohutukawa, pohuehue, lupin and pine are present, as are occasional areas of hard pans.

Significant flora

Amphibromus fluitans (Critically Endangered), *Pimelea arenaria* (Declining) (1999 record), pingao (Recovering-Conservation Dependent).

The original mainland record of *Ipomoea pes-capre* (Regionally signficant species), a tropical species, which in New Zealand grows on the Kermandecs, was recorded from the Bluff area. This is now a modified habitat. The plant was recently rediscovered at Te Paki (L.J. Forester pers. comm.).

Fauna

Birds: Northern NZ dotterel and occasionally wrybill (both Category B threatened species); variable oystercatcher, white-fronted tern and banded dotterel (all Category C threatened species); Caspian tern (Category O threatened species); NI fernbird (Regionally significant species) and bar-tailed godwit.

Marine reptiles: 2000 record of yellow-bellied sea snake. 1991 record of leathery turtle and green turtle and pre-1960 records of hawksbill turtle and loggerhead turtle.

Significance

Habitat for several threatened and uncommon bird species and a dune system between the coast and Aupouri Forest supporting three threatened plants.

Representative site for the following four Ecological units, type (a) *Spinifex* grassland, type (c) toetoe association, type (d) knobby clubrush-oioi association, and type (e) toetoe-harakeke-oioi association. The latter three vegetation types are solely recorded from this site in the Ecological District.

Approximately 207.4 ha (22.3%) of this site is protected, including 103.7 ha Stewardship Land, 63.7 ha Conservation Covenant, and 40 ha Marginal Strip which are all administered by the Department of Conservation.

WAIKANAE STREAM WETLAND

Survey no.	N02/043
Survey date	22 August 1995
Grid reference	N02 973 304
Area	2 ha
Altitude	0–5 m asl

Ecological unit

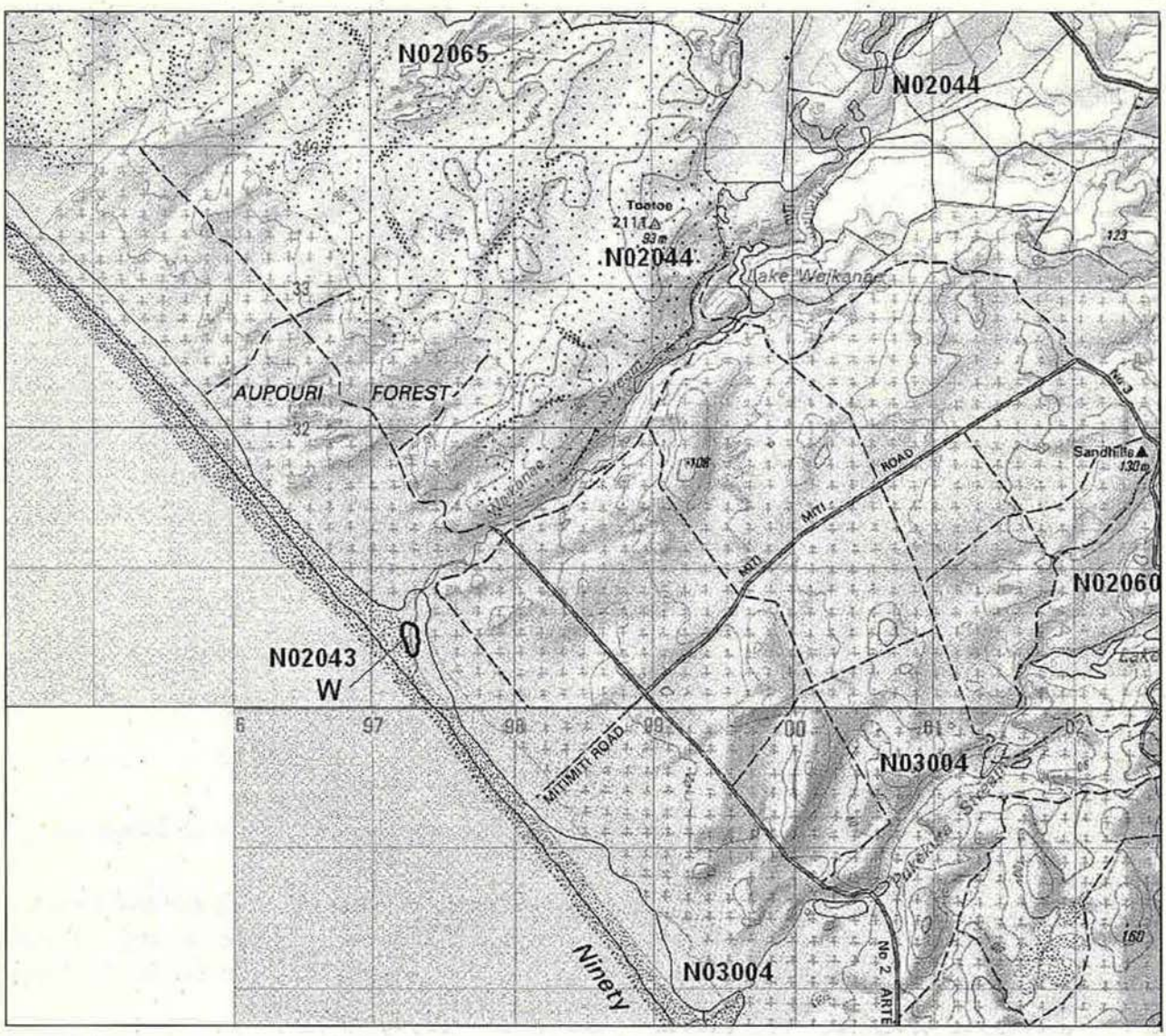
Harakeke-pampas-reed-toetoe wetland association on sandy stream bed

Landform/geology

Freshwater wetland on stream cutting through Holocene coastal foredunes.

Vegetation

Freshwater wetland comprising (100%) harakeke-pampas-reed-toetoe with frequent manuka.



Waikanae Stream Wetland N02/043

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Fauna

Not surveyed.

Significance

A small wetland near the mouth of Waikanae Stream, one of the biggest streams on the western coast of the Ecological Region and linking with Lake Waikanae (N02/044).

LAKE WAIKANAE

Survey no.	N02/044
Survey date	1995-96
Grid reference	N02 000 344, N02 006 348, N02 009 348, N02 987 360, N02 006 346, N02 004 343
Area	252 ha (247 ha shrubland, 5 ha wetland)
Altitude	20-100 m asl

Ecological unit

(a) Open water in dune lake

(b) Kanuka shrubland on flat to gently sloping consolidated dunes

(c) Toetoe-bracken-kanuka association on flat to gently sloping consolidated dunes

(d) *Isolepis prolifer* sedgeland on sand flats

(e) *Eleocharis sphacelata* reedland on sandy lake bed

(f) Raupo reedland on sandy lake bed

(g) Puriri-taraire forest in gully of consolidated dunes

Landform/geology

Lake ponded by Pleistocene consolidated parabolic dunes.

Vegetation

(a) A sheltered lake.

(b) In the northern area, kanuka to 3 m is dominant with occasional *Cassytha* and prickly hakea.

Around Lake Waikanae the shrubland varies between two and five metres and contains frequent manuka. Other species occurring are harakeke, *Cassytha*, native broom, hangehange, bracken, ti kouka, mahoe, karamu, kawakawa, mamaku and prickly hakea.

An extensive area of kanuka dominant shrubland with occasional ti kouka, toetoe and harakeke occurs in the north-west.

(c) Toetoe is abundant, kanuka and bracken are common, and ti kouka and hangehange are occasional.

(d) *Isolepis prolifer* is dominant on the lake shores of Lake Waikanae.

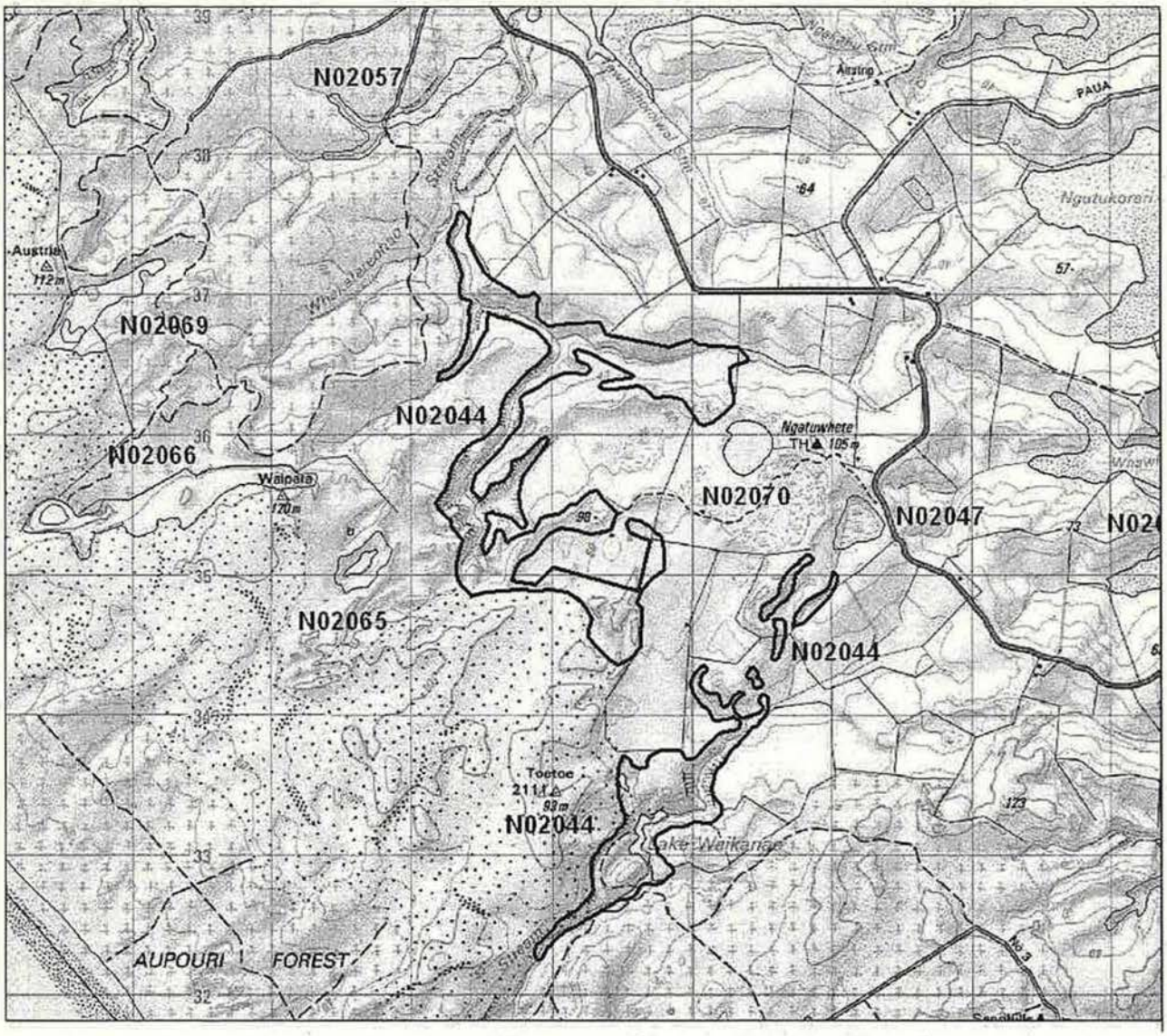
(e) *Eleocharis sphacelata* occurs on the margins of the lake with raupo at the head of the lake. Toetoe and pampas are frequent with occasional ti kouka. In drier areas, pampas and toetoe are common.

(f) A small, deep sided dune lake occurs about 500 m to the north west of Lake Waikanae which is approximately half openwater and half raupo with frequent *Eleocharis sphacelata* and *Baumea articulata*. Harakeke and ti kouka also occur and *Azolla* sp. is present. Marram grows to the water's edge along 10% of the margin.

The stabilised mobile dunes appear to have raised the water level.

In the lower Waikanae Stream, pampas and raupo are dense. *Eucalyptus* sp. are planted to the margins of the wetland.

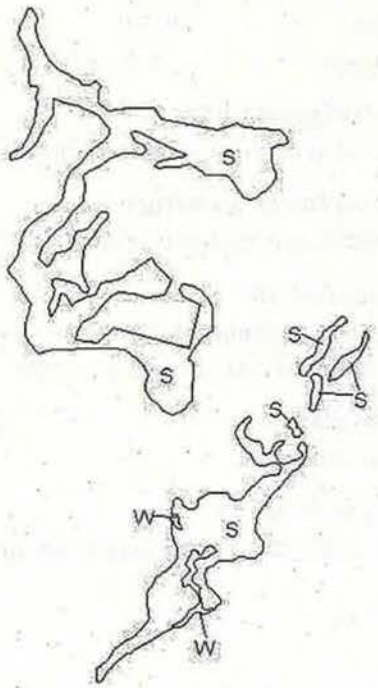
(g) Bluffs have excluded stock from a small area (approximately 0.5 ha, not mapped) of puriri-taraire forest in which rewarewa and titoki are frequent and ti



Lake Waikanae N02/044

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



kouka, and kohekohe are occasional in the canopy. Other species present are houpara, kanono, kawakawa, hangehange, mahoe, *Coprosma rhamnoides*, ponga, mamaku, shining spleenwort, Hound's tongue and kiokio.

This area is too small to be mapped.

Significant flora

A 1984 record of the Declining *Eleocharis neozelandica.*

Fauna

Birds: NZ dabchick (Category C threatened species), NZ scaup (Regionally signficant species), NZ shoveler, grey duck, paradise shelduck, pukeko, NZ kingfisher and welcome swallow. Past surveys (1978) recorded black shag, pied shag and little shag. Common forest birds have also been recorded.

Aquatic fauna: Freshwater mussel.

Significance

A good quality habitat for the threatened NZ dabchick, and containing a mosaic of vegetation types, including a remnant of broadleaf forest now rare in the Ecological Region.

A representative site for type (a) open water in dune lake, type (c) toetoe-bracken-kanuka association, type (d) *Isolepis prolifer* sedgeland, and type (g) puriri-taraire forest. The latter vegetation type is not recorded elsewhere in the Ecological District.

NGATUWHETE WETLAND

Survey no.	N02/047
Survey date	22 August 1995
Grid reference	N02 012 354
Area	8.7 ha
Altitude	25–35 m asl

Ecological unit

Kanuka/manuka swamp shrubland in dune hollow

Landform/geology

Freshwater wetland ponded on Pleistocene consolidated dunes.

Vegetation

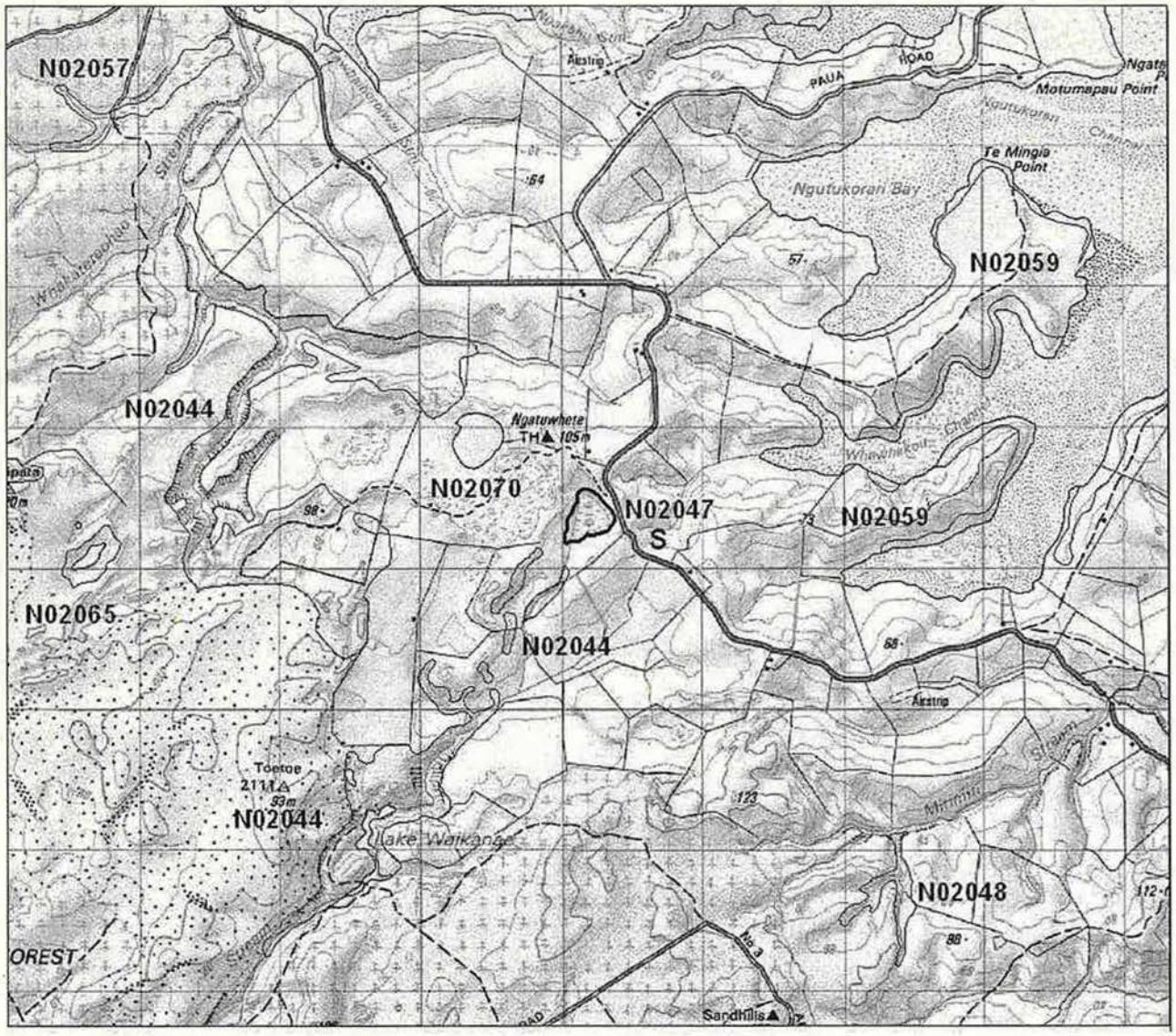
Kanuka/manuka to 2 m is dominant in this wetland with frequent reeds and occasional *Cassytha* and willow.

Fauna

Not surveyed.

Significance

An example of a nationally uncommon habitat type.



Ngatuwhete Wetland N02/047

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

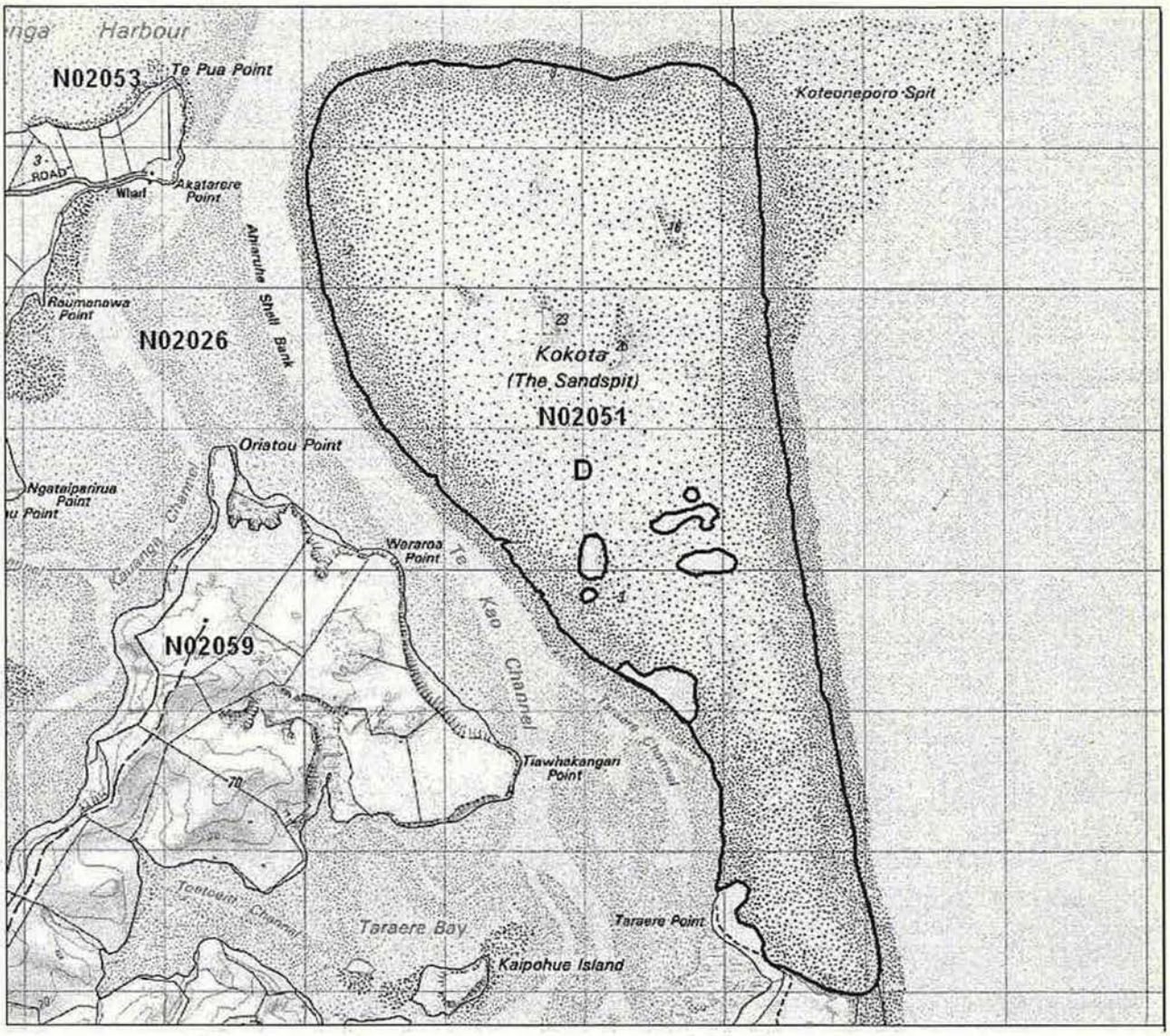
KOKOTA SPIT

Survey no.	N02/051
Survey date	24 August 1995
Grid reference	N02 090 395
Area	1,344 ha
Altitude	0–26 m asl

Ecological unit

(a) Sandfield

(b) Pingao-*Spinifex* association on dunes



Kokota Spit N02/051

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Sandspit of Holocene transverse dunes overlying a core of eroded Pleistocene consolidated dune sands.

Vegetation

(a) This area is primarily a sandfield.

(b) A band of pingao and *Spinifex* occurs with occasional toetoe and tauhinu on the eastern (outer) side of the spit.

Other species present are sea rocket, glasswort, *Samolus repens,* knobby clubrush, pohutukawa, and mangrove.

Significant flora

Austrofestuca littoralis (Declining) occurs and a population of the Declining *Eleocharis neozelandica* was recorded by Bell in 1984 on the western side of the base of the spit. Presence of pingao (Recovering-Conservation Dependent).

Fauna

Birds: Seven threatened bird species including northern NZ dotterel and wrybill (both Category B threatened species), banded dotterel, white-fronted tern, and variable oystercatcher (all Category C threatened species), Caspian tern and reef heron (both Category O threatened species), bar-tailed godwit. Other avifauna includes Pacific golden plover, Asiatic whimbrel, curlew sandpiper, lesser knot, turnstone, and red-necked stint.

Lizards: shore skink.

Significance

A large sandspit on the south eastern side of Parengarenga Harbour which is a major landscape feature with a notably luxuriant area of pingao.

It is vital as a high tide roost for waders. Kokota Spit is an outstanding site for international wader species, with an estimated 3% of the world wrybill and 2% of the world bar-tailed godwit populations. The large numbers of Pacific golden plover, turnstones and lesser knot are also notable, with some of these birds staging at Parengarenga prior to their northern migration.

A representative site for both Ecological units and only record of type (b) in the Ecological District.

Kokota Spit is remote enough to consider the transfer of the Critically Endangered strand plant *Atriplex hollowayi* now restricted to two beaches at Te Paki.

Kokota sandspit is a geopreservation site of national importance. The sandspit is the largest unvegetated spit in New Zealand and contains the highest grade of silica sand deposit in New Zealand (Kenny & Hayward 1996).

TANGOAKE SHRUBLAND

Survey no.	N02/052
Survey date	23 August 1995
Grid reference	N02 093 327
Area	138 ha
Altitude	0-60 m asl

Ecological unit

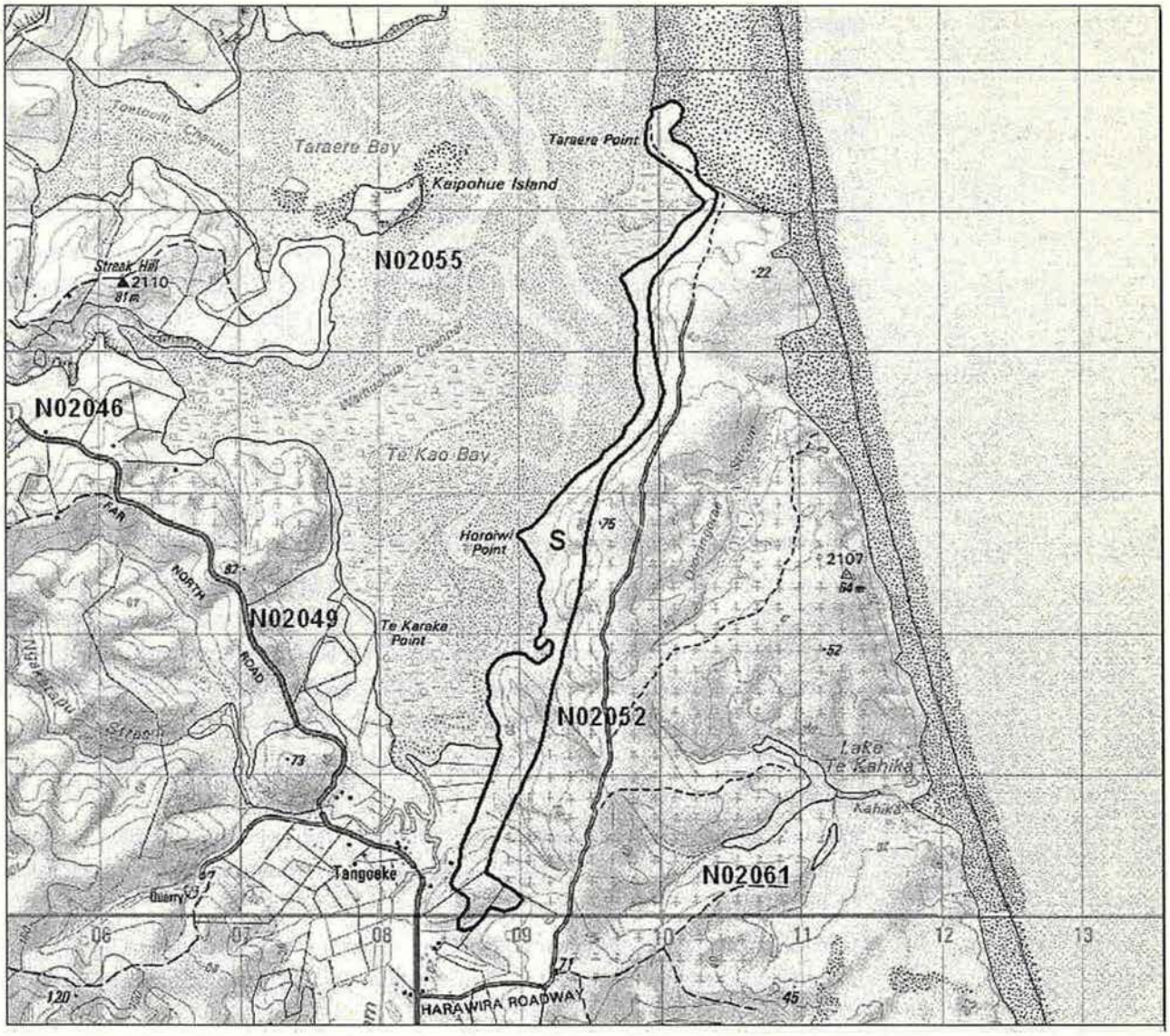
Kanuka-*Callistachys lanceolata* shrubland on coastal hillslope

Landform/geology

Coastal hillslopes of Pleistocene leached consolidated sand. Awhitu complex overlying deeply weathered Parengarenga Group sandstone and conglomerate.

Vegetation

Kanuka is dominant with emergent *Callistachys lanceolata* commonly occurring and prickly hakea and emergent Sydney golden wattle occur occasionally.



Tangoake Shrubland N02/052

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Significant flora

The threatened *Todea barbara* (Vulnerable) was recorded in 1982 and 1983 from gullies near the harbour with bracken.

Fauna

Not surveyed.

Significance

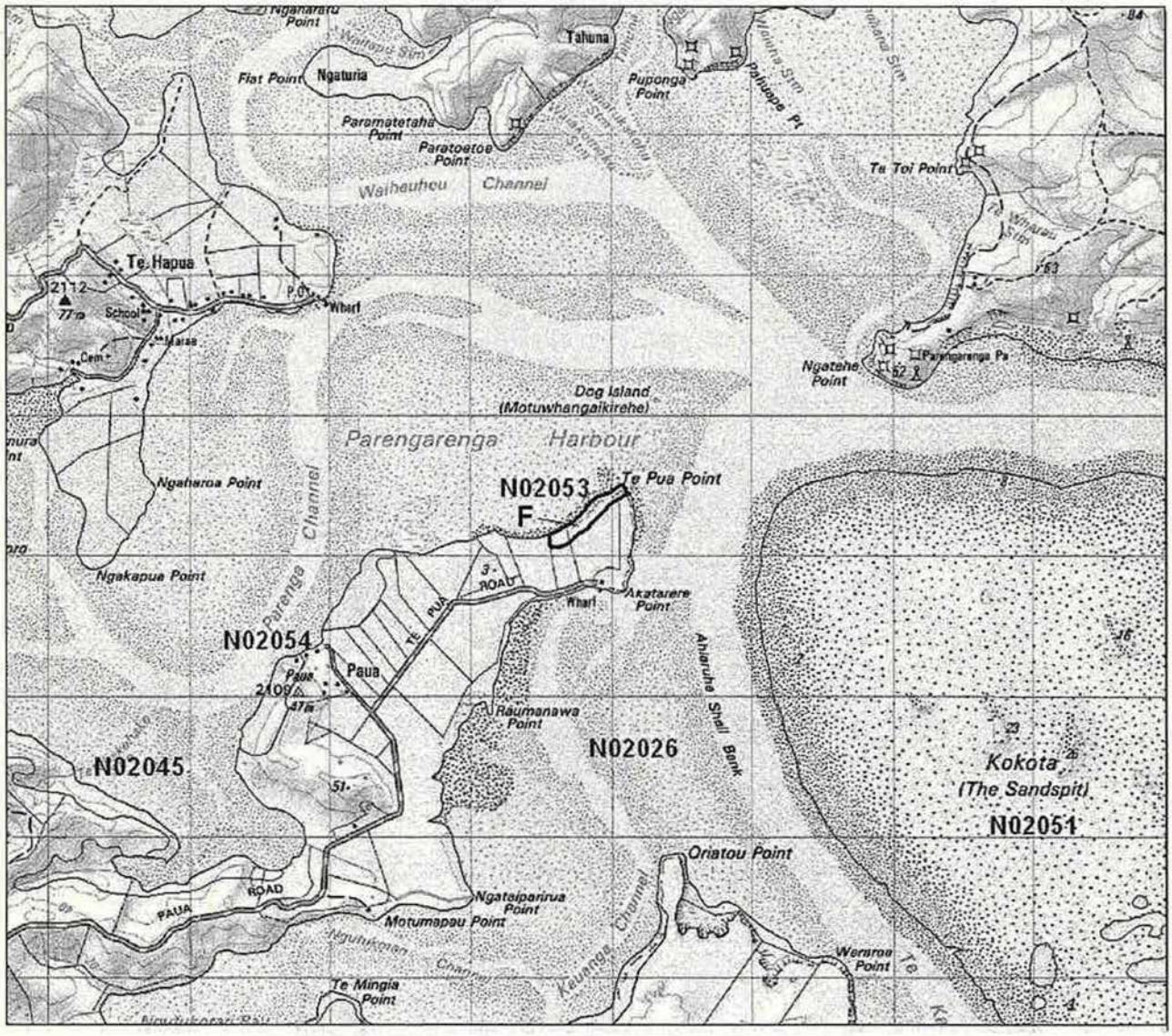
A long band of shrubland that buffers Parengarenga Harbour from exotic forestry plantations.

TE PUA POINT POHUTUKAWA REMNANT

Survey no.	N02/053
Survey date	23 August 1995
Grid reference	N02 058 413
Area	6.3 ha
Altitude	0–3 m asl

Ecological unit

Pohutukawa forest on sand cliffs



Te Pua Point Pohutukawa Remnant N02/053

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Low coastal cliffs of last interglacial consolidated estuarine sands.

Vegetation

An isolated stand of pohutukawa.

Fauna

Not surveyed.

Significance

A remnant of pohutukawa dominant coastal forest, a very uncommon habitat type which adjoins the Parengarenga Harbour.

This is a representative site for pohutukawa forest.

KAIPOHUE ISLAND

Survey no.	N02/055
Survey date	23 August 1995
Grid reference	N02 080 350
Area	14.5 ha
Altitude	0-20 m asl

Ecological unit

Kanuka shrubland on consolidated sand

Landform/geology

Terraces on last interglacial consolidated estuarine sands.

Vegetation

The island vegetation is mainly kanuka shrubland with emergent wattle occurring only occasionally along with harakeke.

Fauna

High tide roost for many species including white heron, royal spoonbill, Caspian tern (all Category O threatened species), variable oystercatcher (Category C threatened species), banded dotterel (Category C threatened species), bar-tailed godwit, turnstone, lesser knot, whimbrel, and pied stilts (OSNZ 1980s, 1990s and 2000).

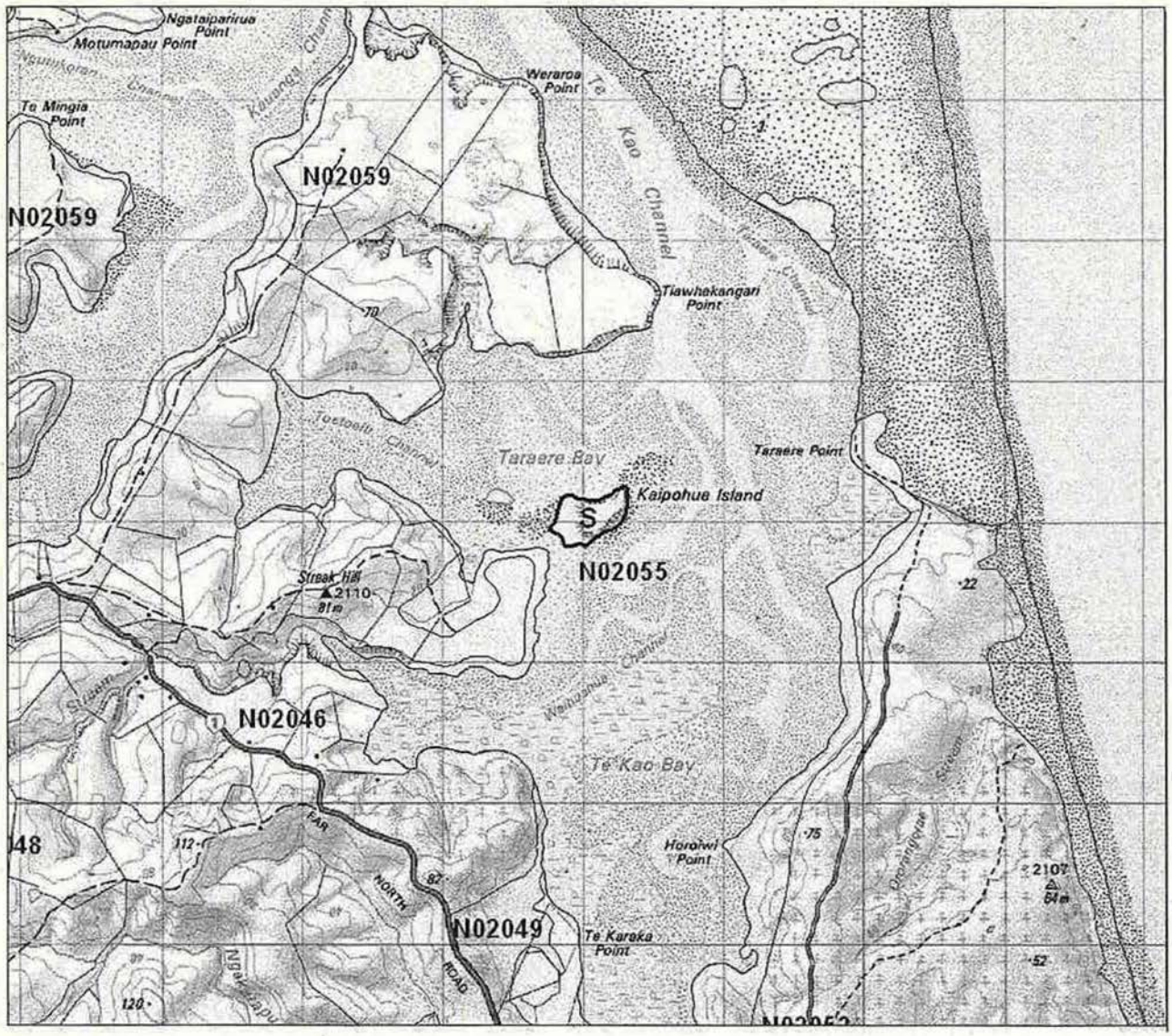
NI fernbird (Regionally significant species).

Significance

Kaipohue Island has ecological value as an island habitat.

A representative site for kanuka shrubland, which has not been recorded elsewhere on island habitats in this Ecological District.

Additional surveying is recommended to determine further ecological significance of this site.



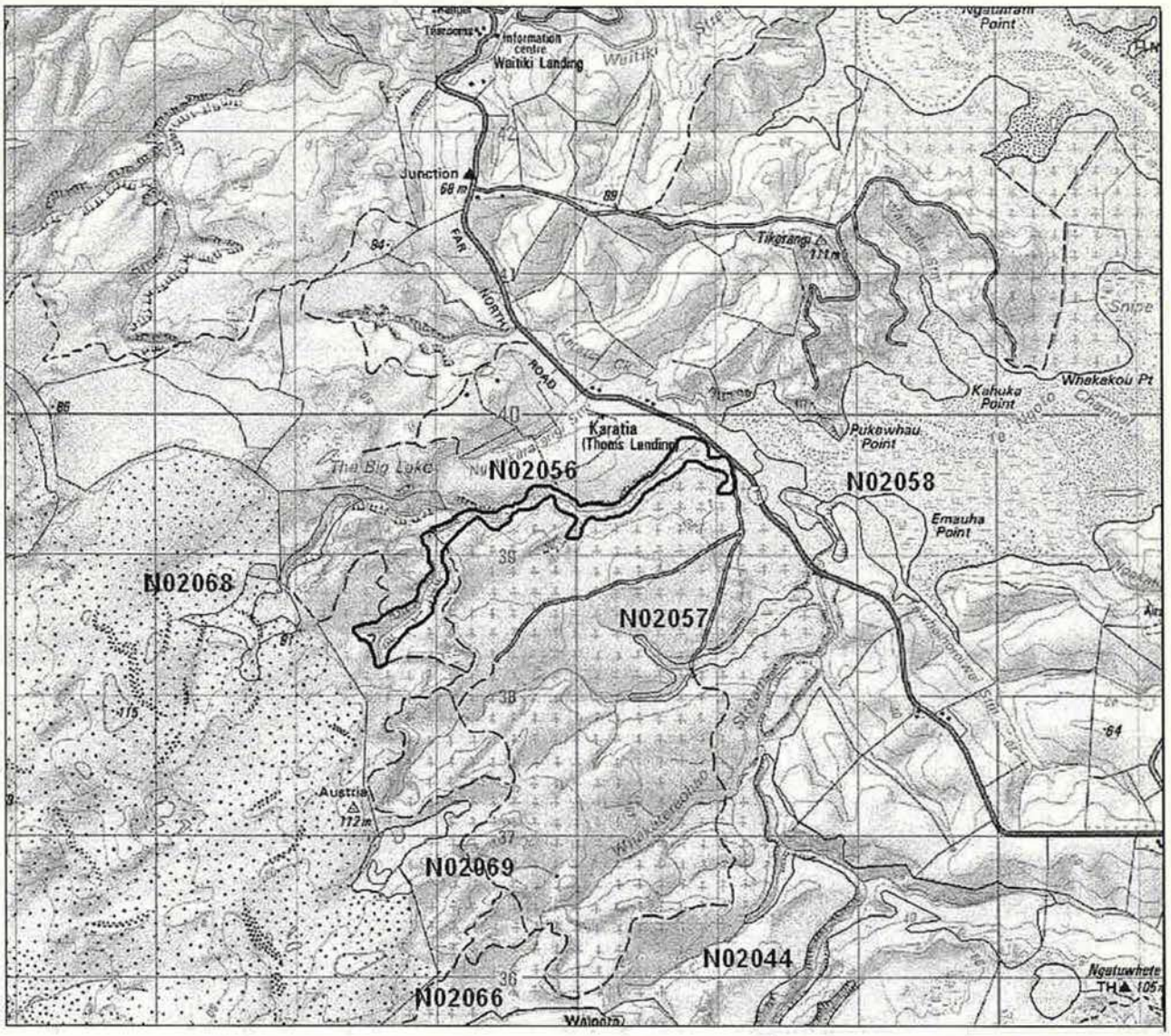
Kaipohue Island N02/055

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

KARATIA WETLAND

Survey no.	N02/056
Survey date	28 August 1995, 6 May 1991, 26 April 1991
Grid reference	N02 975 395
Area	44 ha (17 ha shrubland, 27 ha wetland)
Altitude	5-20 m asl



Karatia Wetland N02/056

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

(a) *Eleocharis sphacelata*-wire rush association in valley

(b) *Baumea articulata-Eleocharis sphacelata*-harakeke-manuka association in valley

(c) Raupo reedland on alluvium

(d) Kanuka shrubland on alluvium

(e) Open water

Landform/geology

Valley freshwater wetland.

Vegetation

(a) The top section of the swamp is in a basin surrounded by steep bluffs. *Eleocharis sphacelata* is dominant and wire rush is common. Harakeke, raupo, manuka, *Baumea rubiginosa*, kiokio and the threatened *Todea barbara* all occur occasionally.

(b) The lower section is primarily *Baumea articulata*, *Eleocharis sphacelata*, harakeke and manuka.

(c) About 20% of the lower area is raupo dominant with frequent *Eleocharis*, with an area about half that size being kanuka shrubland, type (d), with frequent *Coprosma propinqua*, ti kouka, bracken and herbaceous weeds.

(e) A small area is open water. Stock presently have access.

Significant flora

A record of the threatened *Todea barbara* (Vulnerable) and *Myriophyllum robustum* (Declining) comes from this site.

Wire rush is a regionally significant species in Northland.

Fauna

Birds: Australasian bittern (Category O threatened species), NI fernbird (Regionally significant species).

Aquatic fauna: 1993 record of giant bully (Regionally significant species).

Significance

A very good quality example of a wetland type which is nationally uncommon and a location for threatened and regionally significant species.

A representative site for type (a) *Eleocharis sphacelata*-wire rush association, type (b) *Baumea articulata-Eleocharis sphacelata*-harakeke-manuka association, type (c) raupo reedland, and type (d) kanuka shrubland. Type (a) and (b) are solely represented in the District at this site.

WHAKATEREOHAO STREAM SWAMP

Survey no.	N02/057
Survey date	26 April 1991
Grid reference	N02 985 386
Area	18.4 ha
Altitude	5–20 m asl

Ecological unit

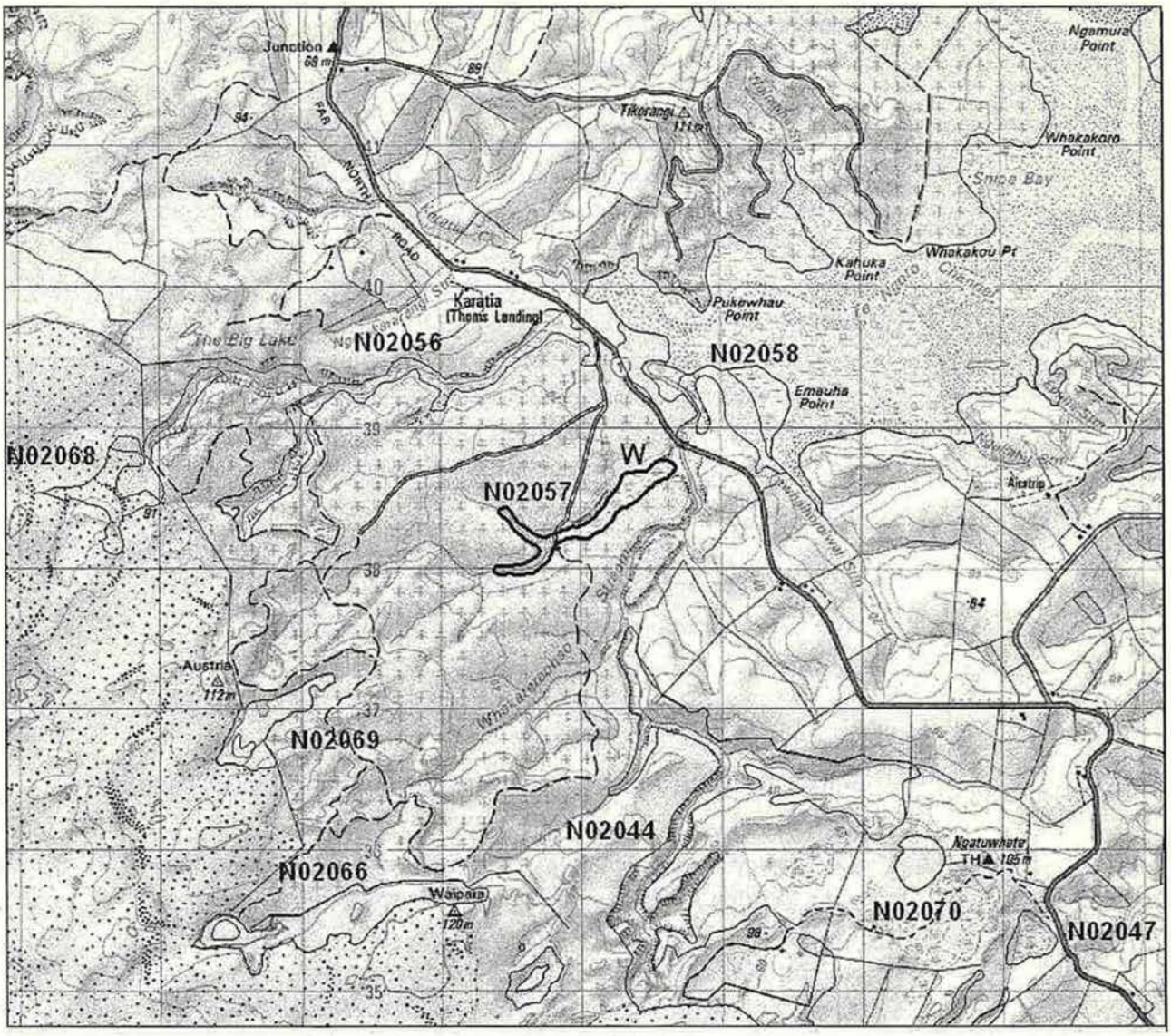
(a) Open water

(b) Manuka swamp shrubland in dune hollow

(c) *Baumea rubiginosa* sedgeland in dune hollow

(d) *Eleocharis sphacelata* reedland in dune hollow

(e) Oioi saltmarsh on estuary



Whakatereohao Stream Swamp N02/057

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Dune swamp.

Vegetation

(a) Less than 1% of the area is open water.

(b) The site is primarily (70%) manuka dominant, with *Gleichenia dicarpa*, *Baumea rubiginosa* and kiokio.

(c) About 20% of the area is *Baumea rubiginosa* dominant with *Gleichenia* sp., manuka. Kiokio and *Lycopodiella cernua* are also present. Upstream of the road causeway the area is wetter, with less manuka and more *Baumea rubiginosa*.

(d) There is a small area of *Eleocharis sphacelata* with frequent *Baumea articulata*.

(e) At the saltwater interface oioi is dominant with frequent mangrove and occasional *Coprosma* sp.

The site is surrounded by pine plantation.

Fauna

Birds: NI fernbird (Regionally significant species).

Aquatic fauna: 2001 fish survey: black mudfish (Category C threatened species) - to date (March 2001) this is the northern most record of black mudfish. Banded kokopu (Category C threatened species) and short-finned eel were also recorded.

Significance

A large, high quality valley ponded wetland containing a variety of vegetation types grading into the upper reaches of the Parengarenga Harbour. Supports two threatened and one regionally significant species.

A representative site for type (a) *Baumea rubiginosa* sedgeland and type (e) oioi saltmarsh. Only record in the Ecological District for type (a).

EMAUHU POINT SHRUBLANDS

Survey no.	N02/058
Survey date	26 February 1996
Grid reference	N02 987 392
Area	31 ha
Altitude	0–10 m asl

Ecological unit

(a) Kanuka shrubland on terrace and gentle hillslope

(b) Saltmarsh on estuary

Landform/geology

Estuarine and alluvial deposits.

Vegetation

(a) Kanuka is abundant with frequent manuka and occasional *Callistachys lanceolata*.

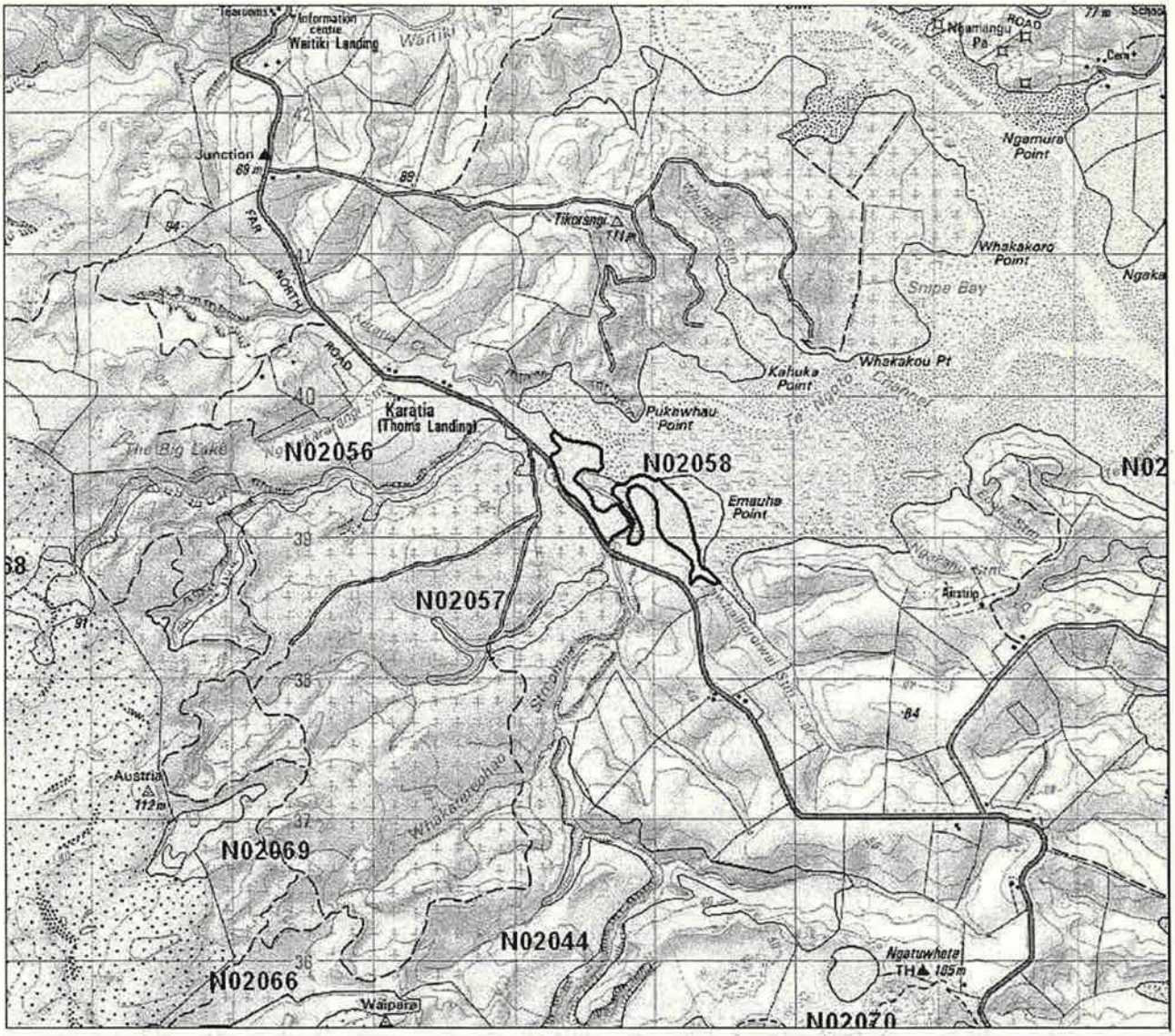
(b) This grades into saltmarsh in which mangroves occur frequently, and manuka occasionally.

Significant flora

The threatened *Christella* aff. *dentata* (Taxonomically Indeterminate–Critically Endangered) was recorded from this site in 1977.

Fauna

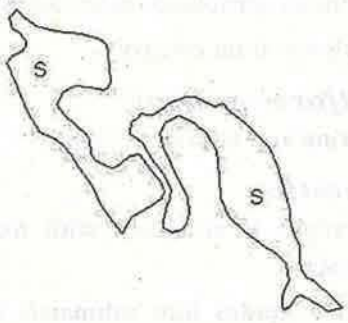
Not surveyed.



Emauhu Point Shrublands N02/058

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Significance

A saltmarsh habitat with a shrubland buffer on the upper reaches of the Parengarenga Harbour.

Almost contiguous with Karatia Wetland (N02/056) and Whakatereohao Stream Swamp (N02/057).

LAKE KIHONA & FOREST REMNANTS

Survey no.	N02/060
Survey date	23 August 1995, 26 April 1991, 2 November 1978
Grid reference	N02 021 304
Area	19 ha (3.4 ha forest, 8.3 ha shrubland, 7.3 wetland)
Altitude	40–60 m asl

Ecological unit

(a) Open water in dune lake

(b) Manuka shrubland on gently sloping lake margins

(c) Raupo reedland on lake bed

(d) Manuka-sedge bog association on flats

(e) Kanuka/manuka shrubland on gentle slope

(f) Kanuka forest on gentle slope

(g) Kohekohe-puriri-taraire forest in stream gully

Landform/geology

Gully with Mangakahia Complex sandstone in stream bed and Pleistocene parabolic dunes on gully walls. Lake ponded by Holocene dunes.

Vegetation

(a) Open water.

(b) A buffer strip of manuka shrubland with frequent bracken and hangehange occurs between the lake edge and pines on the northern side.

(c) Raupo occurs as a narrow discontinuous band with *Eleocharis* sp. and occasional harakeke on the fringe.

(d) At the eastern end of the lake manuka occurs with *Gleichenia* sp., kiokio, *Baumea* sp. and other sedges.

(e) About a third of the area is tall kanuka/manuka shrubland with occasional mamaku, Sydney golden wattle and *Cassytha*.

(f) In the east is secondary kanuka forest.

(g) Along the stream bed, kohekohe-puriri-taraire dominant forest between 9 and 12 m tall occurs with occasional karaka, titoki, hinau and rewarewa. Other species present are ti kouka, rangiora, mahoe, mamaku, hangehange, kumarahou, mapou, karamu, *Coprosma rhamnoides,* houpara, and a variety of ferns.

Pines surround the site and are planted to water's edge on the southern side.

Significant flora

The threatened *Todea barbara* (Vulnerable) was previously present (Bellingham 1984).

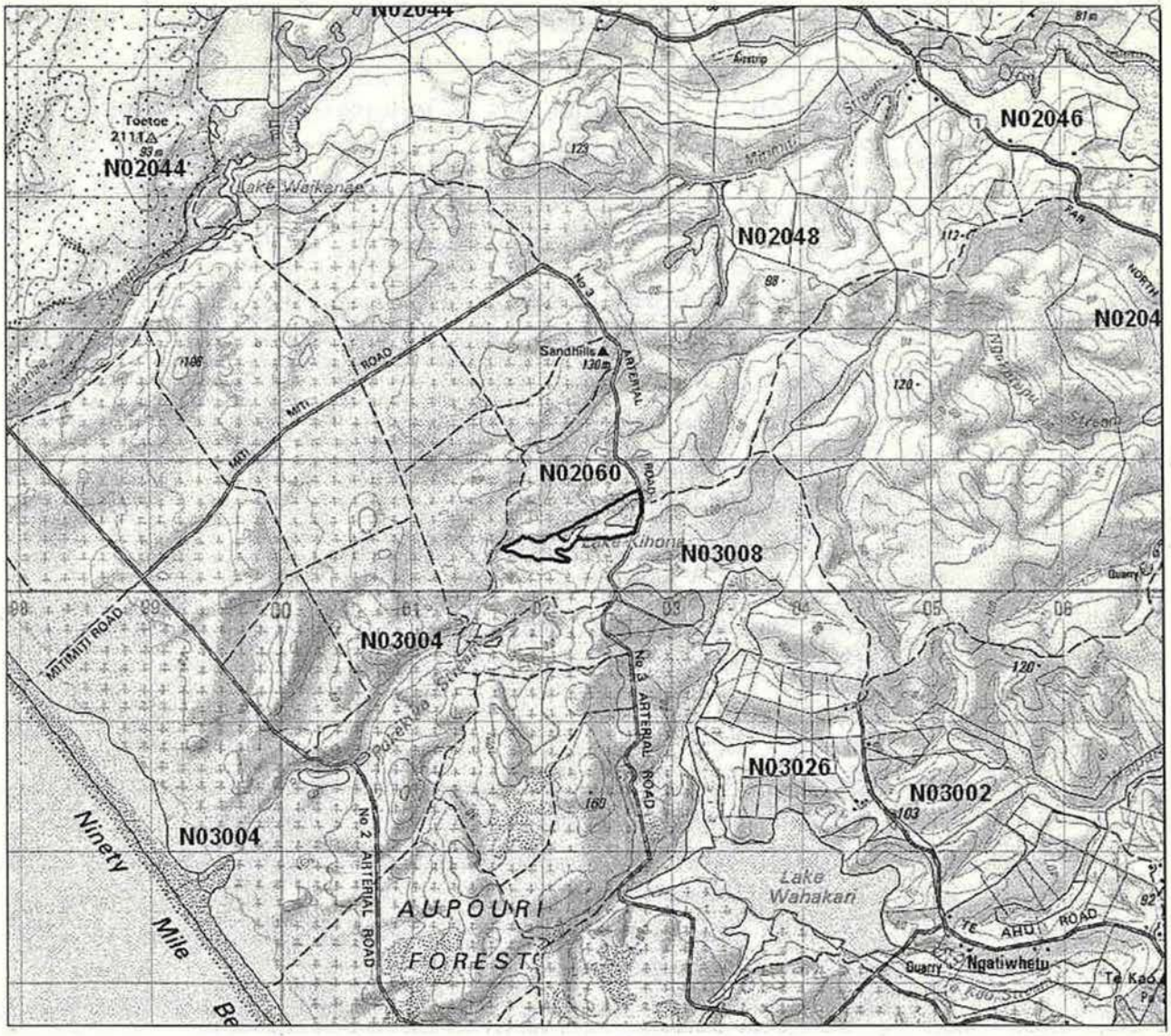
Fauna

Birds: NI fernbird and NZ scaup (both Regionally significant species), pied shag, black shag, little black shag, little shag, Australasian crested grebe.

Aquatic fauna: grey mullet and eels.

Significance

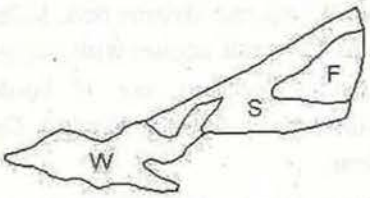
Excellent quality unmodified dune lake with clear water and good examples of vegetation types uncommon in the Ecological Region.



Lake Kihona & Forest Remnants N02/060

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Potentially excellent habitat for NZ dabchick (Category C threatened species) and crakes. A further survey of waterbirds is recommended.

Representative site for type (b) manuka shrubland, type (d) manuka-sedge bog association, type (f) kanuka forest, and type (g) kohekohe-puriri-taraire forest. Only record of type (d), (f) and (g) in the Ecological District.

LAKE TE KAHIKA

Survey no.	N02/061
Survey date	28 August 1995, 25 April 1991, 27 October 1978
Grid reference	N02 110 308, N02 112 305
Area	17.4 ha
Altitude	0–10 m asl

Ecological unit

(a) Open water in dune lake

(b) *Eleocharis sphacelata* reedland on lake bed

(c) Wire rush-*Gleichenia dicarpa* bog association on sand flats

(d) Raupo reedland on sand flats

(e) *Hakea* sp.-manuka shrubland on sand flats

Landform/geology

Lake ponded by Holocene coastal dunes.

Vegetation

(a) Lake Te Kahika is a large, deep, steep-sided and fairly acid oligotrophic dune lake.

(b) *Eleocharis sphacelata* fringes Lake Te Kahika.

(c) Peat bog of wire rush and *Gleichenia dicarpa* connect the main lake Lake Te Kahika to the small lake nearby. *Baumea articulata, B. teretifolia,* oioi, *Schoenus* sp., *Morelotia affinis* and *Lepidosperma laterale* are also present.

(d) A raupo swamp extends towards the beach.

(e) A buffer strip of *Hakea* sp. and manuka with sedges occurs between the lakes and the pine forest. The threatened *Todea barbara* is present. Other species occurring are harakeke, mingimingi, kumarahou, *Dracophyllum* sp., *Pimelea urvilleana* "northern", *Cassytha* and *Callistachys lanceolata.*

Significant flora

Todea barbara (Vulnerable) and wire rush (Regionally significant species).

Fauna

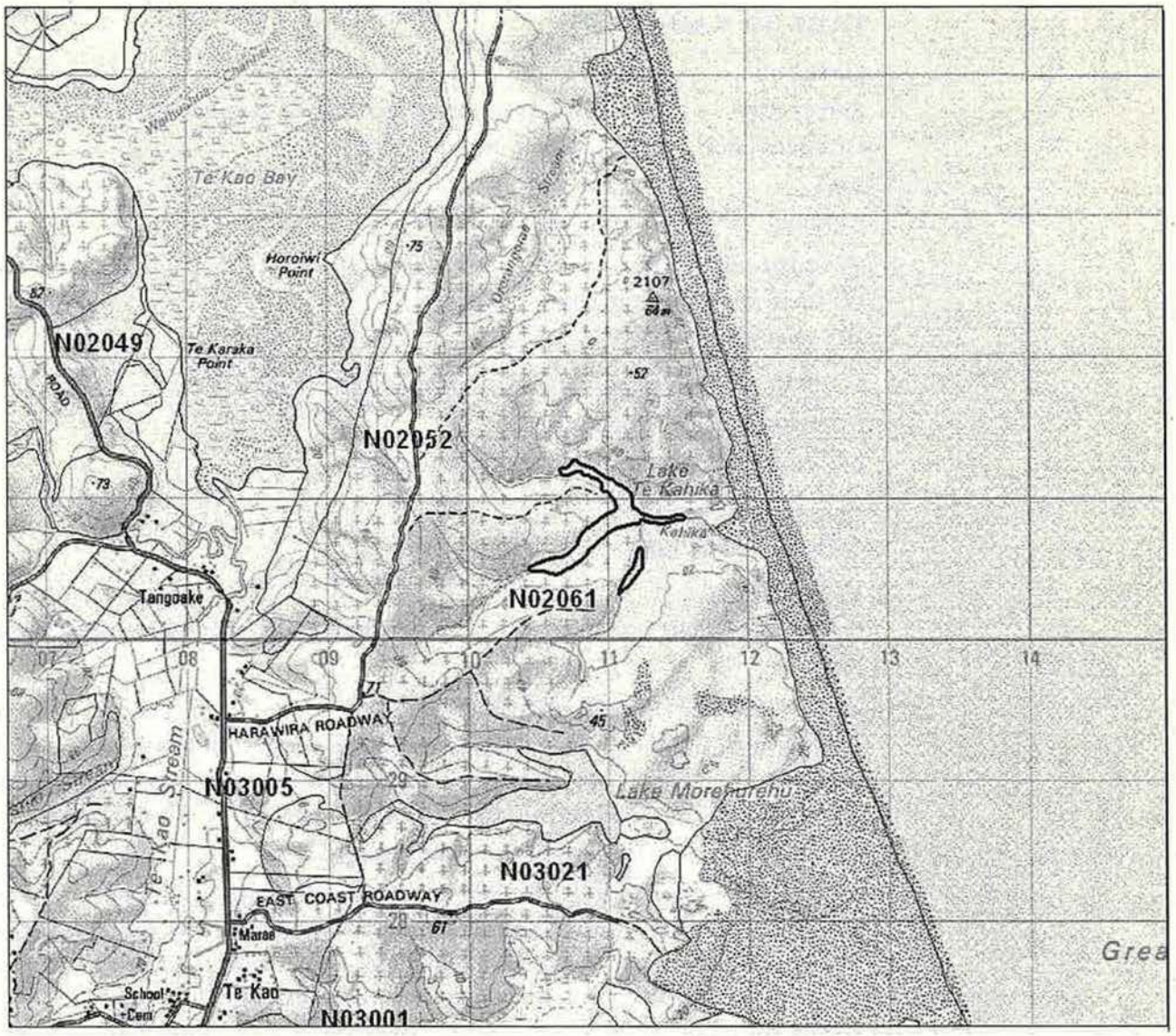
Birds: Caspian tern (Category O threatened species), spotless crake and NI fernbird (both Regionally significant species). The OSNZ have also recorded NZ shoveler in recent surveys.

Significance

An excellent example of an unmodified lake and swamp system being a rare wetland ecosystem in Northland, and linked to the nearby beach.

Representative site for type (a) open water, type (c) wire rush-*Gleichenia dicarpa* bog association, and type (d) raupo reedland. Type (c) is not recorded elsewhere in the Ecological District.

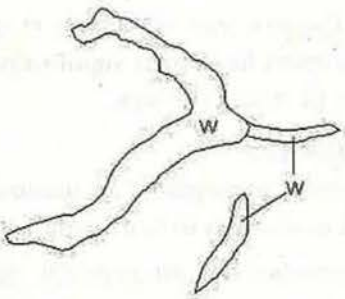
Habitat for threatened species.



Lake Te Kahika N02/061

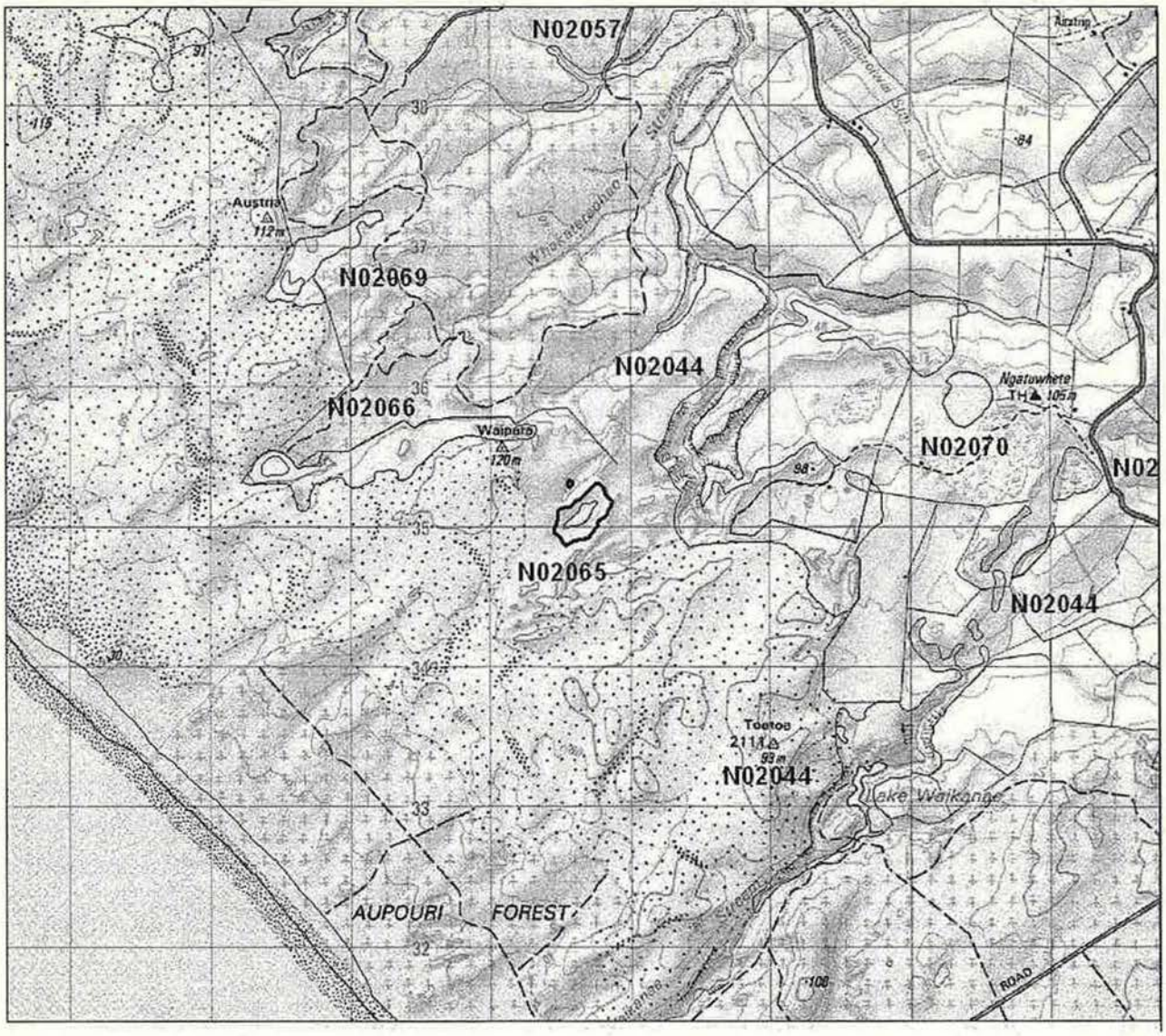
Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



WAIPARA & DEAD LAKES

Survey no.	N02/065
Survey date	27 February 1996
Grid reference	N02 977 351, N02 977 353
Area	9.8 ha (8 ha shrubland, 1.8 ha wetland)
Altitude	70 m asl



Waipara & Dead Lakes N02/065

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

(a) Open water in dune lake

(b) *Eleocharis sphacelata* reedland on lake bed

(c) *Baumea articulata* reedland on lake bed

(d) Kanuka shrubland on dunes

(e) *Baumea articulata-Juncus pallidus* association on lake bed

(f) *Baumea juncea*-manuka association on dune flats

Landform/geology

Lake ponded by Holocene dunes.

Vegetation

(a) Lake Waipara is a deep sided dune lake (95%).

Small wetland areas occur including (type b) *Eleocharis sphacelata* with occasional giant umbrella sedge and (type c) *Baumea articulata* with occasional *Eleocharis sphacelata*.

Dense water fern occurs on the edges of the wetland.

(d) The surrounding buffer of shrubland is kanuka dominant with scattered *Cassytha*, hangehange, ti kouka, toetoe, tutu, gorse and brush wattle.

A short distance to the north is Dead Lake, type (a), a small deep-sided dune lake surrounded by sedges and shrubland.

(e) Most of the Dead Lake surrounds consists of *Baumea articulata* with *Juncus pallidus* and frequent swamp millet and *Eleocharis sphacelata*. About 5% of the area is *Eleocharis sphacelata*, (type b), and a similar sized area is type (f), *Baumea juncea*-manuka shrubland with *Juncus planifolius* and *Cassytha*.

Fauna

Birds: Common waterbirds and bush birds present.

NI fernbird reported (Regionally significant species).

Significance

Potential habitat for the regionally significant NI fernbird and the regionally significant waterbird NZ scaup which has been reported as present within the chain of dune lakes along the Aupouri Peninsula. Representative site for type (e) *Baumea articulata-Juncus pallidus* association and only record in Ecological District for this association.

PRETTY LAKE

Survey no.	N02/066
Survey date	27 February 1996
Grid reference	N02 964 355
Area	44.8 ha (42.8 shrubland, 2 ha wetland)
Altitude	55 m asl

Ecological unit

(a) Open water in dune lake

(b) Oioi-pampas-water fern association on lake bed

(c) Marram grassland on low dunes

(d) Kanuka shrubland on dunes

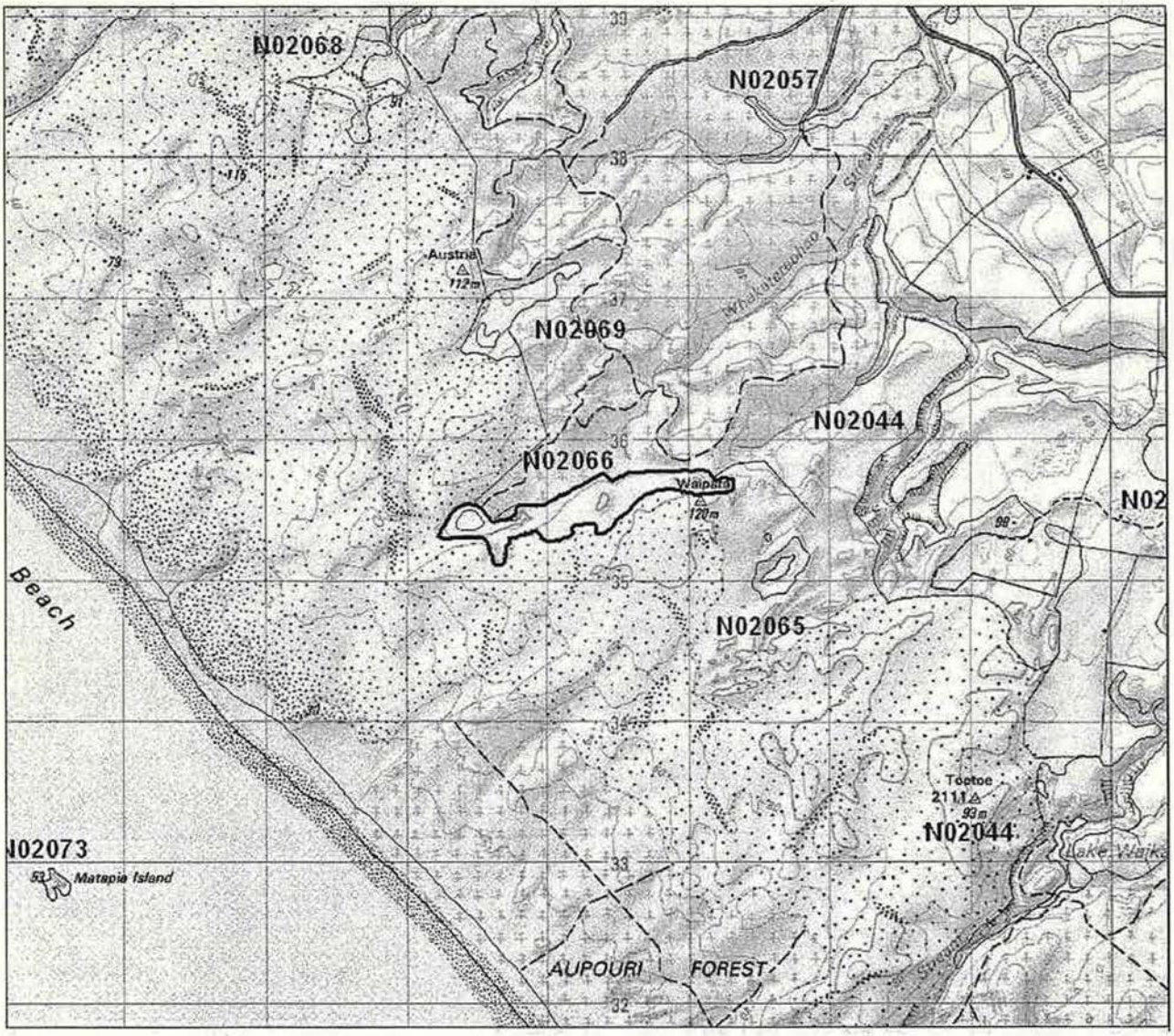
Landform/geology

Holocene dune field with lake in interdune hollow.

Vegetation

(a) The lake is considerably smaller than formerly.

(b) Oioi, pampas, water fern, rushes and sedges occur on the lake edge and part of the now dry lake bed.



Pretty Lake N02/066

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

(c) Marram and fleabane occur at the south west end.

(d) Most of the surrounding vegetation is kanuka dominant with frequent manuka and occasional ti kouka, harakeke, mamaku, toetoe, native broom, *Cassytha*, gorse and brush wattle.

Fauna

Birds: Common waterbirds and bush birds.

Significance

Habitat for waterbirds.

Part of the Aupouri dune lake suite - a nationally uncommon habitat type and representative site and only example of oioi-pampas-water fern association in this Ecological District, albeit with a conspicuous component of adventive pampas.

UPPER KARATIA SWAMP

Survey no.	N02/068
Survey date	1991, 1993
Grid reference	N02 950 390
Area	34 ha (16.5 ha shrubland, 17.5 ha wetland)
Altitude	60 m asl

Ecological unit

(a) *Baumea rubiginosa*-manuka association in dune hollow

(b) Manuka shrubland on dunes

Landform/geology

Swamp ponded by Holocene dunes.

Vegetation

(a) Most of the area is swamp shrubland with *Baumea rubiginosa* dominant and *Eleocharis sphacelata, Baumea articulata, B. juncea,* oioi, kiokio, *Dracophyllum lessonianum* and harakeke under a canopy of manuka and *Cassytha.*

(b) About 10% of the area is manuka dominant with *Dracophyllum lessonianum, Baumea rubiginosa, Gleichenia* sp. and the threatened *Todea barbara.*

Significant flora

Todea barbara (Vulnerable).

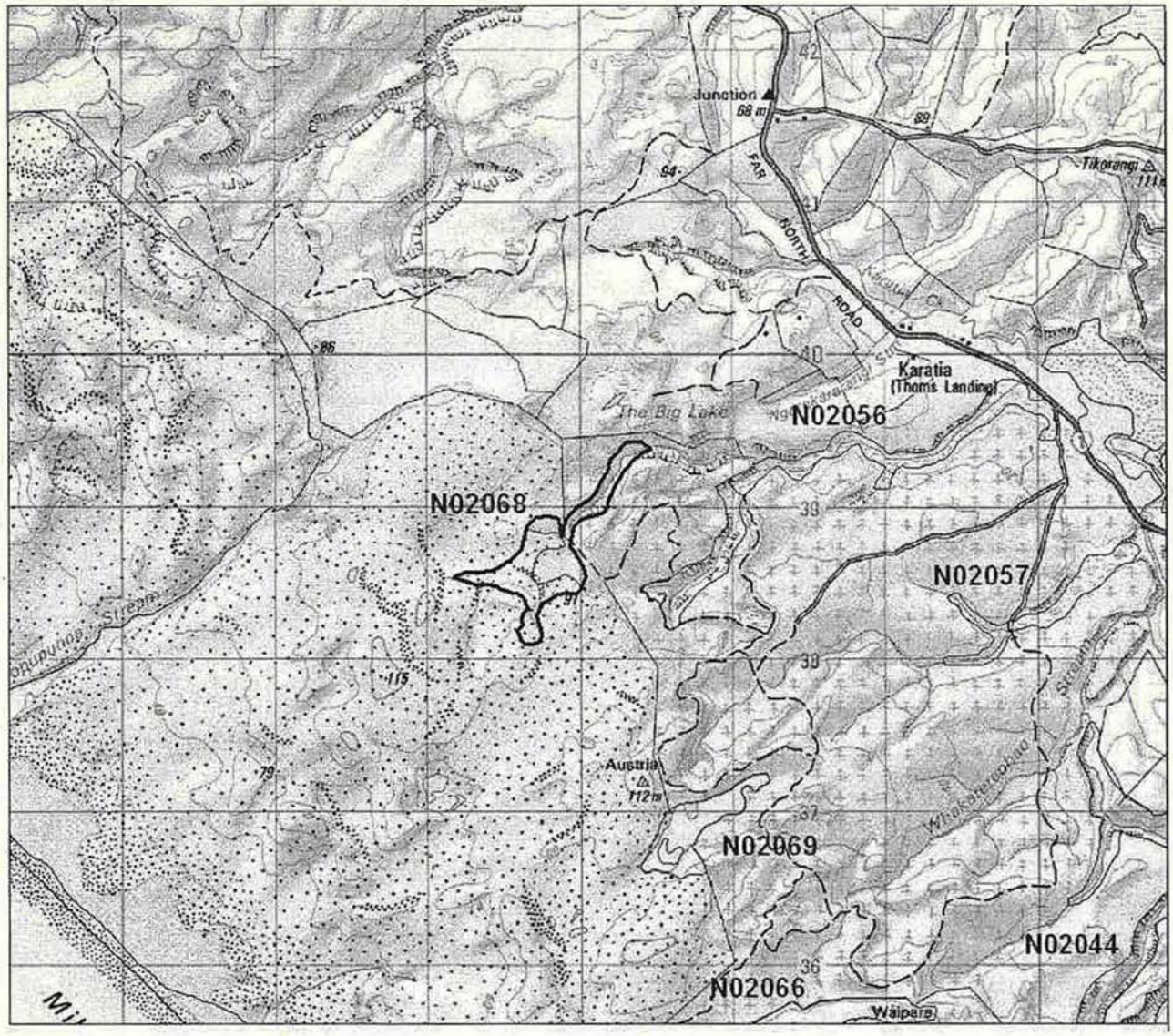
Fauna

Birds: NI fernbird (Regionally significant species).

Significance

Uncommon habitat type and presence of two significant species, *Todea barbara* and NI fernbird.

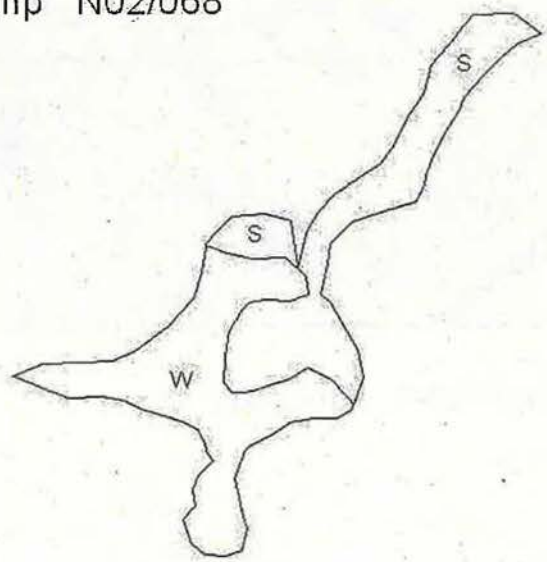
Representative site for both Ecological units.



Upper Karatia Swamp N02/068

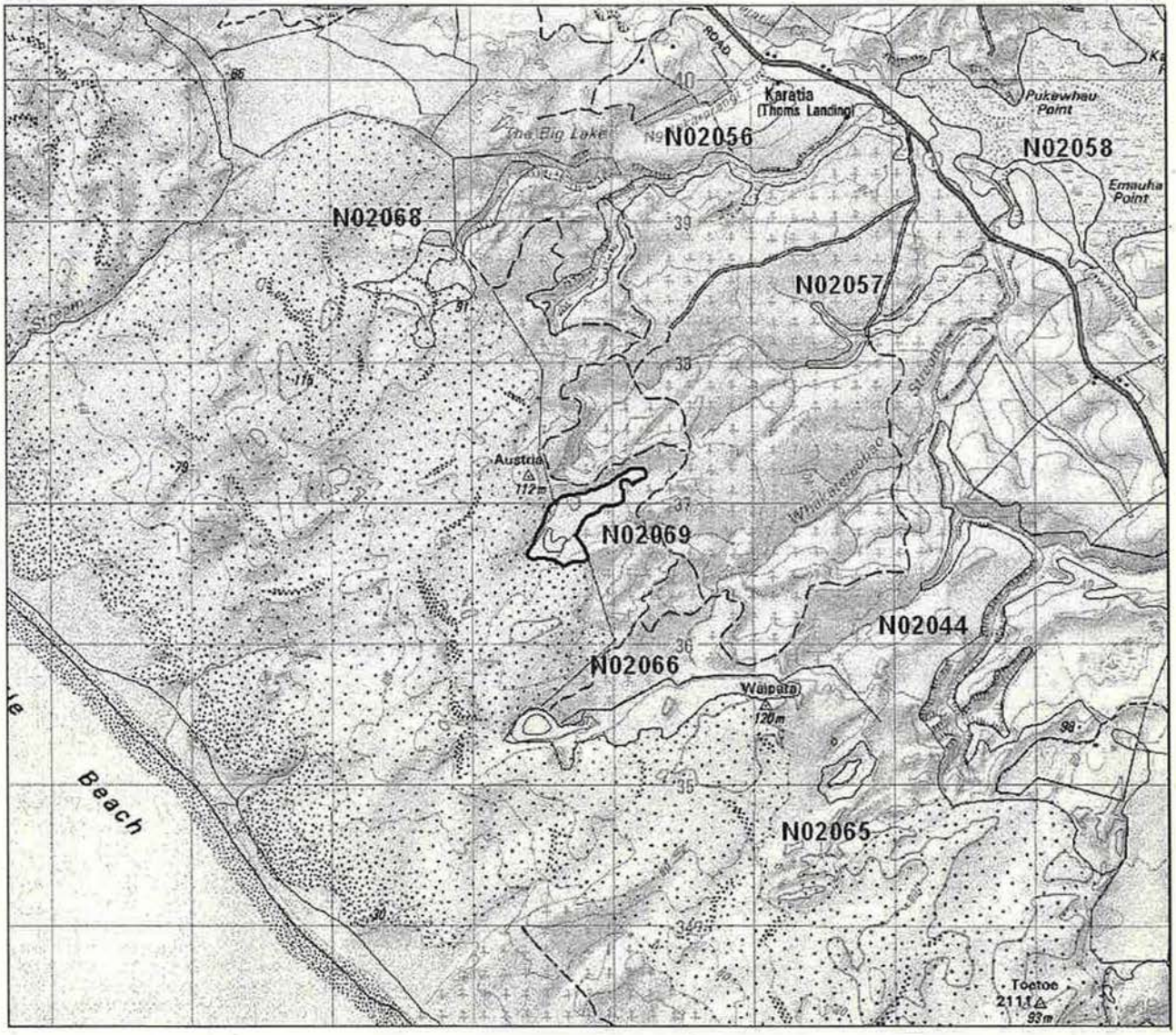
Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



LAKE AUSTRIA & SHRUBLAND

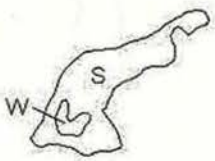
Survey no.	N02/069
Survey date	27 February 1996
Grid reference	N02 957 370
Area	19.7 ha (18.2 ha shrubland, 1.5 ha wetland)
Altitude	70 m asl



Lake Austria & Shrubland N02/069

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Ecological unit

(a) Open water in dune lake

(b) *Eleocharis sphacelata* reedland on lake bed

(c) Oioi rushland on sand flats

(d) Manuka swamp shrubland on sand flats

(e) Kanuka shrubland on dunes

Landform/geology

Lake ponded by Holocene dunes and adjacent to Pleistocene duneland.

Vegetation

(a) The open water area of the lake has reduced over time.

(b) The remainder of the lake bed is mainly *Eleocharis sphacelata* with *Baumea articulata* and kuta.

(c) There is a small area of oioi and type (d) manuka swamp shrubland with kiokio, water fern, bracken and kumarahou.

(e) On the periphery is kanuka shrubland to 3–4 m with frequent manuka and occasional harakeke, mamaku, toetoe, gorse, bracken and water fern.

Fauna

Birds: NZ dabchick (Category C threatened species). Four Regionally significant species: Australasian little grebe, NI fernbird, spotless crake and NZ scaup. Other bird fauna includes NZ pipit, pied stilt and records of little shag roosts.

Significance

A valuable habitat for a wide diversity of waterbirds including threatened and regionally significant species.

Representative site for type (a) open water and type (b) *Eleocharis sphacelata* reedland.

NGATUWHETE LAKE

Survey no.	N02/070
Survey date	1993
Grid reference	N02 003 358
Area	10 ha
Altitude	80 m asl

Ecological unit

(a) Open water in dune lake

(b) Reed-sedge association on lake bed

Landform/geology

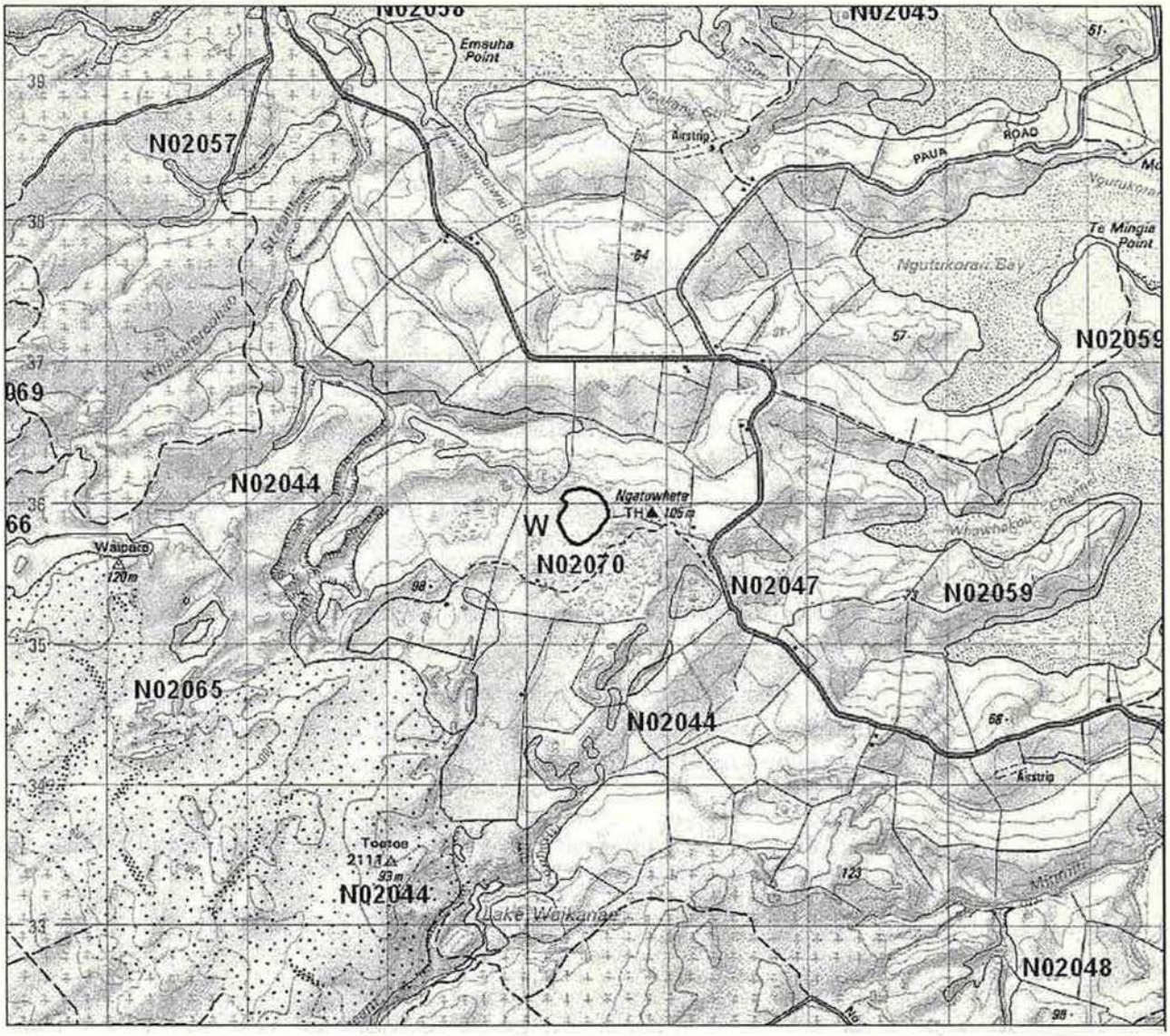
Freshwater lake ponded in interdune flat in Pleistocene parabolic dunefield.

Vegetation

Mostly open water with an island of reeds and sedges near the southern end and some *Eleocharis* sp. on the margins.

Fauna

Birds: Royal spoonbill (Category O threatened species) reported since 1991.



Ngatuwhete Lake N02/070

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

A year 2000 survey by the OSNZ recorded black shag, pied shag, and common waterbirds.

Significance

A large, shallow lake near Parengarenga Harbour suitable for waterbirds and likely to be increasingly used by the threatened royal spoonbill.

MATAPIA ISLAND

Survey no.	N02/073
Survey date	1986, 1993
Grid reference	N02 925 328
Area	2.3 ha
Altitude	0–53 m asl

Ecological unit

(a) Giant umbrella sedge sedgeland on coastal slopes and banks

(b) Native iceplant-knobby clubrush herbfield on coastal slopes

(c) Glasswort-Mercury Bay weed herbfield on coastal banks

(d) Cook's scurvy grass herbfield on coastal bank

(e) Rock platforms

Landform/geology

Pebbly sandstone and sandstone (Matapia Formation) derived from Houhora Volcanic Group and other volcanic units.

Vegetation

(a) Giant umbrella sedge is the dominant species, forming dense swards with occasional taupata with *Parietaria debilis* seedlings underneath.

(b) On steep slope edges, native iceplant and knobby clubrush are dominant with *Chenopodium album* forming a patchy band above the coastal banks.

(c) Glasswort and Mercury Bay weed extend into the splash zone.

(d) Cook's scurvy grass is an endangered species and forms a patchy band around the island above the coastal banks. Associated species include native iceplant, Mercury Bay weed, knobby clubrush, taupata, *Chenopodium album* and isolated giant umbrella sedge.

(e) Solid rocky platform around the perimeter of the island.

Significant flora

Cook's scurvy grass (Endangered) was replanted by Vic Hensley on Matapia Island in the 1980s (Forester & Anderson 1995). It is subject to severe trampling by seals but this has probably always been the case and is cyclical (L.J. Forester pers. comm.).

Fauna

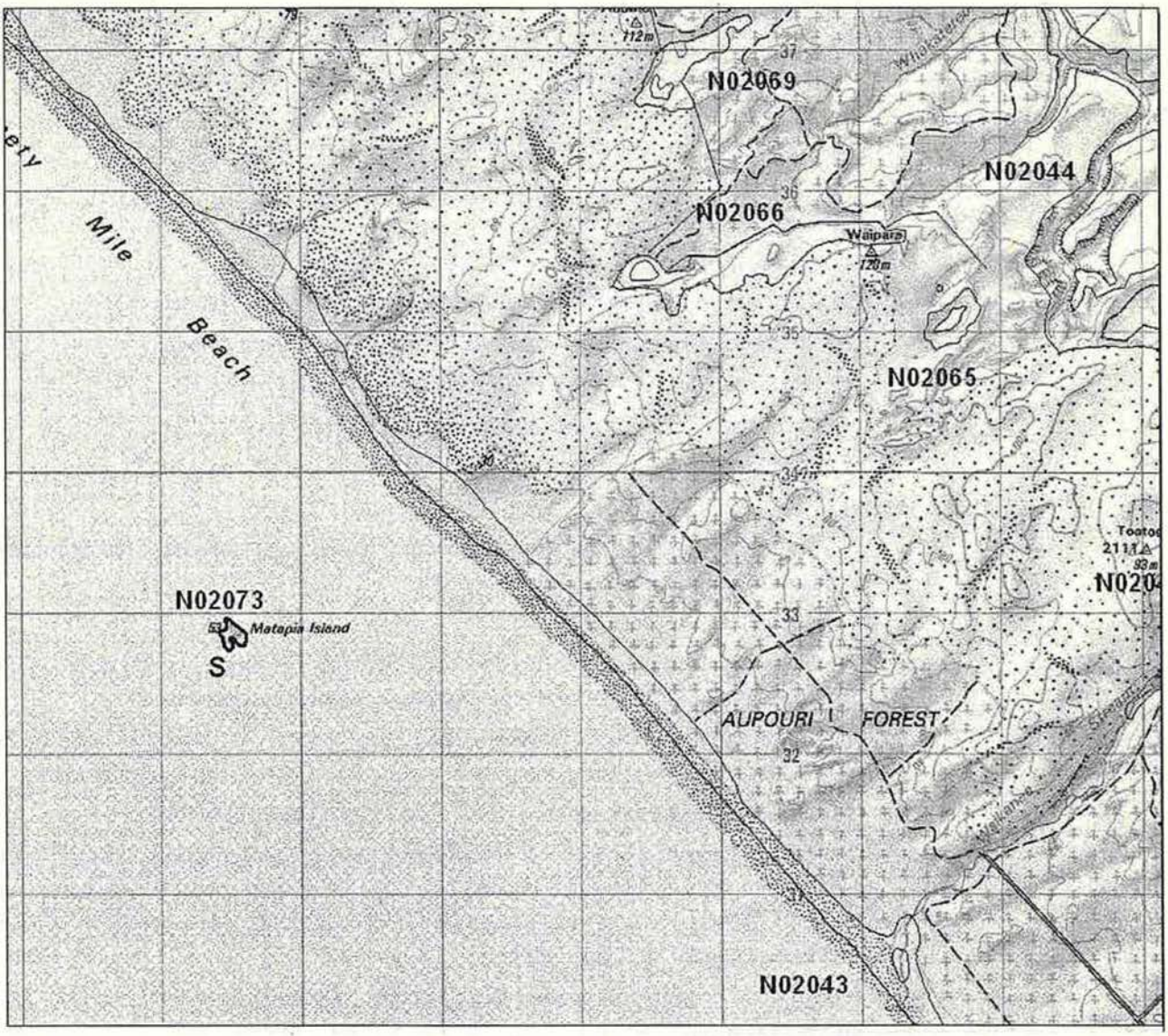
Birds: white-fronted tern (Category C threatened species), breeding black-winged petrels, common diving petrel, blue penguin, NZ pipit, Australasian harrier, paradise shelduck, red-billed gulls and welcome swallow.

The island is a fur seal haul-out site; in excess of 500 seals have been recorded in the months from June to October, making Matapia Island the most significant seal haul-out site in Northland (R. Parrish pers. comm. 2002).

Lizards: The site endemic *Hoplodactylus* "Matapia Island" (Category B threatened species), robust skink (Category B threatened species), ornate skink (Regionally significant species), Pacific gecko, and shore skink.

Significance

As this is one of only two off-shore islands on the West Coast of Northland, this island is a fragile but important biological refuge for relict fauna species including threatened species and a species endemic to the island.



Matapia Island N02/073

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

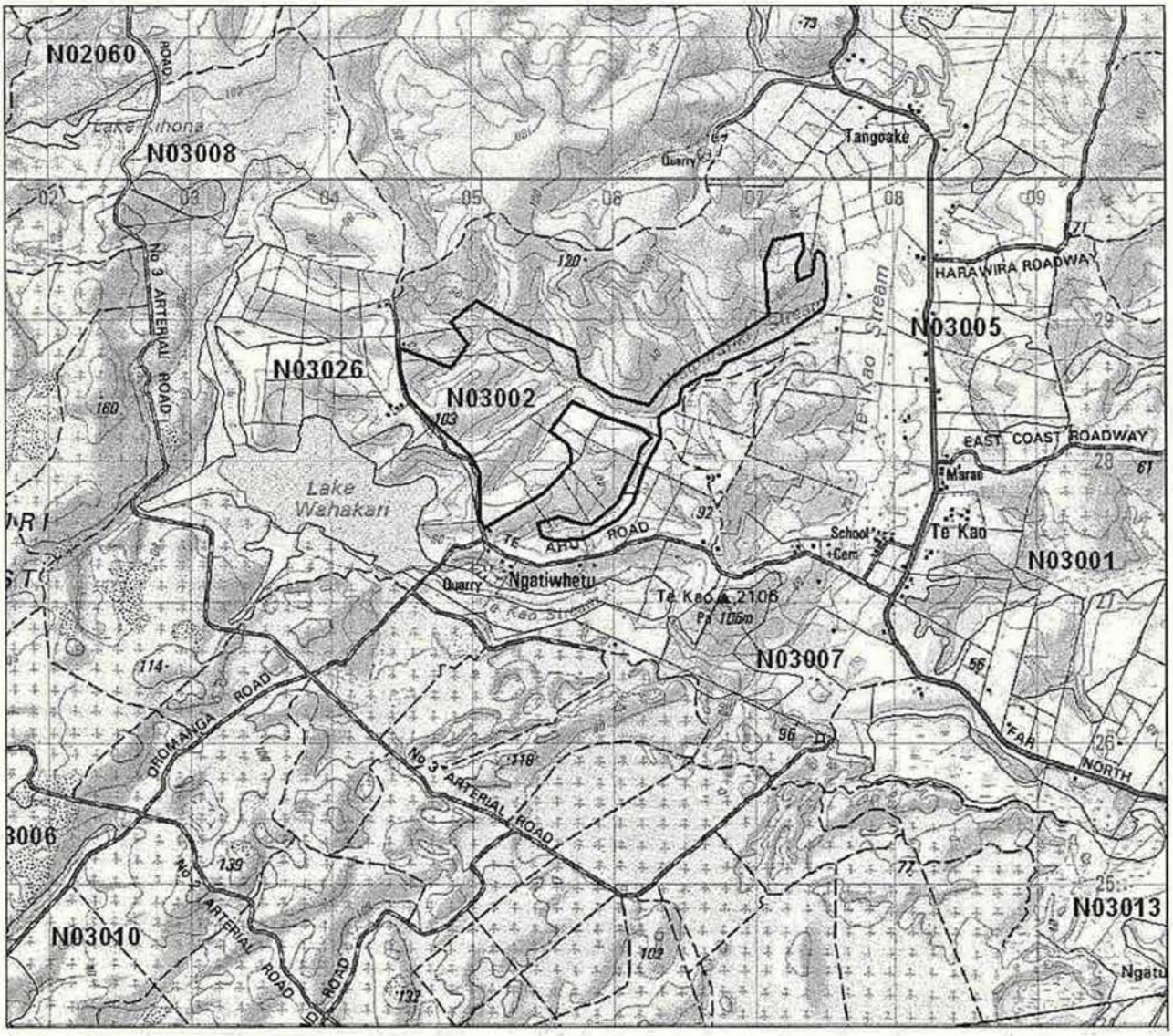
All Ecological units are representative and are unrecorded elsewhere in the Ecological District.

This is the only known outcrop of Matapia Formation rocks.

This site description is drawn directly from: Forester & Anderson (1995); Parrish & Anderson (1999)

TE AHU RD

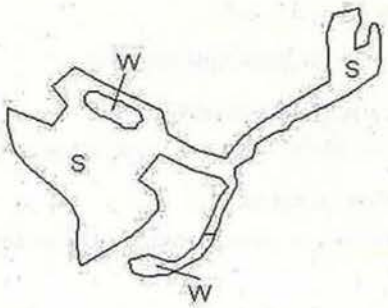
Survey no.	N03/002
Survey date	15 August 1995
Grid reference	N03 055 285
Area	179 ha (164 ha shrubland, 15 ha wetland)
Altitude	10–103 m asl



Te Ahu Rd N03/002

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Ecological unit

(a) Raupo reedland in valley

(b) Prickly hakea-kanuka-kumarahou shrubland on hillslope

(c) Kanuka/manuka shrubland on gentle hillslope.

Landform/geology

Hill country and valley, freshwater wetlands in highly weathered Tangihua Complex volcanic and sedimentary rock units.

Vegetation

(a) A raupo wetland covers about 10% of the area.

(b) In about half of the area vegetation less than one metre tall occurs in which prickly hakea is abundant, kumarahou and kanuka common, bracken frequent and ti kouka, blue pine, gorse, pampas, manuka, rushes and patches of pasture occur occasionally.

(c) The rest of the area consists of kanuka/manuka shrubland to two metres. Gorse is locally frequent. Other species occurring are ti kouka, harakeke, hangehange, prickly hakea, mamaku, pampas and blue pine.

Significant flora

Pomaderris polifolia (Vulnerable) recorded in 1999.

Fauna

Not surveyed.

Significance

Threatened plant habitat. An area of mixed shrubland midway between east and west coasts providing a link with the various wetlands, sand dunes, forest remnants and shrublands that stretch along Aupouri Peninsula. The shrubland provides a linkage to Lake Wahakari (N03/026).

Additional surveying is recommended to determine further ecological significance of this site.

WILD HORSE WETLAND

Survey no.	N03/003
Survey date	23 August 1995
Grid reference	N03 072 173
Area	7.9 ha
Altitude	2–10 m asl

Ecological unit

(a) Open water

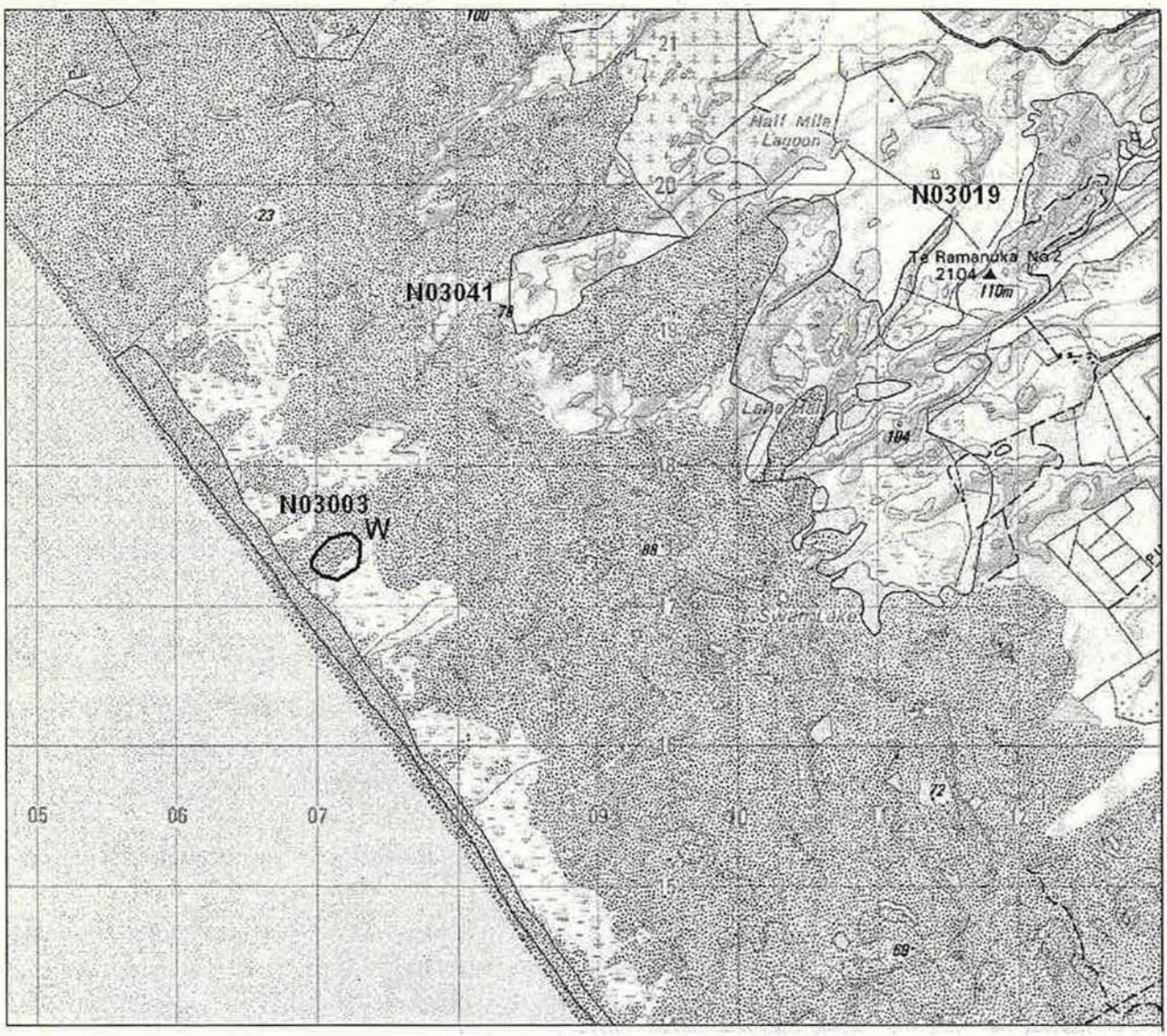
(b) Oioi rushland on dunes

Landform/geology

Freshwater wetland in Holocene coastal dune deflation zone.

Vegetation

(a) Open water covers 60% of the area.



Wild Horse Wetland N03/003

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

(b) Oioi is abundant in the remainder of the area with toetoe, pampas, other sedges and *Lilaeopsis novae-zelandiae* occurring occasionally.

Fauna

Not surveyed.

Significance

A nationally uncommon habitat type.

Representative site for type (b) oioi rushland.

PUKEKURA STREAM WETLANDS

Survey no.	N03/004
Survey no.	23 August 1995
Grid reference	N03 014 296, N03 016 296, N03 007 287, N03 995 278
Area	12 ha
Altitude	5–10 m asl

Ecological unit

(a) Open water

(b) *Eleocharis sphacelata* reedland in stream bed

(c) *Baumea articulata*-raupo reedland in stream bed

(d) Raupo reedland in stream bed

(e) Oioi rushland on sand flats

Landform/geology

Freshwater wetland in gully in eroded Pleistocene consolidated parabolic dunes.

Vegetation

A series of wetlands along the Pukekura Stream.

(a) The uppermost area (N03 016 296) is 80% open muddy water.

(b) A narrow fringe of *Eleocharis sphacelata* occurs around the pond, with a reedbed of this species at one end and raupo, (type d), at the other. *Carex* sp. occurs occasionally.

Pines grow to the margins which are dominated by dense pampas and Sydney golden wattle.

(c) Just to the west (N03 014 296) *Baumea articulata* and raupo are common with frequent kiokio and other sedges. Harakeke, manuka, bracken and ti kouka also occur. Pampas is also locally common, indicating a possible drying out of the wetland. A 100 m buffer of kanuka with wattle occurs on the northern side. Elsewhere pines are planted to the margin.

(d) A kilometre or so downstream (N03 003 287) is a raupo wetland in which harakeke, kanuka, pampas and other sedges (*B. articulata, Eleocharis* sp.) occur frequently. Oioi, watercress, *Azolla* and balsam are also present. Again, pines are planted to the margin.

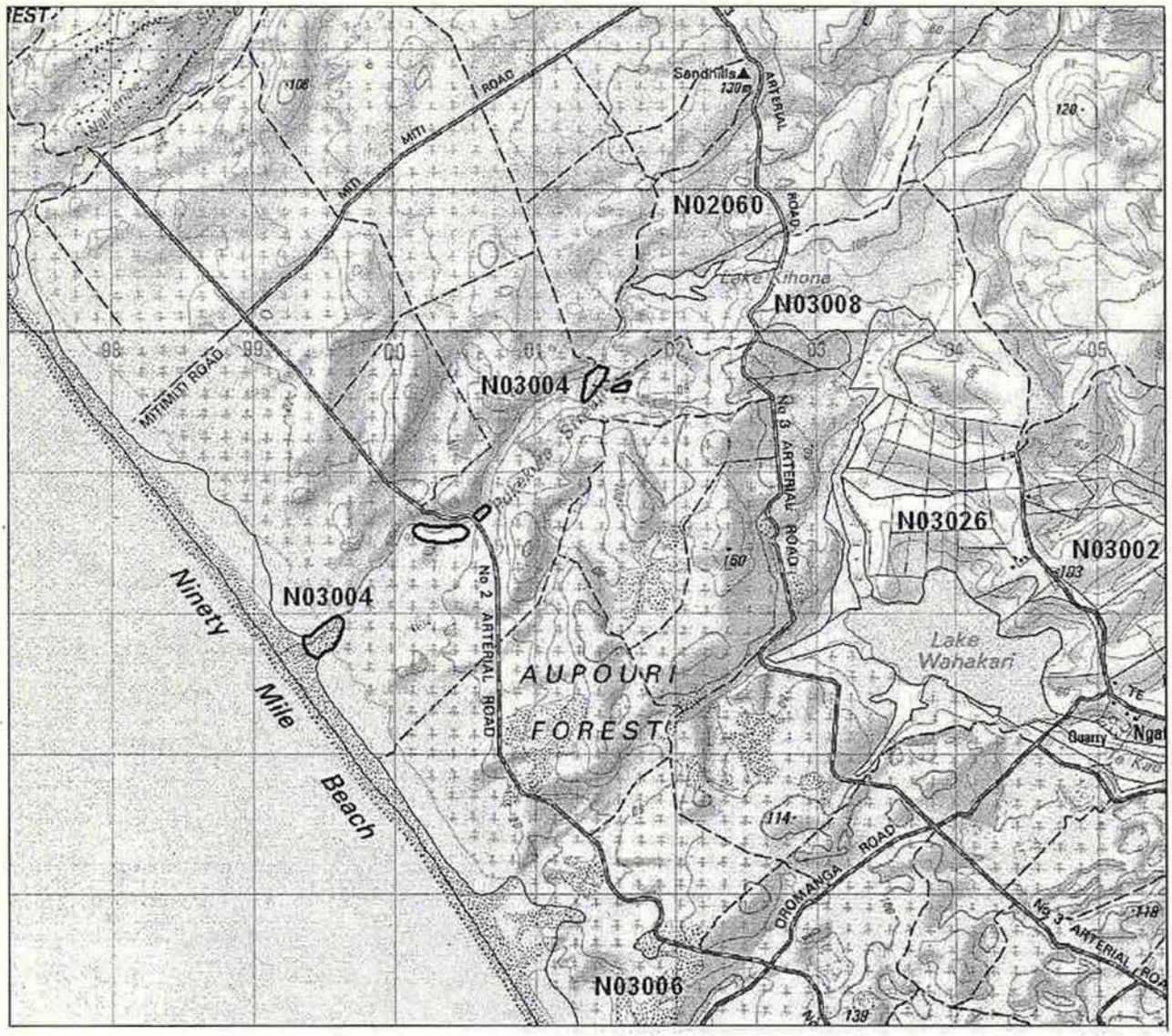
(e) At the stream mouth (N03 995 278) there is an oioi dominant wetland. Pampas is frequent and raupo, harakeke and *Lilaeopsis novae-zelandiae* are also present.

Fauna

Birds: Spotless crake and Australasian little grebe (inland sites) (both Regionally significant species).

Significance

A series of wetlands providing a range of habitat types and providing habitat for regionally significant species.



Pukekura Stream Wetlands N03/004

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

TE ARAI SANDFIELDS

Survey no.	N03/009
Survey date	15 August 1995
Grid reference	N03 065 225
Area	1,253 ha (534 ha duneland, 697 ha shrubland, 9 ha forest, 13 ha wetland)
Altitude	0–105 m asl

Ecological unit

(a) Sandfield

(b) Marram-pohuehue association on sand

(c) Mixed coastal turf association on damp sand flats

(d) Open water in dune lake

(e) *Eleocharis sphacelata*-raupo reedland in lake bed

(f) Raupo reedland in lake bed

(g) Kanuka/manuka-marram-toetoe association on dunes

(h) Pohutukawa forest on dunes

(i) Kanuka shrubland on dunes

Landform/geology

Holocene dune belt with areas of underlying late Pleistocene unconsolidated parabolic dunes.

Vegetation

(a) On the sandfield, vegetation is variable, consisting primarily of sandbinding species sparsely distributed in the west. Marram, knobby clubrush and oioi are uncommon to locally frequent. On the foredune *Spinifex*, pingao and *Carex pumila* occur sparsely. In the swampy lower dunes oioi and knobby clubrush are common.

(b) In the east a dense association of pohuehue and marram occurs. Other species occurring are toetoe, kanuka, bracken, harakeke, tauhinu, NZ spinach, *Coprosma acerosa*, native broom, ti kouka, mahoe, lupin and a variety of adventive weeds.

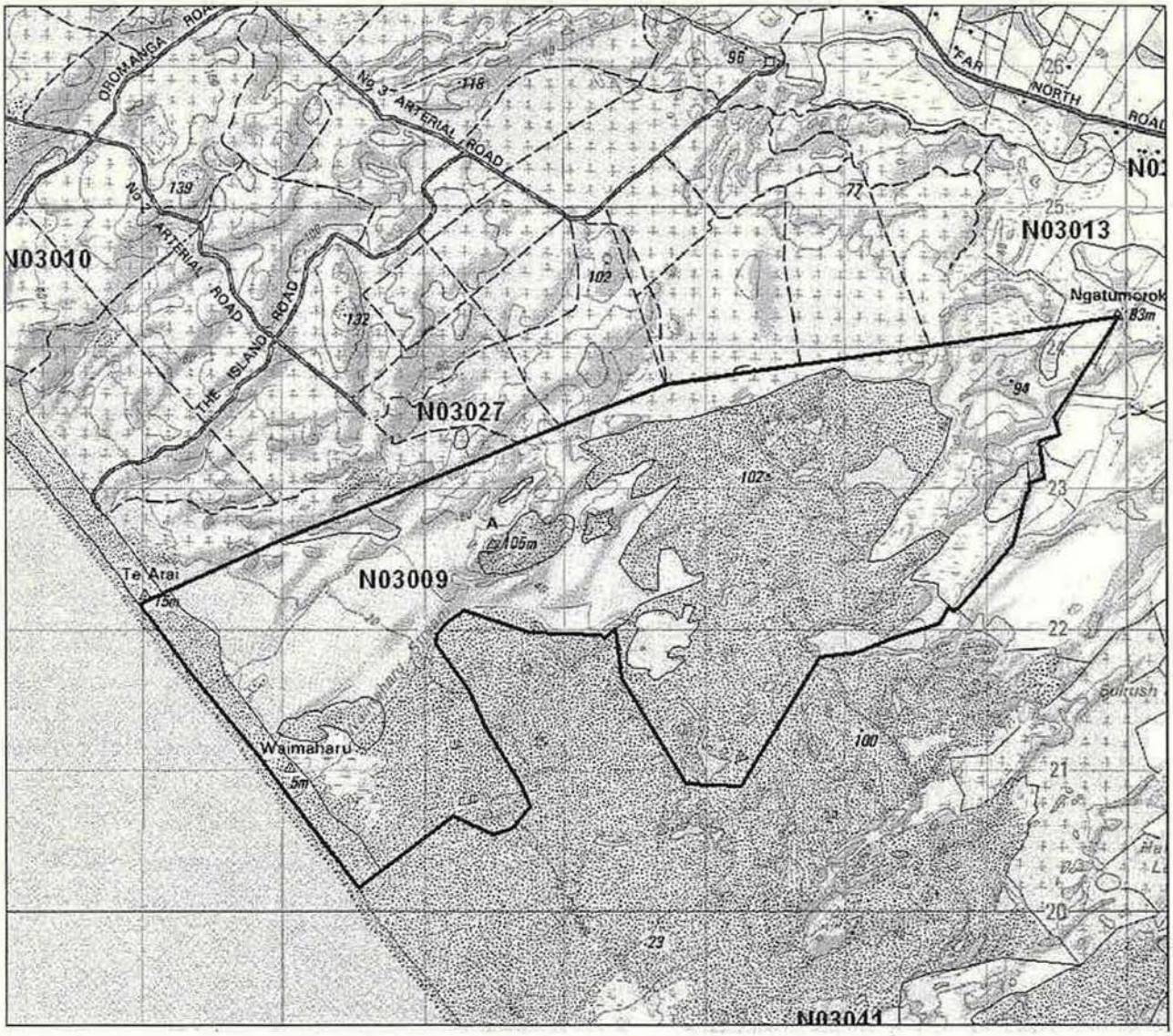
(c) Where freshwater streams approach the coast, wet dune flats occur as the streams fan out, with dense streamside turfs, and damp interdune depressions occur. Species occurring in these sites include *Myriophyllum votschii*, *Glossostigma*, *Azolla pinnata, Isolepis prolifer*, *I. reticularis*, *I. inundata* and the threatened *Eleocharis neozelandica* (L.J. Forester pers. comm.).

(d) A deep dune lake (Lake Ngatumoroki, N03 092 230) is bounded to the south by steep dunes and to the north by lowland basins. The lake is approximately 80% open water with *Myriophyllum propinquum*.

(e) Reed beds fringing the lake consist of *Eleocharis sphacelata* and raupo.

(f) A low saddle vegetated in rushes, sedges and occasional pampas divides the lake from a raupo swamp to the east. Ti kouka, harakeke and sedges are scattered throughout the raupo.

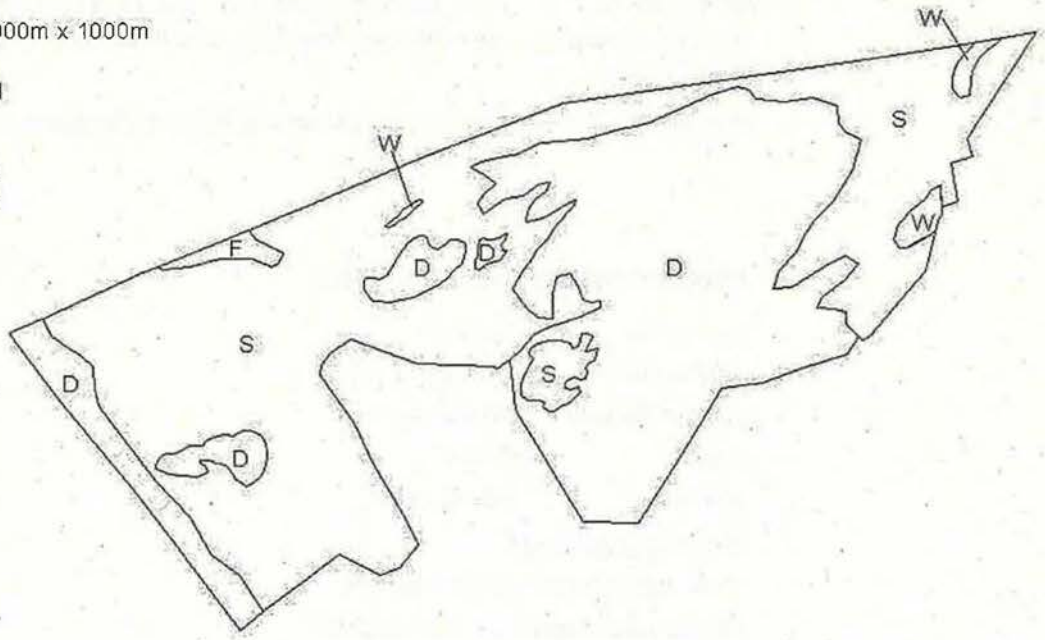
(g) On the margins kanuka/manuka-marram-toetoe with bracken, hangehange and mingimingi occur.



Te Arai Sandfields N03/009

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



(h) Large pohutukawa form forested islands amongst the sand. In the largest stand, mapou, hangehange, kawakawa, harakeke, toetoe, *Coprosma rhamnoides*, hound's tongue, and shining spleenwort occur in the understorey along with the regionally significant *Hebe diosmifolia*, the threatened *Pseudopanax ferox* and a variety of *Pseudopanax* hybrids.

(i) On stabilised dunes kanuka shrubland occurs with toetoe, harakeke and bracken. Mapou, ti kouka and pohutukawa occur occasionally. Ngaio is abundant on the margins. The understorey contains houpara, ngaio, mapou, kawakawa, *Coprosma rhamnoides*, shining spleenwort and hound's tongue. Sydney golden wattle is locally abundant. In the more sheltered leeward slopes of the dunes the vegetation is taller and has a more developed understorey.

Significant flora

Ophioglossum petiolatum, Todea barbara and *Thelypteris confluens* all Vulnerable, *Eleocharis neozelandica* (Declining), *Cyclosorus interruptus* (Declining), pingao (Recovering-Conservation Dependent), *Pseudopanax ferox* (Naturally Uncommon-Sparse).

Hebe diosmifolia and *Myriophyllum votschii* (Regionally significant species).

Fauna

Birds: NZ dabchick and variable oystercatcher (both Category C threatened species), Australasian bittern (Category O threatened species), NI fernbird (Regionally significant species), NZ shoveler, as well as common bush and open country birds.

Significance

One of the largest areas of mobile duneland not planted in pines, a rare habitat type along this coast containing many threatened and uncommon plant species and threatened and regionally significant bird species.

It contains one of two records of mixed coastal turf association in the Ecological District (although likely to occur elsewhere). It is a representative site for type (a) sandfield, type (d) open water, type (e) *Eleocharis sphacelata*-raupo reedland, type (h) pohutukawa forest, and type (i) kanuka shrubland.

Over half of this site is protected (58.9%), 734.24 ha Stewardship Land, and 4.76 ha Ecological Area, both of which are administered by the Department of Conservation.

References: Barnett (1985); Panckhurst (1984); Bellingham (1984).

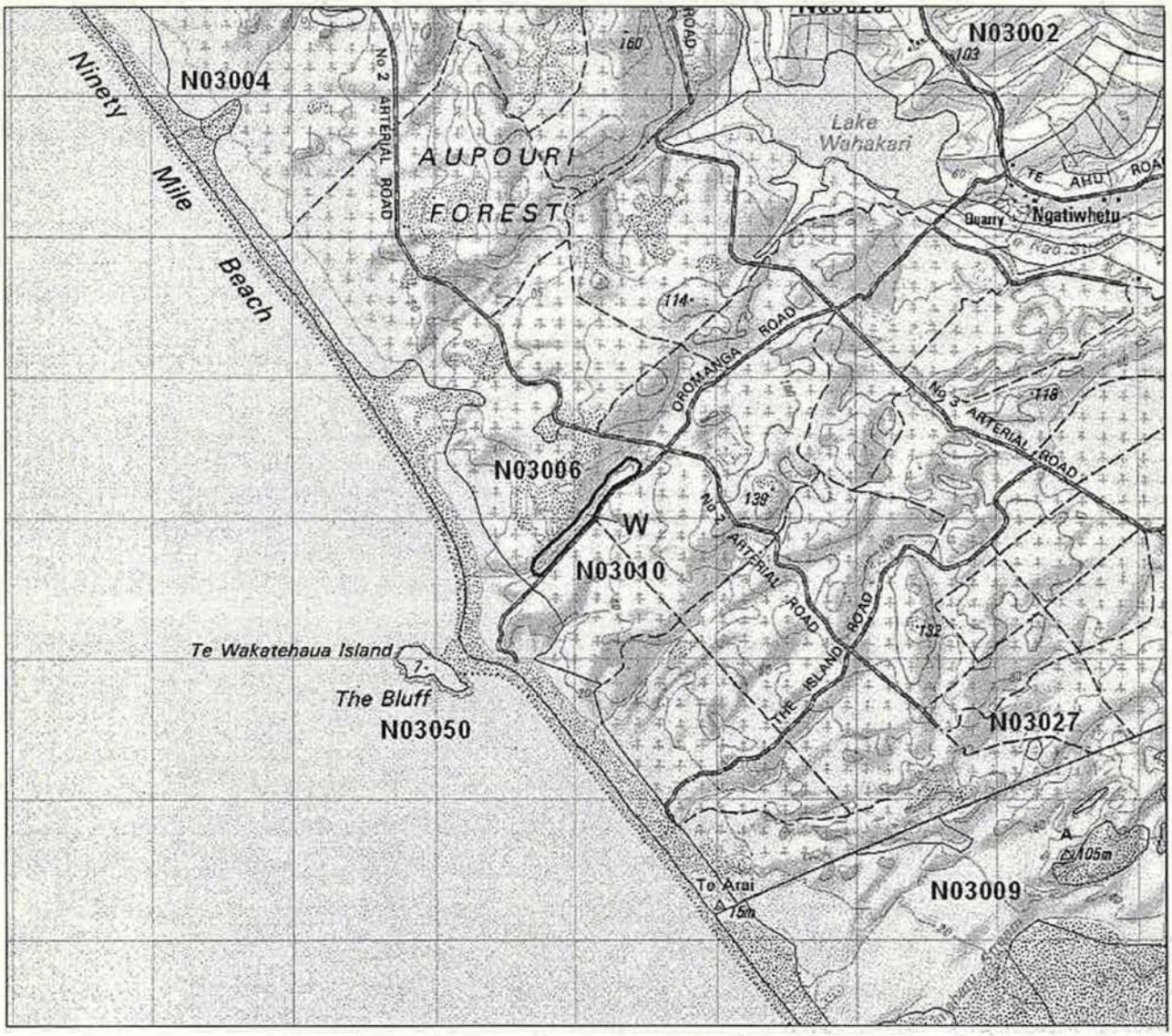
OROMANGA RD WETLANDS

Survey no.	N03/010
Survey date	15 August 1995
Grid reference	N03 019 248
Area	9.6 ha
Altitude	20–40 m asl

Ecological unit

(a) Raupo reedland in stream bed

(b) Manuka shrubland in stream bed



Oromanga Rd Wetlands N03/010

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

(c) Raupo-rush association in stream bed

Landform/geology

Freshwater wetland in gully in eroded Pleistocene consolidated parabolic dunes.

Vegetation

Two raupo dominant wetlands linked by a small stream with a few native shrubs amongst the pines.

(a) The upstream site also contains kiokio, harakeke, ti kouka, bracken, pohuehue and locally frequent rushes.

(b) It has a thin fringe of manuka. Kanuka occurs frequently and *Coprosma macrocarpa* is occasional.

(c) The downstream site is similar but with locally common rushes and frequent harakeke, kanuka and kikuyu. In addition to the species mentioned above, toetoe, houpara, hangehange and karamu also occur.

Both sites have pines to their margins.

Significant flora

The threatened *Thelypteris confluens* (Vulnerable) is reported from this site (1984).

Fauna

Not surveyed.

Significance

Both wetlands occur near the coast and are collectively of a size to provide suitable habitat for cryptic marsh bird species. Presence of threatened plant species.

HENDERSON BAY SHRUBLAND

Survey no.	N03/014
Survey date	August 1995
Grid reference	N03 194 192, N03 207 188, N03 214 183, N03 196 174
Area	139.5 ha (2 ha duneland, 137 ha shrubland, 0.5 ha wetland)
Altitude	0–34 m asl

Ecological unit

(a) Wattle shrubland on flat to gently sloping consolidated sands

(b) Kanuka shrubland on flat to gently sloping consolidated sands

(c) Harakeke association on gently sloping consolidated sands

(d) Kanuka-manuka-wattle shrubland on gentle slope

(e) Raupo reedland in shallow valley

(f) Manuka shrubland on flat to gently sloping consolidated sands

(g) Pohutukawa forest on steep coastal faces

(h) Manuka-harakeke association on consolidated dunes

Landform/geology

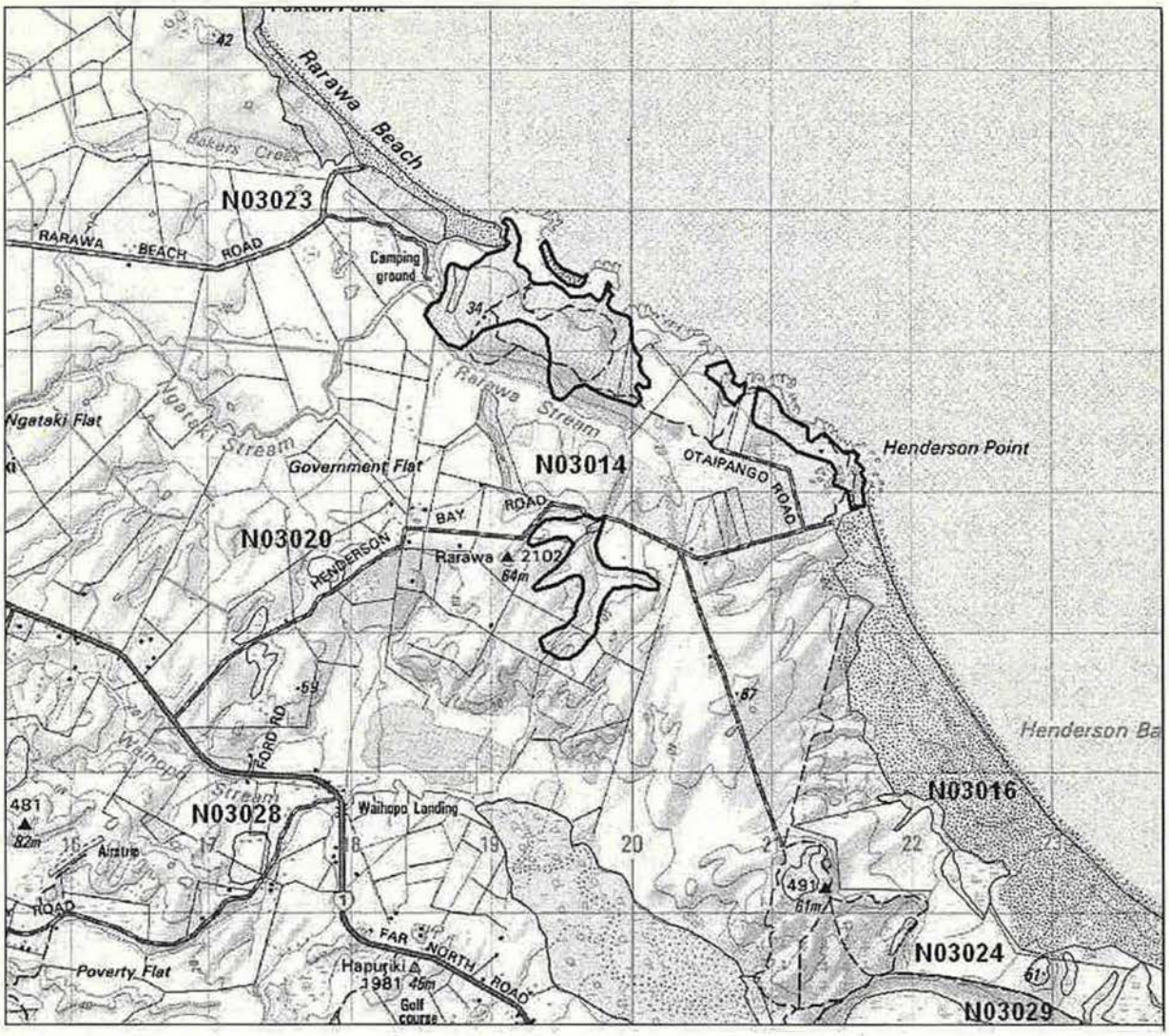
Pleistocene leached consolidated sands, with underlying Houhora Complex greywacke and conglomerate outcropping in coastal cliffs and shore platforms.

Vegetation

(a) Much of the area near the Rarawa Stream is wattle scrub in which kanuka occurs frequently.

(b) The rest of the area near the stream is mostly kanuka shrubland to three metres with frequent wattle.

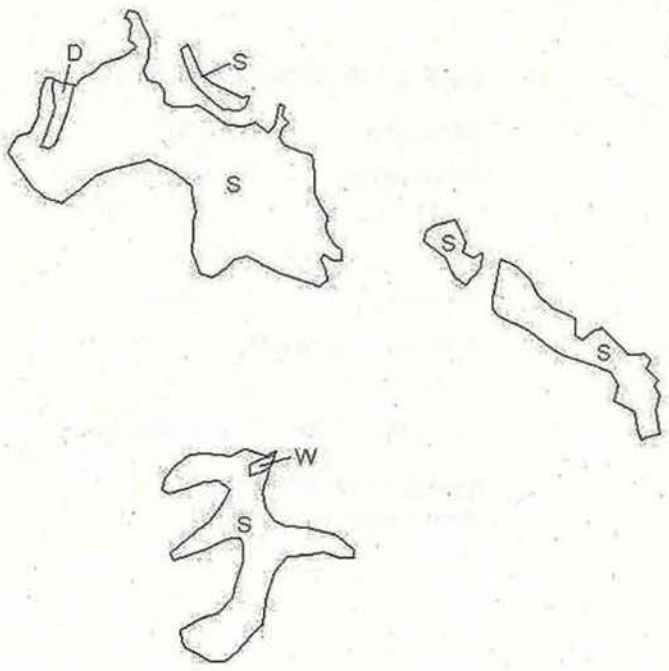
(c) There is also an area of harakeke dominant coastal association with frequent pohutukawa and occasional hangehange occurs along the dunes.



Henderson Bay Shrubland N03/014

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



(d) Near the Rarawa trig the shrubland is kanuka-manuka wattle. This type is also found near type (g).

(e) A raupo swamp with occasional harakeke also occurs here.

(f) Low manuka to two metres contains scattered *Dracophyllum lessonianum,* wattle, *Callistachys lanceolata,* mingimingi and patches of bare sand.

(g) On steep coastal faces on the margins of type (f) are small pockets of pohutukawa with houpara, *Coprosma* species, *Cyathodes juniperina* and kowharawhara.

(h) Coastal association of abundant manuka with harakeke and hangehange occurs in about 20% of the area.

Significant flora

At least 7 species of native orchids are present including *Thelymitra* "rough leaf" AK 229531 (Regionally significant species) which is confined to upper Northland.

Astelia grandis (Regionally significant species).

Fauna

Lizards: Northland green gecko (Regionally significant species).

Aquatic fauna: Banded kokopu (Category C threatened species) and red-finned bully.

Significance

Contains several uncommon coastal habitat types, and this particular area displays a diversity of native orchid species. Type (c) harakeke association, type (g) pohutukawa forest, and type (h) manuka-harakeke association, are representative vegetation types, with type (c) harakeke association unrecorded elsewhere on the mainland in the Ecological District.

Additional surveying is recommended to determine further ecological significance of this site.

GREAT EXHIBITION BAY

Survey no.	N03/015
Survey date	28 August 1995
Grid reference	N03 137 270
Area	755 ha
Altitude	0-43 m asl

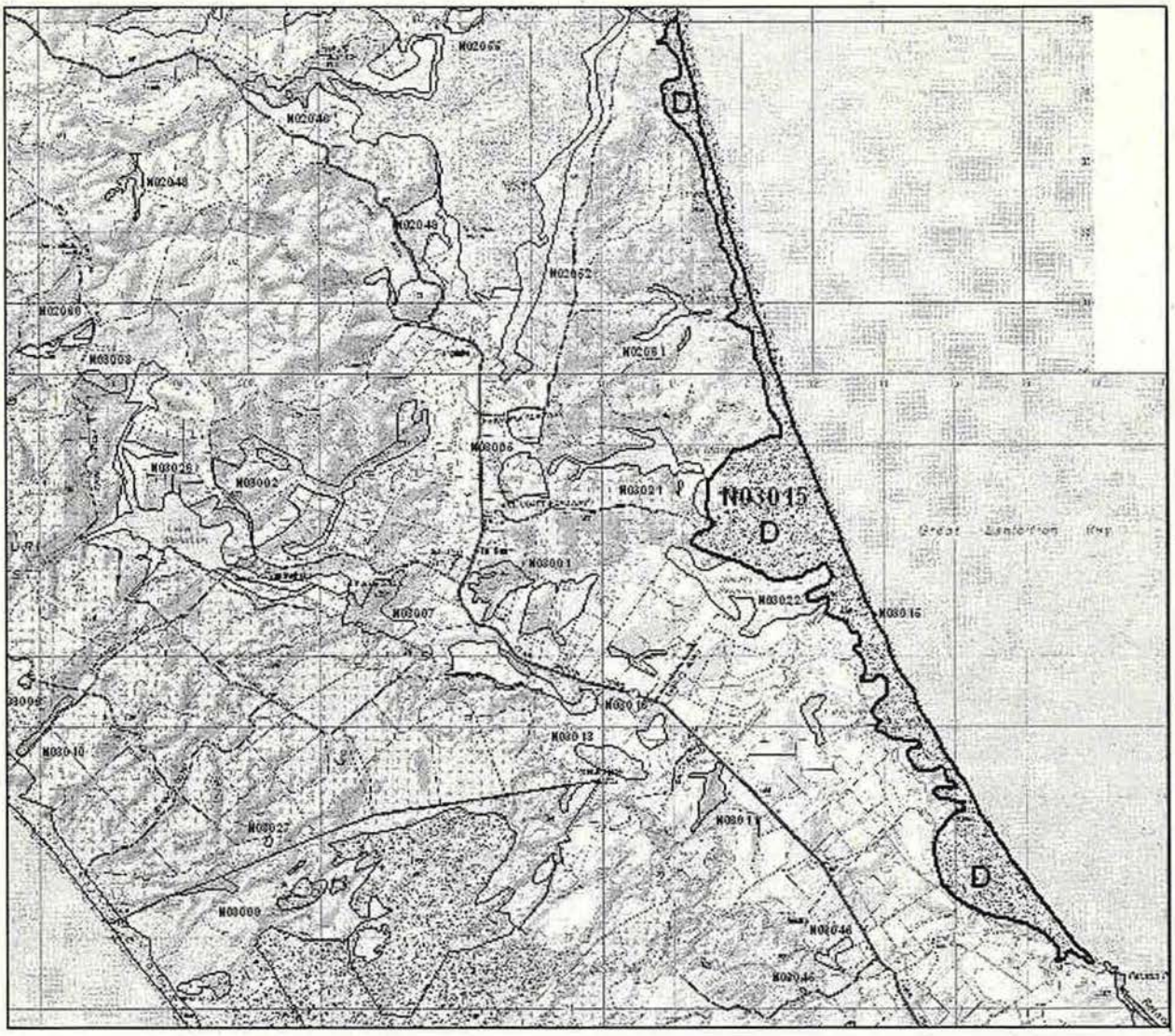
Ecological unit

(a) Sandfield

(b) Marram-*Spinifex* grassland on upper dunes

Landform/geology

Holocene coastal dunes.



Great Exhibition Bay N03/015

Each grid is 1000 m x 1000 m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Vegetation

Marram and *Spinifex* are common with frequent toetoe and oioi. Also present are manuka, kanuka, pine, tauhinu, Sydney golden wattle, *Callistachys lanceolata* and bracken.

Significant flora

Esler recorded the threatened *Euphorbia glauca* (Declining) amongst *Spinifex* near Wairahi Stream in 1974.

Fauna

Birds: Northern NZ dotterel (Category B threatened species), variable oystercatcher (Category C threatened species), white-fronted tern (Category C

threatened species), and common coastal bird species were recorded by the OSNZ in early 2000. NZ pipit have also been recorded from this site.

Snails: Unconfirmed record of Archey's dune snail (Serious Decline) (F. Brook pers. comm.).

Significance

A good example and representative site of a nationally uncommon habitat type, (type a), with limited modification.

Further fauna survey is recommended.

Stewardship land, 271 ha, administered by the Department of Conservation protects 35.8% of this site.

HENDERSON BAY & KOWHAI BEACH

Survey no.	N03/016
Survey date	14 August 1995
Grid reference	N03 235 150
Area	410 ha (401 ha duneland, 9 ha shrubland)
Altitude	0–20 m asl

Ecological unit

(a) S*pinifex* grassland on foredunes

(b) Pingao sedgeland on foredunes

(c) Wattle shrubland on dunes

(d) Sandfield

Landform/geology

Holocene dunes overlying Pleistocene leached consolidated sand.

Vegetation

(a) At Henderson Bay, *Spinifex* is common. Pingao, pohutukawa, kanuka/manuka, harakeke, knobby clubrush, *Coprosma acerosa,* oioi, lupin, Norfolk pine, macrocarpa, marram, Sydney golden wattle and pampas also occur.

(b) South of this, at Kowhai Beach, pingao is common on the foredune and *Spinifex* less so. Marram is present with wattle and sedges. Manuka, kanuka, toetoe, *tauhinu,* and pampas all occur sparsely.

(c) On the inland side of the sandfield wattle is common. Marram is frequent. Other species present are pohutukawa, toetoe, manuka, kanuka, *Coprosma acerosa*, oioi, knobby clubrush, rushes (*Juncus* spp.), pohuehue, and tauhinu. Pine, pampas and macrocarpa are occasional.

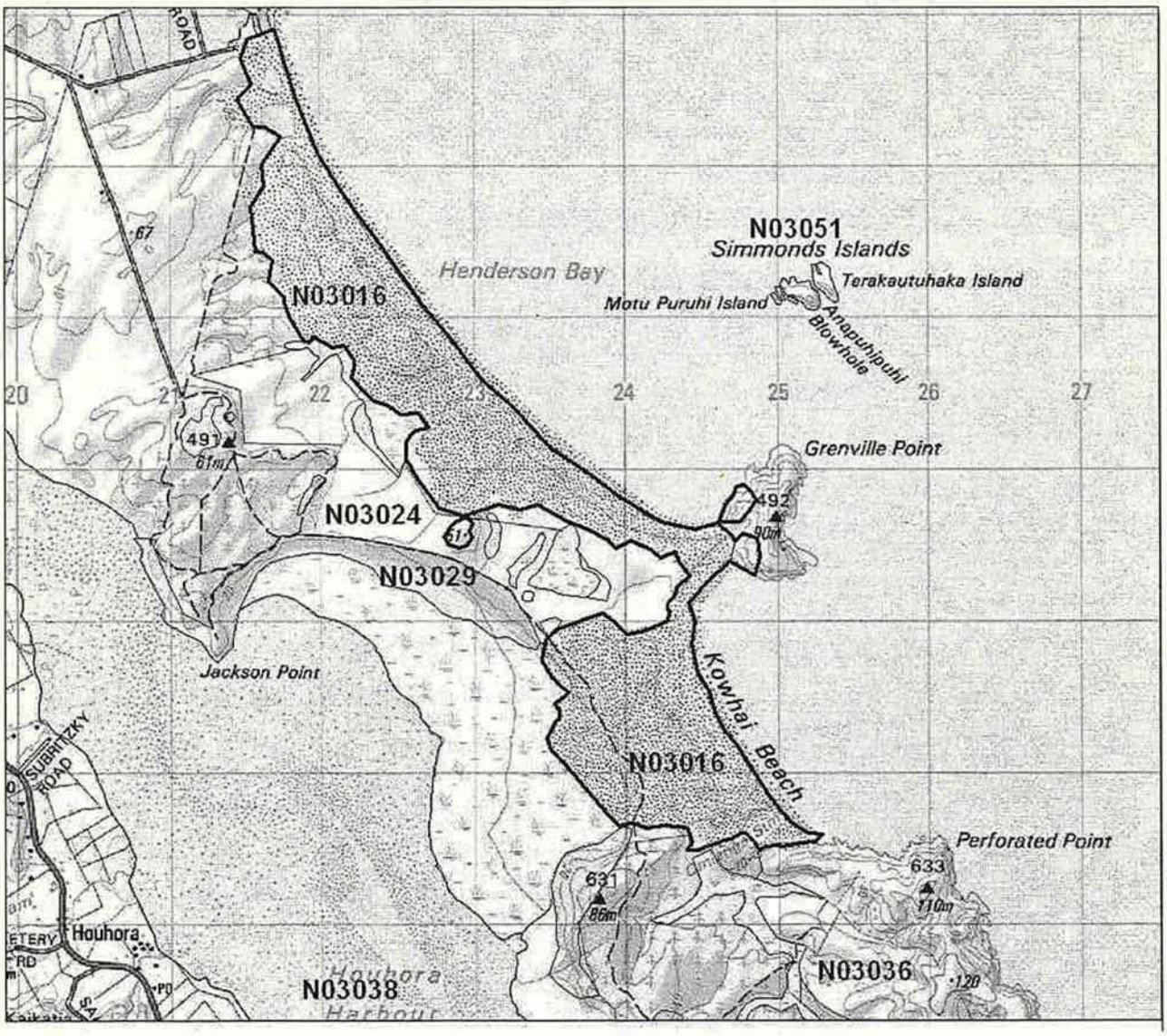
(f) Hard pans and stone flats are scattered throughout the sandfields.

Significant flora

Pingao (Recovering–Conservation Dependent). This site is being considered for translocation of the Critically Endangered *Atriplex hollowayi* from Te Paki Ecological District (L.J. Forester pers. comm.).

Fauna

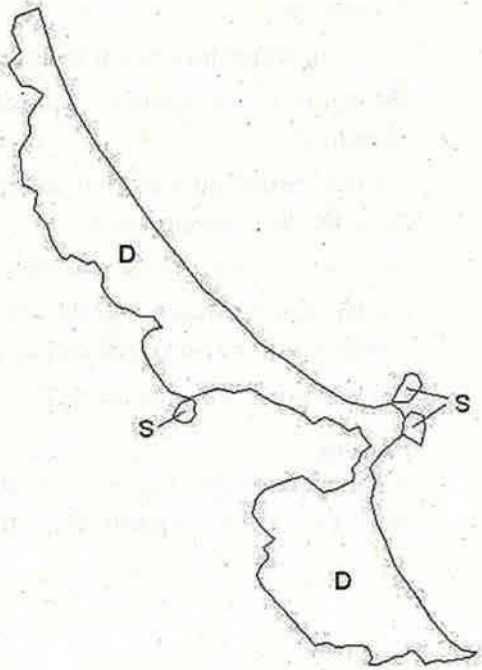
Birds: Northern NZ dotterel (Category B threatened species), banded dotterel, variable oystercatcher (Category C threatened species), bar-tailed godwit,



Henderson Bay & Kowhai Bay N03/016

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



turnstone, lesser knot and white-faced heron were recorded in a year 2000 survey by the OSNZ. White-fronted tern (Category C threatened species), Caspian tern (Category O threatened species), whimbrel, Australasian gannet and pied shag have been recorded previously.

Significance

A thriving area of pingao and a very good example of a nationally threatened habitat type with limited modification. Representative site for type (b) pingao sedgeland and type (d) sandfield.

Kowhai Beach is a wildlife refuge supporting at least five threatened bird species and is an important roost site for waders including international migrants.

TE KAO SOUTH SWAMP

Survey no.	N03/018
Survey date	15 August 1995
Grid reference	N03 087 256, N03 107 248
Area	83 ha (9 ha shrubland, 74 ha wetland)
Altitude	25–40 m asl

Ecological unit

(a) Open water (intermittent) in dune valley

(b) Manuka-raupo swamp association in dune valley

(c) Manuka shrubland on swamp margin and gentle slope

(d) Wattle scrub on gentle slope

(e) Raupo reedland in dune valley

Landform/geology

Freshwater wetland ponded between Pleistocene leached consolidated sand on true left and parabolic dunes on true right.

Vegetation

(a) Open water may occur intermittently.

(b) In the larger wetland manuka and raupo are common with harakeke less common.

(c) The shrubland margin is discontinuous. Ti kouka, hangehange, pampas and *Cassytha* are also present.

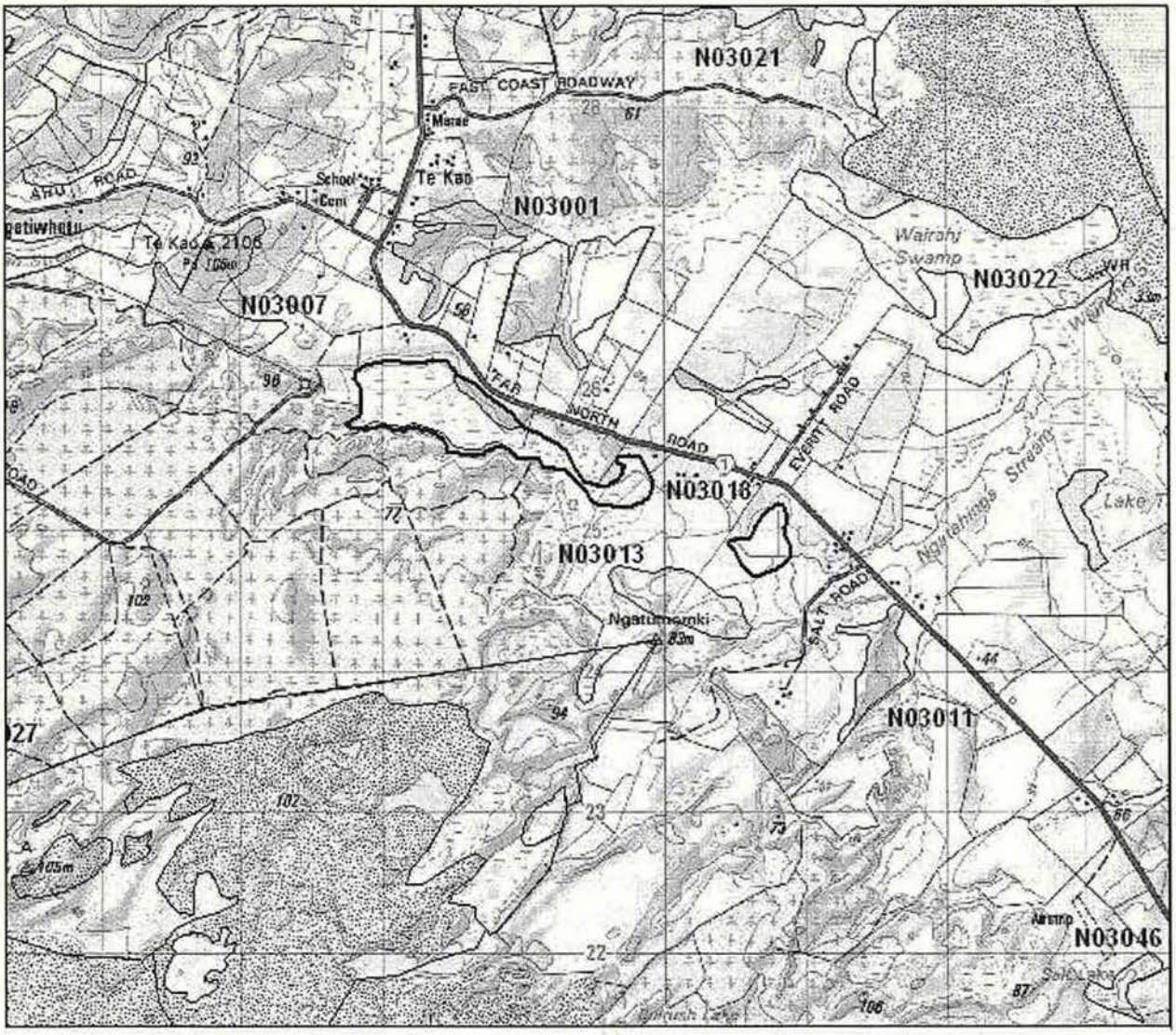
(d) There is also a small area of wattle (3%).

(e) The smaller Ngatumoroki wetland is raupo dominant (100%) with frequent sedges and occasional harakeke and ti kouka.

These wetlands appear to be drier than formerly.

Fauna

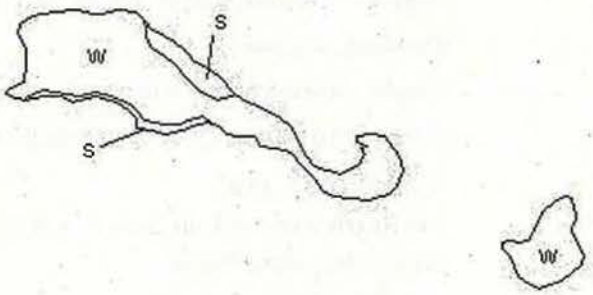
Birds: Australasian bittern (Category O threatened species), NZ shoveler. Little shag, grey duck, formerly present.



Te Kao South Swamp N03/018

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Significance

A sizeable wetland habitat suitable for cryptic species such as Australasian bittern, NI fernbird and spotless crake. Representative site for manuka-raupo swamp association, type (b).

TE RAMANUKA LAKES & SHRUBLAND

Survey no.	N03/019
Survey date	14 August 1995
Grid reference	N03 135 207, N03 112 183, N03 128 202, N03 119 182
Area	423 ha (15 ha duneland, 398 ha shrubland, 10 ha wetland)
Altitude	60–110 m asl

Ecological unit

(a) Kanuka shrubland on dunes

(b) Sandfield

(c) Wattle shrubland on dunes

(d) *Baumea articulata-Eleocharis sphacelata* reedland in lake bed

(e) *Isolepis* sp. sedgeland on sand flats

(f) Raupo reedland in lake bed

(g) Bracken fernland on sandy flats and knolls

(h) Gorse scrub on dunes

(i) Knobby clubrush-*Juncus* sp.-oioi association in lake bed

Landform/geology

Pleistocene consolidated parabolic dunes and late Holocene unconsolidated parabolic dunes with interdune sandy alluvial flats and freshwater wetlands/ lakes.

Vegetation

Te Ramanuka Trig

(a) About half of the area is kanuka shrubland between 3–5 m with occasional ti kouka, tobacco weed and wattle. Apart from small areas of gorse and wattle scrub, the remainder is 6 m tall kanuka.

(b) To the west of Lake Half is a large sandfield with frequent toetoe and occasional wattle.

(c) Near Lake Half, wattle is common in the stabilised sand, toetoe frequent and kanuka, bracken, pingao, lupin and *Coprosma acerosa* occur occasionally.

Significant flora

Pingao (Recovering-Conservation Dependent).

A suite of small lakes and wetlands are buffered by shrubland:

Eleocharis Lake

(d) North-west of Lake Half is a wetland consisting of *Baumea articulata* and *Eleocharis sphacelata*.

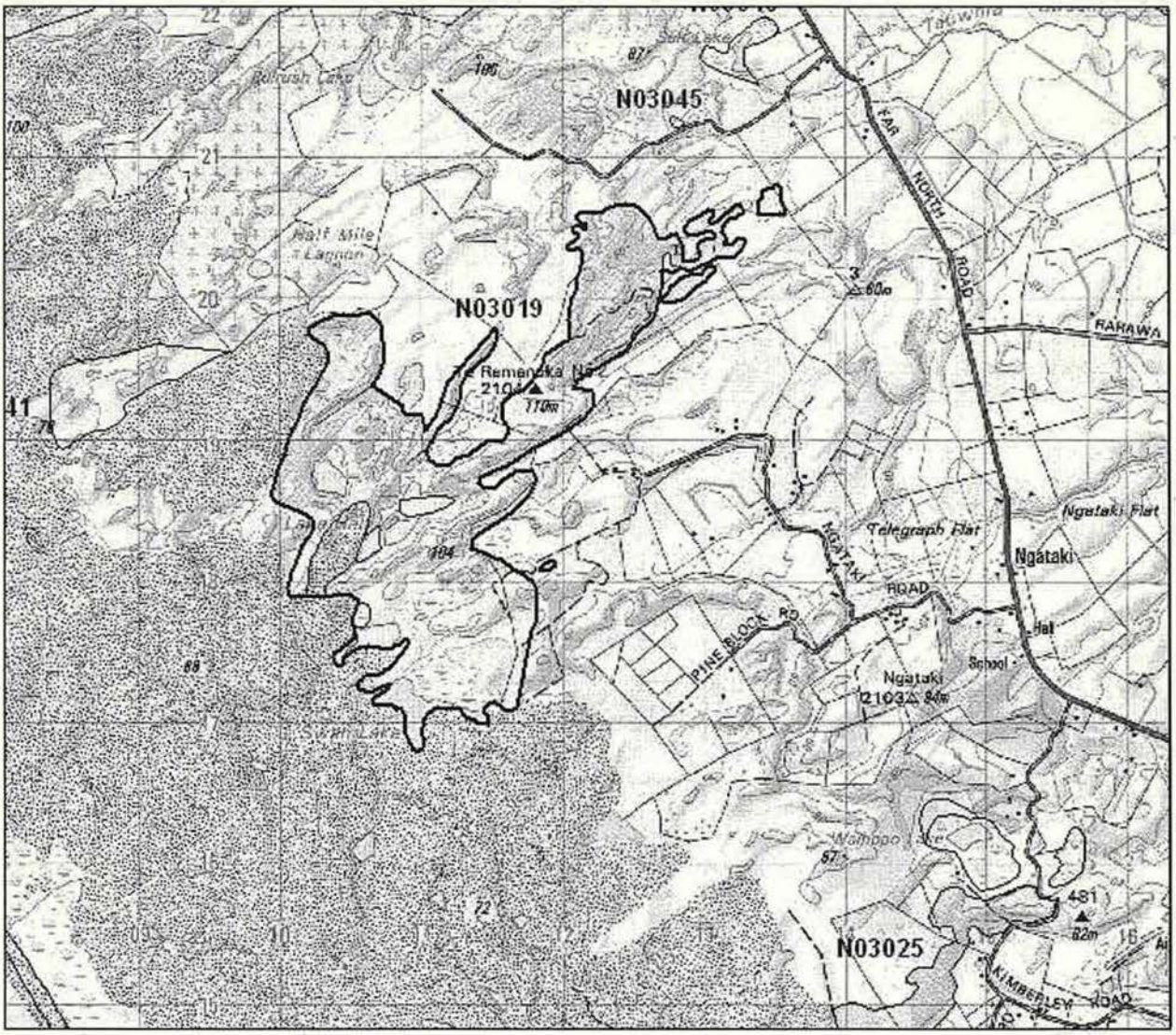
(e) 20% of the area is *Isolepis* sp. and small sedges.

Dabchick Lake

(f) A short distance to the east is a small dune lake with an *Eleocharis* sp. fringe and raupo swamp. Although small, it is habitat for NZ dabchick and Australasian bittern.

Lake Half

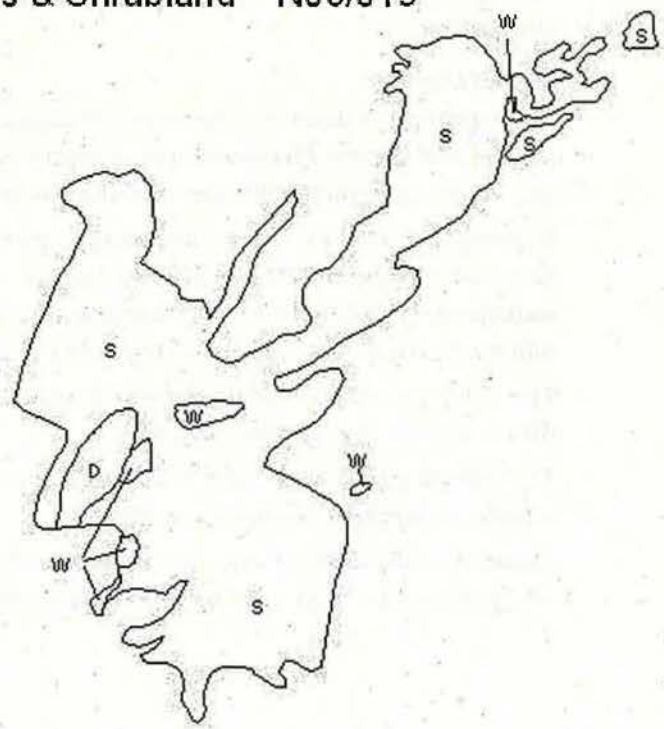
This lake appears to be drying out, being primarily (type f) raupo with small amounts of *Eleocharis sphacelata* and kuta.



Te Ramanuka Lakes & Shrubland N03/019

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Shrubland adjoining the habitat is either type (a) kanuka 2–3 m tall with frequent toetoe, occasional mingimingi, hangehange, bracken and wattle, or type (c) wattle with frequent kanuka. Other species present are pohuehue, *Cassytha*, lupin, *Coprosma rhamnoides* and shining spleenwort.

(g) Bracken fernland occurs in former swampy areas and on knolls.

Significant flora

Thelypteris confluens (Vulnerable) is also found and *Cyclosorus interruptus* (Declining) was recorded from the east of the area in 1984.

Lake Wingy

(h) This has also dried out, with only two small wettish areas remaining. Weeds such as gorse, thistle, pampas and grass are invading. Only a small area of raupo, type (f), remains in which giant umbrella sedge and harakeke occasionally occur.

The surrounding vegetation is two-thirds gorse and one-third kanuka. Wattle is locally dominant.

Swan Lake

(i) This lake has also dried out to a primarily sedge/rushland of knobby clubrush, *Juncus* sp., oioi, *Baumea articulata,* and *Eleocharis* sp. Raupo, toetoe, kanuka, gorse, wattle, pampas and lupin are also present.

Significant flora

The threatened plant *Hydatella inconspicua* (Declining) has been recorded from here, and *Eleocharis neozelandica* (Declining) on damp sand flats with *Lilaeopsis novae-zelandiae* and *Myriophyllum* sp. (Bell 1985).

Fauna

NZ dabchick (Category C threatened species). NZ dabchick have declined and virtually disappeared from these lakes in recent years due to drying out (V. Hensley pers. comm.). Australasian bittern (Category O threatened species). NZ scaup, NI fernbird, spotless crake and Australasian little grebe (all regionally significant species). NZ shoveler, grey duck, little shag and little black shag are also present.

Significance

An important habitat for several threatened and regional signficant animal species and several threatened plant species. The shrubland is one of the larger and better examples of its type and the site is located on a rare landform.

Representative site for type (a) kanuka shrubland, type (b) sandfield, type (d) *Baumea articulata-Eleocharis sphacelata* reedland, type (e) *Isolepis* sp. sedgeland, type (g) bracken fernland, and type (i) knobby clubrush-*Juncus* sp.-oioi association. Only record of type (g) and (i) in the Ecological District.

The complex of lakes, wetlands and shrubland is an important link in the chain of habitats on the Aupouri Peninsula.

The lake/wetland areas and their biota need continuing monitoring on the effects of apparent hydrological changes.

Approximately 80% of this site is protected by Stewardship Land (340 ha) administered by the Department of Conservation.

HENDERSON BAY RD WETLANDS

Survey no.	N03/020
Survey date	14 August 1995
Grid reference	N03 173 170, N03 174 167, N03 178 174
Area	10 ha
Altitude	25–40 m asl

Ecological unit

(a) Open water

(b) *Eleocharis sphacelata*-raupo reedland in dune hollow

(c) *Baumea articulata-Eleocharis sphacelata*-raupo reedland in dune hollow

(d) *Eleocharis sphacelata* reedland in dune hollow

(e) Manuka shrubland on lake margin

Landform/geology

Freshwater wetlands ponded between Pleistocene consolidated parabolic dunes.

Vegetation

This suite of small wetlands is surrounded by pasture.

Site 1

(a) (N03 178 174) to the north of the road is half open water.

(b) The remaining area is *Eleocharis sphacelata* and raupo, and is habitat for common waterbirds.

Site 2

(c) (N03 173 170) at the western end of the road on the north side consists of a *Baumea articulata-Eleocharis sphacelata*-raupo wetland with less than 5% open water, type (a). Spotless crake were recorded in 1991.

Site 3

(N03 173 167) on the south side of the road is about a quarter open water, type (a), possibly intermittently, with kauri stumps visible.

(d) Two-thirds is dense *Eleocharis sphacelata* with small amounts of *Baumea articulata* and raupo.

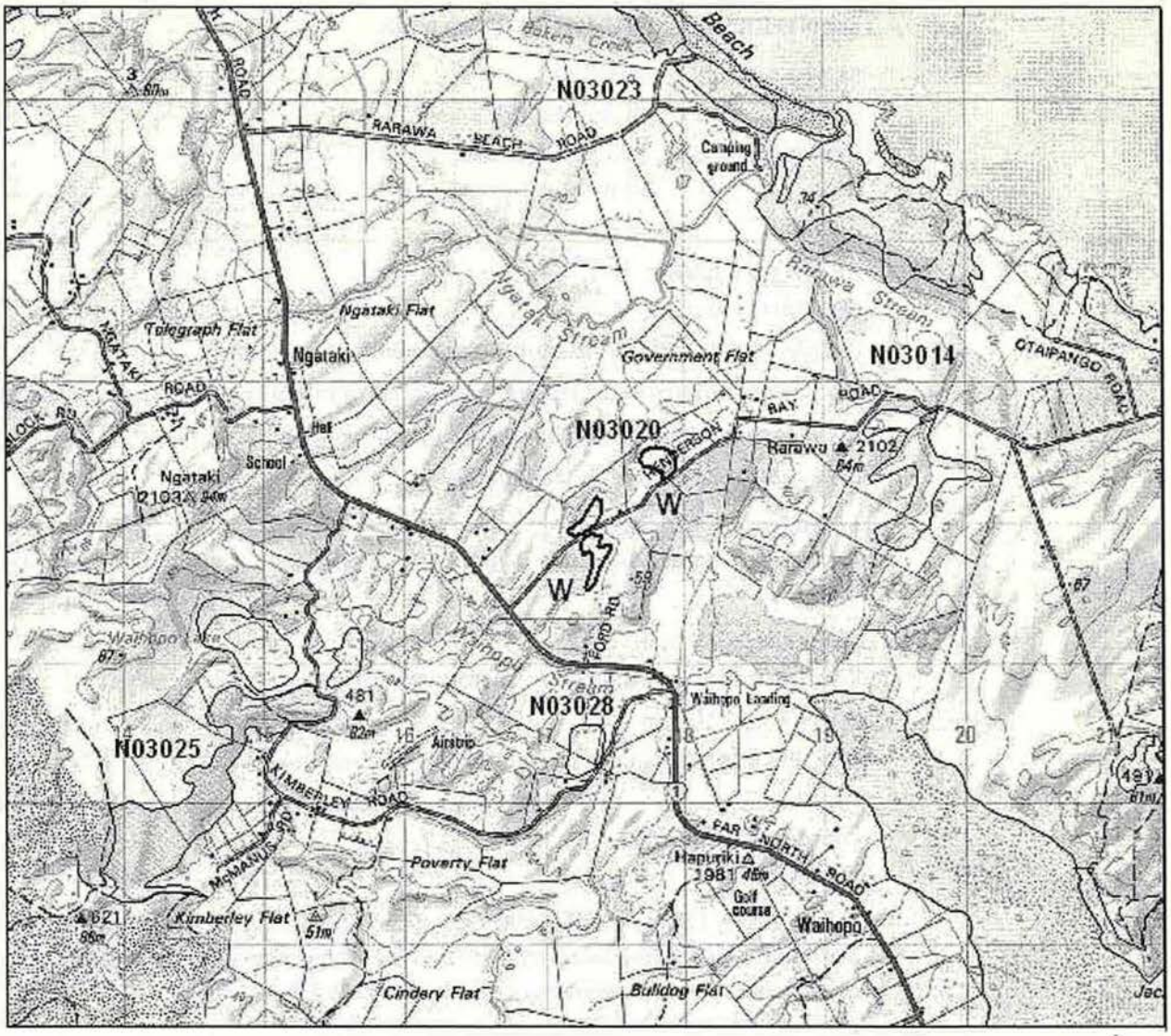
(e) A small area of manuka shrubland to 2m occurs on the margin and *Cassytha,* wattle and *Callistachys lanceolata* are present.

Fauna

Birds: Caspian tern (Category O threatened species), little black shag, and common waterbirds were recorded in 2000 by the OSNZ. NZ dabchick (Category C threatened species) recorded in 2002 (V. Hensley pers. comm.) and spotless crake (Regionally significant species) have been recorded in the past.

Significance

Three small wetlands providing habitat for common waterbirds, two threatened species and a regionally significant species. Representative site for *Baumea articulata-Eleocharis sphacelata*-raupo reedland.



Henderson Bay Rd Wetlands N03/020

Each grid is 1000 m × 1000 m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

LAKE MOREHUREHU & WETLAND

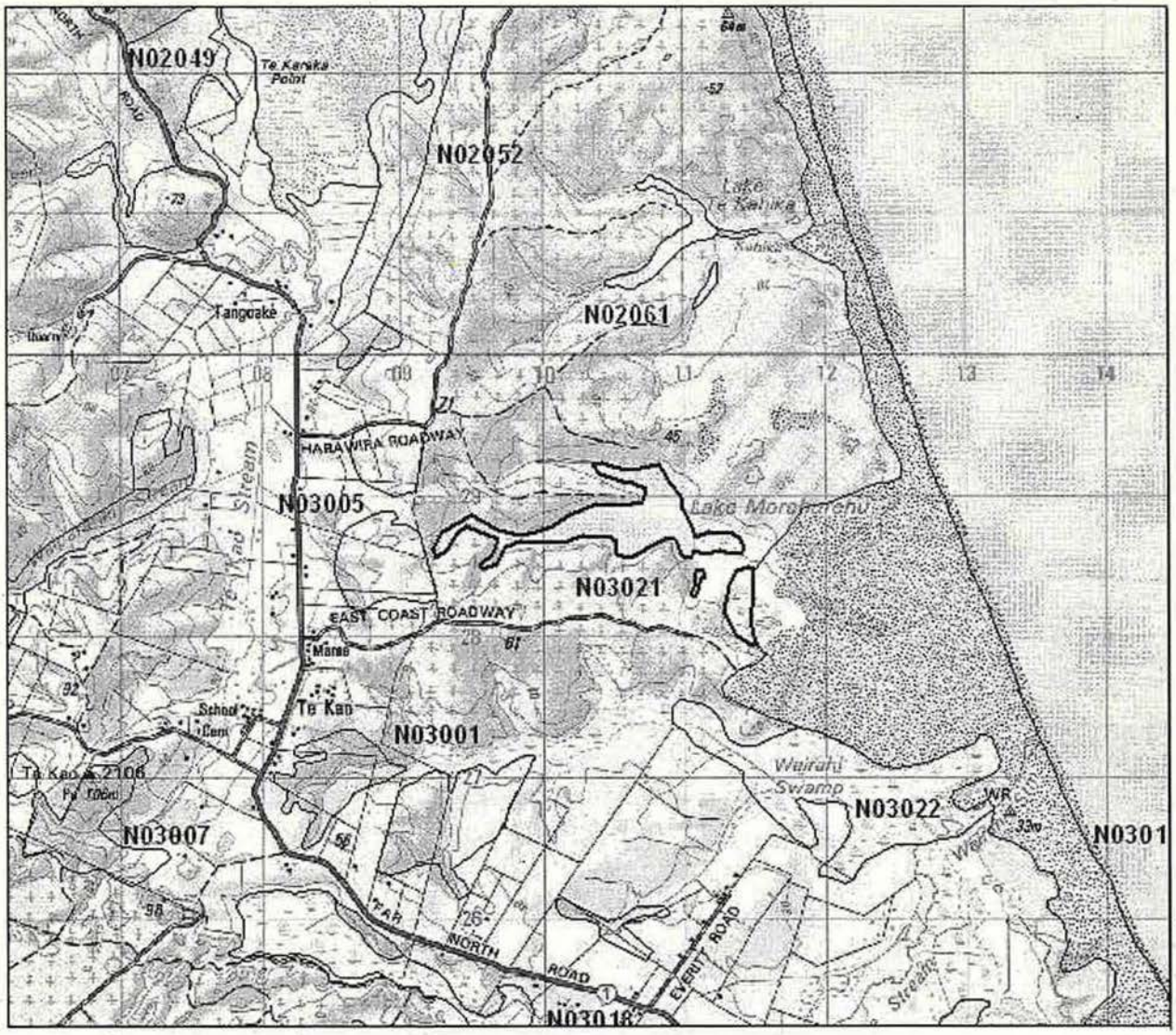
Survey no.	N03/021
Survey date	28 August 1995
Grid reference	N03 105 288, N03 112 284, N03 114 283
Area	56.6 ha
Altitude	5–20 m asl

Ecological unit

(a) Open water in dune lake

(b) *Eleocharis sphacelata* reedland on lake bed

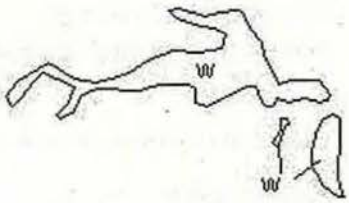
(c) Manuka shrubland on sand flats



Lake Morehurehu & Wetland N03/021

Each grid is 1000 m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Landform/geology

Freshwater wetlands and lakes ponded behind Holocene coastal dunes.

Vegetation

(a) Lake Morehurehu is mostly open water (94%).

(b) A sparse fringe of *Eleocharis sphacelata* occurs. The threatened fern *Todea barbara* is present.

(c) A shrubland margin of abundant manuka occurs with frequent kanuka, emergent *Callistachys lanceolata* and rushes. Kumarahou, toetoe, harakeke, Sydney golden wattle and prickly hakea are occasional.

The southern small lake (N03 114 283) is 60% open water, type (a), with an adjacent wetland of *Eleocharis sphacelata* and rushes and occasional harakeke, type (b).

Significant flora

Todea barbara (Vulnerable).

Fauna

Birds: NI fernbird (Regionally significant species), NZ pipit, grey duck, little shag, black shag. NZ dabchick (Category C threatened species) have been recorded by OSNZ in recent times.

Aquatic fauna: short-finned eel, common bully and inanga.

Significance

A relatively large open-water lake and wetland area provides good habitat for waterbirds and NI fernbird as well as a threatened plant species. A good example of its habitat type. The dune lake, type (a) is a representative example of its type within this District.

WAIRAHI SWAMP & LAKE TAEORE

Survey no.	N03/022
Survey date	28 August 1995
Grid reference	N03 121 270, N03 130 253
Area	127 ha
Altitude	5–10 m asl

Ecological unit

(a) Raupo reedland in dune hollow

(b) *Baumea articulata*-manuka swamp association on peat

(c) Kanuka/manuka shrubland on dunes

(d) Open water in dune lake

Landform/geology

Freshwater wetland ponded behind Holocene coastal dunes.

Soils

Gley soil (Waipu), organic soil (Ruakaka).

Vegetation

The Wairahi Swamp contains two wetland types:

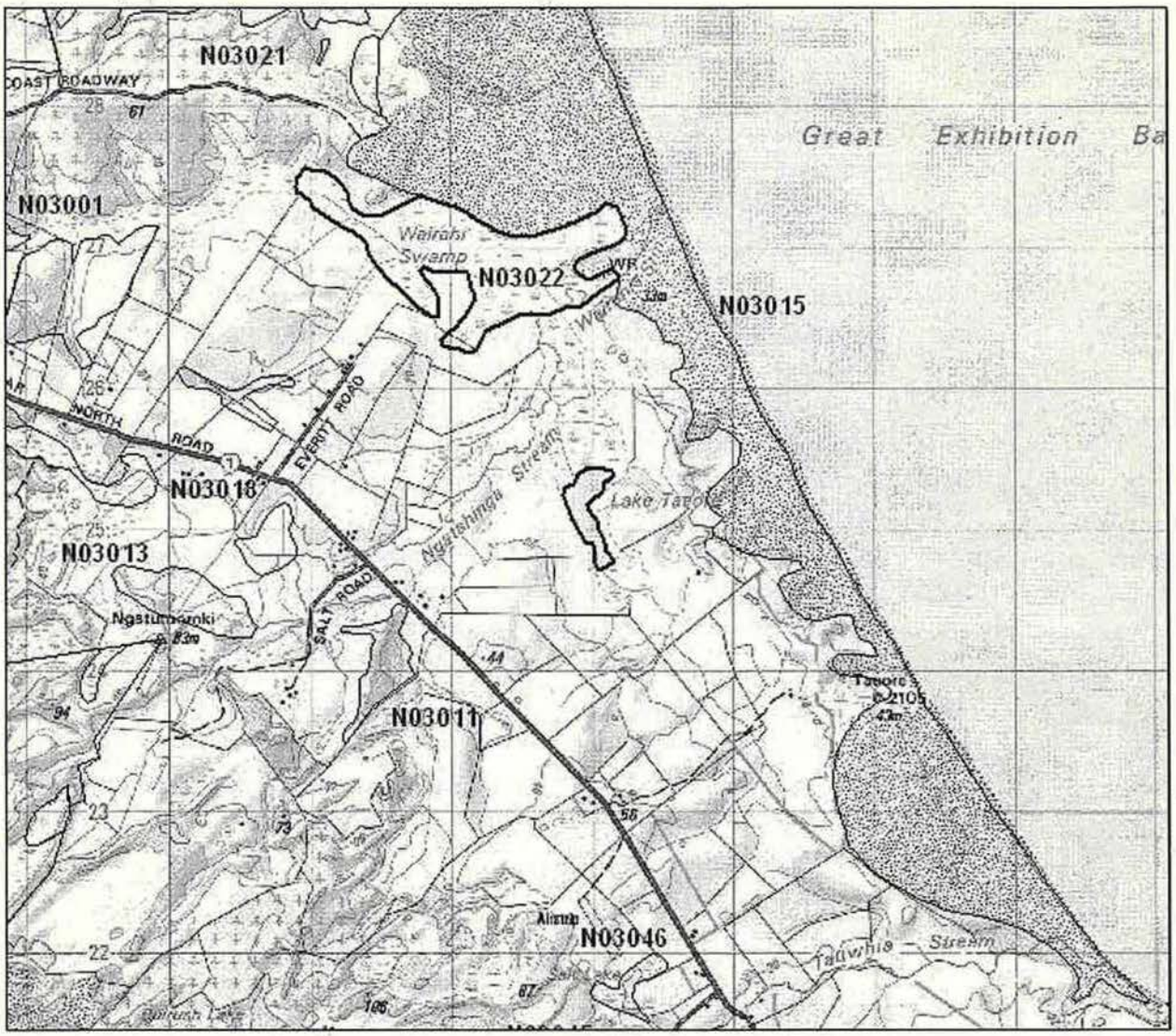
Type (a) raupo dominant with frequent manuka, *Gleichenia* and sedges. The threatened *Thelypteris confluens* is present.

Type (b) *Baumea articulata*-manuka dominance.

(c) Kanuka/manuka shrubland occurs adjacent to the wetland on the northern side. Sydney golden wattle is locally abundant.

(d) Lake Taeore is 10% open water comprising clumps of reeds and raupo swamp. Some manuka shrubland adjoins the site.

This area appears to be drying out.



Wairahi Swamp & Lake Taeore N03/022

Each grid is 1000 m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Significant flora

Thelypteris confluens (Vulnerable).

Fauna

Birds: Past survey (1978): (reported) banded dotterel (Category C threatened species), NZ scaup and (reported) NI fernbird (both Regionally significant

species), Australasian bittern (Category O threatened species), little shag, NZ scaup, and grey duck.

1991 survey: Caspian tern (Category O threatened species), grey teal (Regionally significant species), NZ shoveler, black shag, breeding black swan, paradise shelduck, Australasian harrier, pied stilt, welcome swallow, spur-winged plover, cattle egret, little egret, and NZ kingfisher.

Lizards: ornate skink (Regionally significant species).

Significance

A large wetland area on the east coast being habitat for a diversity of species including threatened and regionally significant species and a good example of a nationally threatened habitat type.

Representative site for type (a) raupo reedland and type (b) *Baumea articulata*-manuka association with the latter unrecorded elsewhere in the Ecological District.

Lake Taeore is a protected Wildlife Management Reserve with approximately 11.4 ha (8.9%) protected within this site. The wider area is very important for several threatened or regionally significant fauna species.

This site also contains soils of national importance:

(i) lowland organic and gley soils under indigenous vegetation are nationally uncommon.

(ii) good examples of Waipu and Ruakaka soils are uncommon (most Waipu soils have been developed for dairying).

(Arand et al. 1993).

RARAWA BEACH

Survey no.	N03/023
Survey date	10 August 1995
Grid reference	N03 180 206
Area	59 ha
Altitude	0–20 m asl

Ecological unit

(a) *Spinifex* grassland on dunes

(b) Oioi saltmarsh on estuary

(c) Harakeke-pohuehue association on dunes

(d) Wattle scrub on dunes

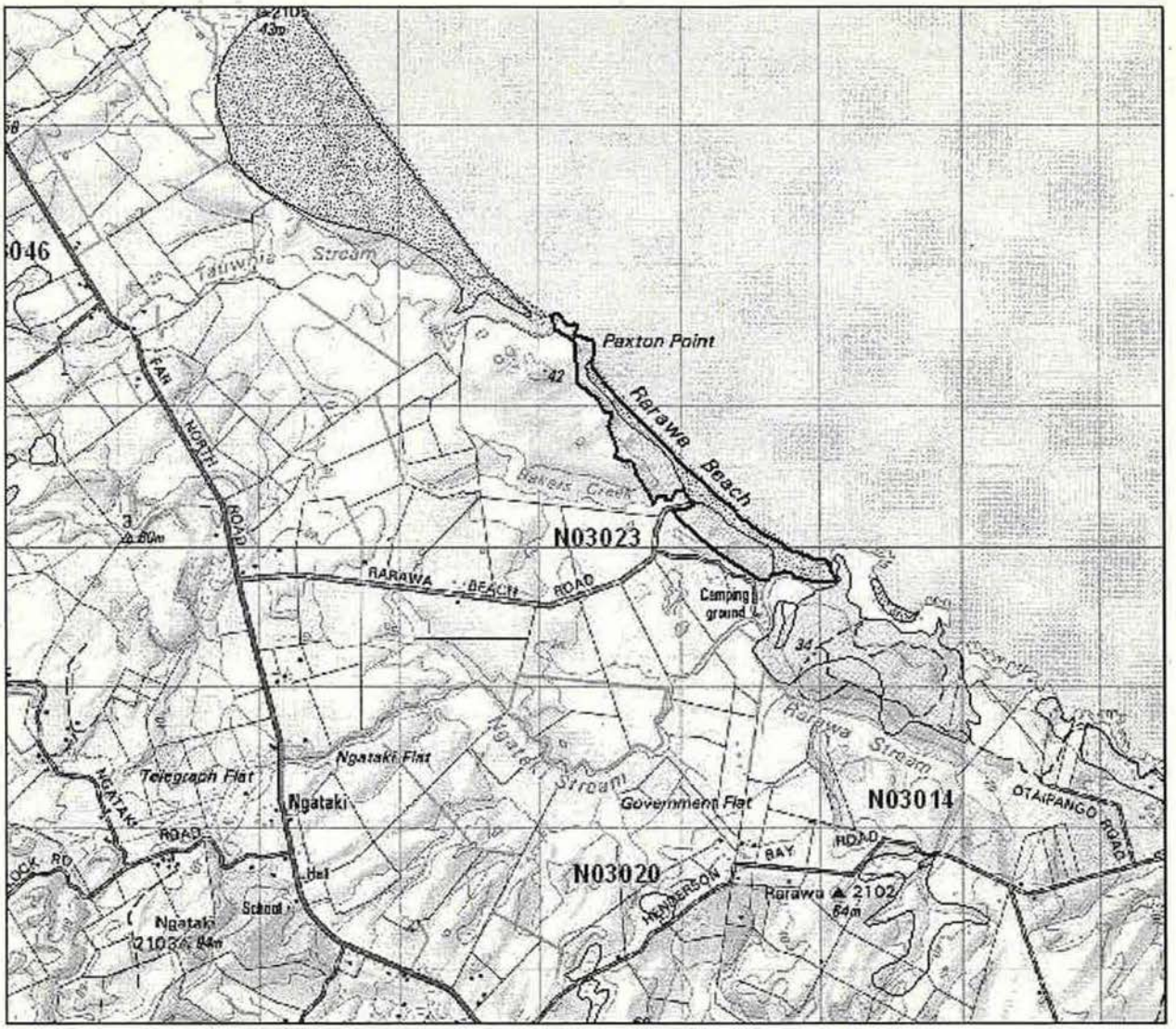
Landform/geology

Beach and Holocene foredune belt backed by Pleistocene leached consolidated sand.

Vegetation

(a) *Spinifex* is abundant on the dunes with frequent pingao, *Coprosma acerosa* and knobby clubrush. Pohutukawa, toetoe, pohuehue, *Pimelea arenaria*, harestail, wild gladiolus, lupin and pampas are also present.

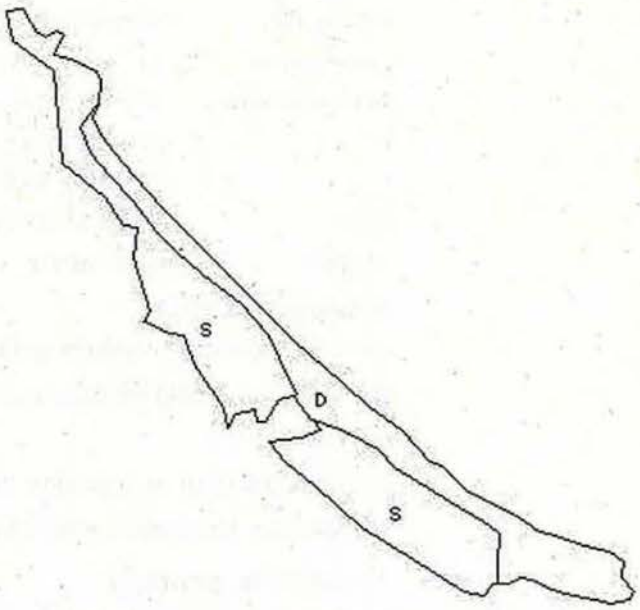
(b) Oioi is common in the tidal reaches of the Ngataki Stream mouth. Saltmarsh ribbonwood occurs frequently. Other species present are mangrove, manuka,



Rarawa Beach N03/023

Each grid is 1000 m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



kanuka, pohutukawa, glasswort, *Juncus* sp., knobby clubrush, *Callistachys lanceolata,* NZ spinach, taupata, water fern and *Watsonia* sp. Wattle is locally common.

(c) Coastal scrub of harakeke and pohuehue with frequent pohutukawa and toetoe covers the northern point of beach.

(d) The wattle scrub is from 1 to 6 m and contains frequent pohutukawa and occasional harakeke, pohuehue and houpara.

Significant flora

The threatened *Hibiscus diversifolius* (Vulnerable) is recorded from Paxton Point (1984), in a damp seepage below coastal banks. Presence of pingao (Recovering-Conservation Dependent) and *Pimelea arenaria* (Declining) (1998 record).

Fauna

Birds: Northern NZ dotterel (Category B threatened species), variable oystercatcher (Category C threatened species), white-fronted tern (OSNZ year 2000 record) (Category C threatened species), Caspian tern (Category O threatened species).

Significance

An excellent example of dune and tidal stream habitat with a shrubland buffer supporting threatened flora and fauna. A representative site for and the only record of type (c) harakeke-pohuehue association in the Ecological District.

An area of protected stewardship land (approximately 42 ha (71%)) falls within this site, and is administered by the Department of Conservation.

WAGENER'S SWAMPS

Survey no.	N03/024
Survey date	11 September 1995
Grid reference	N03 213 153, N03 232 146, N03 224 155, N03 234 145, N03 219 148, N03 234 142, N03 228 146, N03 236 144, N03 235 140
Area	45 ha (5 ha shrubland, 40 ha wetland)
Altitude	5–15 m asl

Ecological unit

(a) Kanuka/manuka-Sydney golden wattle shrubland on swamp margin

(b) Raupo reedland in dune hollows

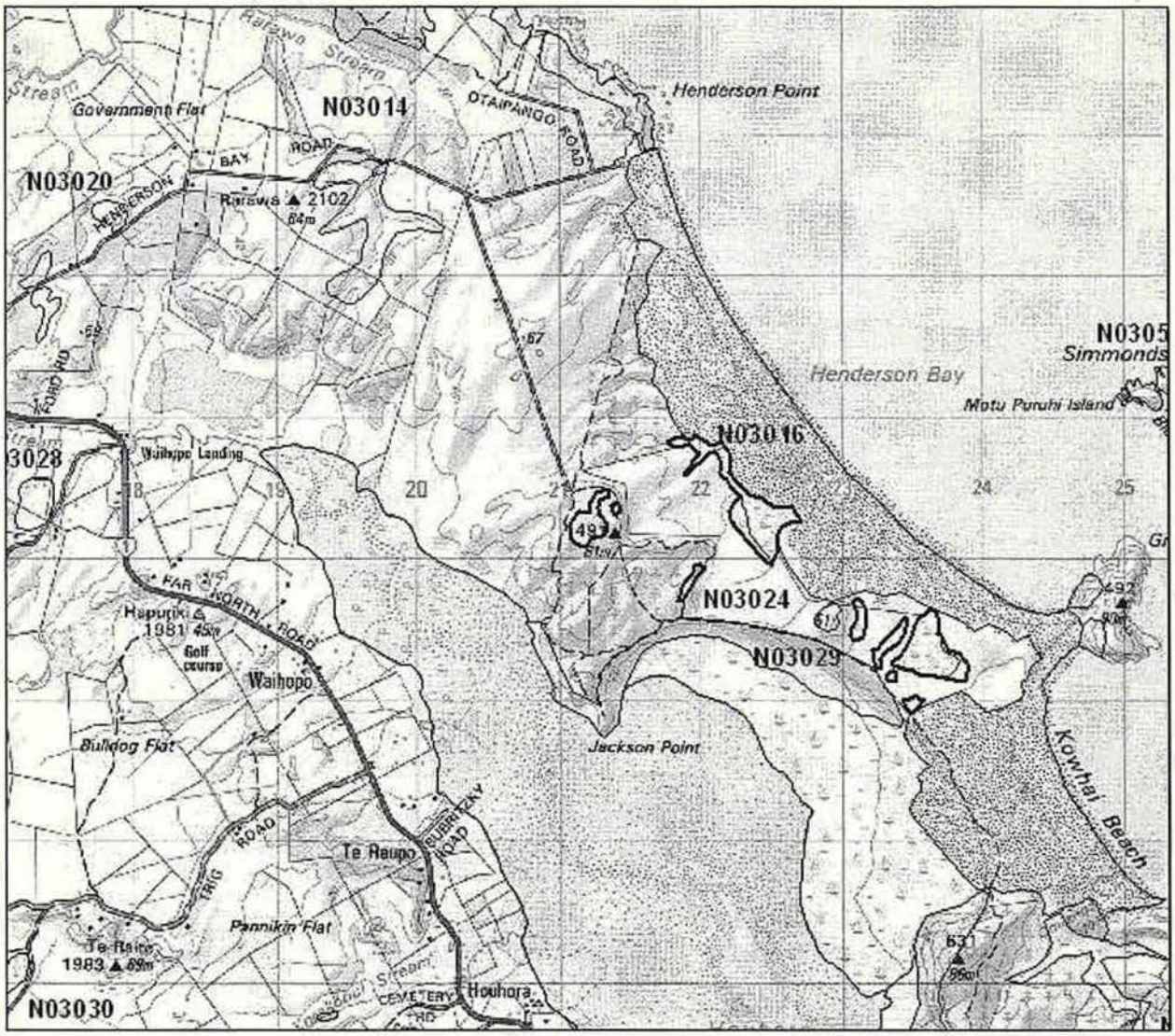
(c) Open water

(d) *Eleocharis* sp. reedland in dune hollows

(e) Manuka-*Eleocharis sphacelata* swamp association in dune hollows

Landform/geology

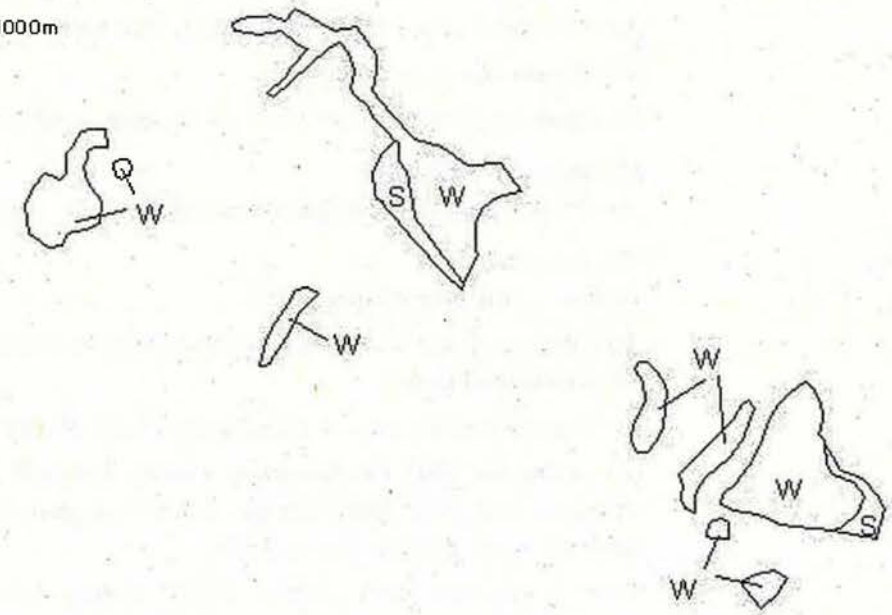
Freshwater wetlands on leached Pleistocene consolidated sand and ponded behind Holocene coastal dunes.



Wagener's Swamps N03/024

Each grid is 1000 m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Vegetation

A series of mostly small wetlands. Some have a narrow fringe of kanuka/manuka and Sydney golden wattle, type (a), others have pines or pasture to the margins.

The wetlands are either:

Type (b) raupo dominant. Open water, type (c) comprises approximately 10%, which may be intermittently present.

Type (d), *Eleocharis* sp. dominant. Type (e), manuka may be abundant in association with *Eleocharis sphacelata*, raupo and other sedges may be present.

Fauna

Birds: Australasian bittern (Category O threatened species), NZ dabchick (Category C threatened species), little shag and other common waterbirds recorded by OSNZ in recent surveys.

Aquatic fauna: 1999 survey of black mudfish (Category C threatened species), banded kokopu (Category C threatened species), and short-finned eel.

Significance

A suite of wetlands with threatened species present. A representative site for type (e) manuka-*Eleocharis sphacelata* swamp association.

LAKE WAIHOPO & SHRUBLANDS

Survey no.	N03/025
Survey date	10 August 1995
Grid reference	N03 149 162, N03 156 160, N03 145 150
Area	101 ha (73 ha shrubland, 28 ha wetland)
Altitude	20–40 m asl

Ecological unit

(a) Open water in dune lake

(b) *Eleocharis sphacelata* reedland on lake bed

(c) Kanuka shrubland on dunes

(d) *Baumea articulata* reedland on swampy sand flats

Landform/geology

Late Pleistocene unconsolidated parabolic dunes with swampy interdune flats.

Vegetation

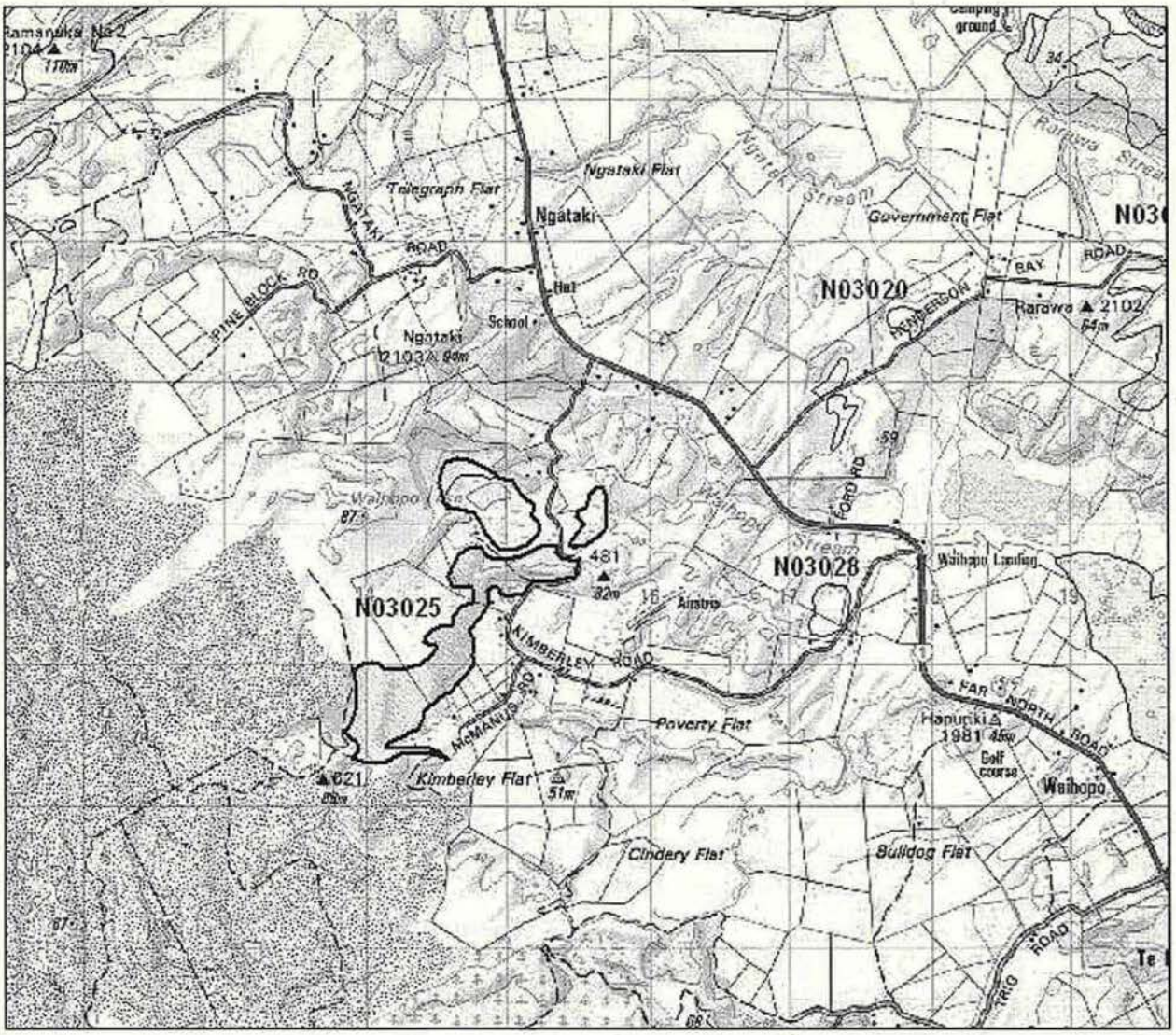
(a) Half of the lake is open water.

(b) The remainder is *Eleocharis sphacelata* dominant with frequent *Baumea articulata* and raupo.

(c) There is a small area of kanuka shrubland nearby.

(d) Across the road the Landcorp swamp is mostly *Baumea articulata*, with frequent raupo and low manuka. A small amount of open water is seasonally present. Stock graze to the margins.

Type (c) occurs to the south, where Sydney golden wattle is common or frequent. Gorse is locally frequent. Black wattle and pohutukawa are also present.



Lake Waihopo & Shrublands N03/025

Each grid is 1000 m x 1000 m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Significant flora

Utricularia protrusa and *Thelypteris confluens* (Vulnerable).

Fauna

Birds: spotless crake (Regionally significant species), grey duck. NZ dabchick (Category C threatened species), chestnut-breasted shelduck, NZ shoveler, black shag, pied shag, little shag and other common waterbirds were recorded by the OSNZ in early 2000 (Snell 2000).

Aquatic fauna: black mudfish (Category C threatened species).

Significance

Central shrubland and wetland area providing a linkage between the various habitats which stretch along Aupouri Peninsula.

Important habitat for the threatened NZ dabchick, the regionally significant spotless crake and other waterbirds. Presence of two threatened plants.

The threatened black mudfish were recorded from Lake Waihopo in 1998.

Representative site for type (b) *Eleocharis sphacelata* reedland and type (d) *Baumea articulata* reedland.

LAKE WAHAKARI

Survey no.	N03/026
Survey date	15 August 1995
Grid reference	N03 040 277
Area	239 ha (77 ha shrubland, 162 ha wetland)
Altitude	45–60 m asl

Ecological unit

(a) Open water in dune lake

(b) Raupo-*Eleocharis sphacelata* reedland in valley

(c) *Gleichenia dicarpa*-manuka swamp association in bog

(d) Raupo reedland in bog

(e) Kanuka shrubland on hillslope

Landform/geology

Catchment with lake and freshwater wetlands ponded between hill country of deeply weathered Tangihua Complex rocks on the true left, and Pleistocene parabolic dunefields on the true right.

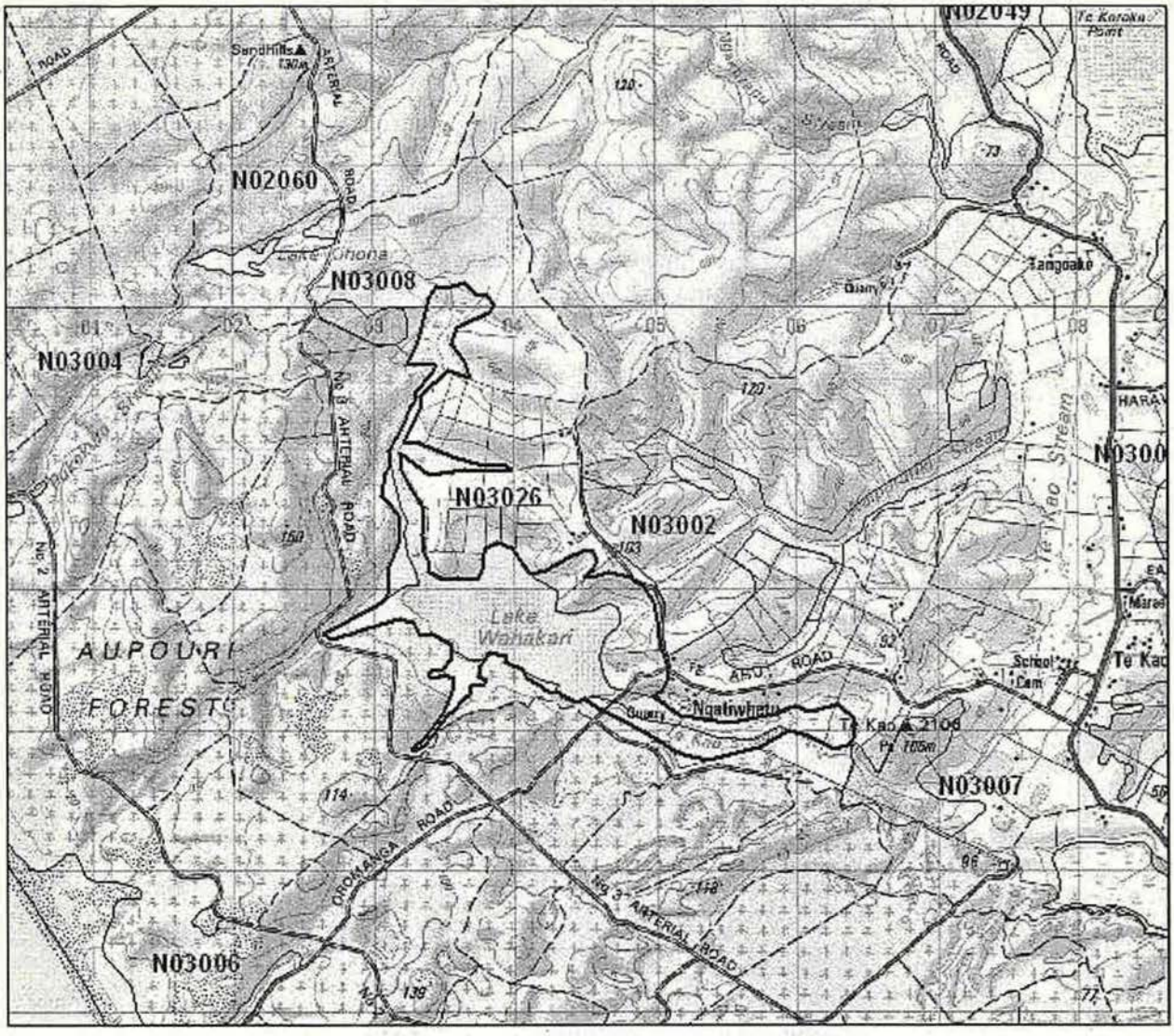
Vegetation

(a) A large lake with a discontinuous fringe of type (b), raupo and *Eleocharis sphacelata*, and wetlands at each end.

(c) At the western end is a *Gleichenia dicarpa*-manuka bog.

(d) At the eastern end a raupo swamp with occasional harakeke, manuka and other sedges which is broken up into arms within pasture.

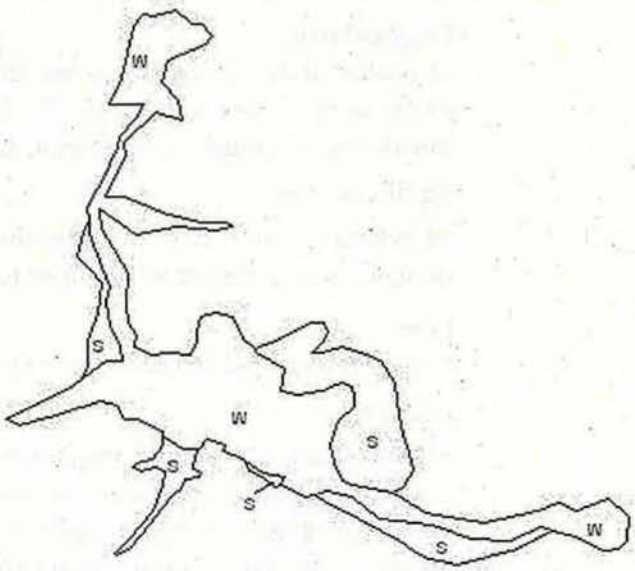
(e) On the eastern side kanuka shrubland from 1 to 4 m occurs, with frequent manuka. Ti kouka, harakeke, hangehange, kumarahou, gorse and prickly hakea are also present.



Lake Wahakari N03/026

Each grid is 1000 m x 1000 m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Significant flora

Utricularia protrusa (Vulnerable), *Isolepis fluitans* (Declining), 1999 record of *Pomaderris polifolia* (Vulnerable).

Fauna

Birds: NZ scaup, spotless crake and NI fernbird (all Regionally significant species), NZ pipit, black shag, pied shag, grey duck.

Aquatic fauna: long-finned and short-finned eel, common smelt, common bully, red-finned bully, and inanga. Mosquito fish have also been recorded.

Lizards: 1980 record of Pacific gecko.

Significance

An excellent example of a large freshwater lake system supporting threatened and regionally significant species and potential habitat for the threatened NZ dabchick.

Representative site for type (a) open water, type (c) *Gleichenia dicarpa*-manuka swamp association, type (d) raupo reedland and type (e) kanuka shrubland. Type (c) is solely recorded from this site in the Ecological District.

PURIRI-KARAKA REMNANT

Survey no.	N03/027
Survey date	15 August 1995
Grid reference	N03 053 234
Area	1.2 ha
Altitude	50–60 m asl

Ecological unit

Puriri-karaka forest on dunes

Landform/geology

Late Pleistocene unconsolidated parabolic dunes.

Vegetation

An outlier of the Te Arai area consisting of coastal broadleaf forest dominated by puriri with karaka sub-dominant. Kanuka is less common while houpara, kawakawa, wharangi, pohutukawa, native broom and ngaio occur occasionally.

Significant flora

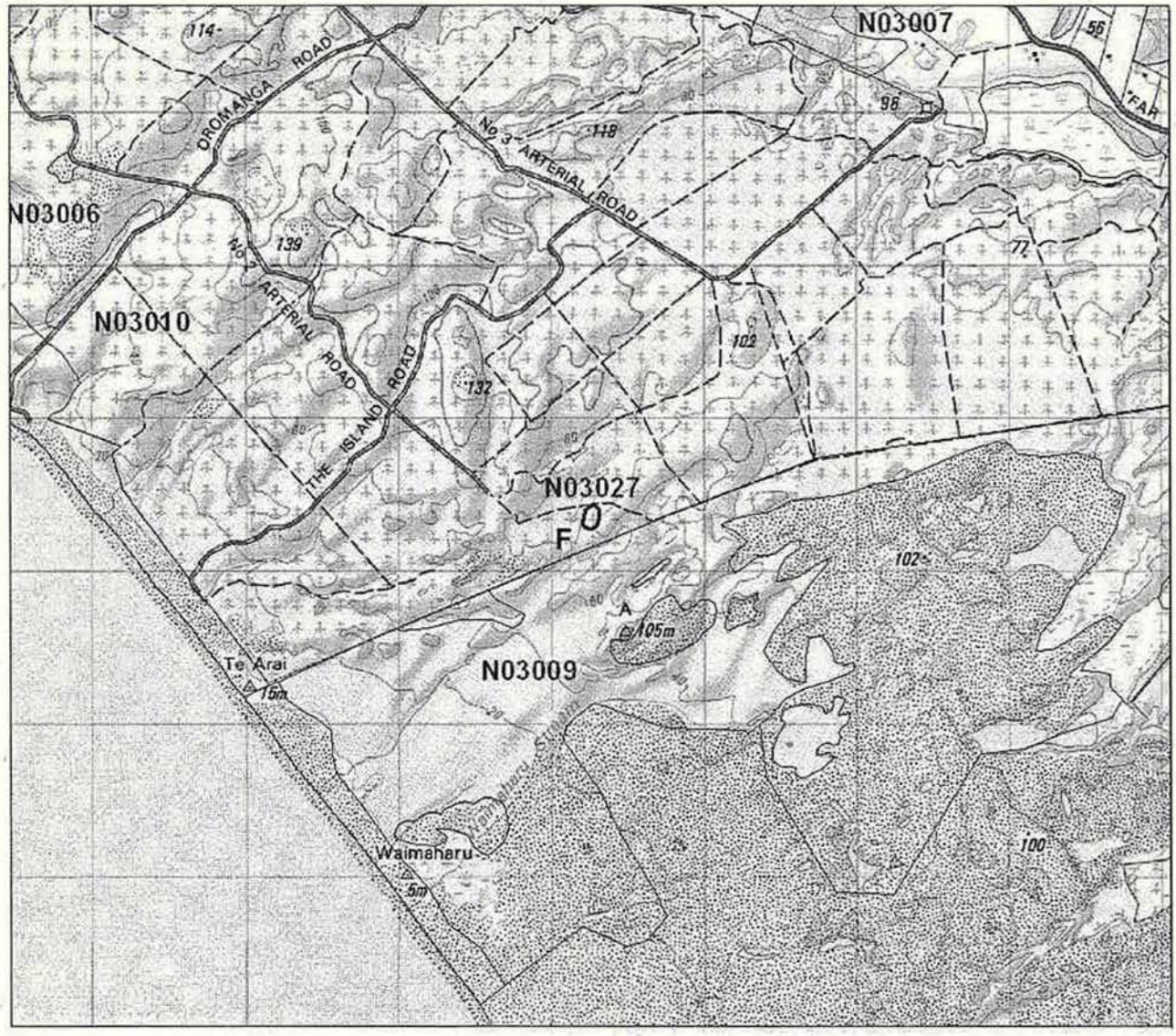
Of botanical interest is the presence of *Myrsine* aff. *divaricata* previously thought to be endemic to the Poor Knights (P.J. de Lange pers. comm. 1999).

Fauna

Birds: Common bush birds. Other fauna not surveyed.

Significance

A very small but unique vegetation/geomorphological combination for the Aupouri Ecological Region. It is the last remaining habitat of its type in the Ecological Region. A representative site for puriri-karaka forest which is not recorded elsewhere in the District and is the only example of its type on dunes in Northland (P. Anderson, L J. Forester pers. comm. 2000).



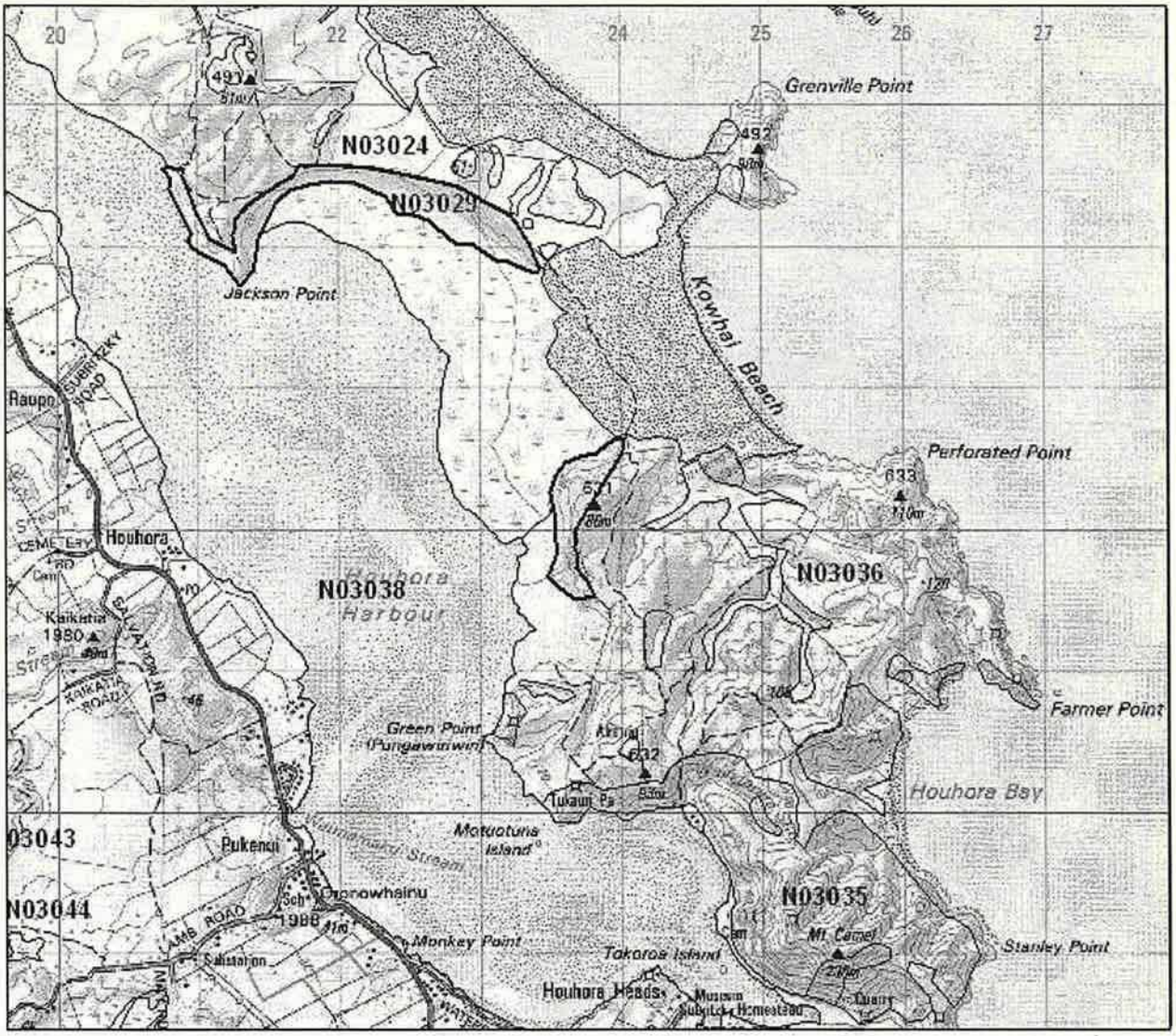
Puriri - Karaka Remnant N03/027

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

JACKSON POINT SHRUBLAND

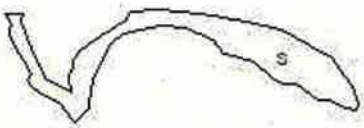
Survey no.	N03/029
Survey date	9 August 1995
Grid reference	N03 221 145, N03 236 123
Area	89 ha
Altitude	0–25 m asl



Jackson Point Shrubland N03/029

Each grid is 1000 m x 1000 m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Ecological unit

(a) Wattle-kanuka/manuka shrubland on coastal hillslope

(b) Manuka shrubland on coastal hillslope

(c) Wattle shrubland on coastal hillslope

Landform/geology

Coastal hillsides and cliffs of Pleistocene leached consolidated sand with underlying Houhora Complex greywacke outcropping in cliffs and shore platform at Jackson Point.

Vegetation

(a) Wattle and kanuka/manuka to 3 m occurs in both the northern and southern area and constitutes the main vegetation type. *Cassytha*, pohutukawa and ti kouka are present.

(b) Less than 5% of the area is manuka to 2 m.

(c) An area about twice this size is wattle dominant with frequent kanuka/manuka and pohutukawa.

Fauna

Birds: Common bush birds. Other fauna not surveyed.

Significance

A shrubland area buffering an estuarine marsh on Houhora Harbour.

TE RAITE WETLAND

Survey no.	N03/030
Survey date	10 August 1995
Grid reference	N03 170 119
Area	9.9 ha
Altitude	25–35 m asl

Ecological unit

(a) *Eleocharis sphacelata*-raupo reedland in dune hollow

(b) Open water

Landform/geology

Freshwater wetland ponded by Pleistocene consolidated parabolic dunes.

Vegetation

(a) *Eleocharis sphacelata* is dominant and raupo common. Mamaku, kanuka, *Cassytha*, harakeke, *Azolla* and other sedges are also present.

(b) About 5% of the area is open water. Wattle and pines grow to the margins.

Fauna

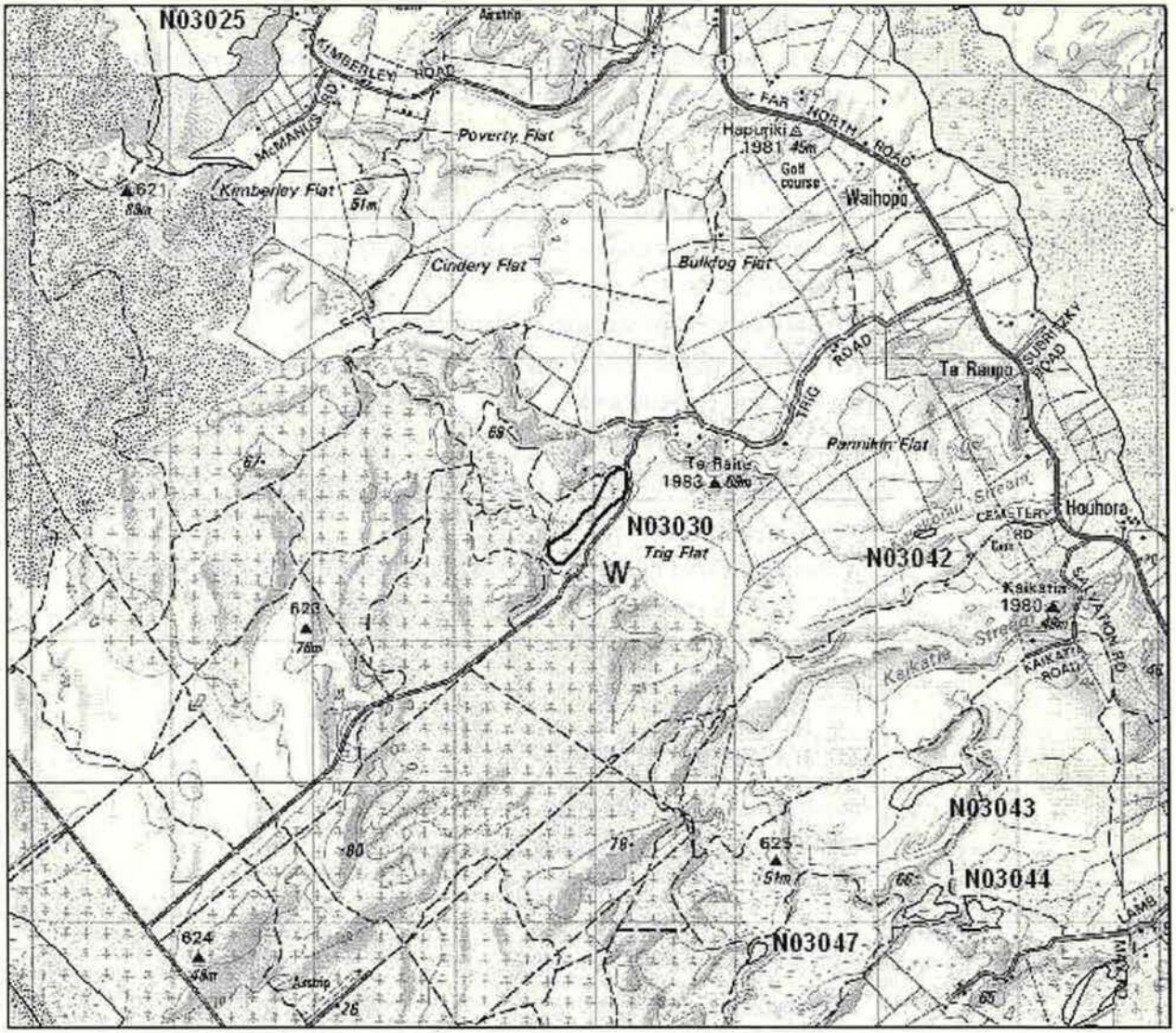
NZ dabchick (Category C threatened species), spotless crake (Regionally significant species), and common waterbirds (OSNZ 2000 survey).

Significance

A wetland of reasonable size which is a nationally under-represented habitat type.

Habitat for threatened and regionally significant species.

A representative site for type (a) *Eleocharis sphacelata*-raupo reedland.



Te Raite Wetland N03/030

Each grid is 1000 m x 1000 m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

KAIMAUMAU-MOTUTANGI WETLANDS

Survey no.	N03/031
Survey date	9 August 1995
Grid reference	Midpoint of site is N03 300 000. The whole site is represented on N03, N04, O03 and O04
Area	4,075 ha (2,205 ha shrubland, 1,870 ha wetland)
Altitude	1–20 m asl

Ecological unit

(a) Kanuka/manuka shrubland on raised sand ridges

(b) Manuka shrubland on raised sand ridges and flats

(c) Manuka shrubland on low peaty depressions and flats

(d) Manuka-*Schoenus brevifolius* association on damp peaty flats

(e) *Gleichenia dicarpa-Schoenus brevifolius* association on peaty sand flats

(f) Black wattle-Sydney golden wattle association on dry sand ridges and flats

(g) *Baumea* spp.-manuka association in peat bog

(h) Harakeke-raupo reedland in swamp

(i) *Baumea teretifolia-Gleichenia dicarpa* association in peat bog

Landform/geology

Holocene coastal foredune belt backed by Pleistocene consolidated foredunes and overlying swamp deposits.

Vegetation

A large, highly acid infertile bog ecosystem with more fertile areas near inflowing streams and farmland edges.

(a) Kanuka/manuka dominate the canopy in dense thickets together with prickly hakea, Sydney golden wattle and the twining *Cassytha*. The understorey generally consists of bracken, mingimingi, *Coprosma rhamnoides*, hangehange, mamaku, *Lepidosperma laterale*, turutu and some terrestrial ferns, gorse and hakea.

Type (b) is either

(i) lower shrubland (1–2.5 m) consisting of dense thickets of manuka, and to a lesser extent kanuka, interspersed with *Baumea*, mingimingi, bracken, *Schoenus tendo*, hakea and *Gleichenia* sp. and scattered ground orchids, especially *Thelymitra* species, or

(ii) taller unburnt vegetation above the north western corner of Lake Waikaramu, comprising pure manuka to 5 m with *Schoenus tendo* and occasional *Coprosma areolata* and harakeke in the understorey. Near the lake edge, wire rush is common and the threatened duck-billed orchid *Cryptostylus subulata* is found in wet, disturbed ground.

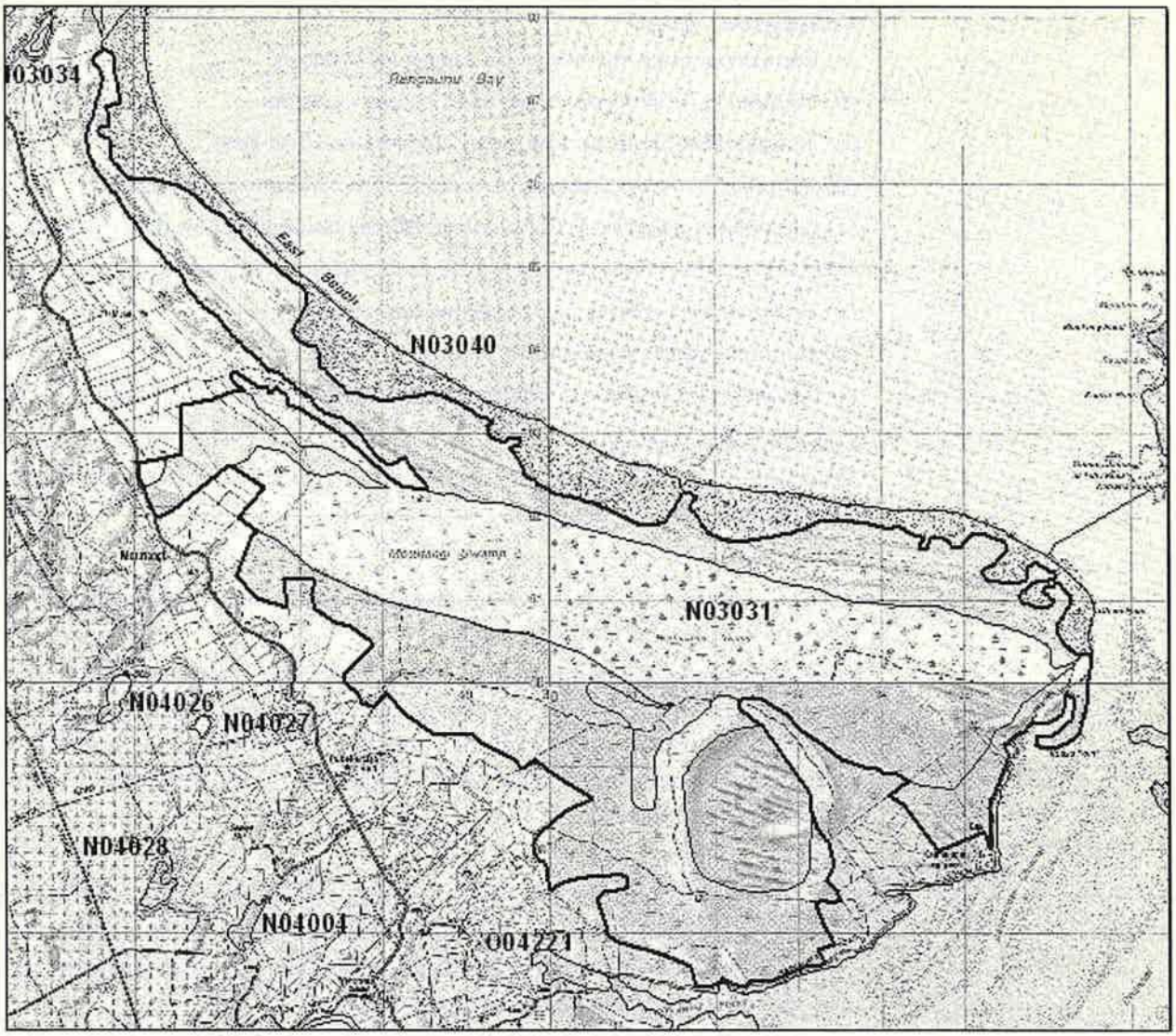
(c) Manuka dominated gumland occurs in depressions between sand ridges to the north-west between Norton and Lake Roads. It is associated with kumarahou, hakea, *Dracophyllum lessonianum, Morelotia affinis, Lycopodium deuterodensum*, comb fern and *Schoenus brevifolius* in hollows.

In depressions old burnt manuka stands are regenerating in type (d) manuka and *Schoenus brevifolius*. Other species present include prickly hakea, turutu, mingimingi, kumarahou and bracken, with occasional wattle.

In the former "orchid block", the vegetation is more open, with manuka and sedges and bare, open areas, now surrounded by dense wattle.

A dense stand of damp sedgeland type (e) *Gleichenia dicarpa* with *Schoenus brevifolius* occurs near the road junction at the north-western corner of Lake Waikaramu and in peaty depressions amongst type (d).

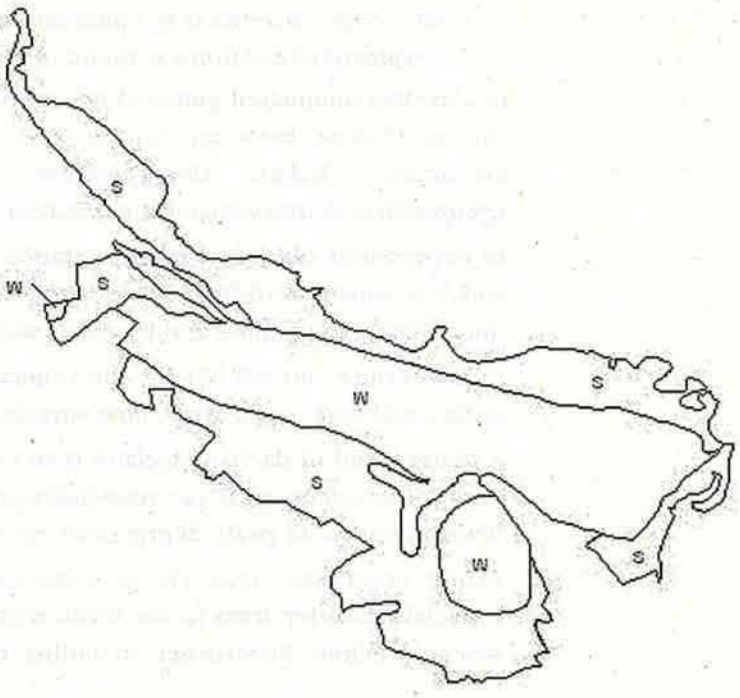
Exotic vegetation, type (f), is conspicuous on the periphery of the site, especially in drier areas in the south-west sector and around Lake Waikaramu, where previous disturbance including repeated burning, has occurred, and



Kaimaumau - Motutangi Wetlands N03/031

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



wattles, both black wattle and Sydney golden wattle, have displaced indigenous vegetation. Other fire-resistant species predominant are prickly hakea, downy hakea, and to a lesser extent, *Callistachys lanceolata*.

In some areas, Sydney golden wattle is abundant, sometimes forming a monoculture. A scattered understorey may be present comprising spindly manuka, bracken, hangehange, mingimingi, *Baumea juncea, Schoenus tendo,* and *Lepidosperma laterale*. Prickly moses, gorse and pampas may be present.

About 5% of the area consists of gorse and adventive broom.

Pine, gum and macrocarpa are locally frequent in drier parts of the wetland.

Acid peat bog type (g) is mainly at the eastern end of the Motutangi Block. Clumps of manuka are emergent over *Baumea* sedges, *B. rubiginosa* with *B. arthrophylla* and/or *B. teretifolia*, sometimes in dense swards, *Gleichenia* sp., *Schoenus brevifolius*, *Pimelea* sp., wire rush, bracken, sundew and orchids, with *Eleocharis sphacelata* occurring in the wettest holes and *Cryptostylis subulata* may also be present.

(h) Harakeke and raupo are dominant, and generally confined to the western end of Motutangi. Other species frequently occurring are *Baumea* sp. and *Schoenus* sp. sedges in dense swards, manuka, *Coprosma tenuicaulis*, kiokio, wire rush, *Carex virgata* and swamp millet with threatened ferns *Thelypteris confluens* and *Cyclosorus interruptus.*

In type (i), *Baumea teretifolia* and *Gleichenia dicarpa* thrive on the sides and bottoms of gumholes. Sundews and the combfern *Schizaea fistulosa* are also present, with *Sphagnum* in the hole bottoms.

Significant flora

The outstanding natural values of this site include a large number of threatened species including:

Endangered

Phylloglossum drummondii (1998 record).

Vulnerable

Lycopodiella serpentina, Ophioglossum petiolatum, Thelypteris confluens and *Todea barbara.*

Declining

Cyclosorus interruptus, Myriophyllum robustum and *Pterostylis tasmanica.*

Taxonomically Indeterminate-Critically Endangered

Calochilus aff. *herbaceus.*

Naturally Uncommon-Sparse

Korthalsella salicornioides and *Thelymitra sanscilia.*

Naturally Uncommon-Range Restricted

Thelymitra malvina and *Cryptostylus subulata.*

Taxonomically Indeterminate-Insufficiently Known

Spiranthes aff. *novae-zelandiae.*

Regionally significant species

Utricularia delicatula (largest NZ population) (Clunie & Ogle 1983), wire rush and *Corybas rotundifolius.*

1897 record of *Atriplex hollowayi* by Carse by the Rangaunu Harbour and anecdotal records in the 1970s on East Beach (V. Hensley pers. comm.).

Fauna

Birds: Over 40 species of birds have been recorded including northern NZ dotterel (Category B threatened species). Category C threatened species include banded dotterel, white-fronted tern, and variable oystercatcher. Category O threatened species include Caspian tern, and Australasian bittern. Other bird species include three regionally significant species, NI fernbird, banded rail and spotless crake. Also present is the SI pied oystercatcher.

Aquatic fauna: black mudfish (Category C threatened species), banded kokopu (Category C threatened species), giant bully (Regionally significant species), red-finned bully, common bully, inanga, short-finned eel and freshwater shrimp.

Lizards: Northland green gecko (Regionally significant species), copper skink.

Significance

A large wetland complex system which has an unbroken zonation of wetland sequences from seawater to freshwater and contains diverse habitats including sandy beach (see East Beach N03/040), small dunes, estuarine peat bogs, semi-fertile swamps and stabilised dunes with native shrublands. Old kauri logs remain in some areas. Peat bogs and semi-mineralised wetlands are a much depleted vegetation type. Diversity of flora and fauna species including many threatened species and regionally significant species. The Kaimaumau-Motutangi Wetlands provide very important habitat for NI fernbird, Australasian bittern and other birds because of the large area and quality of habitat.

A representative site for seven vegetation types: kanuka/manuka shrubland, manuka shrubland, manuka-*Schoenus brevifolius* association, *Gleichenia dicarpa-Schoenus brevifolius* association, *Baumea* spp.-manuka association, harakeke-raupo reedland, and *Baumea teretifolia-Gleichenia dicarpa* association, with the last-named unrecorded elsewhere in the Ecological District.

This area is contiguous with Houhora Harbour, East Beach and Rangaunu Harbour-Lake Ohia, and along with the three northern harbours of Rangaunu, Houhora and Parengarenga is being investigated for RAMSAR status as a wetland of international significance. More than 100 ha has been cleared since 1995.

Department of Conservation administered land protects a total of 2,825.6 ha (69.3%) which includes 1,889 ha of Stewardship Land, 929.3 ha of Scientific Reserve, and 7.3 ha of Marginal Strip.

References: Anderson (1988); Anderson et al. (1992); Clunie (1988); Hicks et al. (2001).

HUKATERE LOOKOUT

Survey no.	N03/032
Survey date	15 August 1995
Grid reference	N03 188 017, N03 183 013, N03 188 013, N03 195 005, N04 195 995
Area	207 ha
Altitude	5–53 m asl

Ecological unit

(a) Manuka shrubland on dunes

(b) Kikuyu-sedge coastal association on dunes

(c) Oioi rushland in dune hollows

(d) Harakeke-manuka association on dunes

(e) Pohutukawa forest on dunes

Landform/geology

Holocene coastal dunes overlying eroded Pleistocene consolidated parabolic dunes.

Vegetation

Type (a) occurs on Hukatere Hill with scattered harakeke, and karo and houpara on the sheltered side. A band of manuka links the hill to the pine forest and continues north along the boundary of the pines.

(b) Occurs on the lower slopes of Hukatere Hill with scattered patches of knobby clubrush, mingmingi, bracken and harakeke with occasional toetoe, pampas and isolated pohutukawa.

Kikuyu is dominant in large patches, especially near the road and track behind the foredune, and along the pine forest margin in the southern block. Pohuehue and knobby clubrush are locally common, with *Spinifex, Coprosma acerosa,* shore bindweed, toetoe and pampas scattered. Tauhinu occurs rarely. Patches of the exotic iceplant *Carpobrotus edulis* dominate areas of several square metres, especially near the road and tracks. Lupin also occurs in scattered patches and fleabane and dandelion are also scattered. Buffalo grass is locally common.

Some hummocks are covered in oioi and toetoe.

(c) Occurs in dune hollows over an extensive area, particularly to the south of the block. Clumps of harakeke are frequent and toetoe occasional.

(d) Harakeke with manuka to 2 m grades out of type (c) and is most extensive in the southern sector. Toetoe and pampas are occasional.

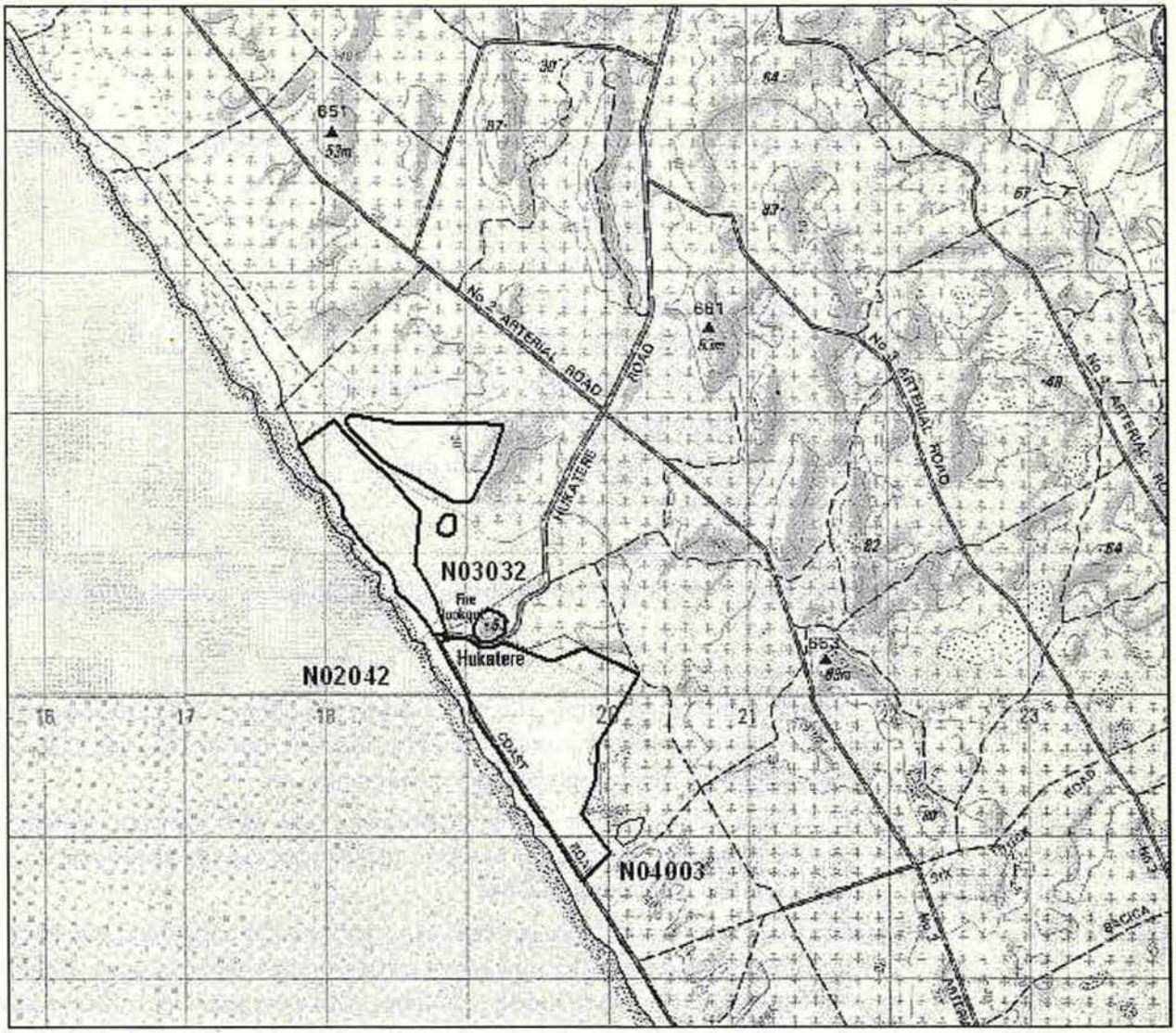
Type (e) occurs on two sites towards the rear of the block, south of Hukatere Rd, where pohutukawa form small, dense stands on the top of dunes.

Fauna

Not surveyed.

Significance

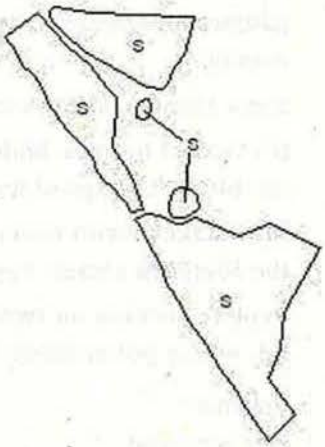
A large area of regenerating coastal shrubland on the west coast being representative of a habitat type much reduced from its former extent. Representative site for type (a) manuka shrubland, type (c) oioi rushland, type (d) harakeke-manuka association, and type (e) pohutukawa forest.



Hukatere Lookout N03/032

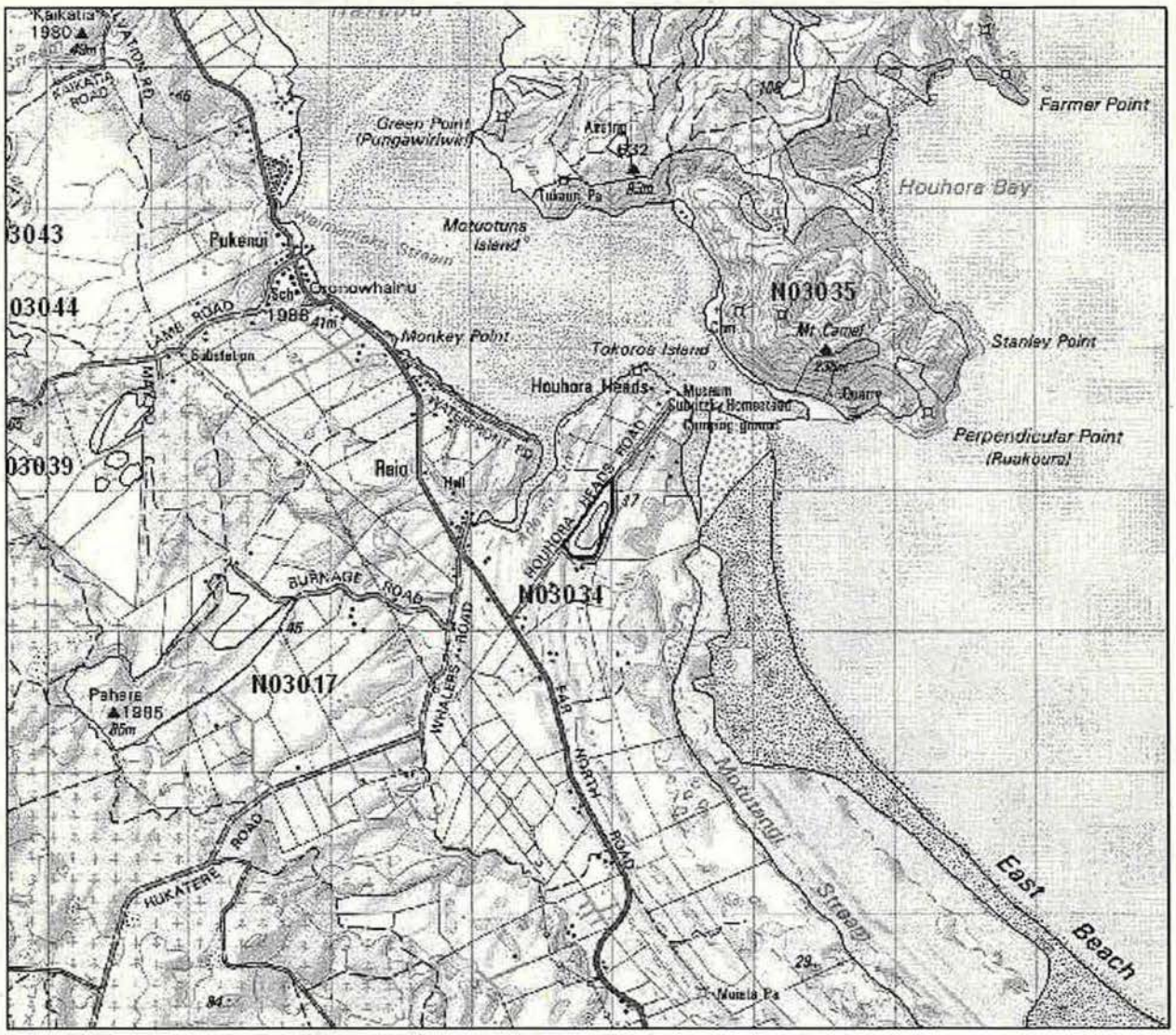
Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



HOUHORA HEADS RD WETLAND

Survey no.	N03/034
Survey date	9 August 1995
Grid reference	N03 239 078
Area	9 ha (6 ha shrubland, 3 ha wetland)
Altitude	5-15 m asl



Houhora Heads Rd Wetland N03/034

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

(a) Manuka-*Cassytha* shrubland in dune hollow

(b) Wattle-kanuka shrubland in dune hollow

Landform/geology

Freshwater wetland ponded on belt of last interglacial consolidated foredunes.

Vegetation

(a) Three quarters of the area is manuka between 1 m and 2 m, commonly covered with *Cassytha*. Isolated raupo is present indicating the area is intermittently wet. Other species occurring are kumarahou, bracken, mingimingi, *Schoenus brevifolius* and *Lepidosperma laterale*.

(b) There is a fringe of wattle and kanuka with frequent prickly hakea and occasional *Cassytha* and pampas.

Fauna

Not surveyed.

Significance

A reasonable sized wetland with limited modification and a shrubland buffer. A representative site for type (a) manuka-*Cassytha* shrubland.

MT CAMEL

Survey no.	N03/035
Survey date	9 August 1995
Grid reference	N03 268 109, N03 262 108, N03 256 105, N03 256 090, N03 235 108, N03 232 107
Area	291 ha (11 ha forest, 278 ha shrubland, 2 ha wetland)
Altitude	0–236 m asl

Ecological unit

(a) Kanuka/manuka shrubland on rolling and steep coastal hillslope

(b) Pohutukawa-kanuka-puriri broadleaf forest on coastal hillslope

(c) *Astelia* sp.-kanuka association on rock

(d) Manuka swamp shrubland in gully

Landform/geology

Promontory of deeply weathered Houhora Complex volcanics and greywacke rock units.

Vegetation

Predominantly shrubland vegetation including numerous remnants with a small area of broadleaf coastal forest.

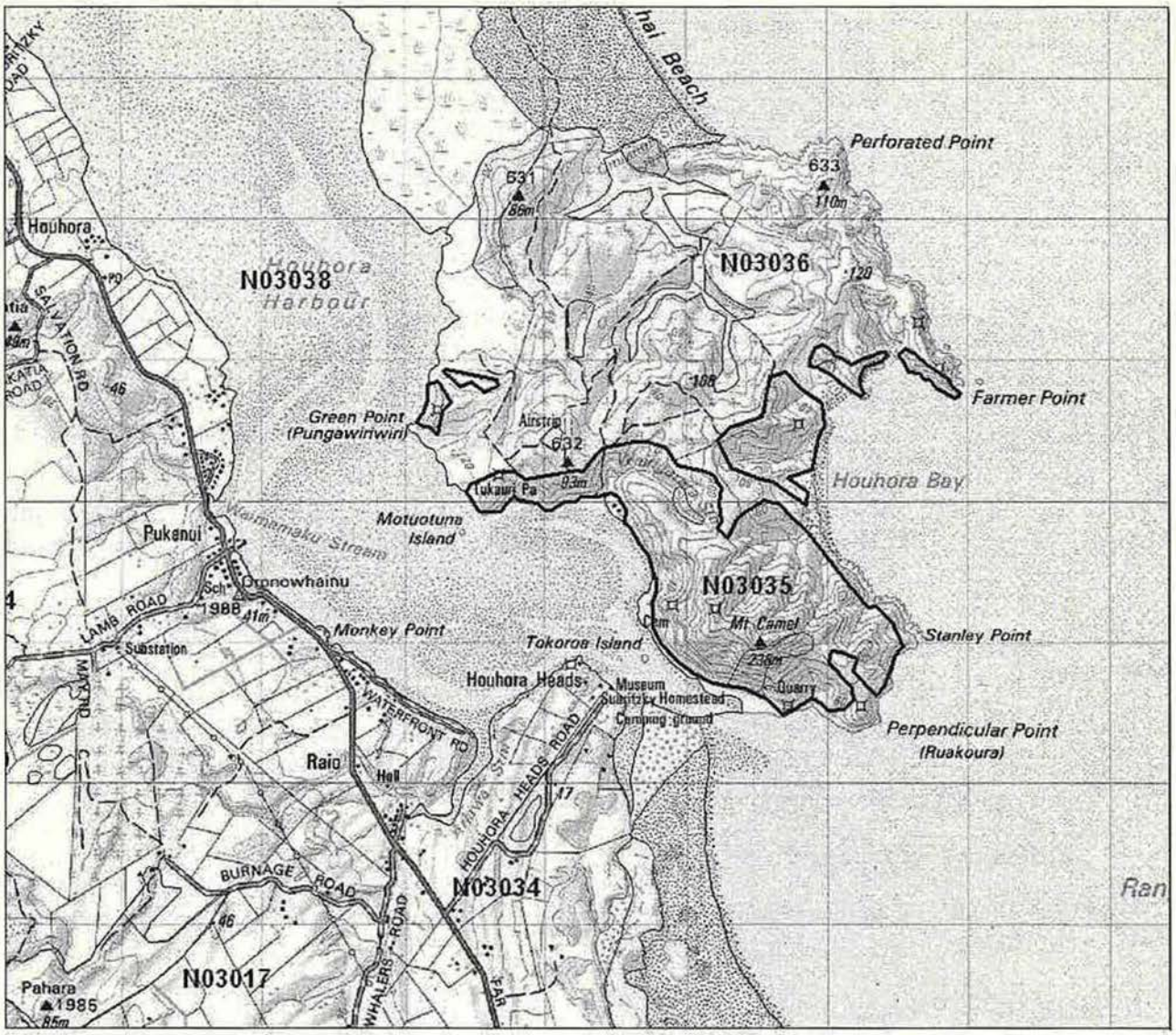
Mt Camel is heavily modified with stock having access to most areas (R. Cawte pers. comm.).

(a) Most of the area is kanuka/manuka dominant, of varying height, with locally frequent pohutukawa. Ti kouka, puriri, kohekohe, harakeke, pampas, prickly hakea, brush wattle, mamaku, manuka, pine and *Cassytha* are also present.

(b) About 10% of the area contains abundant pohutukawa with puriri and kanuka commonly occurring and frequent kohekohe and taraire in gullies.

(c) A small area of bare rock contains frequent *Astelia* sp. and kanuka.

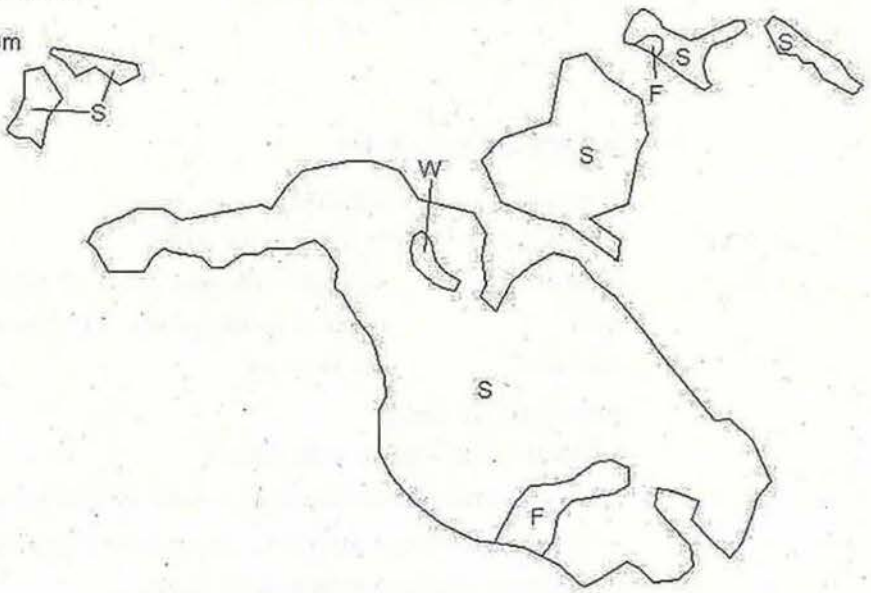
(d) A small gully wetland contains frequent raupo with occasional ti kouka and mamaku.



Mt Camel N03/035

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Significant flora

Senecio scaberulus (Vulnerable) and *Fuchsia procumbens* (Naturally Uncommon-Sparse) were collected near Perpendicular Point in 1992. 1992 record of *Utricularia protrusa* (Vulnerable) at Mt Camel swamp.

Ophioglossum petiolatum (Vulnerable) is present as is *Thelymitra* "rough leaf" AK 229531 (Regionally significant species). *Euphorbia glauca* (Declining) was recorded from here by Chinnock in 1971 and there is a 1965 record of *Colensoa physaloides* (Declining).

On the southern coast of Mt Camel, *Hebe speciosa* (AK 107327) (Endangered) was collected in 1915.

Fauna

Birds: Common bush birds and a potential stepping stone for cuckoo species, kukupa and other birds.

Snails: *Allodiscus* sp. "Houhora" (Nationally Endangered), *Climocella reinga* (Range Restricted). Northland-Auckland endemic snails, *Paracharopa delicatula*, and *Phrixgnathus* sp. aff. *P murdochi.*

Aquatic fauna: 1999 records of banded kokopu (Category C threatened species), giant bully (Regionally significant species), long-finned eel, red-finned bully, and inanga.

Lizards: 1971 record of Northland green gecko (Regionally significant species), 1972 record of ornate skink (Regionally signficiant species), shore skink and common gecko.

Significance

Remnants of coastal forest to the east of the entrance to Houhora Harbour with a regenerating buffer, with several species which are threatened, endemic or of restricted distribution.

A stepping stone for migrating/dispersing forest birds.

Representive site for kanuka/manuka shrubland and representative site and only record in the Ecological District for *Astelia* sp.-kanuka association and pohutukawa-kanuka-puriri forest.

KOWHAI SWAMPS

Survey no.	N03/036
Survey date	11 September 1995
Grid reference	N03 250 118, N03 243 113, N03 241 104
Area	48 ha (9 ha shrubland, 39 ha wetland)
Altitude	15–40 m asl

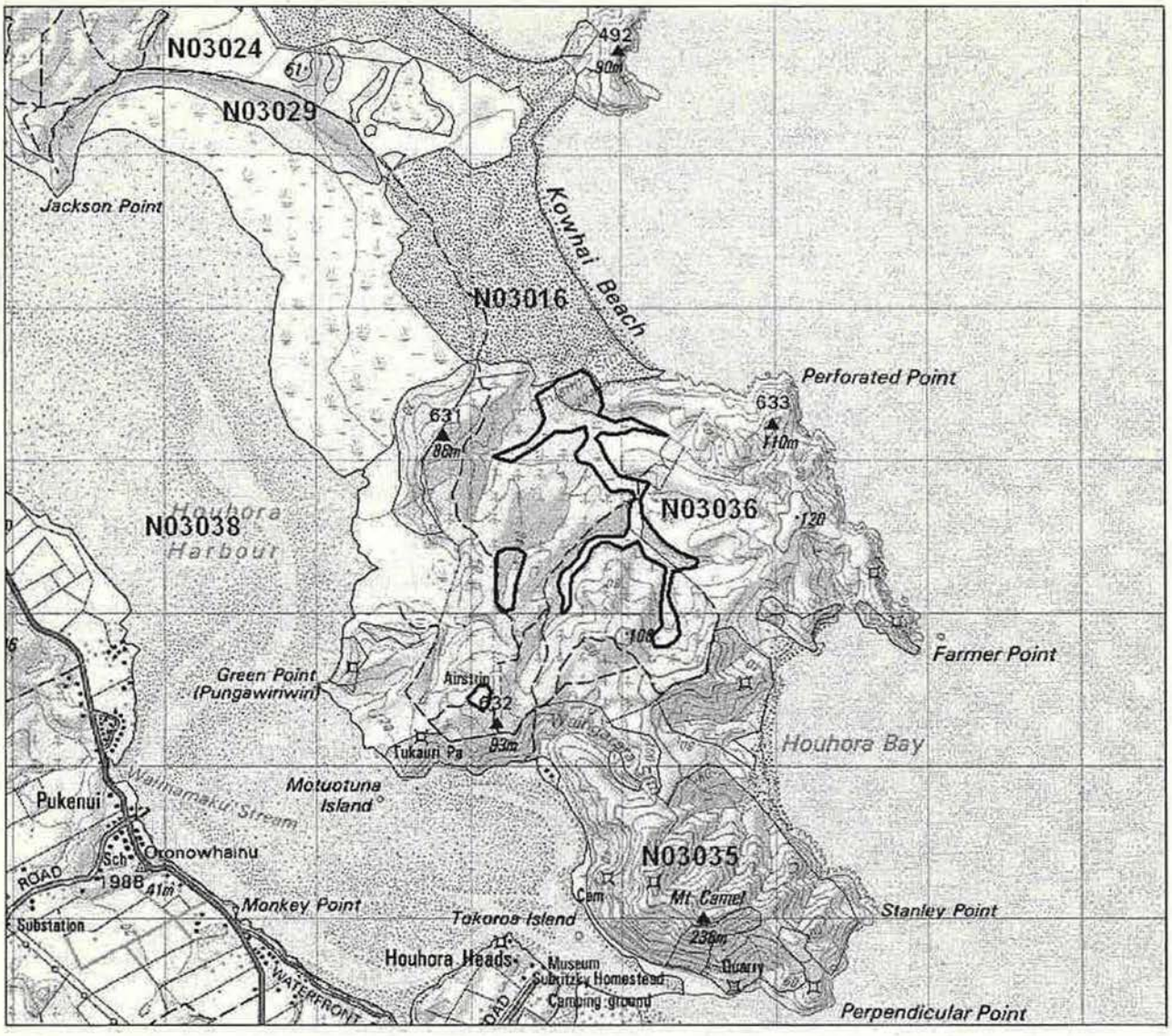
Ecological unit

(a) Raupo reedland in dune hollow

(b) Giant umbrella sedge-swamp millet sedgeland in dune hollow

(c) *Eleocharis acuta-Isolepis prolifer*-jointed rush association in dune hollow

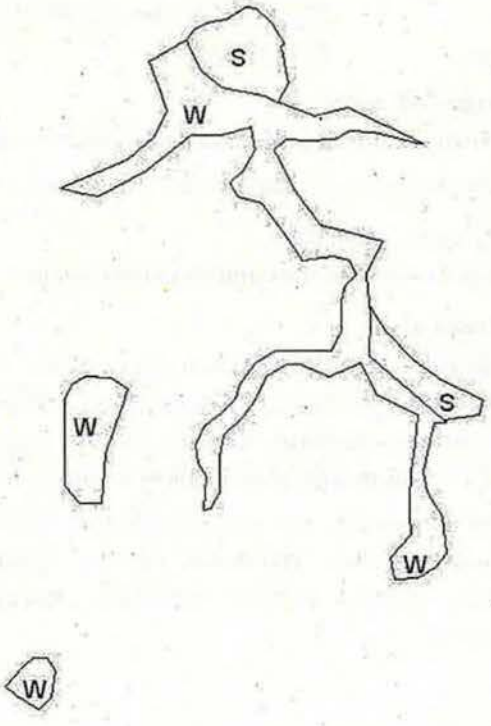
(d) Manuka-kanuka shrubland on dunes



Kowhai Swamps N03/036

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Landform/geology

Valley freshwater wetlands ponded by Holocene coastal dunes.

Vegetation

(a) Mainly raupo with *Baumea rubiginosa* and some scattered *B. articulata* and *Eleocharis sphacelata.*

(b) The upper part has small areas of giant umbrella sedge and swamp millet.

(c) The lower area contains *Eleocharis acuta, Isolepis prolifer* and jointed rush.

(d) A small area of manuka-kanuka shrubland occurs on the periphery. Mamaku, *Coprosma parviflora* and ti kouka are also present.

Fauna

Birds: Australasian bittern (Category O threatened species);

Aquatic fauna: 1999 record of black mudfish (Category C threatened species) and short-finned eel.

Significance

A narrow wetland system containing a diversity of wetland plant species contiguous with coastal habitat, an uncommon habitat type. Presence of threatened species and potential habitat for crakes and other wetland fauna (survey required).

Representative site for type (a) raupo reedland, type (b) giant umbrella sedge-swamp millet sedgeland and type (c) *Eleocharis acuta-Isolepis prolifer-Juncus articulatus* association. Only record of type (b) and (c) in the Ecological District.

POHUTUKAWA REMNANT

Survey no.	N03/037
Survey date	10 August 1995
Grid reference	N03 143 075
Area	55 ha (32 ha duneland, 23 ha shrubland)
Altitude	5–15 m asl

Ecological unit

(a) *Spinifex*-kanuka-pohutukawa association on dunes

(b) Kanuka-Sydney golden wattle shrubland on dunes

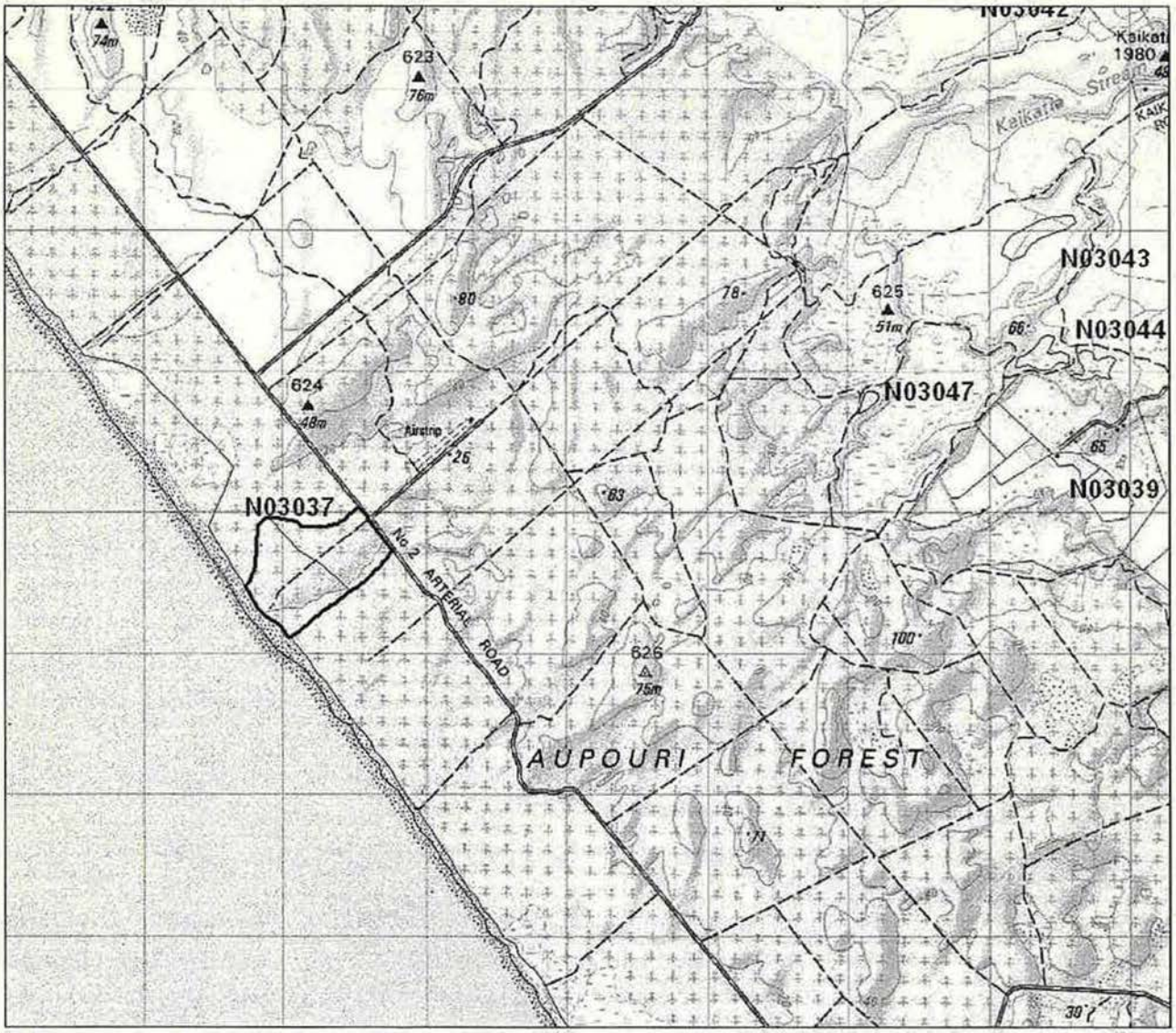
Landform/geology

Holocene coastal dunes and deflation zones.

Vegetation

(a) *Spinifex* is abundant on the dunes where pohutukawa and kanuka commonly occur. Harakeke, toetoe and oioi are frequent. Other species present are *Coprosma acerosa,* tauhinu, knobby clubrush, pohuehue, native iceplant, manuka, mingimingi, wattle, kikuyu, gorse, lupin and buffalo grass.

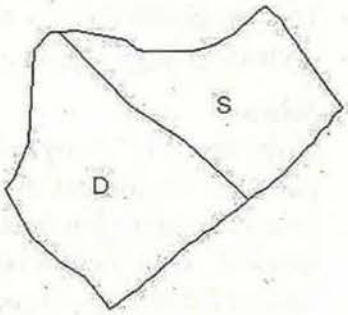
(b) Just over half of the site is kanuka shrubland in which Sydney golden wattle commonly occurs. Harakeke, toetoe, *Spinifex* and small pohutukawa are frequent. Ngaio, knobby clubrush, mature pohutukawa and lupin are occasional.



Pohutukawa Remnant N03/037

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Fauna

Not surveyed.

Significance

A small remnant of what must have been an extensive pohutukawa forest along the west coast. A representative site for *Spinifex*-kanuka-pohutukawa which is only recorded from this site in the Ecological District.

Conservation Covenant protects 5.2 ha of this site and 2.41 ha is protected Stewardship Land both administered by the Department of Conservation.

HOUHORA HARBOUR

Survey no.	N03/038
Survey date	9 August 1995, 11 September 1995
Grid reference	N03 225 115
Area	1,534 ha (1,315 ha estuary, 219 ha shrubland)
Altitude	<2 m asl

Ecological unit

(a) Mangrove-oioi association on estuary

(b) Oioi saltmarsh on estuary

(c) Glasswort herbfield on estuary

(d) *Baumea* sp.-manuka swamp shrubland on sand flats

(e) Eelgrass beds on sandy flats

Landform/geology

Estuary fringed predominantly by Pleistocene sands, but with rocky coast in the vicinity of Jackson's Point and between Green Point and the mouth.

Vegetation

(a) Abundant mangroves and oioi are common near the head of the harbour. On the margins manuka is frequent, and saltmarsh ribbonwood, *Isolepis* sp., *Juncus* sp., pampas and harakeke also occur.

(b) On the western side there is an extensive saltmarsh of oioi with sea rush and saltmarsh ribbonwood.

(c) Open areas of glasswort with *Samolus repens* and *Selliera radicans* are frequent.

(d) *Baumea* sp.-manuka association covers three quarters of the area between Jackson Point and Green Point. Kanuka, wattle, *Coprosma rhamnoides*, mingimingi, bracken and *Gleichenia* sp. are also present. The vegetation is a mosaic with islands of woody vegetation amongst sedges and dense kanuka. *Cassytha* is present throughout.

The area grades into the adjoining shrubland behind (N03/029).

(e) Beds of eelgrass are common throughout the tidal flats.

Fauna

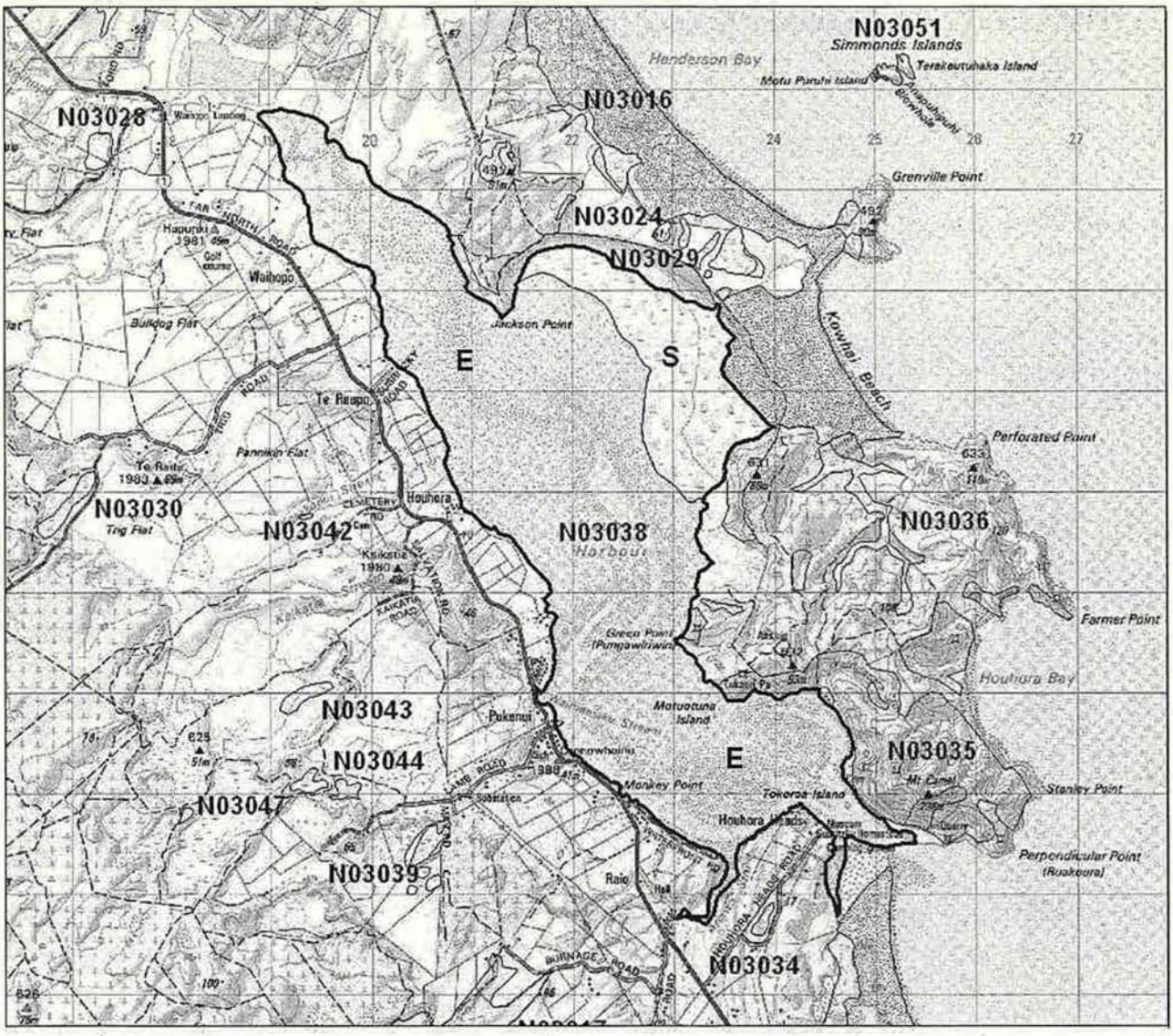
Birds: Diversity of bird species with 45 species recorded including wrybill and northern NZ dotterel (both Category B threatened species), banded dotterel, variable oystercatcher, and white-fronted tern (all Category C threatened species), white heron, reef heron, Australasian bittern, and Caspian tern (all Category O threatened species), banded rail, spotless crake, and NI fernbird (all Regionally significant species). Other recorded bird fauna includes, bar-tailed godwit, pied oystercatcher, Australasian gannet, turnstone, lesser knot, terek sandpiper, Pacific golden plover, brown booby, and greenshank.

Lizards: 1992 record of Northland green gecko, a Northland endemic (Regionally significant species) and shore skink.

Aquatic fauna: black mudfish (Category C threatened species) recorded from the Houhora swamp in 1999.

Significance

Houhora Harbour provides excellent wader habitat with extensive shellbanks and mud flats. More than 3000 waders have been recorded at high-tide roosts. It



Houhora Harbour N03/038

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

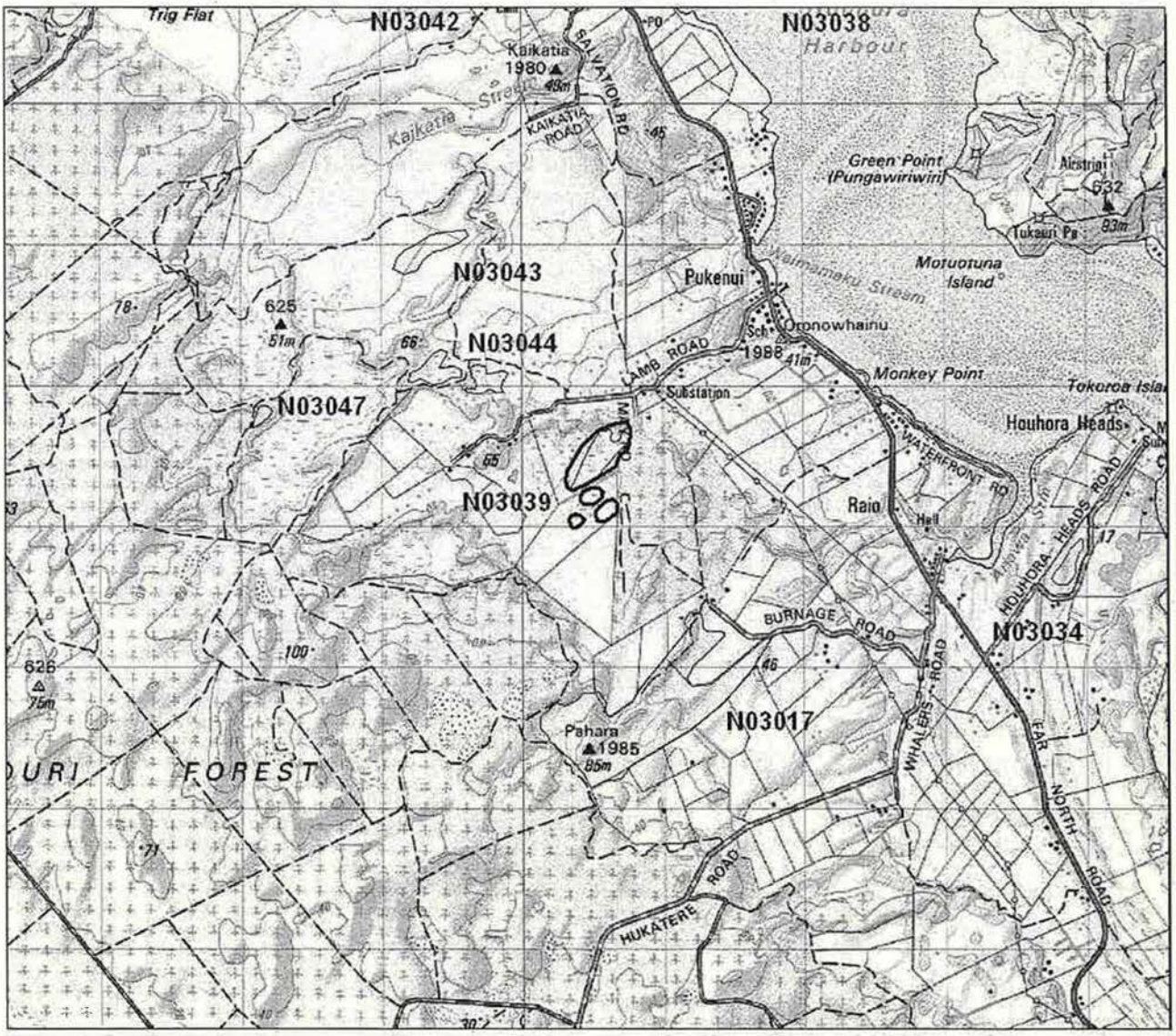
is an important feeding area for international migratory waders, internal migrants and sedentary species, and is a vital link in the chain of estuaries from Rangaunu to Parengarenga.

Representative site for all five Ecological units.

Canada geese have increased over the years. They breed on the Mt Camel side of the harbour (V. Hensley pers. comm.), and if they continue to increase, they will pose a potential threat to dune lake/duneland communities, both flora and fauna (R. J. Pierce pers. comm.).

ARETHUSA SWAMP

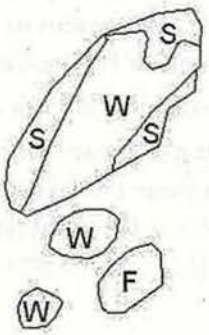
Survey no.	N03/039
Survey date	10 August 1995
Grid reference	N03 205 085, N03 205 083, N03 204 081, N03 206 082
Area	15.3 ha (1.6 ha forest, 4.7 ha shrubland, 9 ha wetland)
Altitude	25–35 m asl



Arethusa Swamp N03/039

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Ecological unit

(a) *Baumea articulata-Eleocharis sphacelata* reedland in dune hollow

(b) Open water

(c) Sydney golden wattle-kanuka shrubland on gently sloping consolidated dunes

Landform/geology

Freshwater wetland ponded by Pleistocene consolidated parabolic dunes.

Vegetation

A freshwater wetland with many exotic plant species around it.

(a) Most of the area is *Baumea articulata* and *Eleocharis sphacelata*. Raupo and harakeke are locally frequent. Papyrus is also present.

(b) An area of open water contains water lilies.

(c) Surrounding the wetland, Sydney golden wattle is emergent over kanuka. Manuka, brush wattle and black wattle occur frequently. A wide range of exotic plant species and other native planted specimens are present as well as frequently occurring kumarahou, mingimingi, mapou, *Pomaderris phylicifolia*, turutu, *Lepidsoperma laterale*, waterfern and bracken.

Fauna

Birds: Australasian bittern (Category O threatened species) reported. Spotless crake and Australasian little grebe (Regionally significant species), shining cuckoo, NZ kingfisher, pukeko and grey warbler are all year 2000 records by the OSNZ.

Significance

A sizeable wetland area providing habitat for threatened and regionally significant species and potentially banded rails and NI fernbirds. Arethusa Swamp is owned by the Royal Forest and Bird Protection Society, protecting 12.5 ha of this site.

EAST BEACH

Survey no.	N03/040
Survey date	23 August 1995
Grid reference	O03 330 023, N03 275 044
Area	627 ha
Altitude	0–10 m asl

Ecological unit

(a) *Spinifex* grassland on foredunes

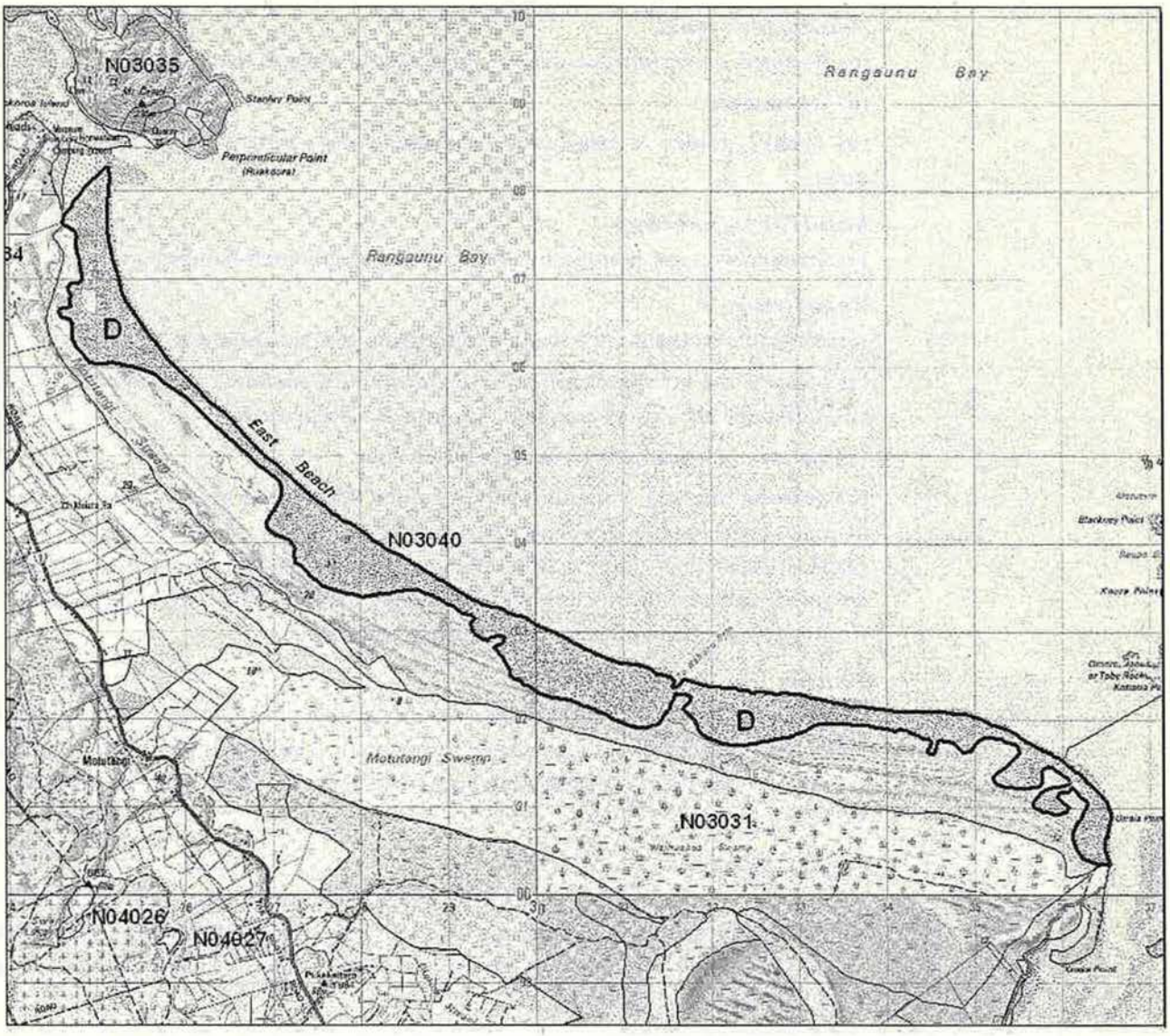
(b) Knobby clubrush-oioi-pampas association in dune depressions

Landform/geology

Holocene coastal foredunes and deflation areas.

Vegetation

(a) *Spinifex* is abundant. Pingao and open sand areas are frequent. Marram is present.



East Beach N03/040

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

(b) In dune depressions, knobby clubrush and oioi are common as is pampas and open sand. Kanuka, *Spinifex,* toetoe, lupin and *Coprosma acerosa* are frequent. Other species present are tauhinu, bottlebrush, gorse, prickly hakea, wattle, apple of Sodom, broom, kikuyu, pine and macrocarpa.

Significant flora

Austrofestuca littoralis (Declining) and pingao (Recovering-Conservation Dependent).

Fauna

Birds: Northern NZ dotterel and wrybill (both Category B threatened species), Caspian tern (Category O threatened species), variable oystercatcher (Category C threatened species), pied stilt, bar-tailed godwits and several common coastal bird species were recorded in a year 2000 OSNZ Aupouri Peninsula lake survey. Banded dotterel and white-fronted tern (both Category C threatened species) and SI pied oystercatcher have been recorded in previous surveys.

Marine reptiles: 1973 record of loggerhead turtles.

Significance

A major east coast beach utilised by threatened bird species for nesting and by large numbers of international and national migrant birds for roosting and feeding.

The foredune vegetation is primarily indigenous.

Representative site for *Spinifex* grassland.

An example of a nationally rare habitat type.

Approximately 92% of this site is protected. East Beach, 577.9 ha, is protected Stewardship Land and a small area of Marginal Strip, 0.4 ha, is included, both administered by the Department of Conservation.

WAIKOKOPU SHRUBLAND

Survey no.	N03/041
Survey date	18 January 1996
Grid reference	N03 090 195
Area	42 ha
Altitude	50–80 m asl

Ecological unit

Kanuka shrubland on dunes

Landform/geology

Holocene parabolic dunefield.

Vegetation

Shrubland comprising 2–3 m kanuka with frequent toetoe. Ngaio is common in the understorey.

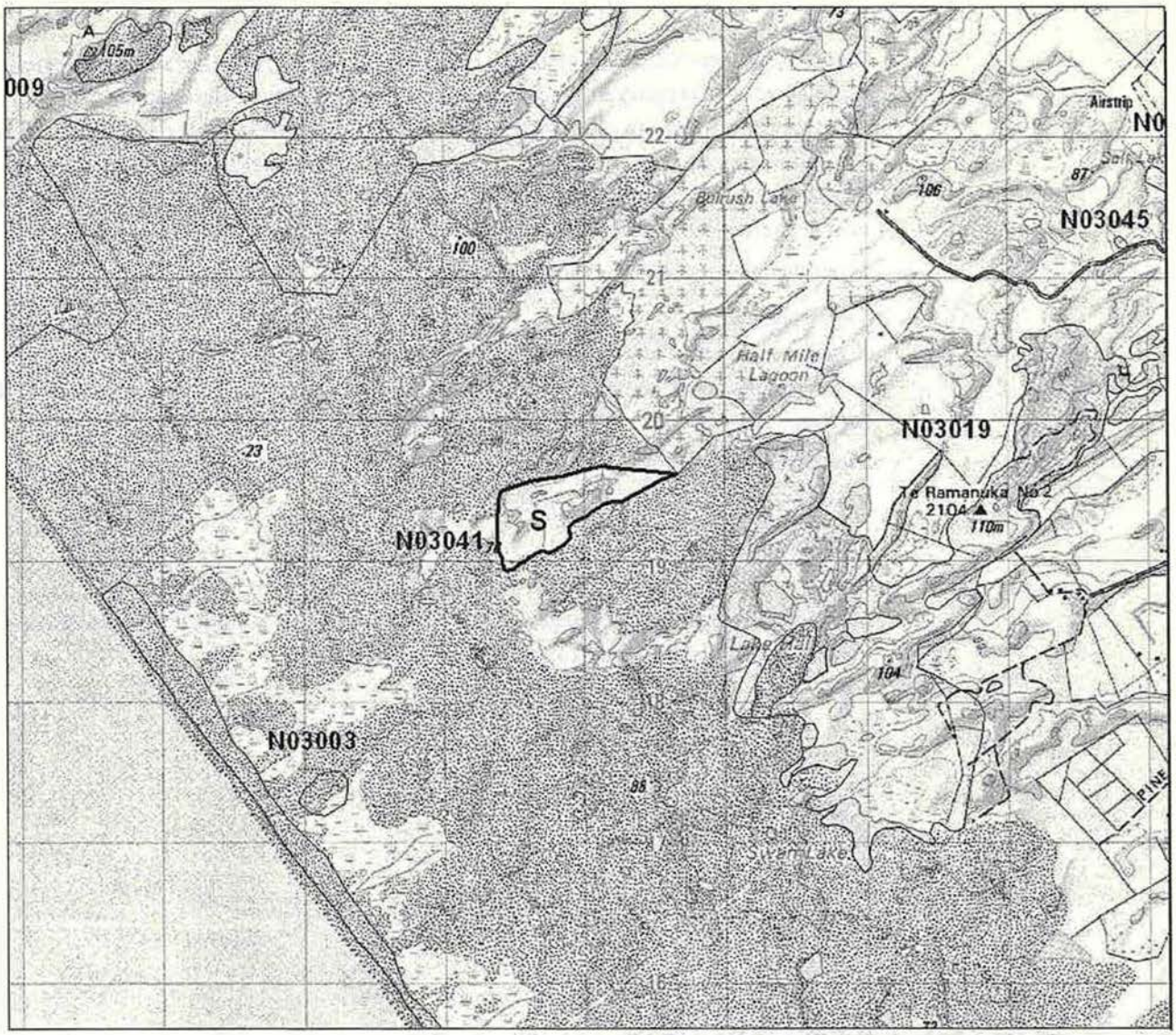
Fauna

Not surveyed.

Significance

A large area comprising a nationally rare habitat type largely devoid of exotic species and with an uncommon understorey type.

Representative site.



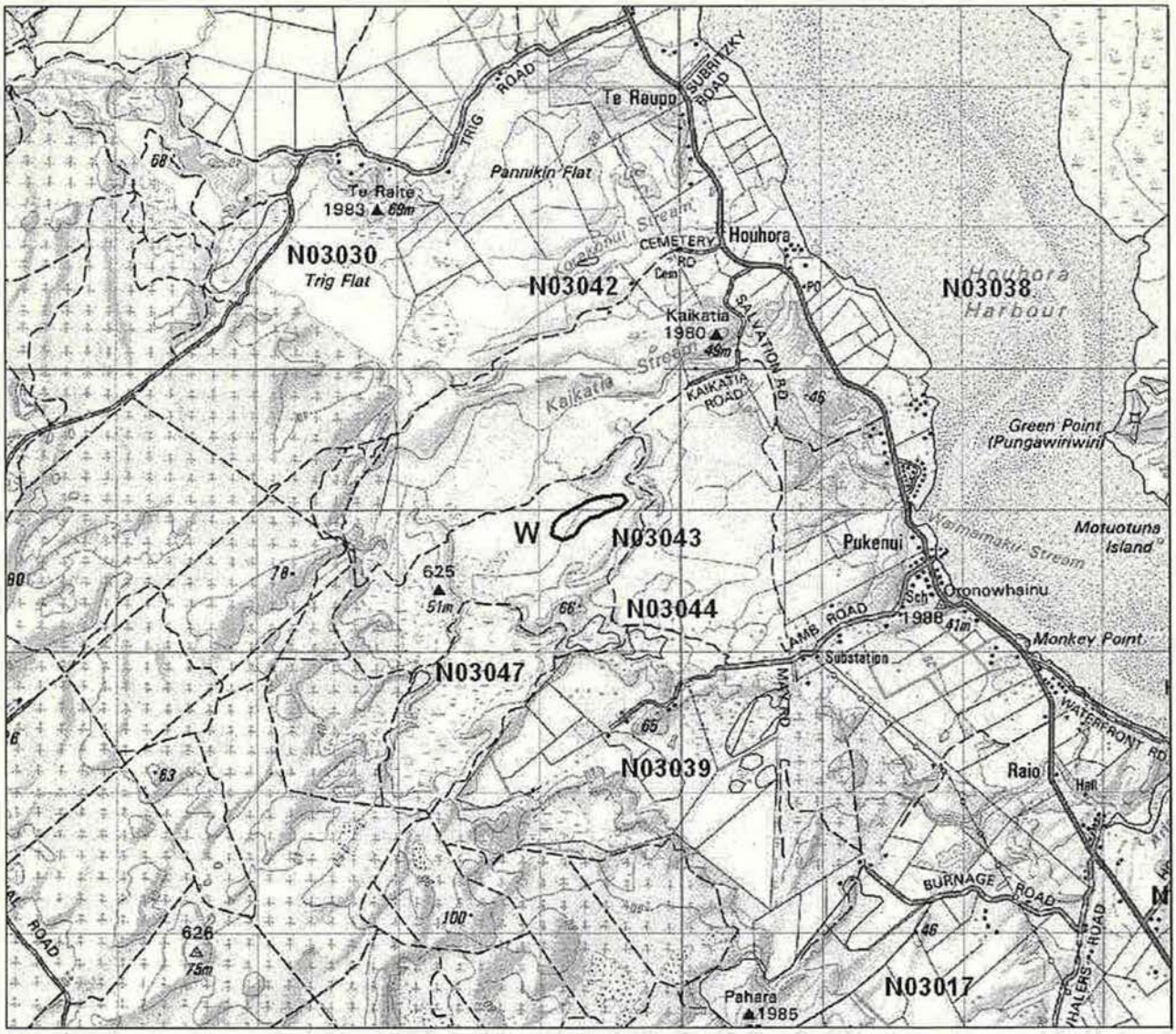
Waikokopu Shrubland N03/041

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

SALVATION RD SWAMP

Survey no.	N03/043
Survey date	17 January 1996
Grid reference	N03 193 099
Area	6.6 ha
Altitude	40 m asl



Salvation Rd Swamp N03/043

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

(a) *Eleocharis sphacelata* reedland in dune hollow

(b) Open water

Landform/geology

Freshwater wetland on interdune flat of Pleistocene parabolic dunefield.

Vegetation

(a) Almost all of the area is *Eleocharis sphacelata* with *Baumea articulata*.

(b) Only a very small area of open water occurs.

Fauna

Birds: NZ dabchick (Category C threatened species), Australasian little grebe (Regionally significant species), black shag, pied shag, pied stilt, and other common waterbirds (recorded by OSNZ in 2000).

Significance

A sizeable wetland being suitable habitat for waterbirds including a threatened and regionally significant species, and part of a suite of wetlands in the Lambs Rd area.

Representative site for type (a).

LAMBS RD SWAMP

Survey no.	N03/044
Survey date	17 January 1996
Grid reference	N03 197 090, N03 194 091
Area	8.4 ha
Altitude	40 m asl

Ecological unit

(a) Open water

(b) *Baumea articulata-Eleocharis sphacelata* reedland in dune hollow

(c) *Eleocharis sphacelata* reedland in dune hollow

Landform/geology

Freshwater wetlands in interdune hollows on Pleistocene parabolic dunefield.

Vegetation

(a) Two small adjoining wetlands. Open water comprises 20% in one and 5% in the other.

(b) *Baumea articulata* and *Eleocharis sphacelata* are common in one.

(c) In the other, *Eleocharis sphacelata* is abundant and *Baumea articulata* frequent. Some raupo is also present.

Both are grazed to the margins.

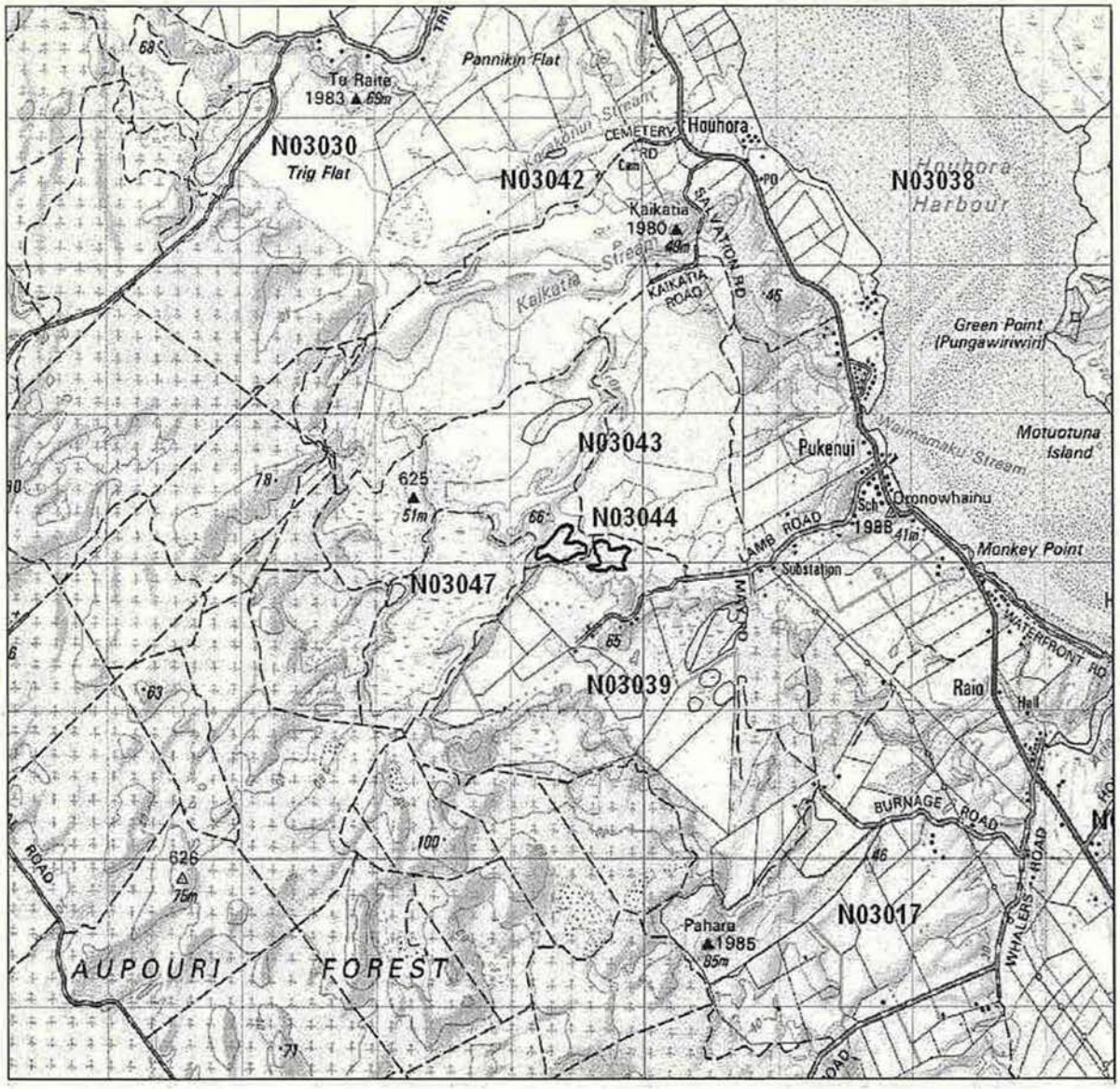
Fauna

Birds: NZ dabchick (Category C threatened species), little shag and other common waterbirds where recorded by the OSNZ in early 2000. Black shag and pied shag have also been recorded.

Aquatic fauna: short-finned eel.

Significance

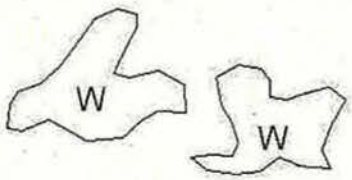
Part of a suite of wetlands in Lambs Rd, providing habitat for waterbirds including a threatened species.



Lambs Rd Swamp N03/044

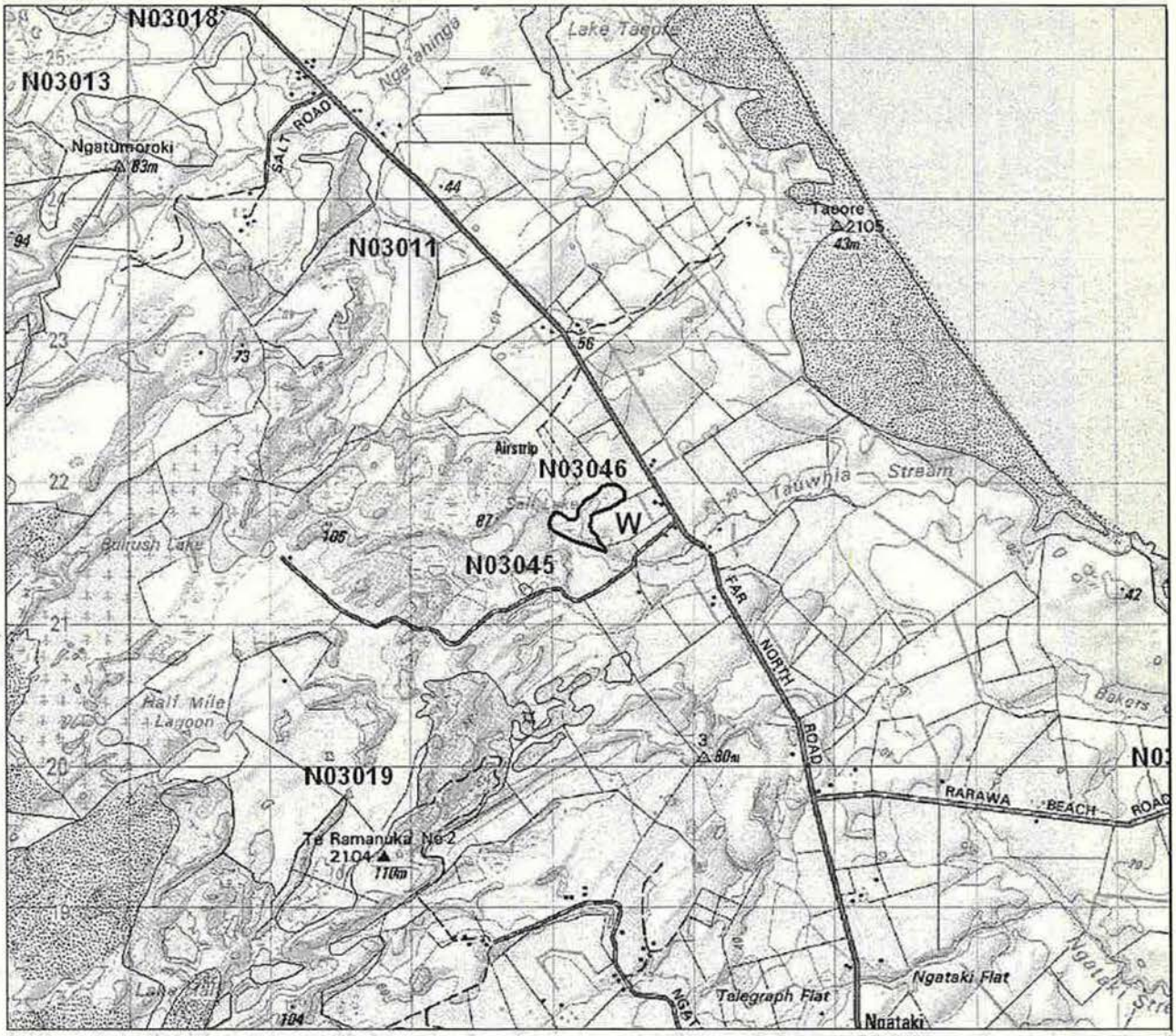
Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



SALT LAKE

Survey no.	N03/046
Survey date	18 January 1996
Grid reference	N03 132 217
Area	9.5 ha
Altitude	20 m asl



Salt Lake N03/046

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

(a) Open water in dune lake

(b) Raupo reedland in dune hollow

(c) Manuka shrubland in dune hollow

Landform/geology

Freshwater wetland on Pleistocene dunefield ponded by gully in Holocene parabolic dunes.

Vegetation

(a) About 25% of the lake is open water.

(b) More than half the area is raupo with occasional ti kouka.

(c) Manuka shrubland with ti kouka occurs in the north-west arm.

Fauna

Birds: Common waterbirds.

Significance

A fenced area providing good habitat for waterbirds and other wetland species. Likely habitat for threatened species such as Australasian bittern and spotless crake. Further survey needed.

Salt Lake (3.4 ha or (35.7%) of this site) is protected Stewardship Land administered by the Department of Conservation.

TE WAKATEHAUA (THE BLUFF) ISLAND

Survey no.	N03/050
Survey date	1990, 1996
Grid reference	N03 010 240
Area	7.2 ha
Altitude	0–7 m asl

Ecological unit

(a) Buffalo grass grassland on rock

(b) Taupata shrubland on cliff margins

(c) *Spinifex* grassland on low dune

(d) Native iceplant turf on rock

(e) *Dichondra* aff. *brevifolia*-native iceplant turf on rock

(f) Glasswort turf on exposed rock faces

Landform/geology

Basaltic lava of Houhora complex, connected to the mainland by a sand tombolo.

Vegetation

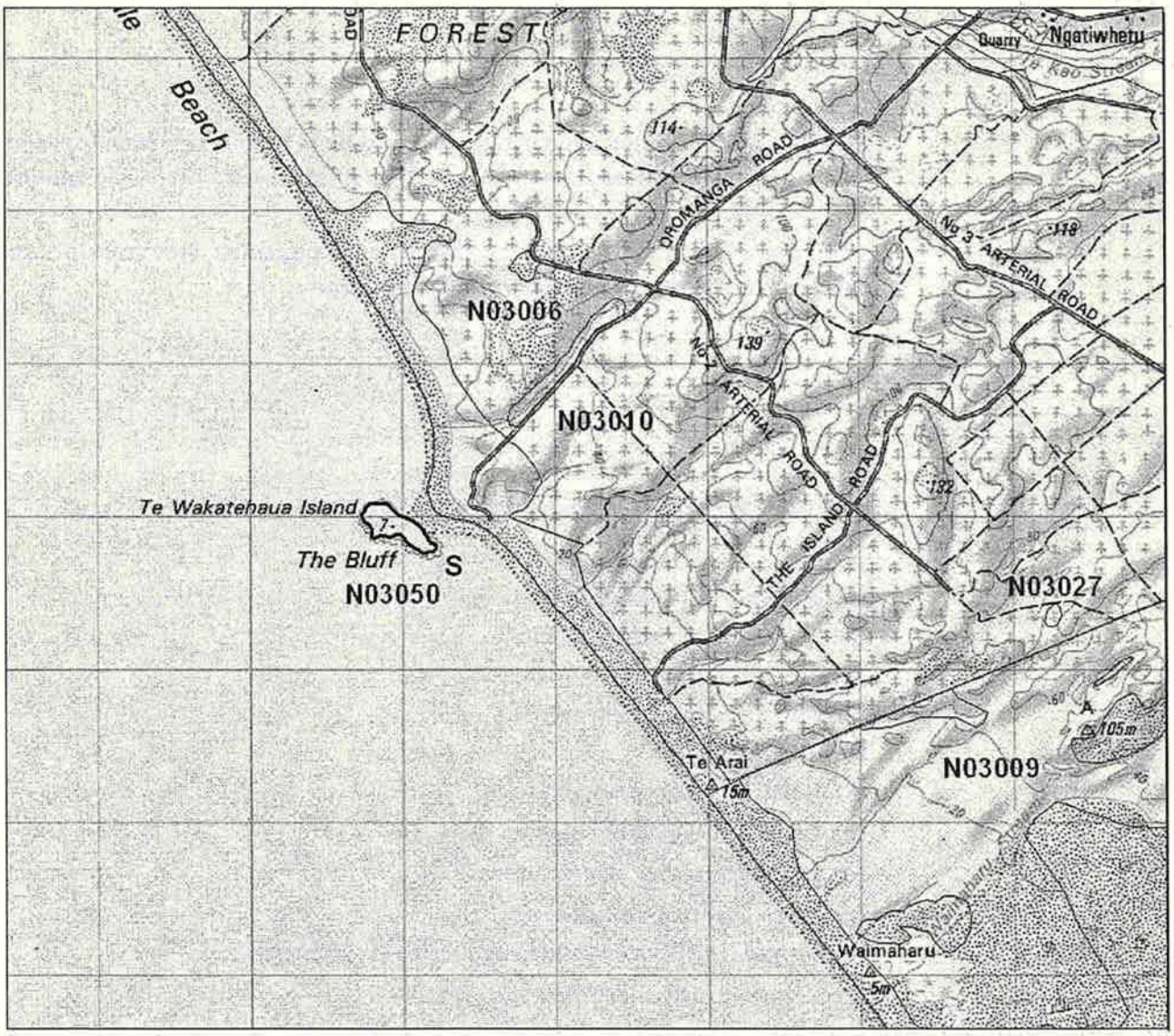
(a) Buffalo grass grows densely on the leeward side of the northern rock with occasional *Lachnagrostis billardieri*, knobby clubrush, *Lotus*, grasses and *Sonchus oleraceus*.

(b) Dense stunted taupata are confined to cliff margins through which grows shore groundsel, *Senecio repangae* subsp. *repangae*, *Einadia trigonos*, shore bindweed and occasional tauhinu. *Hebe stricta* var. *macroura* occurs within this type.

(c) *Spinifex* is dominant on a low dune covering most of the southern rock. Scattered shore bindweed, *Lachnagrostis billardieri*, *Zoysia pauciflora* and oioi occur here.

(d) On the northern rock native iceplant forms a dense turf with occasional shore groundsel, *Selliera radicans* and *Lachnagrostis littoralis*.

(e) The exposed summit is covered with native iceplant and *Dichondra* aff. *brevifolia*. The grass *Zoysia minima* occurs where the turf grades into the taupata shrubland.



Te Wakatehaua Island (The Bluff) N03/050

Each grid is 1000m x 1000m
and = 100 ha.
S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

(f) On exposed cliff faces of the northern rock are small tufts of glasswort. Associated species are *Samolus repens*, shore groundsel, *Crassula sieberiana* and *Einadia trigonos*.

Significant flora

Sonchus kirkii (true puha) (Declining) (probably extinct from this site), 1990 record of *Senecio regangae* subsp. *repangae* (Naturally Uncommon-Sparse). The site contains taxa which are uncommon in the Ecological District and close to their northern limits, i.e. *Hebe stricta* var. *macroura* (generally found south of Taranaki and Bay of Plenty).

Fauna

Variable oystercatcher and white-fronted terns (both Category C threatened species) and tattlers (sp.) recorded (R.J. Pierce pers. comm.).

Significance

Rocky habitats are scarce along Ninety Mile Beach and uncommon in the Ecological District.

Roosting and feeding area for threatened bird species.

Presence of several threatened and uncommon plant species and representative site for *Spinifex* grassland, taupata shrubland, native iceplant turf, *Dichondra* aff. *brevifolia*-native iceplant turf and glasswort turf.

This site description draws directly from de Lange (1996).

MOTU PURUHI ISLAND & TERAKAUTUHAKA ISLAND

Survey no.	N03/051
Survey date	1988, 1990, 1992, 1993
Grid reference	N03 252 162
Area	6.34 ha
Altitude	0–40 m asl

Ecological unit

(a) Tawapou forest on gentle coastal slopes

(b) Coastal shrubland on coastal slopes

(c) Pohutukawa treeland on coastal cliffs

(d) *Samolus repens*-glasswort turf on rock

Landform/geology

Altered volcanic rocks of the early Cretaceous Houhora complex.

Vegetation

(a) Coastal forest 4–5 m tall occurs on Motu Puruhi Island and is dominated by tawapou with occasional mahoe, houpara and karo. The understorey is sparse with occasional *Asplenium flaccidum* subsp. *haurakiense.*

(b) Shrubland 1.5–2.5 m tall occurs near the coastal edge and includes ti kouka, *Coprosma macrocarpa*, taupata, *Melicytus novae-zelandiae*, hangehange, pohuehue, harakeke, toetoe, bracken and sedges.

(c) Pohutukawa are scattered around the cliffs.

(d) Salt tolerant succulents are found in the splash zone.

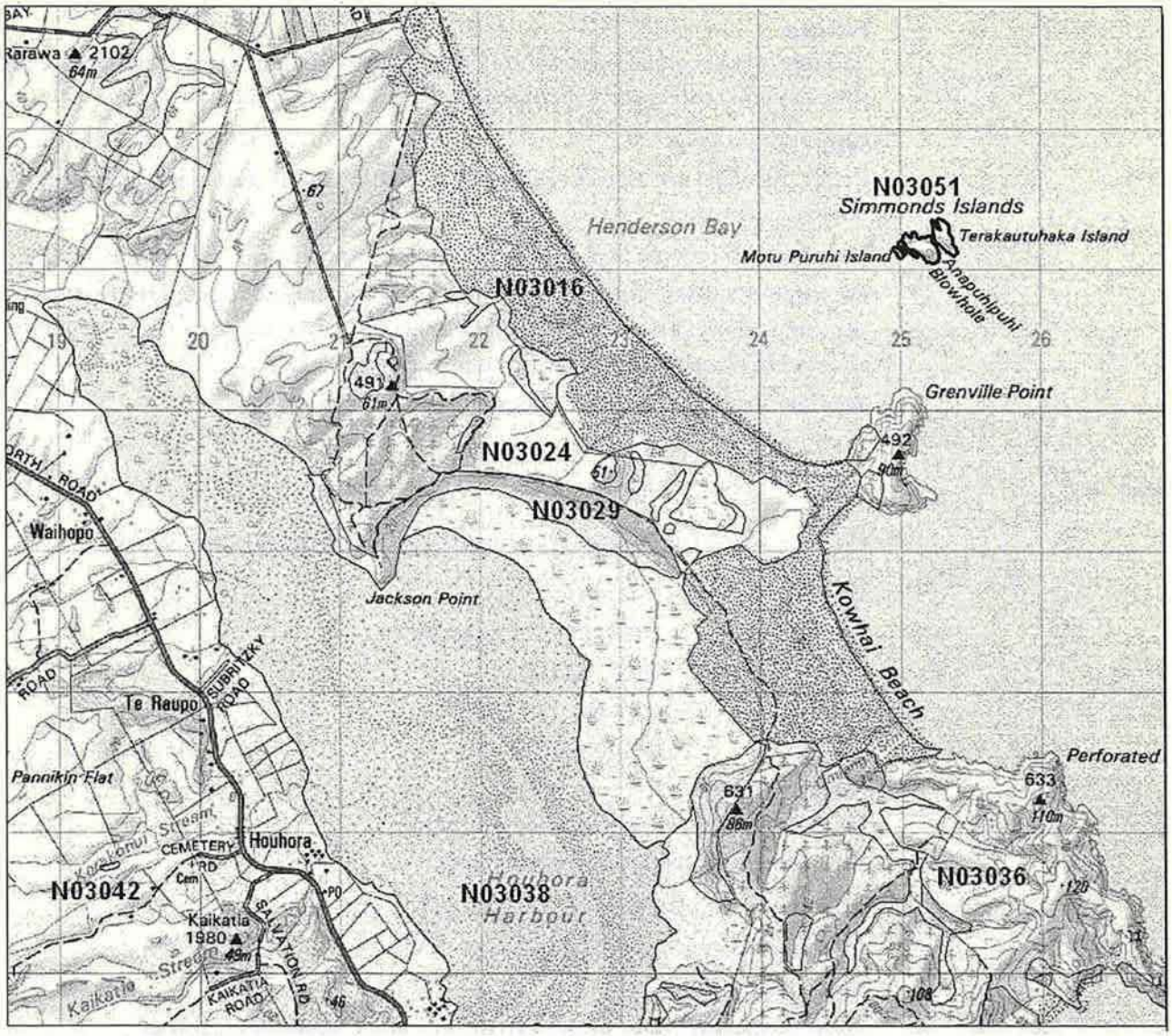
Significant flora

Sicyos australis (Vulnerable) year 2000 record, and tawapou (Regionally significant species).

Fauna

Birds: 1990 record of Bullers shearwater (Category B threatened species), white-fronted tern (Category C threatened species), fluttering shearwater, little blue penguin, grey-faced petrels nesting. Reef heron, and Caspian tern (both Category O threatened species), black-winged petrel, pied shag.

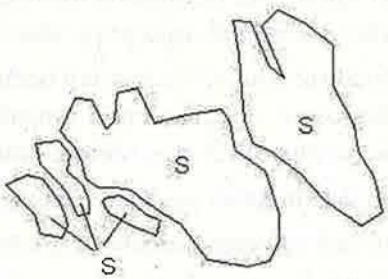
Lizards: shore skink.



Motu Puruhi Is. & Terakautuhaka Is. N03/051

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Snails: *Placostylus ambagiosus keenorum* (Category A threatened species) were released by the Wildlife Service in 1984; a check in 1990 revealed no live snails, empty shells or shell remains. *Climocella reinga* (Range Restricted), Punctidae sp. "arewa", *Tornatellinops novoseelandica*, *Phrixgnathus* sp. "marshalli", *Kokikora angulata*, *Delos coresia* all recorded from Motu Puruhi Island.

Significance

Predator and browser free habitats are rare and provide important safe breeding sites for many seabird species including threatened species. They also support threatened plants and have potential for transfers of threatened fauna.

Sicyos australis is unrecorded elsewhere in the Ecological District.

Tawapou forest is a nationally uncommon vegetation type and is solely recorded from this site in the Ecological District and Region. Also a representative site for *Samolus repens*-glasswort turf and pohutukawa treeland. These vegetation types have not been recorded from other island habitats in the Ecological District.

The islands are protected Nature Reserve administered by the Department of Conservation.

FAR NORTH RD SHRUBLANDS & WETLANDS

Survey no.	N04/002
Survey date	10 August 1995, 26 February 1996
Grid reference	N04 298 918, N04 300 910, N04 295 909, N04 299 895, N04 291 883, N04 282 883, N04 285 881, O04 302 877
Area	206.8 ha (193 ha shrubland, 13.8 ha wetland)
Altitude	10–40 m asl

Ecological unit

(a) Kanuka shrubland on flats and gentle slope

(b) *Baumea articulata*-giant umbrella sedge-manuka-raupo association in dune hollow

(c) Kanuka/manuka shrubland on flats and gentle slope

(d) Raupo reedland in dune hollow

(e) Kanuka-manuka shrubland on flats

(f) *Eleocharis sphacelata* reedland in dune hollow

(g) Manuka-*Baumea teretifolia* swamp association in dune hollow

(h) *Baumea juncea-Eleocharis sphacelata*-manuka association in dune hollow

Landform/geology

Pleistocene parabolic dunes and swampy interdune flats.

Vegetation

A mosaic of discontinuous shrubland/wetland habitats at Paparore.

(1) (a) The northernmost area, Hearlings Swamp (N04 298 918) consists of kanuka shrubland with frequent manuka, gorse and wattle. Mamaku, pampas, tobacco weed and *Eucalyptus* sp. are also present.

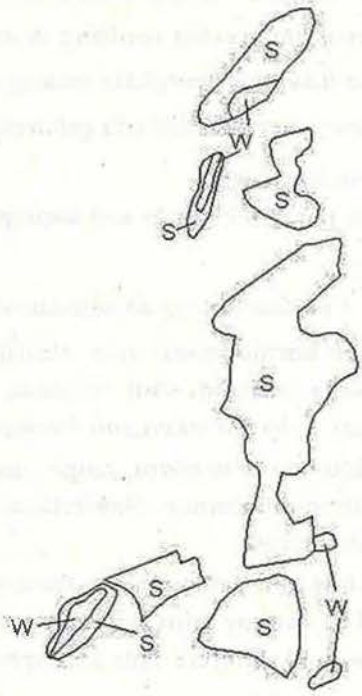
(b) *Baumea articulata*, raupo, manuka, and giant umbrella sedge form a mosaic of dominance. (Australasian bittern are recorded here.) The area is heavily grazed.

(2) (c) A few hundred metres to the south (N04 300 910) kanuka/manuka form a 2–4 m canopy with frequent gorse over *Gleichenia dicarpa*. Pine and wattle are scattered. This area appears to be drier than formerly.

Far North Rd Shrublands & Wetlands N04/002

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



(3) (d) Across the road to the west (N04 295 909), is Broadhursts Swamp, raupo with manuka, kanuka and gorse. About half of the area is type (a), kanuka shrubland with wattle occurring frequently. Harakeke, manuka and pampas are also present.

(4) (e) Approximately 1 km south (N04 299-895) is a mosaic of kanuka dominant shrubland between 1 m and 6 m. Manuka is common or frequent and locally dominant. Sydney golden wattle is present throughout, locally common or frequent, as is prickly hakea. Other species present are mamaku, harakeke, ti kouka, gorse, tobacco weed, brush wattle (locally common), black wattle, pine, mingimingi, bracken, kumarahou and *Callistachys lanceolata*.

(5) (f) Contiguous to the east (O04 303 886) is a small wetland, the Paparore Eleocharis Swamp, dense sedges with clumps of manuka. Water fern, *Baumea juncea,* and *B. teretifolia* occur occasionally. (Australasian bittern are recorded here.)

Although grazed to the margins, the wetland itself is fenced from stock.

(6) (g) A kilometre to the south is Macrae's Wetland, a small, semi-infertile wetland (0.5 ha) of manuka emergent over *Baumea teretifolia* with *Schoenus* sp., *Gleichenia* sp. and *Sphagnum.* Raupo and *Eleocharis sphacelata* are present.

There is a dense shrubland periphery of type (c), kanuka/manuka with frequent gorse and hakea. Mamaku, *Coprosma rhamnoides,* turutu and other sedges are also present. The area is fenced.

(7) A kilometre or so to the west (N04 291 883) is another area of type (c) kanuka/manuka shrubland about 5 m tall. Mamaku, gorse, prickly hakea and tobacco weed are present.

(8) (h) Directly across the road to the west (N04 285 881) is Forestry Swamp, which is mostly dense *Baumea juncea* with *Eleocharis sphacelata* and manuka. Some raupo is present (black mudfish are found here). Type (c) occurs here around the fringe, with locally frequent brush wattle. Kiokio, mingimingi, mamaku, ti kouka, gorse and prickly hakea are also present. The area is surrounded by *Eucalyptus* sp.

Fauna

Birds: Australasian bittern (Category O threatened species), NI fernbird (Regionally significant species), little shag.

Aquatic fauna: 1999 record of black mudfish (Category C threatened species), record of giant bully (Regionally significant species), short-finned and long-finned eel and inanga.

Significance

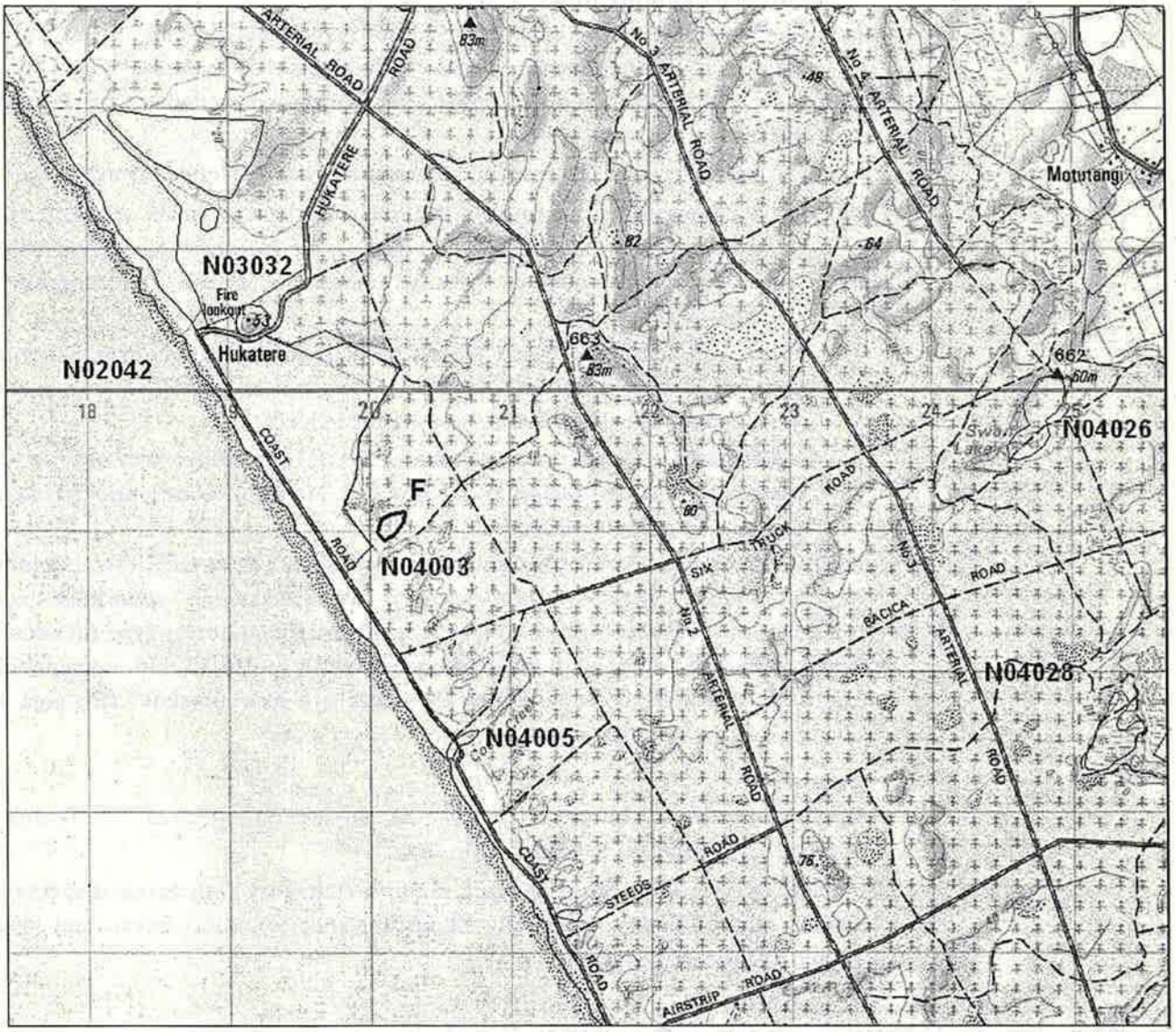
A mosaic of partially linked shrubland and wetland habitats comprising a collective habitat for threatened and regionally signficant species. Further survey is recommended.

Representative site for manuka-*Baumea teretifolia* swamp association, *Baumea juncea-Eleocharis*-manuka association, and *Baumea articulata*-giant umbrella sedge-manuka-raupo association, with the latter two only recorded at this site. Additional surveying is recommended to determine further ecological significance.

In the south, 30.6 ha of this site (14.8%), is protected by a Queen Elizabeth II National Trust Open Space Covenant.

COMPARTMENT 65 FOREST REMNANT

Survey no.	N04/003
Survey date	13 September 1995, 8 December 1995
Grid reference	N04 202 991
Area	2.4 ha
Altitude	10–20 m asl



Compartment 65 Forest Remnant N04/003

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

Pohutukawa forest remnant on dunes

Landform/geology

Holocene coastal dunes.

Vegetation

A remnant of pohutukawa forest. In the sparse understorey, *Coprosma macrocarpa* is dominant and houpara and shining spleenwort are common.

Also present are *Coprosma rhamnoides,* pohuehue, native broom, knobby clubrush, toetoe, ngaio, mingimingi, bracken, hound's tongue, leather-leaf fern and hook grass.

Fauna

Birds: Common bush birds.

Significance

A representative site for pohutukawa forest on coastal sand, a rare vegetation type in the Ecological Region and one of only three sites in this Ecological District.

COAL CREEK WETLAND

Survey no.	N04/005
Survey date	13 September 1995
Grid reference	N04 206 974, N04 214 963, N04 224 943
Area	3.9 ha
Altitude	0–15 m asl

Ecological unit

(a) Raupo-oioi reedland on coastal dunes

(b) Harakeke-pampas-raupo-association on coastal dunes

Landform/geology

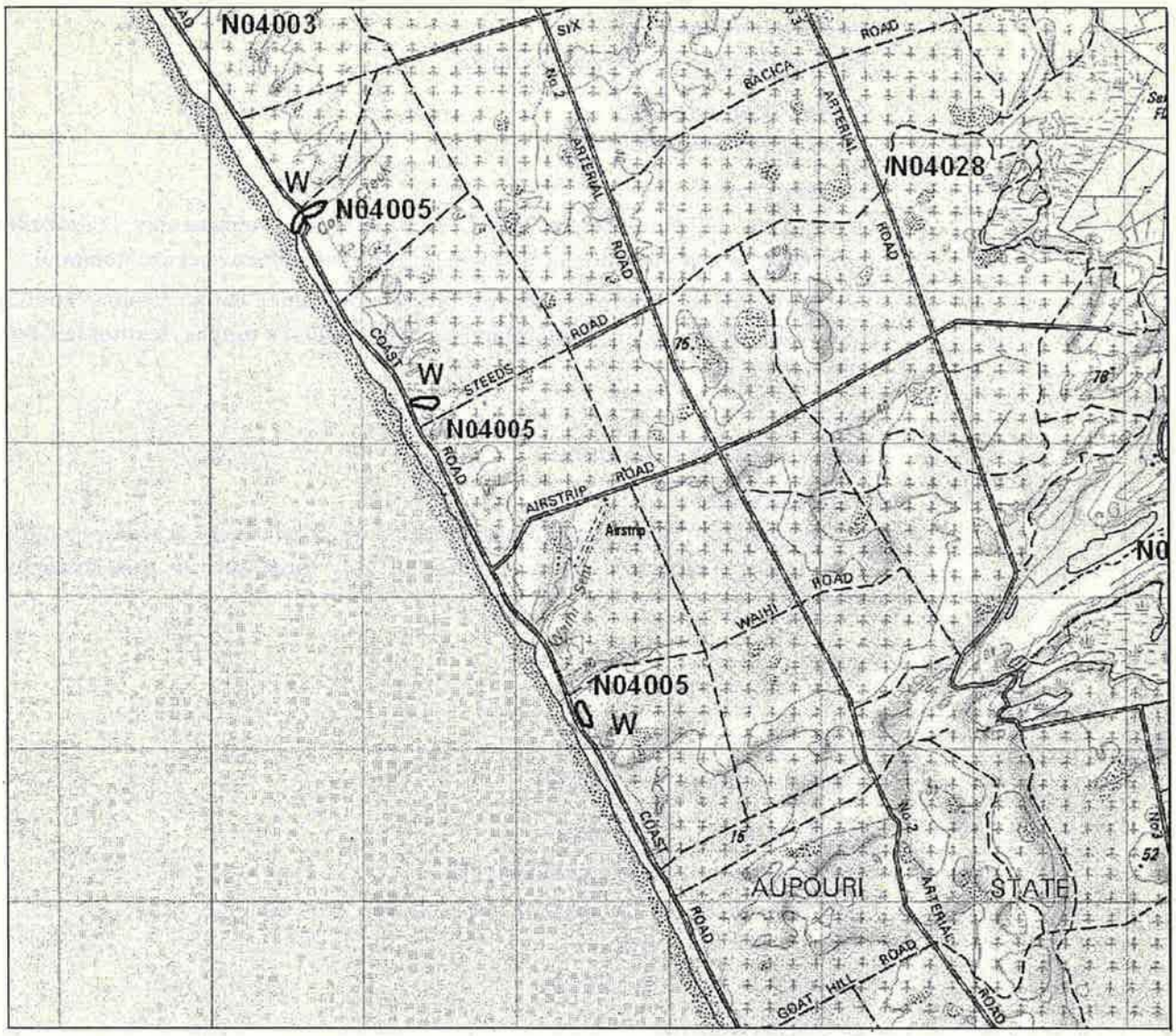
Freshwater wetlands in Holocene coastal duneland.

Vegetation

(a) Coal Creek wetland is raupo dominant with oioi commonly occurring. Toetoe is frequent. Other species present are pohuehue, harakeke, pohutukawa, buffalo grass and pampas. This wetland is surrounded by dense oioi with several young pohutukawa, toetoe and harakeke, with pines to the margin on the eastern side of the bridge.

(b) The Steeds Rd wetland is an association of raupo, harakeke and pampas. Again, toetoe is frequent. Other species occurring are *Blechnum* sp., giant umbrella sedge, pohuehue, water fern, oioi and the threatened *Cyclosorus interruptus.* Pines grow to the margins.

The Waihi Rd site consists of a seepage from a roadside bank and contains sedges, buffalo grass and kiokio. The threatened *Cyclosorus interruptus* is present.



Coal Creek Wetlands N04/005

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Significant flora

Cyclosorus interruptus (Declining).

Fauna

Birds: Common bush birds. Waterbirds such as spotless crakes (Regionally significant species) are likely to be present.

Significance

Three small but important wetland areas on coastal dunes, which is nationally an under-represented habitat type.

Representative site for raupo-oioi reedland.

Presence of *Cyclosorus interruptus*, a threatened fern of warm wetland areas.

Further survey recommended.

HEATH RD POWERLINE SWAMP

Survey no.	N04/006
Survey date	8 August 1995
Grid reference	N04 298 934, O04 303 933
Area	84.5 ha (83 ha shrubland, 0.7 ha wetland)
Altitude	5–25 m asl

Ecological unit

(a) Manuka swamp shrubland in dune hollow

(b) Manuka-kanuka shrubland on flats

(c) Sydney golden wattle-kanuka/manuka shrubland on flats

(d) *Eleocharis sphacelata* reedland in dune hollow

Landform/geology

Freshwater wetlands ponded by Pleistocene consolidated parabolic dunes.

Vegetation

(a) An area of dense short manuka with *Baumea teretifolia* and *Schoenus* sp. sedges, *Dracophyllum lessonianum* and *Cassytha.*

(b) On the margins are (i) low manuka-kanuka shrubland with frequent gorse and wattle and (ii) type (c) Sydney golden wattle-kanuka shrubland.

There is also a small area of pine and *Eucalyptus*.

(d) At the northern end is a small shallow *Eleocharis sphacelata* reedland with some *Baumea* sp.

Fauna

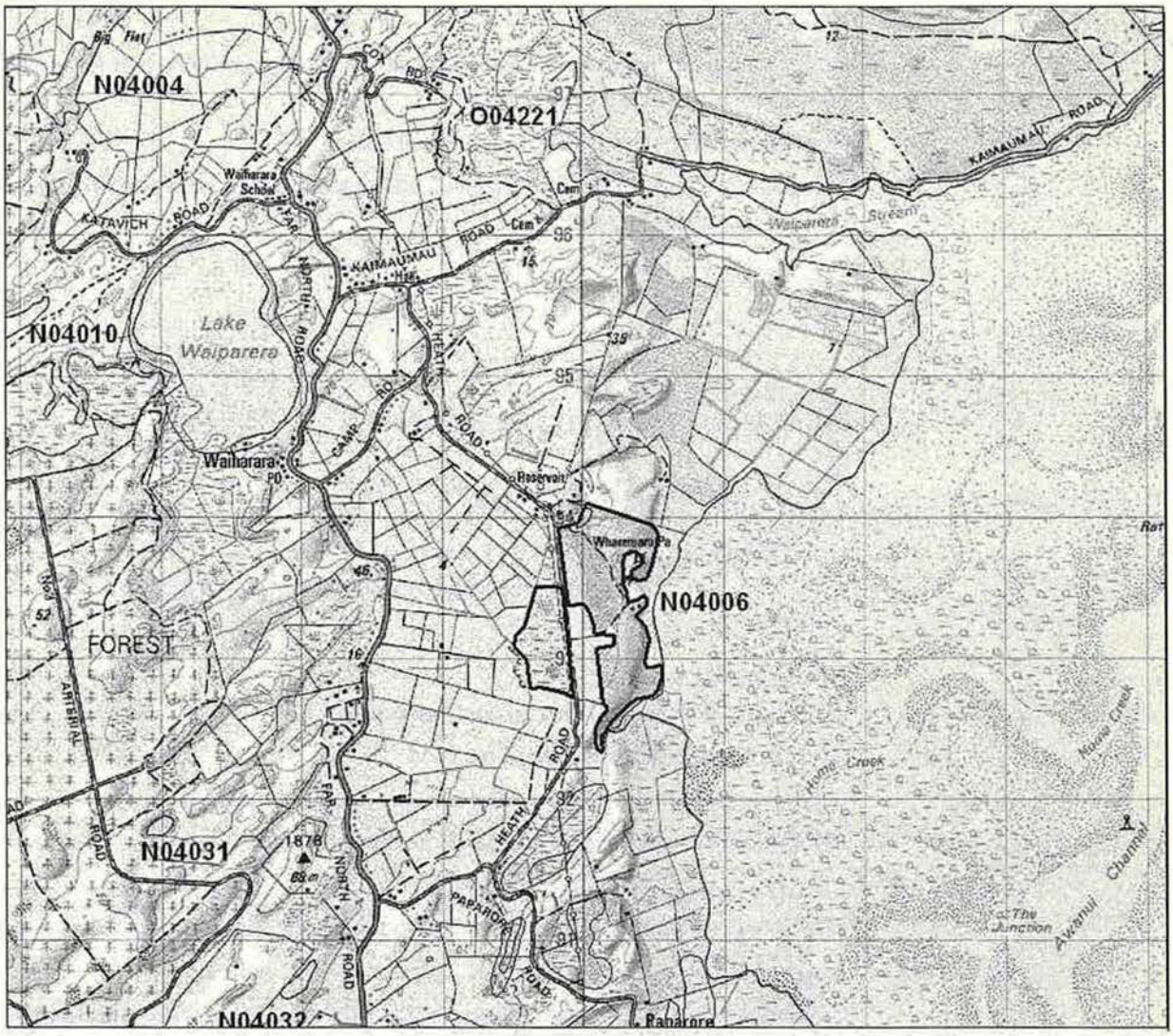
Birds: Australasian bittern (Category O threatened species).

Aquatic fauna: 1993 record of black mudfish (Category C threatened species).

Significance

Habitat for threatened species and likely to provide habitat for NI fernbirds.

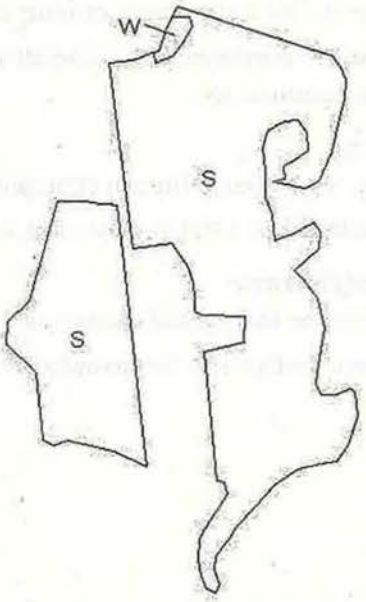
Representative site for manuka swamp shrubland.



Heath Rd Powerline Swamp N04/006

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

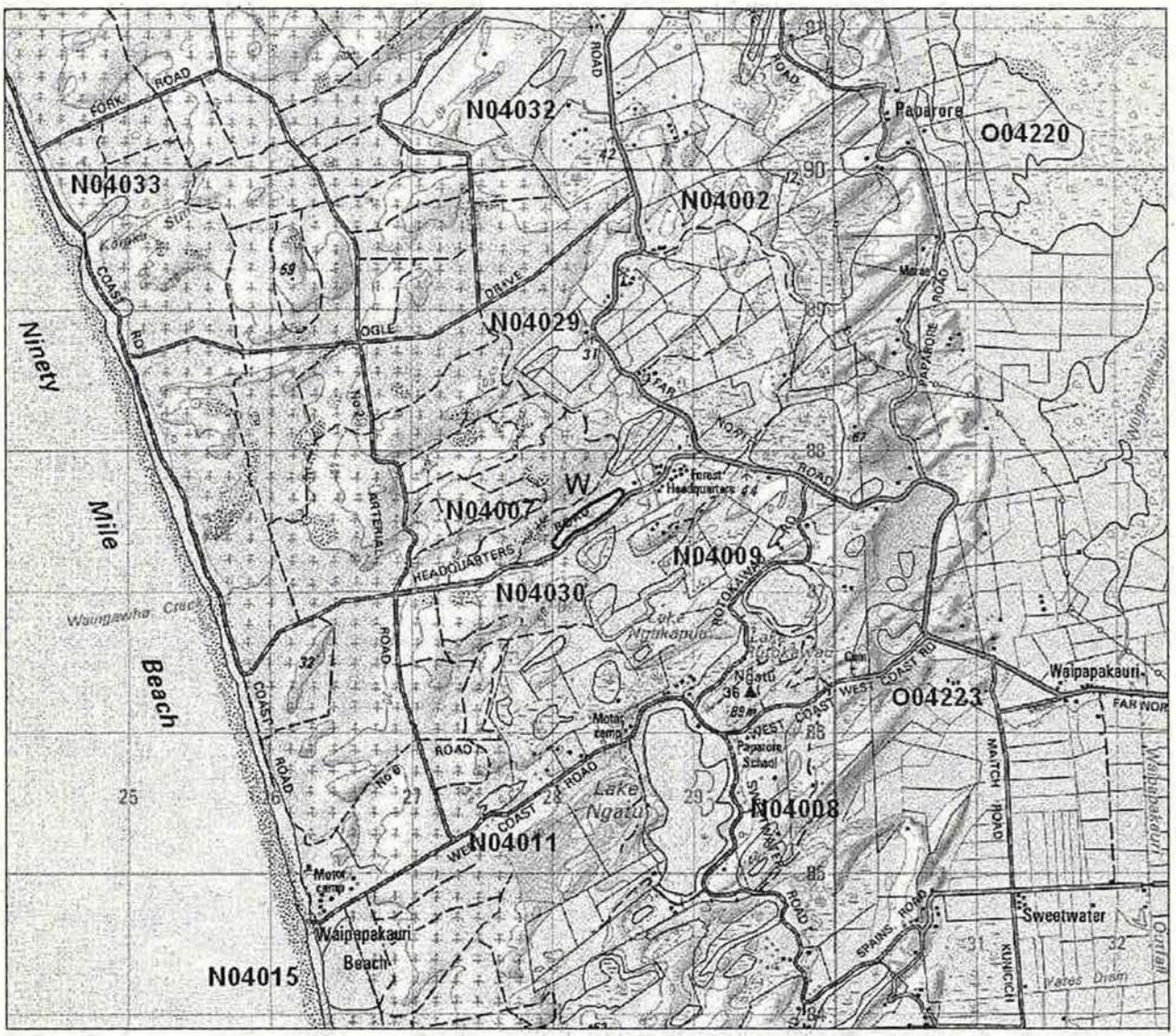


HEADQUARTERS POND

Survey no.	N04/007
Survey date	8 August 1995
Grid reference	N04 283 875
Area	5.77 ha
Altitude	10–20 m asl

Ecological unit

Baumea articulata-Eleocharis sphacelata reedland in dune hollow



Headquarters Pond N04/007

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Freshwater wetland ponded by Pleistocene parabolic dunes.

Vegetation

A dense sward of *Baumea articulata* and *Eleocharis sphacelata* with raupo, *Juncus* sp., swamp millet and other *Baumea* species.

Pines are planted to the margin with poplars along the roadside. Brush wattle and harakeke are also present.

Significant flora

Myriophyllum robustum (Declining) is reported from this site.

Fauna

Birds: Australasian bittern (Category O threatened species) reported. NI fernbird and spotless crake (both Regionally significant species), pukeko, and grey duck. NZ dabchick (Category C threatened species) and Australasian little grebe (Regionally significant species) have been recorded by the OSNZ in the past.

Significance

Small representative wetland area which is a habitat for several important species including threatened and regionally significant species.

A Conservation Covenant administered by the Department of Conservation protects 5.1 ha (89.4%) of this wetland.

LAKE NGATU COMPLEX

Survey no.	N04/008
Survey date	8 August 1995
Grid reference	N04 290 855, N04 294 891, N04 286 847, N04 284 842, N04 293 846, N04 294 844, N04 300 840
Area	154.8 ha (67 ha shrubland, 87.8 ha forest)
Altitude	5–20 m asl

Ecological unit

(a) Open water in dune lake

(b) *Eleocharis sphacelata* reedland in lake bed

(c) *Eleocharis acuta-Isolepis prolifer-Myriophyllum propinquum*-willow weed association in lake bed

(d) Kanuka shrubland on lake margin

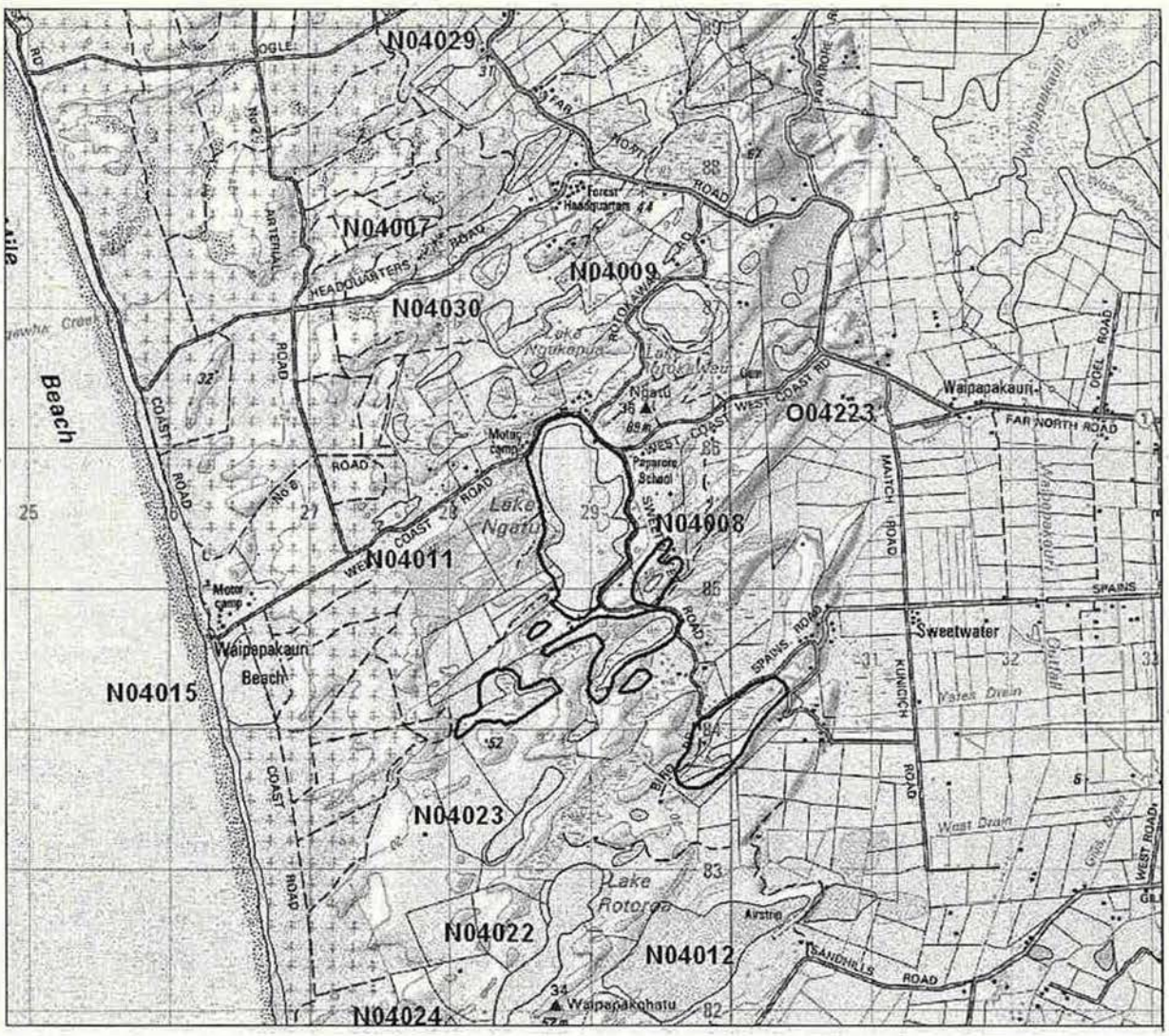
(e) Kanuka/manuka shrubland on dunes

(f) Manuka swamp shrubland on flats

(g) *Baumea teretifolia-Schoenus brevifolius* sedgeland in peat bog

Landform/geology

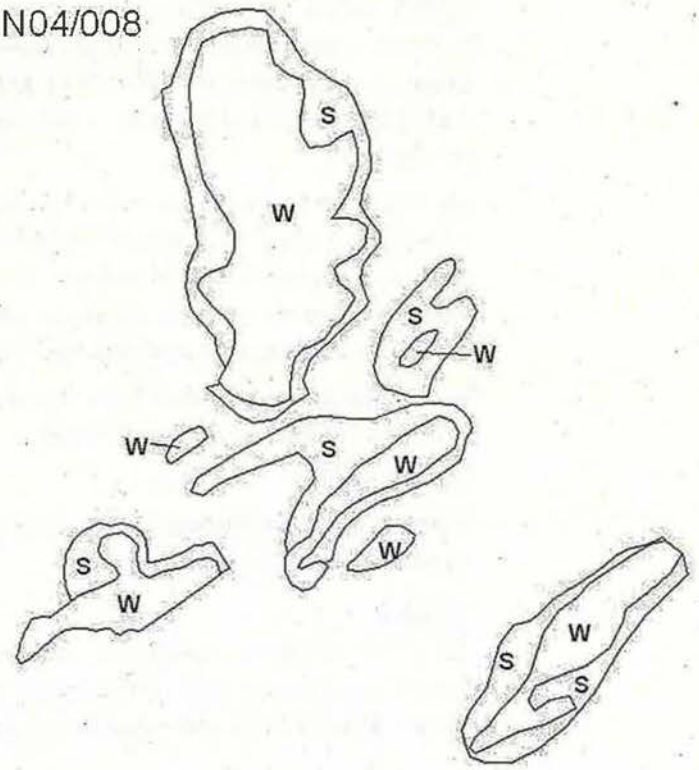
Lake and freshwater wetland ponded within Pleistocene consolidated parabolic dunes.



Lake Ngatu Complex N04/008

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Vegetation

A number of peat swamps with narrow manuka and kanuka dominant shrubland margins.

(a) Lake Ngatu is a large dune lake, almost 90% open water.

(b) About 5% is *Eleocharis sphacelata* with *Isolepis prolifer*, *Baumea articulata, B. teretifolia* and *B. juncea.*

On the fringes are kikuyu with planted harakeke and ti kouka, kanuka/manuka to 3 m and bracken and gorse scrub.

To the south-west is the small Ngatu Pond (N04 286 847) which is 60% open water and 40% type (b) *Eleocharis sphacelata,* with manuka, *Baumea articulata, Isolepis prolifer* and *Eleocharis acuta*. It is grazed to the margins.

Further south-west is the larger Waipapakauri Beach 'Lake', a luxuriant bed of type (b), *Eleocharis sphacelata* with *Baumea articulata.*

(c) There is a small area of *Eleocharis acuta, Isolepis prolifer, Myriophyllum propinquum* and willow weed.

(d) On the northern shore is kanuka shrubland to 6m. Other species present are *Cassytha,* ti kouka, mamaku, brush wattle, manuka, *Coprosma rhamnoides, Lepidosperma laterale*, mingimingi, bracken, hangehange, *Nertera* sp. and *Gonocarpus* sp..

To the south-east of Lake Ngatu is Wasp Nest Lake (N04 295 852), partly open water, *Eleocharis sphacelata* and *Baumea articulata.*

(e) On the margin is kanuka/manuka shrubland with frequent gorse. Tobacco weed, brush wattle and sedges are present.

(f) Across the road to the south west is Sweetwater Rd Swamp, which is 60% manuka and *Eleocharis sphacelata* with *Baumea teretifolia, B. articulata* and *Isolepis prolifer.*

The margins are mostly type (d) kanuka to 4 m with frequent mamaku, gorse, prickly hakea and tobacco weed. Pampas *Cassytha, Schoenus brevifolius*, bracken, mingimingi, *Coprosma rhamnoides* are also present. On the edge of this is Andrews Swamp, (N04 293 843), type (b) an *Eleocharis sphacelata* reed bed with *Sphagnum* forming a mat underneath. Old tree stumps occur in the swamp.

(g) A few hundred metres to the south-east is the Spains Rd swamp, which is mostly *Baumea teretifolia* and *Schoenus brevifolius* with scattered patches of manuka. A small muddy-bottomed area of open water (possibly intermittent) occurs. Old tree stumps occur in the swamp. Wire rush, sphagnum moss, *Eleocharis sphacelata* and *Baumea articulata* are also present.

Kanuka-manuka shrubland type (e) with frequent gorse occurs on the fringe. A variety of exotic weeds are present.

Significant flora

A 1988 record of *Hydatella inconspicua* (Declining). Wire rush is a regionally significant species in Northland.

Fauna

Birds: NZ dabchick (Category C threatened species), Australasian bittern, white heron and Caspian tern (all Category O threatened species), NZ scaup and NI fernbird (both Regionally significant species), black shag, pied shag, glossy ibis,

yellow-billed spoonbill. A year 2000 survey by the OSNZ confirmed the presence of NZ dabchick and Caspian tern and also recorded little black shag,

Aquatic fauna: common bully, common smelt, short-finned eel, landlocked inanga.

Significance

A complex of dune lakes and wetlands with good quality habitat. An important area for a diversity of waterbirds including threatened and uncommon species and habitat for the threatened *Hydatella inconspicua* and regionally significant wire rush.

Representative site for type (a) open water, type (b) *Eleocharis sphacelata* reedland, type (c) *Eleocharis acuta-Isolepis prolifer-Myriophyllum propinquum*-willow weed association, type (d) kanuka shrubland, type (f) manuka swamp shrubland, and type (g) *Baumea teretifolia-Schoenus brevifolius* sedgeland. Only record of type (c) and (g) in the Ecological District.

Recreation Reserve protects 68.7 ha (44.3%) of this site and is administered by the Department of Conservation.

LAKE ROTOKAWAU & POND

Survey no.	N04/009
Survey date	8 August 1995
Grid reference	N04 296 869, N04 296 874
Area	24.9 ha (10 ha shrubland, 14.9 ha wetland)
Altitude	20–40 m asl

Ecological unit

(a) Open water

(b) *Eleocharis sphacelata* reedland on lake bed

(c) *Baumea juncea* sedgeland in dune hollow

(d) Manuka shrubland on lake margin

Landform/geology

Lake ponded by Pleistocene consolidated parabolic dunes.

Vegetation

(a) This is a shallow lake with open water comprising 70% of the area.

(b) Reed beds dominated by *Eleocharis sphacelata* with *Baumea articulata.*

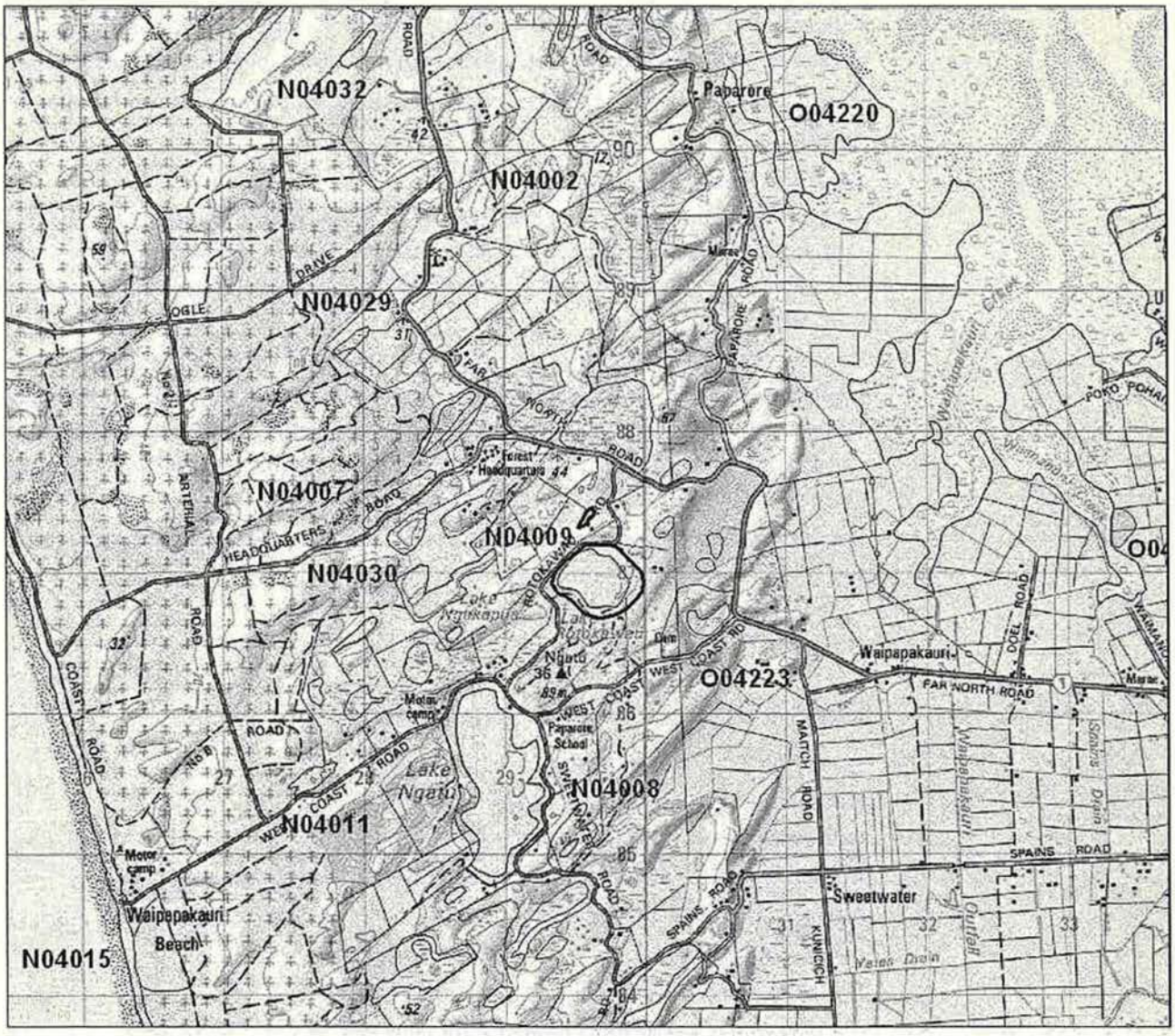
(c) Elsewhere *Baumea juncea* is locally dominant with oioi, *Schoenus brevifolius* and *Isolepis prolifer.*

(d) The shrubland margin is abundant manuka with frequent brush wattle and *Baumea juncea*. Other species present are mamaku, pampas, harakeke, ti kouka and gorse.

The smaller pond across the road is about one quarter open water and three quarters *Eleocharis sphacelata*, and is grazed to the margin.

Significant flora

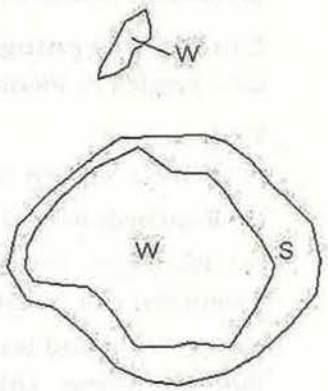
A 1988 record of *Hydatella inconspicua* (Declining) and a 1983 record of *Utricularia protrusa* (Vulnerable).



Lake Rotokawau & Pond N04/009

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Fauna

Birds: NZ dabchick (Category C threatened species), Australasian bittern (Category O threatened species), Australasian little grebe spotless crake and NI fernbird (all Regionally significant species), grey duck and other common

waterbirds. A year 2000 OSNZ survey also recorded black shag, pied shag, little shag and little black shag.

Aquatic fauna: landlocked inanga, common bully.

Significance

An extremely important high-quality shallow lake with reedbeds providing habitat for four threatened and three regionally significant species.

Representative site for *Baumea juncea* sedgeland.

Marginal Strip administered by the Department of Conservation protects 3.6 ha (14.4%) of this site.

LAKE WAIPARERA & WETLANDS

Survey no.	N04/010
Survey date	8 August 1995
Grid reference	N04 265 950, N04 260 954, N04 253 950, N04 254 943
Area	212.3 ha (25.8 ha shrubland, 186.5 ha wetland)
Altitude	20–40 m asl

Ecological unit

(a) Open water in dune lake

(b) Oioi rushland on lake bed

(c) Manuka shrubland on lake margin

(d) *Baumea articulata* reedland on lake bed

(e) *Eleocharis sphacelata* reedland on lake bed

(f) Raupo reedland on lake bed

(g) Kanuka shrubland on lake margin

Landform/geology

Lake ponded between Pleistocene consolidated parabolic dunes in the east and late Pleistocene parabolic dunes to the west.

Vegetation

(a) Lake Waiparera is a large lake with a sandy shore.

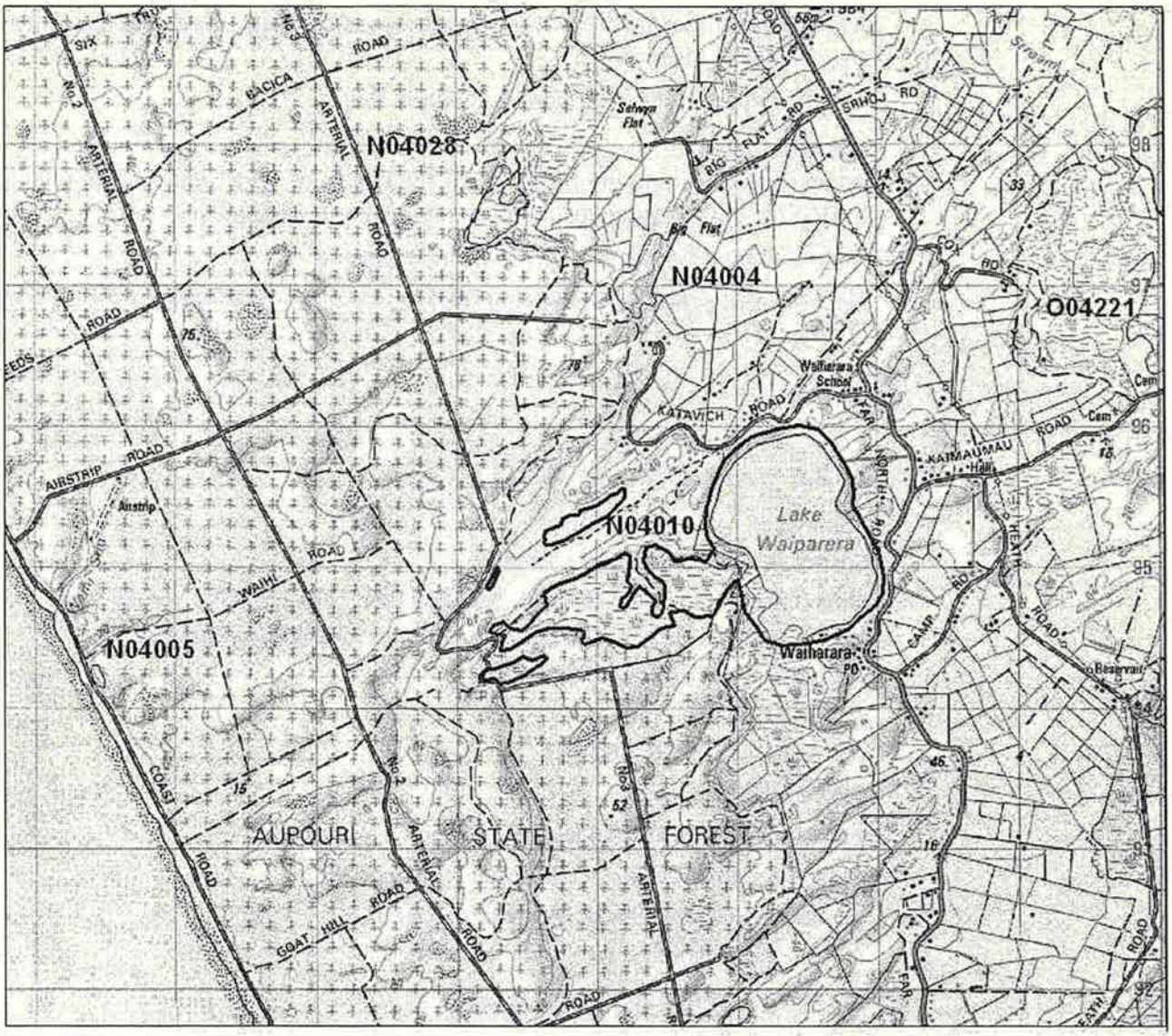
(b) An oioi fringe occurs on the eastern side. Raupo occurs at the southern end.

(c) A fringe of manuka contains tobacco weed, brush wattle and Sydney golden wattle. There are also grassy margins.

(d) To the west is an extensive semi-fertile wetland system. Nearest to Lake Waiparera *Baumea articulata* is dominant over a large area. *Eucalyptus* sp. and pines are planted to the margins in places with a small area of tall kanuka elsewhere.

(e) At the western end there is a sizeable area of open water with the remainder consisting of *Eleocharis sphacelata* reedbeds with frequent *Baumea articulata* and occasional raupo. The threatened fern *Cyclosorus interruptus* is present.

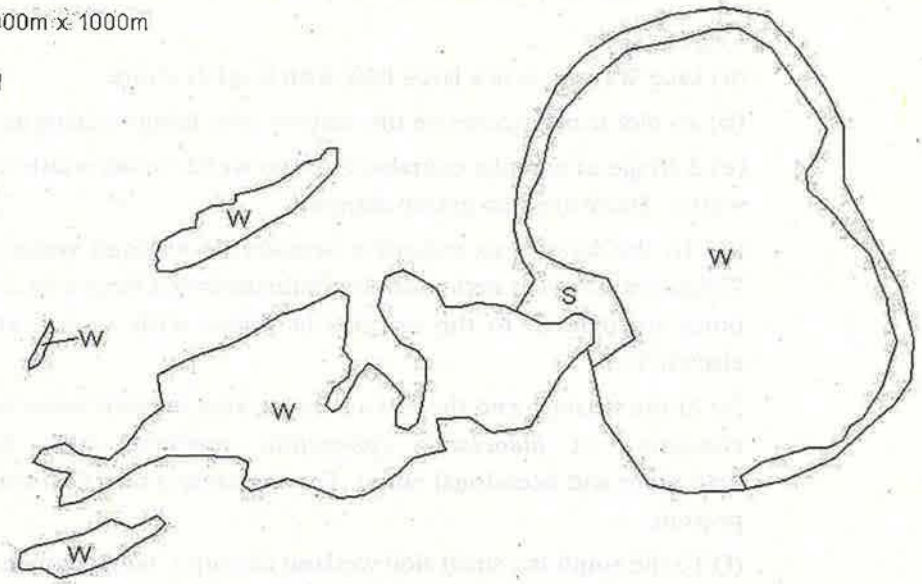
(f) To the south is a small side wetland of raupo, with frequent bracken fern and occasional ti kouka and harakeke. Pines are planted to the margins.



Lake Waiparera & Wetlands N04/010

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



On the northern side is a small lake (mostly open water) with a small area of type (e) *Eleocharis sphacelata* and surrounded by grazed pasture and type (g) tall kanuka with hangehange, harakeke, mingimingi, *Coprosma rhamnoides, C. tenuicaulis* and pampas.

A short distance north is Arterial Rd No 3 Lake, about a third of which is open water, with the remainder consisting of (i) type (f) dense raupo and occasional harakeke (ii) type (d) *Baumea articulata* with other *Baumea* and *Juncus* species.

There is tobacco weed on the pasture periphery and pines to the margin on the north side. Pampas, kanuka, mamaku, hangehange and mingimingi also occur on the periphery.

East of here is Katavich Lake, 60% raupo, type (f), and 40% open water, type (a).

There is some scattered kanuka on the margins but it is grazed to the periphery.

Significant flora

1990 record of *Utricularia protrusa* (Vulnerable), 1988 record of *Hydatella inconspicua* (Declining), *Cyclosorus interruptus* (Declining).

Fauna

Birds: NZ dabchick (Category C threatened species), Australasian bittern (Category O threatened species), NI fernbird, NZ scaup and spotless crake (all Regionally significant species), and a wide diversity of waterbirds.

Aquatic fauna: 1999 records of black mudfish (Category C threatened species), common bully, long-finned eel and inanga.

Significance

One of the best lake/wetland systems in the Ecological Region with several threatened plant and animal species and a variety of vegetation types.

Lake Waiparera wetlands is one of the most significant sites for black mudfish in Northland due to the extensive size of the wetland, its stable hydrology and high density of fish surveyed showing a complete age structure (V. Kerr pers. comm.).

Representative site for type (a) open water, type (d) *Baumea articulata* reedland and type (e) *Eleocharis sphacelata* reedland.

A total of 61.6 ha (29%) is protected within this site; 54.4 ha is Conservation Covenant and 7.2 ha is administered by the Department of Conservation.

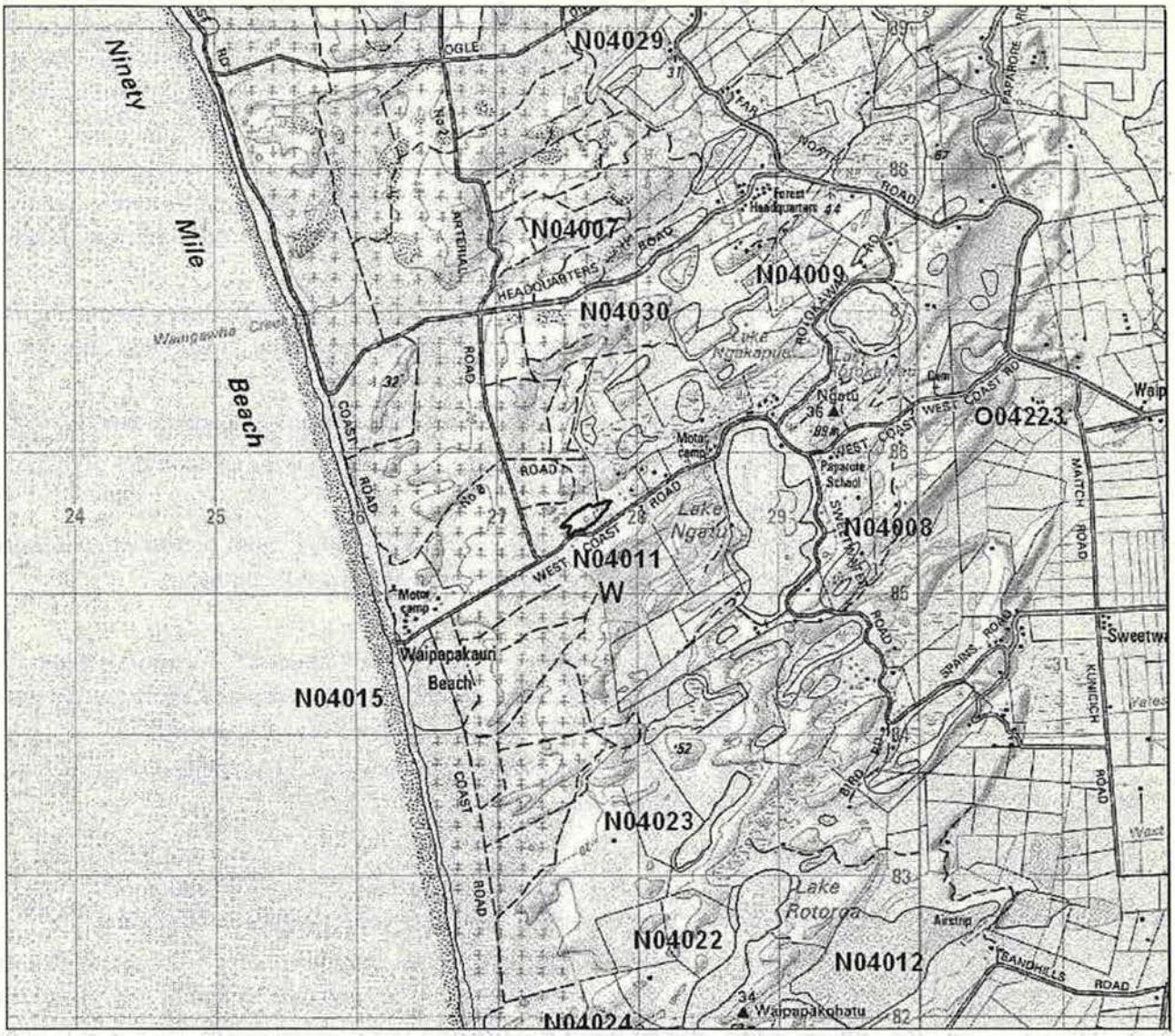
WEST COAST RD LAKE

Survey no.	N04/011
Survey date	9 August 1995
Grid reference	N04 277 855
Area	3.5 ha
Altitude	15–25 m asl

Ecological unit

(a) Open water in dune lake

(b) *Eleocharis sphacelata* reedland in dune hollow



West Coast Rd Lake N04/011

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Freshwater wetland ponded by Holocene dunes.

Vegetation

(a) An area of open water (15%) at the western end.

(b) The remainder consists of a dense bed of *Eleocharis sphacelata* with frequent *Baumea articulata*. The threatened *Myriophyllum robustum* is present.

Pines and farmland occur on the borders, and there is a weedy margin.

Significant flora

Myriophyllum robustum (Declining). The largest known North Island site of this plant (permission granted by Northland Regional Council to use this information from Champion et al. 2002).

Fauna

Birds: NZ dabchick (Category C threatened species), Australasian bittern (Category O threatened species), spotless crake (Regionally significant species), pied shag, and grey duck.

Significance

A high-quality wetland providing habitat for threatened and regionally significant species.

WAIPAPAKAURI BEACH COASTAL SHRUBLAND

Survey no.	N04/015
Survey date	9 August 1995
Grid reference	N04 265 844
Area	16.6 ha
Altitude	0–15 m asl

Ecological unit

Harakeke-kanuka association on dunes

Landform/geology

Holocene coastal dunes.

Vegetation

An association of harakeke, kanuka and sedges. *Coprosma acerosa*, native ice plant, kikuyu, toetoe, pohutukawa and areas of open sand are scattered.

Significant flora

Year 2000 record of *Pimelea arenaria* (Declining).

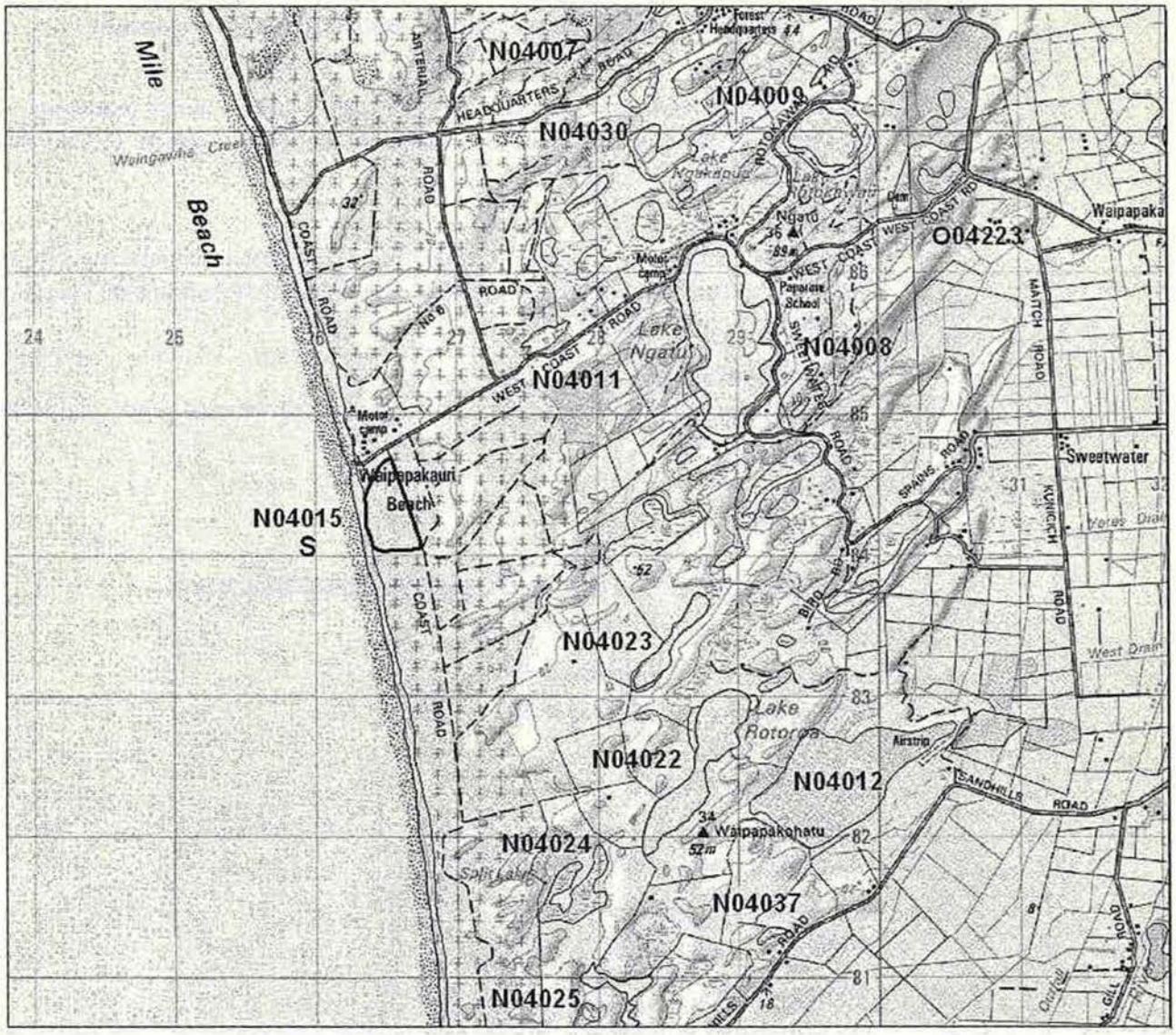
Fauna

Not surveyed.

Significance

A shrubland area which is a good example of a now much-reduced vegetation type. Representative site for, and only record of, harakeke-kanuka association in the Ecological District.

Most of this site, 15.8 ha (95%), is protected Stewardship Land administered by the Department of Conservation.



Waipapakauri Beach Coastal Shrubland N04/015

Each grid is 1000m x 1000m
and = 100 ha.

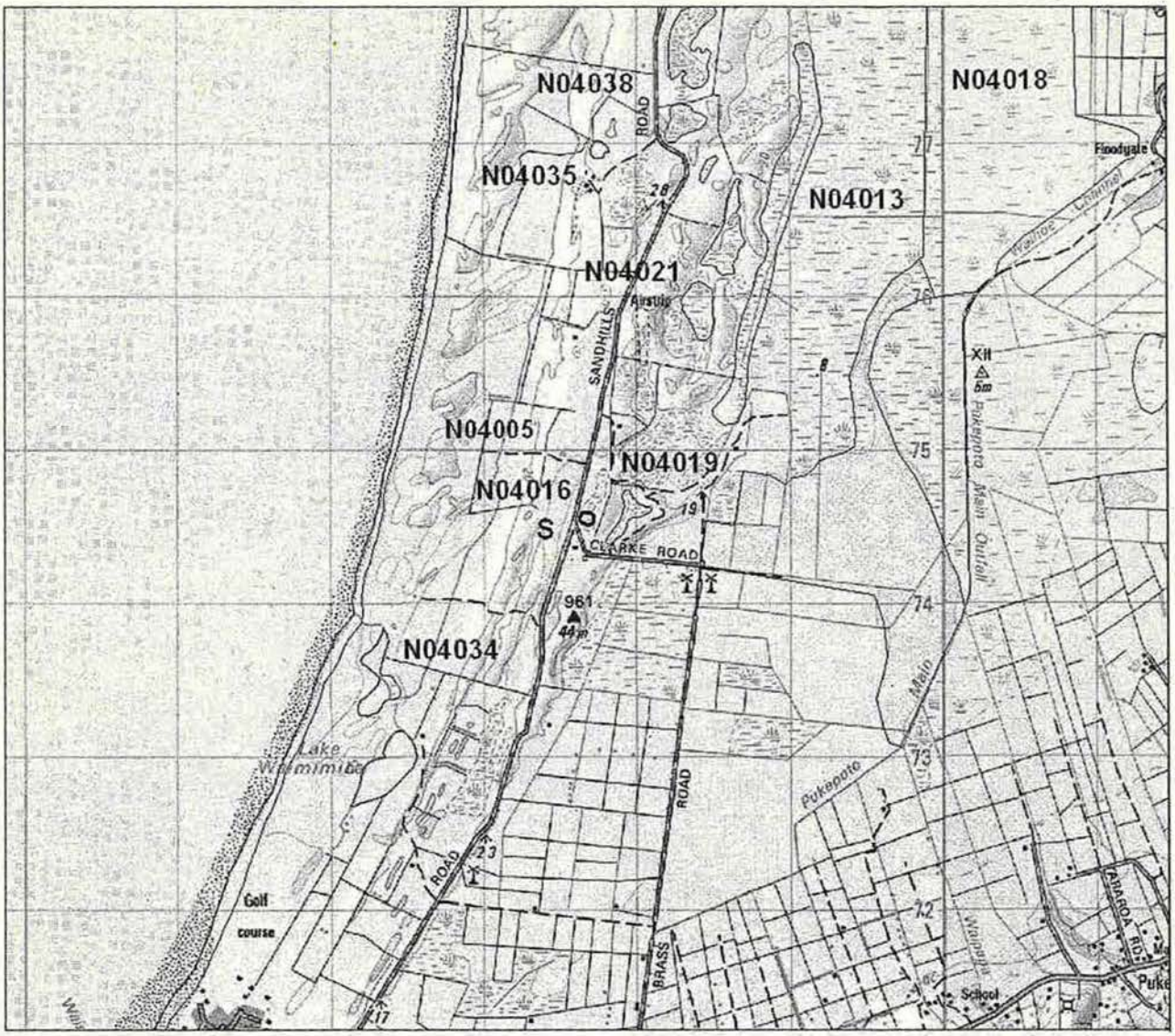
S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

SANDHILLS RD SWAMP

Survey no.	N04/016
Survey date	13 September 1995
Grid reference	N04 277 746
Area	0.6 ha
Altitude	5–15 m asl

Ecological unit

Gorse-manuka shrubland on peat



Sandhills Rd Swamp N04/016

Each grid is 1000m x 1000m
and = 100 ha.
S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Interdune flat in dunefield of Pleistocene consolidated parabolic dunes.

Vegetation

Part of a peat depression that is temporarily wet. Low (1-2 m) shrubland dominated by gorse with manuka commonly occurring. Tasmanian blackwood have been planted throughout.

Significant flora

Thelymitra (a) (Taxonomically Indeterminate-Endangered) and *T. malvina* (Naturally Uncommon-Range Restricted) recorded in 1990, *T.* "darkie" and *T.* "rough leaf" (both Regionally significant species).

Historical record of *T. matthewsii* (Naturally Uncommon-Sparse) by Matthews in 1911.

Fauna

Not surveyed.

Significance

This habitat is very modified and reduced (a pond has been constructed and the area planted (L.J. Forester pers. comm.) since the threatened plant records but continues to provide habitat for threatened species with a narrow habitat range. Frequent monitoring is recommended.

SWEETWATER STATION DEPRESSIONS

Survey no.	N04/017
Survey date	13 September 1995
Grid reference	N04 286 799, N04 284 798, N04 283 794, N04 284 795, N04 281 796, N04 282 795, N04 286 795, N04 278 793
Area	15 ha
Altitude	5–15 m asl

Ecological unit

(a) Open water

(b) Rushland in dune depression

(c) Manuka-gorse shrubland in dune depression

(d) *Eleocharis sphacelata* reedland in dune depression

(e) *Eleocharis sphacelata-Baumea articulata*-raupo reedland in dune depression

Landform/geology

Interdune flat in dunefield of Pleistocene consolidated parabolic dunes.

Vegetation

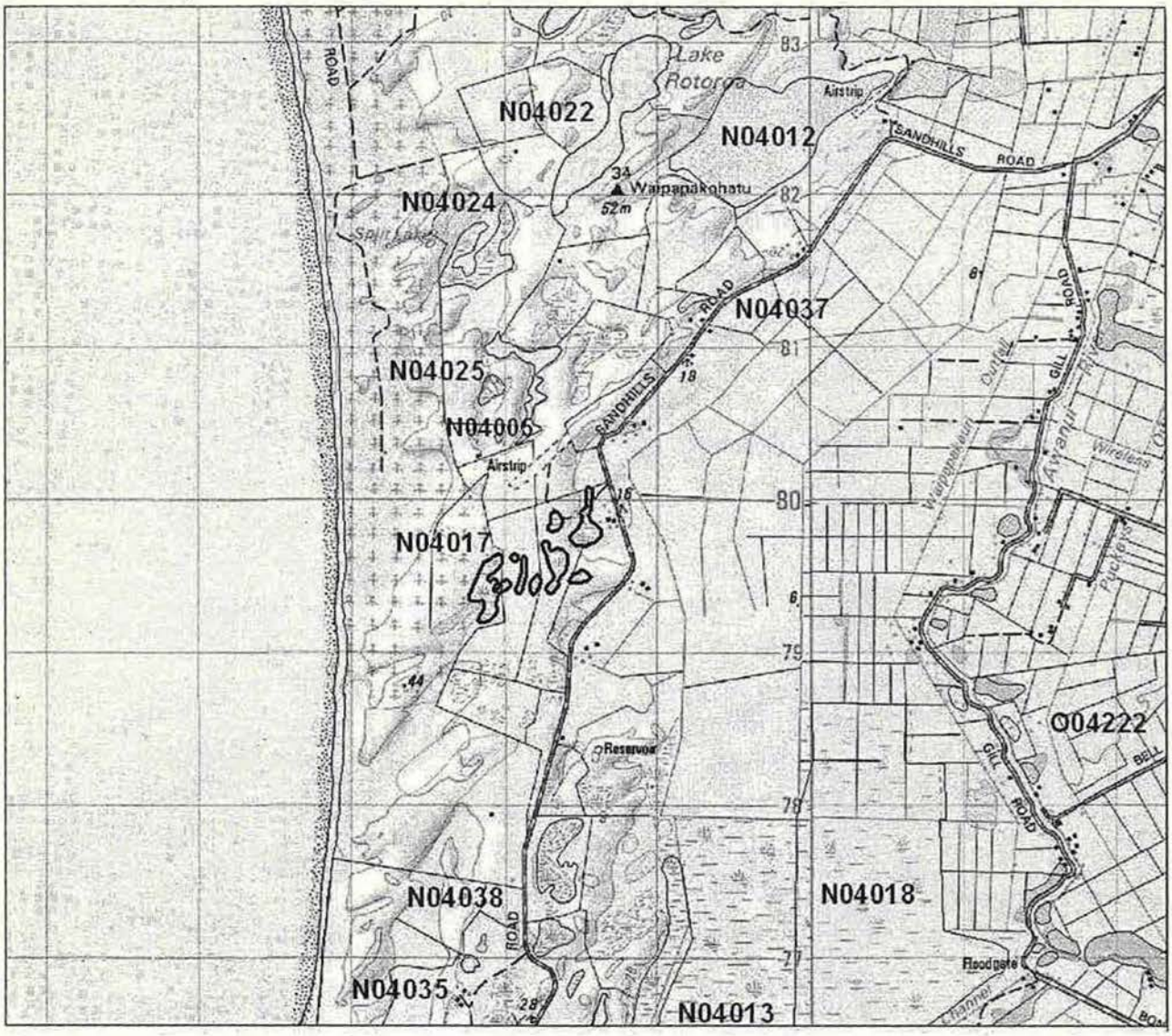
A cluster of dune depressions that are seasonally wet.

(a) The wetlands have little or no permanent water.

(b) Rushes are common throughout. Giant umbrella sedge occurs in almost all areas.

(c) Manuka and gorse occur in the more shallow wetlands.

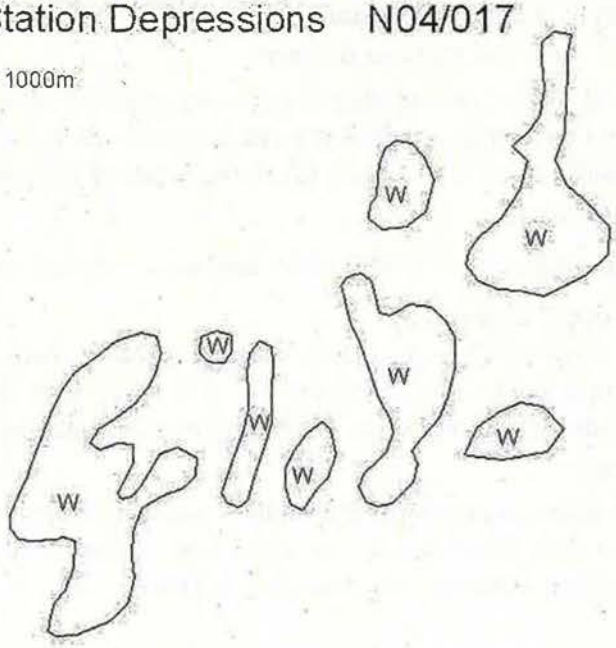
(d) *Eleocharis sphacelata* is abundant in one area but absent or rare in most other areas. Harakeke and raupo are scattered intermittently throughout. Other species present are *Coprosma propinqua* x *robusta, Myriophyllum* sp. and pohuehue.



Sweetwater Station Depressions N04/017

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



(e) The south-western wetland, the largest in the group, is *Eleocharis sphacelata* dominant with raupo and *Baumea articulata*. *Isolepis prolifer* is also present. This site is seasonally dry.

Fauna

Birds: Common bird species.

Aquatic fauna: Black mudfish (Category C threatened species).

Significance

Seasonally wet habitats and habitat for a nationally threatened species.

TANGONGE WETLAND

Survey no.	N04/018
Survey date	7 August 1995
Grid reference	O04 300 760, O04 314 755
Area	486 ha (413 ha shrubland, 73 ha wetland)
Altitude	5–15 m asl

Ecological unit

(a) Open water

(b) Manuka-gorse shrubland on peat

(c) Gorse shrubland on peat

Landform/geology

Holocene swamp and alluvial deposits.

A semi-mineralised wetland with areas of semi-acid peat bog.

Vegetation

(a) This area is now only seasonally wet.

(b) Occasional ti kouka are emergent over thickets of manuka and gorse with swards of *Baumea articulata* mixed with blackberry, *Juncus* rushes, *Baumea* sedges, umbrella fern and bracken.

(c) Drainage of surrounding land has lowered the watertable causing a drying out and favouring invasion of weed species such as blackberry, gorse, pampas and tobacco weed which are locally frequent or abundant.

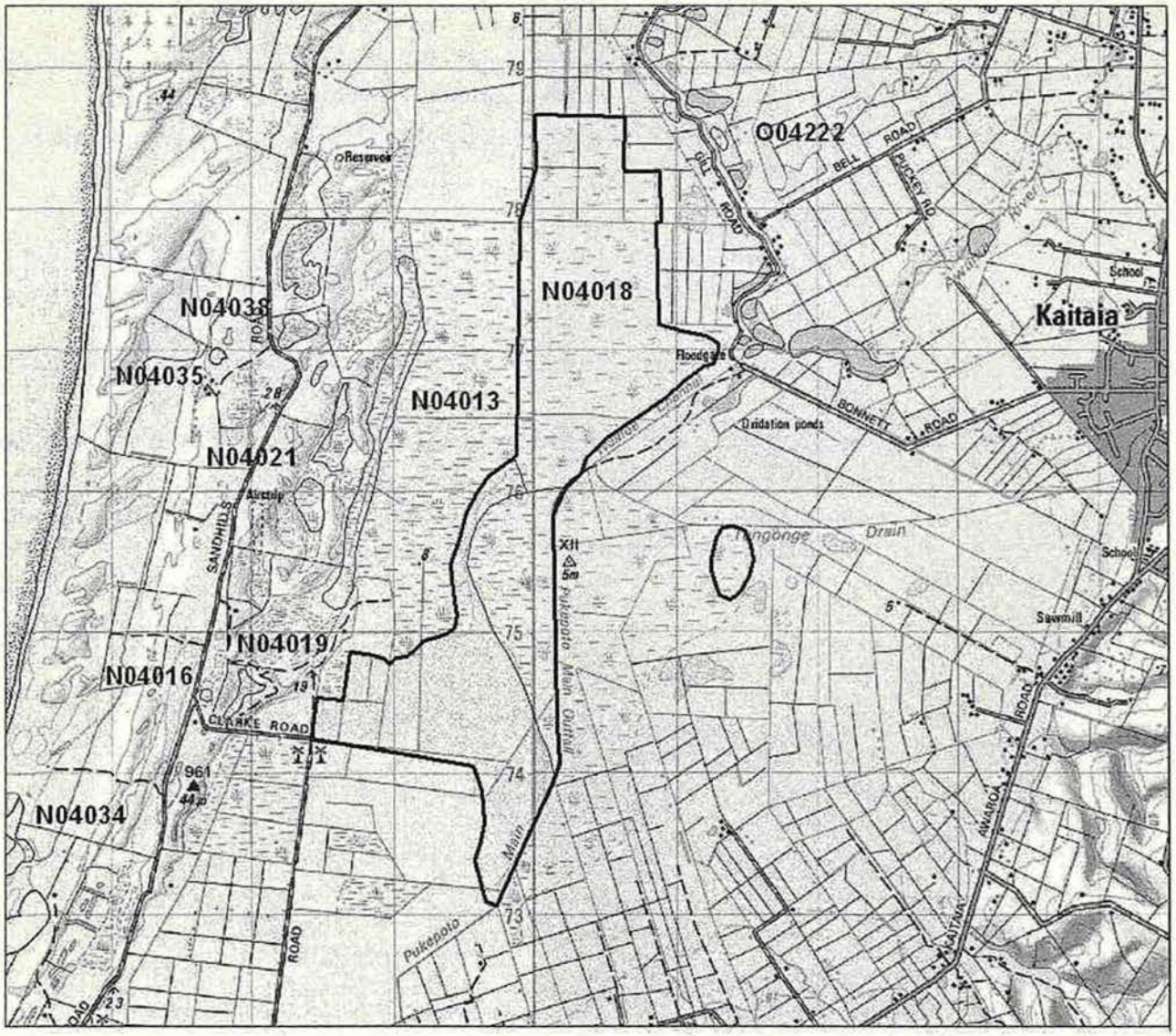
Significant flora

Utricularia protusa (Vulnerable) has been recorded from this site.

Historical records

The now-endangered orchid *Corybas carsei* (Critically Endangered) was recorded from Lake Tangonge in 1919 and there is a 1912/13 record of *Sporodanthus ferrigineus* (Declining) by Carse, also recorded by H.B and R.H. Matthews.

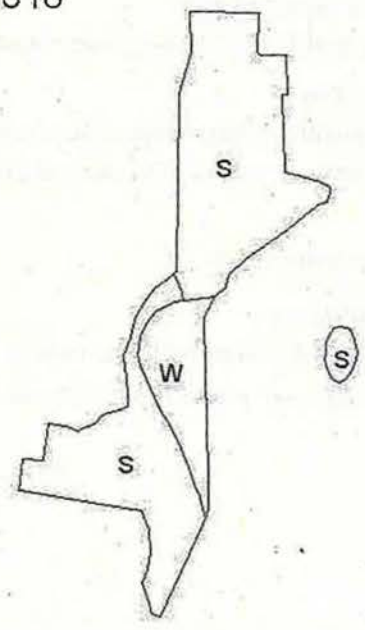
Thelymitra matthewsii (Naturally Uncommon–Sparse) in 1911, *Pterostylis micromega* (Endangered) in 1902 and *Chiloglottis formicifera* (Naturally Uncommon–Vagrant) was recorded in 1900.



Tangonge Wetland N04/018

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Fauna

Birds: Australasian bittern (Category O threatened species). NI fernbird, and spotless crake (both Regionally significant species) and NZ shoveler.

Aquatic fauna: 1993 record of black mudfish (Category C threatened species), freshwater mussel.

Significance

A large shrubland area that is seasonally wet, providing extensive habitat for a diversity of wetland species, including several which are threatened. Tangonge Wetland is a remnant of a larger system that has mostly been drained.

As many as 3000 pied stilts utilise Lake Tangonge during the winter season (R.J. Pierce pers. comm.).

The Tangonge wetlands in 1978 were 341 ha in size; a resurvey in 1988 revealed a loss of 221 ha, to 120 ha.

Approximately 43.2 ha of the wetland (8.8%) is protected Stewardship Land administered by the Department of Conservation.

CLARKE RD WETLAND

Survey no.	N04/019
Survey date	11 August 1995
Grid reference	N04 280 746
Area	3.1 ha
Altitude	10–20 m asl

Ecological unit

(a) Open water

(b) *Eleocharis sphacelata* reedland in dune hollow

Landform/geology

Wetland ponded by Pleistocene consolidated parabolic dunes.

Vegetation

A small shallow peaty depression with dense *Eleocharis sphacelata* and some open water. It is grazed to the margins.

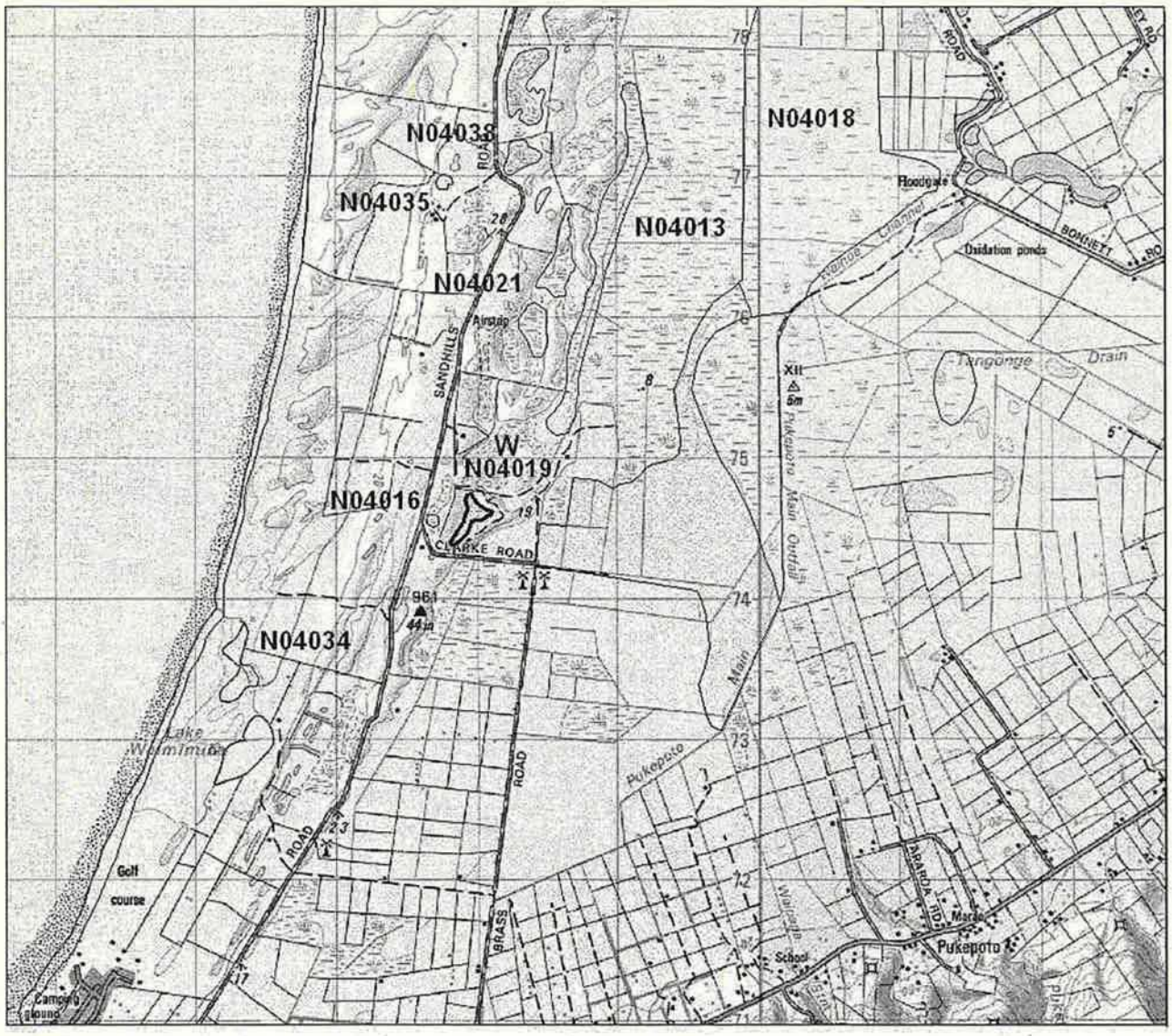
Fauna

Common waterbirds.

Significance

A small wetland area which is habitat for waterbirds.

Peat habitats are much reduced from their former extent.



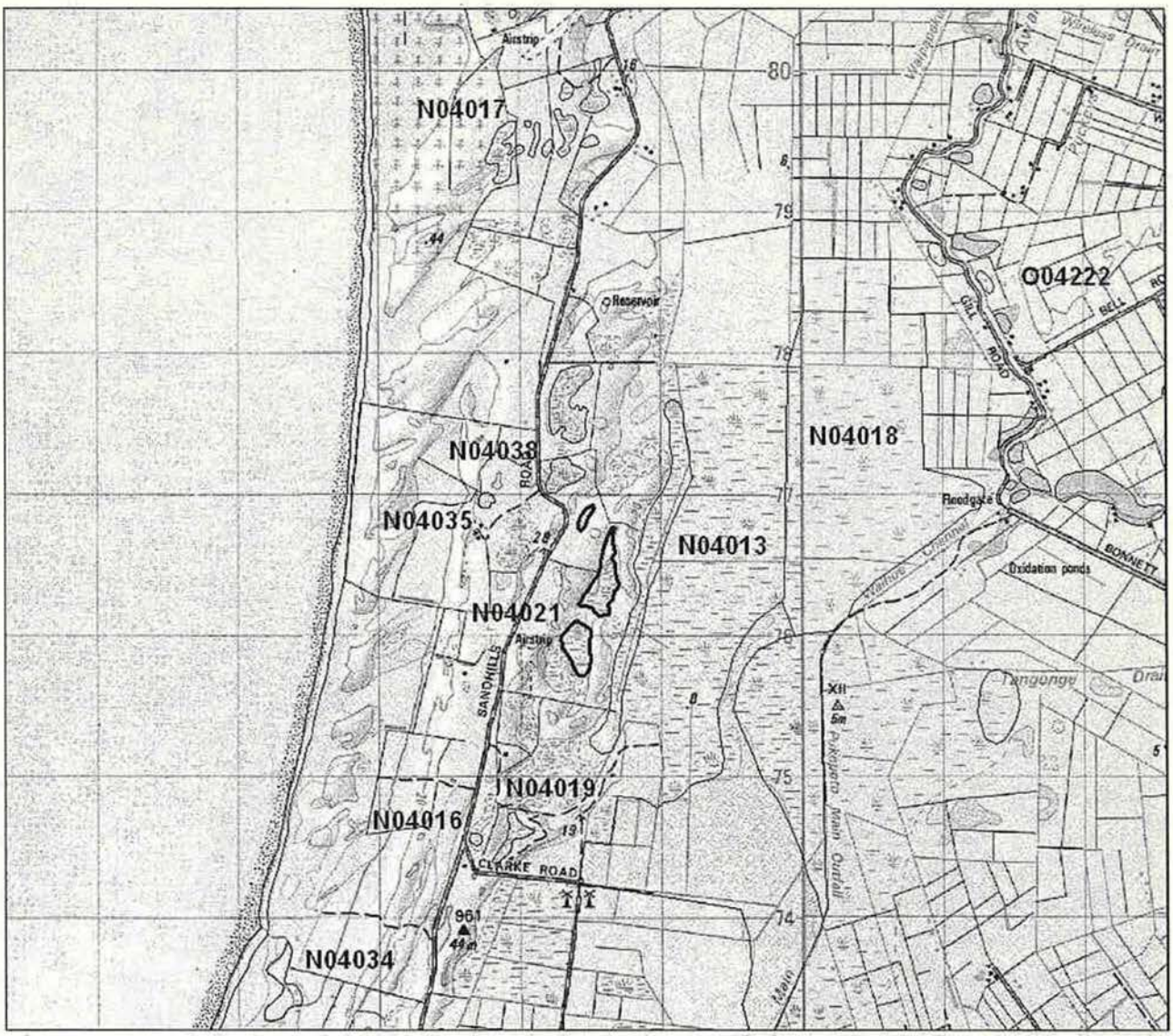
Clarke Rd Wetland N04/019

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

SANDHILLS RD WETLAND NO 1

Survey no.	N04/021
Survey date	12 February 1996
Grid reference	N04 284 768, N04 286 765, N04 284 758
Area	14.1 ha
Altitude	<20 m asl



Sandhills Rd Wetland No1 N04/021

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

(a) Manuka swamp shrubland on peat

(b) *Eleocharis sphacelata* reedland on peat

(c) Open water

(d) *Baumea articulata-Eleocharis sphacelata-Isolepis prolifer* association on peat

Landform/geology

Freshwater wetlands in interdune hollows on Pleistocene parabolic dunefield.

Vegetation

(a) The southern area is a semi-wet manuka peat bog containing some gorse, *Baumea articulata* and other *Baumea* and *Juncus* species.

(b) There is also a tiny area of *Eleocharis sphacelata* reed beds on the periphery.

(c) The main central area is a mosaic of open water, with type (d) *Baumea articulata*, *Eleocharis sphacelata* and *Isopelis prolifer.*

Other species present are manuka, raupo, ti kouka and willow weed.

To the north-west, type (b) also occurs in another *Eleocharis sphacelata* reed bed with a small amount of open water.

All areas are grazed to their margins.

Significant flora

The threatened *Myriophyllum robustum* (Declining) is recorded.

Fauna

Birds: Australasian bittern (Category O threatened species).

Aquatic fauna: 1993 record of black mudfish (Category C threatened species).

Significance

Peat swamps are much reduced from their previous extent and are now an under-represented habitat type.

Representative site for and the only record of *Baumea articulata-Eleocharis sphacelata-Isolepis prolifer* association in the Ecological District.

This area is also habitat for the threatened black mudfish and Australasian bittern.

LAKE ROTOROA & WETLANDS

Survey no.	N04/022
Survey date	19 January 1996
Grid reference	N04 293 834, N04 293 832, N04 287 255
Area	32 ha (2.1 shrubland, 29.9 ha wetland)
Altitude	< 20 m asl

Ecological unit

(a) Open water in dune lake

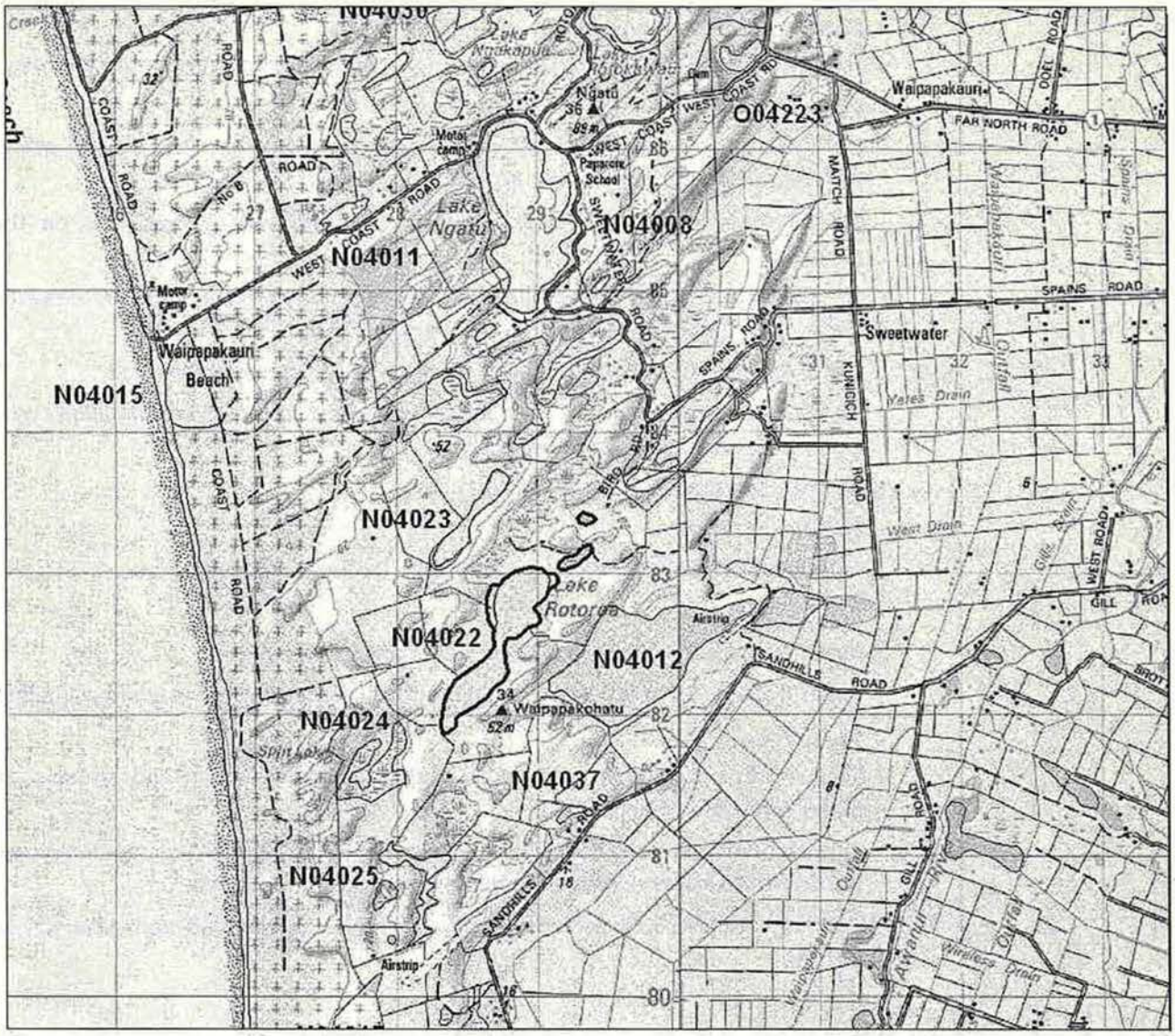
(b) *Eleocharis sphacelata* reedland on lake bed

(c) Kanuka-manuka-gorse shrubland on lake margin

(d) *Eleocharis sphacelata-Baumea articulata* reedland on lake bed

Landform/geology

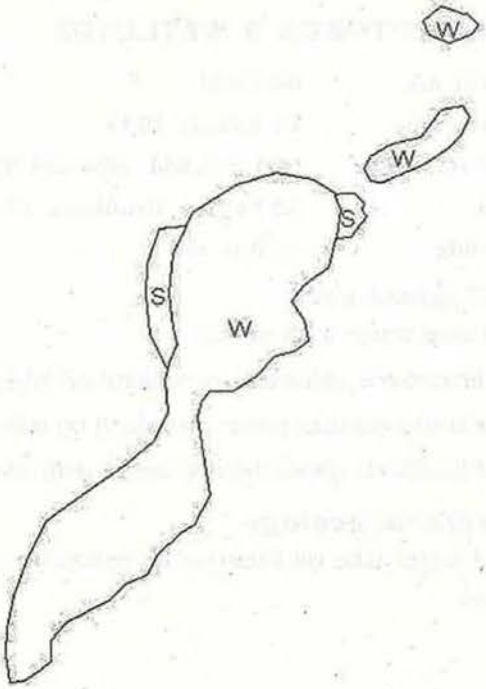
Freshwater lake on Pleistocene parabolic dunefield ponded by late Holocene dunes.



Lake Rotoroa & Wetlands N04/022

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Vegetation

(a) A dune lake which is 95% open water.

(b) The remainder comprises *Eleocharis sphacelata* reed beeds with frequent raupo. *Baumea articulata* is also present. Old kauri stumps are present on the lake bed.

(c) On the northern shoreline is a small area of kanuka-manuka-gorse.

(d) A short distance to the north-east is the semi-fertile Lake Rotoroa Swamp which was once connected to Lake Rotoroa and is mostly *Eleocharis sphacelata. Baumea articulata* is common. Harakeke, *Baumea teretifolia,* oioi, *Eleocharis acuta* and other small herbaceous weeds are present.

This area is fenced and has poplars planted on the margins.

Type (d) also occurs north of this in another small wetland, Bird Rd Swamp, which has only a small area of open water and is mainly *Eleocharis sphacelata* with *Baumea articulata. Juncus* rushes and swamp grass occur on the margin, which is grazed.

Significant flora

The threatened plants *Hydatella inconspicua* and *Myriophyllum robustum* (both Declining) are present.

Fauna

Birds: A wide diversity of waterbirds including NZ dabchick (Category C threatened species), spotless crake and Australasian little grebe (both Regionally significant species). OSNZ have recorded Australasian bittern (Category O threatened species) in recent surveys.

Aquatic fauna: common bully, short-finned eel.

Significance

One of the largest in a chain of dune lakes, with high ecological values, containing several threatened species and two regionally significant species. Representative site for open water, and *Eleocharis sphacelata-Baumea articulata* reedland.

Stewardship Land of 29 ha and a small area of Scenic Reserve, 0.4 ha, both administered by the Department of Conservation protects 91.8% of this site.

LAKE HEATHER

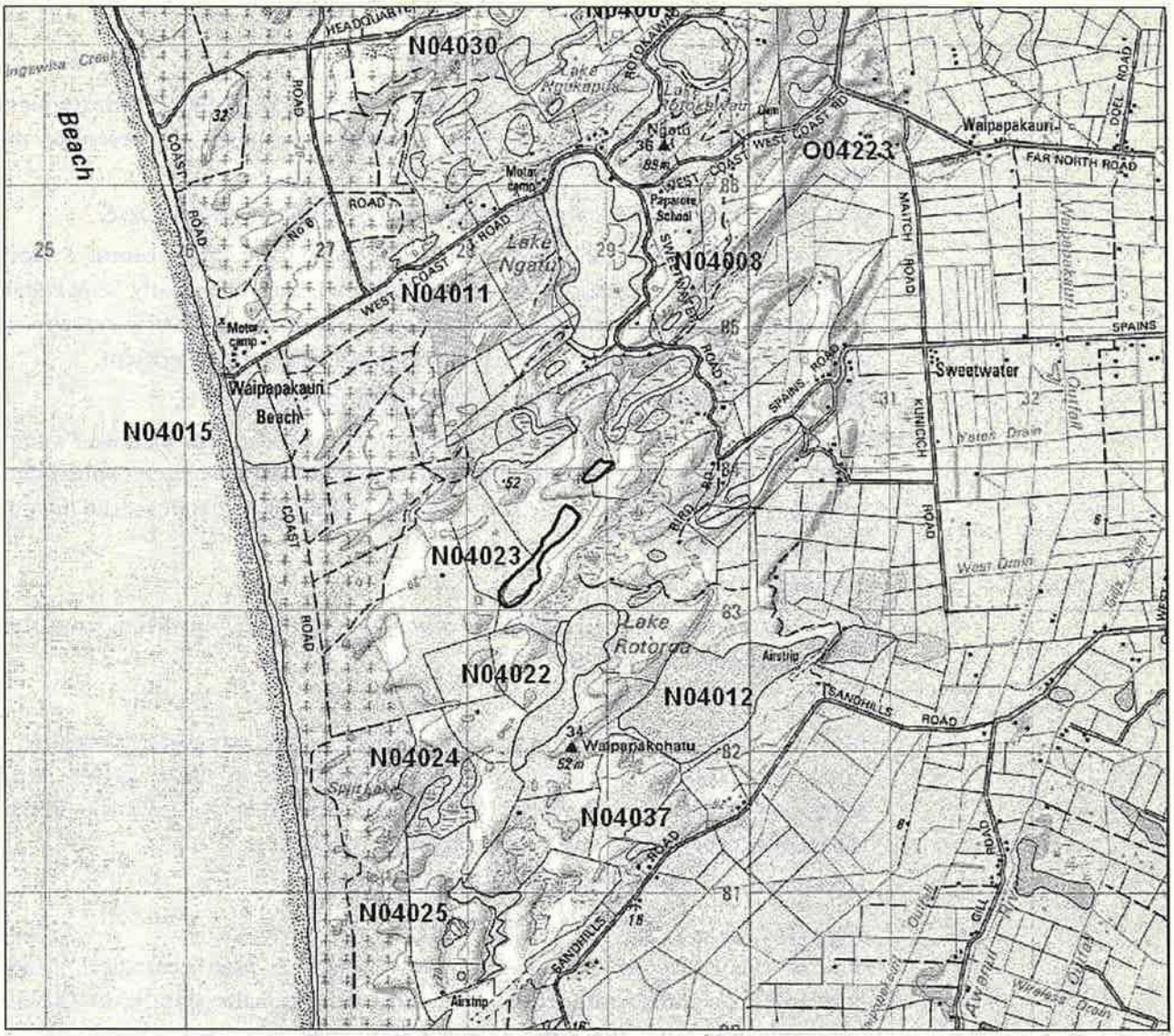
Survey no.	N04/023
Survey date	19 January 1996
Grid reference	N04 285 835, N04 290 840
Area	11 ha
Altitude	< 20 m asl

Ecological unit

(a) Open water in dune lake

(b) *Eleocharis sphacelata*-raupo reedland on lake bed

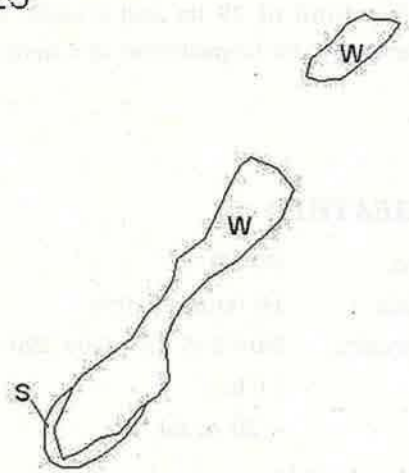
(c) Gorse-tobacco scrub weed on lake margin



Lake Heather N04/023

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Landform/geology

Freshwater wetland ponded on Pleistocene parabolic dunefield by late Holocene dunes.

Vegetation

(a) At least three quarters of the lake is open water.

(b) *Eleocharis sphacelata* dominates the reed beds but raupo is also common. *Baumea* is frequent. Harakeke and kuta are also present. On the margins swamp millet, giant umbrella sedge, *Carex* and willow weed occur as do the threatened plants *Myriophyllum robustum* and *Thelypteris confluens.*

(c) On the southern boundary gorse and tobacco weed occur with occasional ti kouka and mamaku. Some poplars and brush wattle are also present.

Significant flora

Myriophyllum robustum (Declining) and *Thelypteris confluens* and *Utricularia protrusa* (both Vulnerable). Historical record of *Hydatella inconspicua* (Declining) from this site.

Fauna

Birds: NZ dabchick (Category C threatened species), Australasian bittern (Category O threatened species), grey teal (Regionally significant species) and NZ shoveler, black shag, and grey duck.

Aquatic fauna: black mudfish (Category C threatened species), common bully, short-finned eel.

Significance

A large, relatively unmodified dune lake which is used by high numbers of waterbirds including the threatened NZ dabchick and Australasian bittern.

Two threatened plants are also present.

Bushlands Trust is a voluntary organisation that has had an on-going planting regime at Lake Heather for several years. Most plants are sourced from the District such as ngaio, *Pittosporum* sp., harakeke, etc.

Representative site for open water in dune lake.

Stewardship Land of 7.5 ha and 0.8 ha of Scenic Reserve both administered by the Department of Conservation protects 75% of this site.

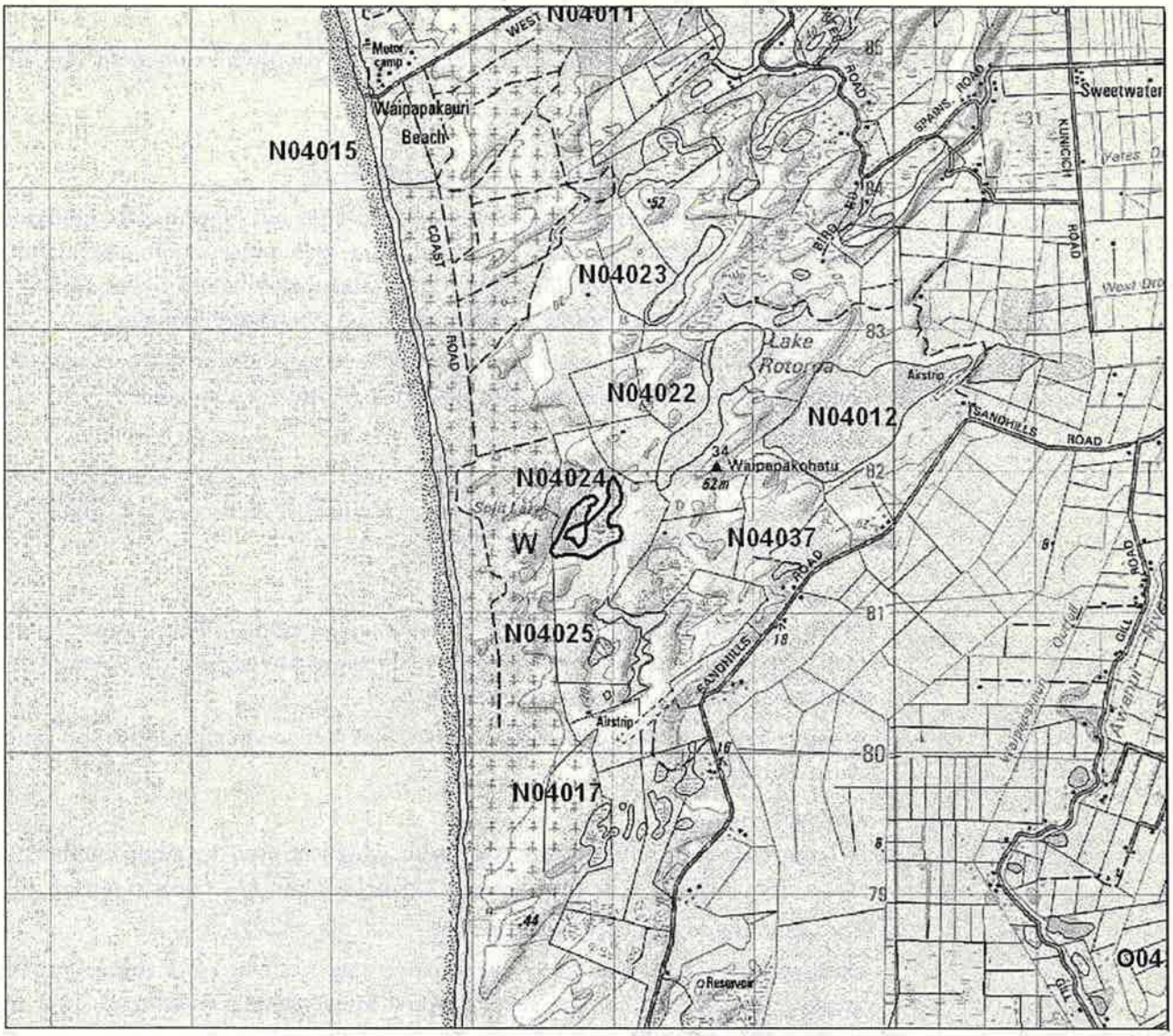
SPLIT LAKE WETLAND

Survey no.	N04/024
Survey date	19 January 1996
Grid reference	N04 278 815
Area	12.6 ha
Altitude	20 m asl

Ecological unit

(a) Open water (intermittent)

(b) *Eleocharis sphacelata* reedland on lake bed



Split Lake Wetland N04/024

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Freshwater wetland ponded against Pleistocene parabolic dunefield by Holocene dunes.

Vegetation

(a) A suspended floating bog in a shallow depression amongst undulating grass-covered dunes.

(b) *Eleocharis sphacelata* is dominant, *Baumea articulata* frequent with occasional raupo, harakeke, water fern, kiokio, ring fern, *Juncus* sp., *Carex* sp., swamp millet and small sedges. It is grazed to the margins.

Fauna

Birds: Australasian bittern (Category O threatened species), past records of black-fronted dotterel. Presence of common waterbirds.

Aquatic fauna: long-finned eel

Significance

Excellent habitat for the threatened Australasian bittern and other marsh species. The suspended nature of this wetland is an unusual feature.

Representative site for *Eleocharis sphacelata* reedland.

The majority of this site (10.8 ha, 85.7%) is protected by Conservation Covenant administered by the Department of Conservation.

MINI & ROUND LAKES

Survey no.	N04/025
Survey date	19 January 1996
Grid reference	N04 283 807, N04 279 807, N04 279 804, N04 293 813
Area	9.9 ha
Altitude	20 m asl

Ecological unit

(a) Open water

(b) Raupo reedland on lake bed

(c) *Eleocharis sphacelata*-raupo reedland on lake bed

Landform/geology

Freshwater wetland ponded against Pleistocene parabolic dunefield by late Holocene dunes.

Vegetation

(a) The largest lake is half open water.

(b) The remaining area is raupo dominant with frequent *Eleocharis sphacelata* and occasional *Isolepis prolifer,* willow weed, *Myriophyllum propinquum, Eleocharis acuta,* and *Cotula* sp. on the margins.

(c) The middle site is also half open water, with the other half *Eleocharis sphacelata* dominant and raupo commonly occurring. *Baumea articulata* is also present.

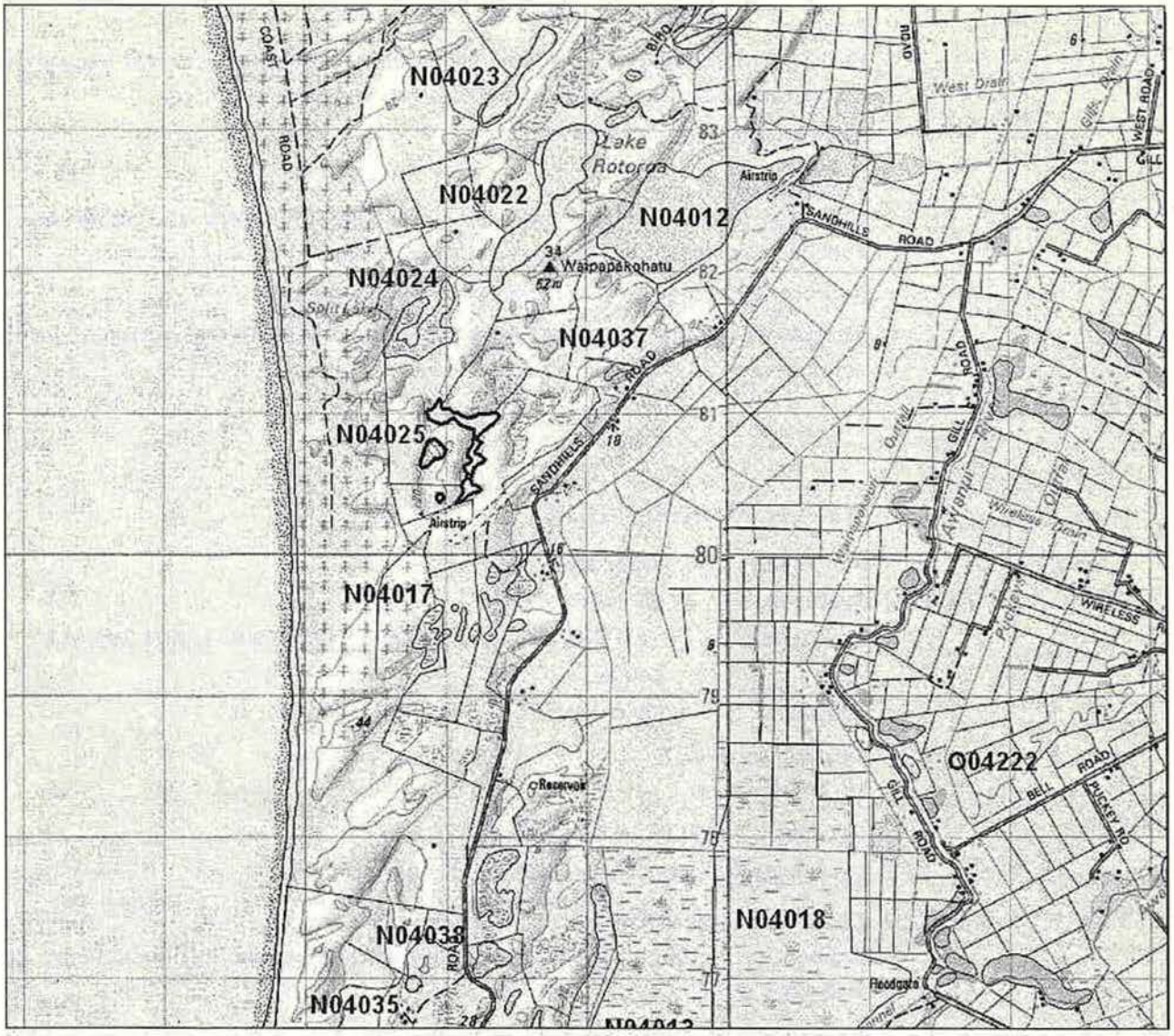
The smallest site is almost all dense raupo, type (b), with just a fraction of open water.

All sites are grazed to the margins.

Fauna

Birds: NZ dabchick (Category C threatened species), Australasian bittern (Category O threatened species), spotless crake and Australasian little grebe (both Regionally significant species), NZ shoveler and yellow-billed spoonbill. Black shag, and pied shag were recorded by the OSNZ in recent surveys.

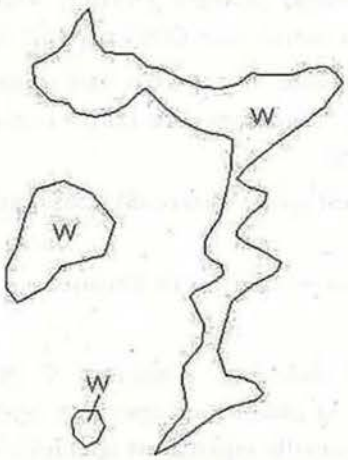
Aquatic fauna: common bully.



Mini & Round Lakes N04/025

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Significance

Habitat for a diversity of bird species including threatened and regionally significant species.

A Conservation Covenant administered by the Department of Conservation protects 8.7 ha (87.8%) of this site.

TURKS LAKE & WETLAND

Survey no.	N04/026
Survey date	17 January 1995
Grid reference	N04 247 998
Area	12.4 ha
Altitude	40 m asl

Ecological unit

(a) *Eleocharis sphacelata-Baumea articulata* reedland on lake bed

(b) Open water in dune lake

(c) Raupo reedland on lake bed

(d) Manuka shrubland on lake margin

Landform/geology

Freshwater wetland on Pleistocene parabolic dunefield, with lake ponded by late Holocene dunes.

Vegetation

(a) The northern area is almost totally *Eleocharis sphacelata* reed beds with *Baumea articulata* commonly occurring. Raupo, harakeke and ti kouka are occasional.

(b) There is a small amount of open water, the level of which is fluctuating.

(c) The southern area is a raupo swamp with frequently occurring ti kouka.

(d) Manuka occurs around the margins and in arms penetrating the wetlands.

Pines and *Eucalyptus* sp. are planted to the margins.

Significant flora

Cyclosorus interruptus (Declining) (P. Anderson pers. comm.).

Fauna

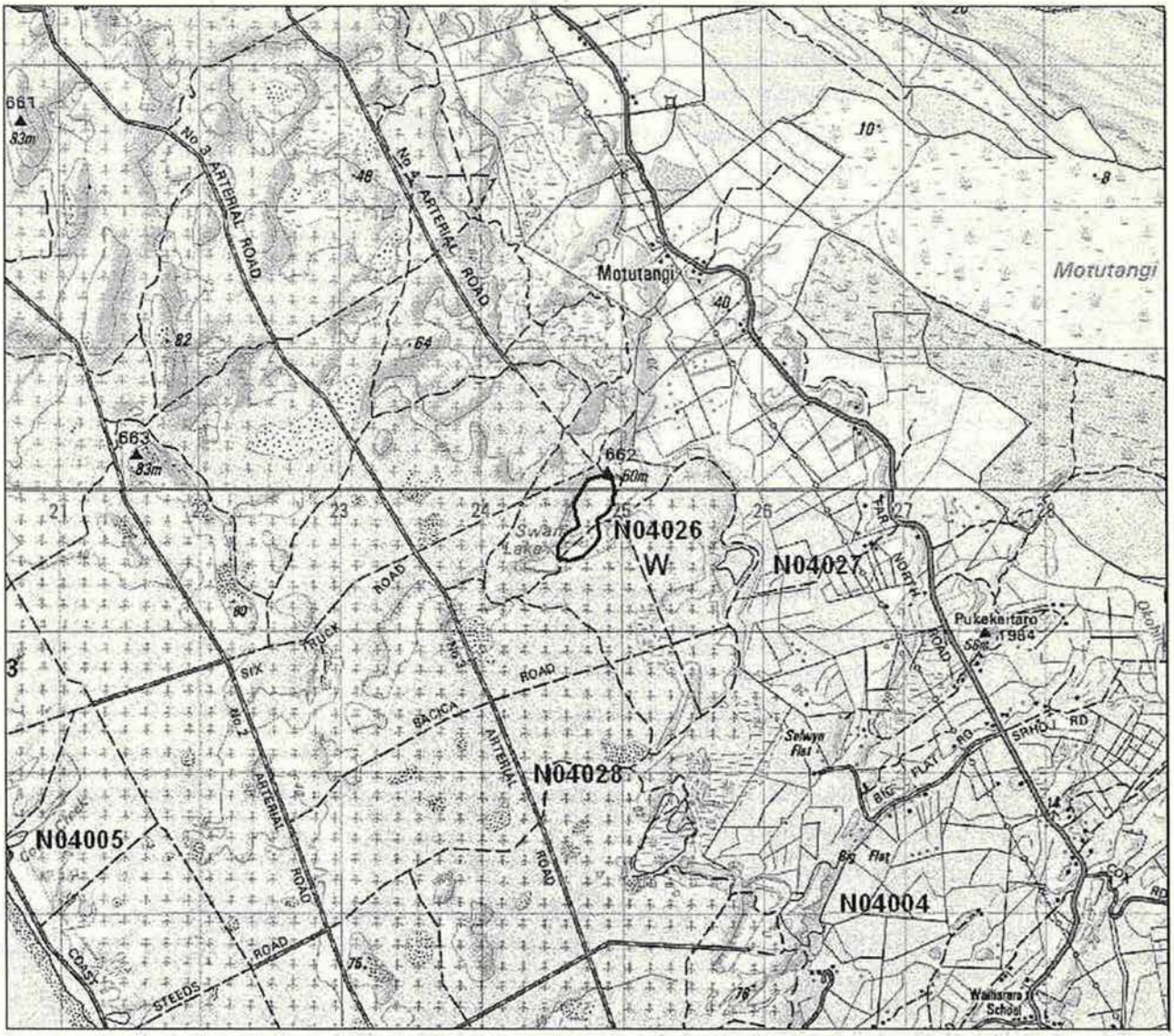
Birds: NI fernbird and Australasian little grebe. (both Regionally significant species).

Significance

Good quality and sized habitat for regionally significant species and provides potential habitat for spotless crake (Regionally significant species) and Australasian bittern (Category O threatened species). Habitat for the threatened fern *Cyclosorus interruptus*.

Representative site for *Eleocharis sphacelata-Baumea articulata* reedland and raupo reedland.

A Conservation Covenant administered by the Department of Conservation protects 8.1 ha of this site.



Turks Lake & Wetland N04/026

Each grid is 1000m x 1000m
and = 100 ha.

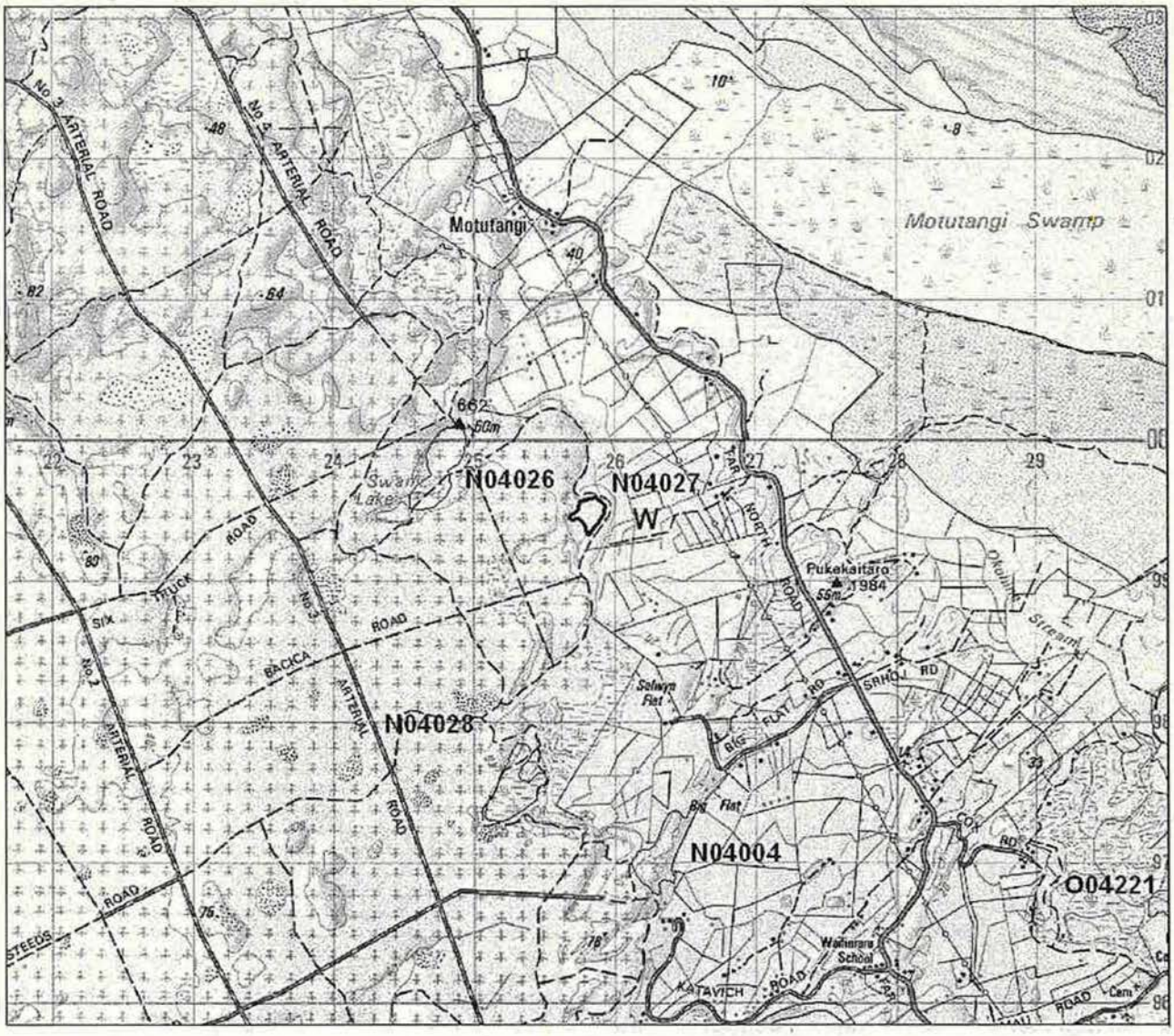
S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

BACICA RD LAKE

Survey no.	N04/027
Survey date	16 January 1996
Grid reference	N04 258 995
Area	3.5 ha
Altitude	< 20 m asl

Ecological unit

(a) Open water in dune lake



Bacica Rd Lake N04/027

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

(b) *Eleocharis sphacelata* reedland on lake bed

(c) Raupo reedland on lake bed

Landform/geology

Freshwater wetland in interdune hollow on Pleistocene parabolic dunefield.

Vegetation

(a) Approximately 50% of the habitat is open water.

(b) *Eleocharis sphacelata* is dominant with *Eleocharis acuta, Carex secta, Isolepis prolifer, Baumea articulata* and willow weed also present.

(c) Manuka is emergent over raupo, with *Baumea articulata,* harakeke and ti kouka also present. A few maire tawake trees occur in the raupo swamp.

The area is fenced. Pines are planted to the margin on the western side.

Fauna

Birds: NZ scaup (Regionally significant species) and common waterbirds.

Aquatic birds: Banded kokopu (Category C threatened species), and eels.

Significance

Ideal habitat for waterbirds and the unusual occurrence in this Ecological Region of maire tawake. Presence of threatened and regionally significant species.

Representative site for *Eleocharis sphacelata* reedland.

The lake is protected Conservation Covenant administered by the Department of Conservation.

SELWYN FLAT WETLAND

Survey no.	N04/028
Survey date	16 January 1996
Grid reference	N04 253 975
Area	11.7 ha
Altitude	40 m asl

Ecological unit

Baumea articulata-raupo reedland in dune hollow

Landform/geology

Freshwater wetland in hollow between Pleistocene parabolic dunes and late Holocene dunes.

Vegetation

A fertile swamp dominated by *Baumea articulata* with raupo commonly occurring. Harakeke is locally dense. Other species present are *Coprosma tenuicaulis, C. robusta, Baumea rubiginosa,* giant umbrella sedge, shaking brake, ti kouka, thistle and Mexican devilweed. The threatened *Thelypteris confluens* is present as are two maire tawake.

There is a narrow buffer of kanuka in places. Pines and *Eucalyptus* sp. are planted to the margins and willow, tobacco weed and black wattle occur occasionally.

Significant flora

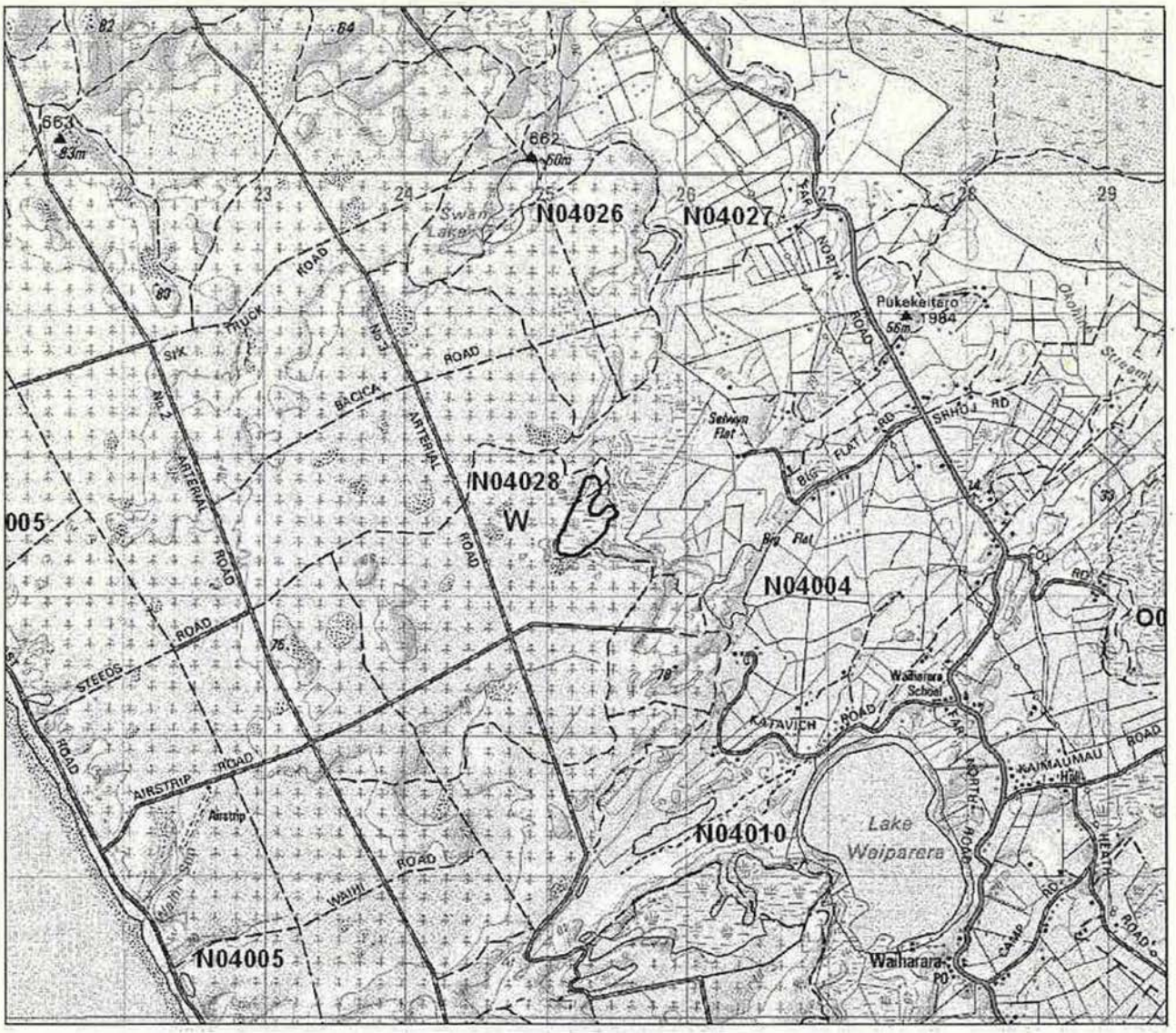
Thelypteris confluens (Vulnerable).

Fauna

Birds: NI fernbird (Regionally significant species).

Significance

A fertile wetland which is habitat for threatened and regionally significant species and potential habitat for spotless crake (Regionally significant species) and Australasian bittern (Category O threatened species).



Selwyn Flat Wetland N04/028

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Unusual occurrence of maire tawake in the Ecological Region.

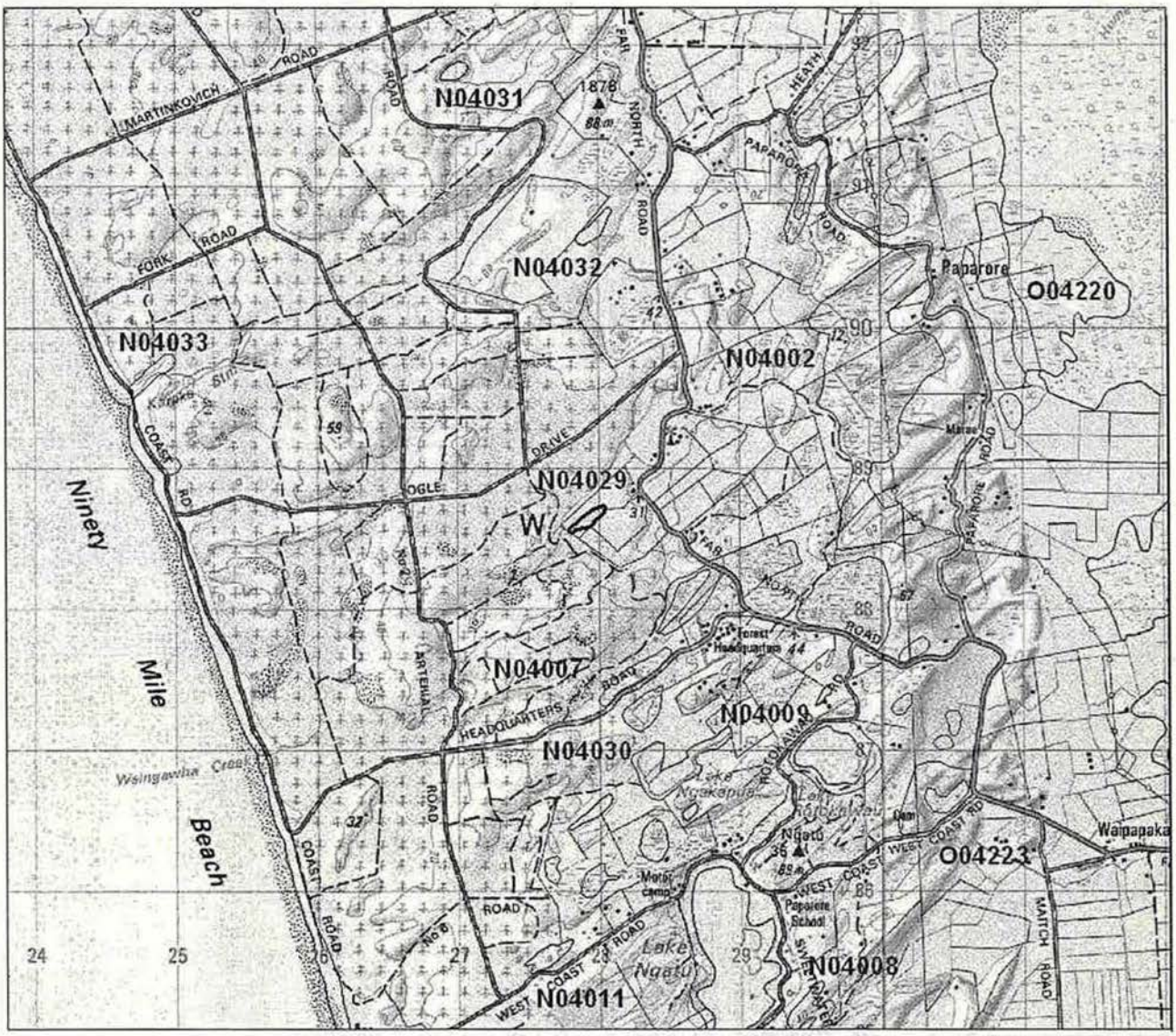
Representative site for *Baumea articulata*-raupo reedland. A Conservation Covenant, 8.9 ha, administered by the Department of Conservation protects 76% of this site.

HERBERTS SWAMP

Survey no.	N04/029
Survey date	16 January 1996
Grid reference	N04 279 886
Area	1.7 ha
Altitude	30 m asl

Ecological unit

(a) *Baumea articulata-Eleocharis sphacelata* reedland in dune hollow



Herberts Swamp N04/029

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

(b) Open water

Landform/geology

Freshwater wetland in interdune hollow on Pleistocene dunefield ponded by Holocene dunes.

Vegetation

(a) *Baumea articulata* is abundant and *Eleocharis sphacelata* common. Raupo is also present.

(b) There is a small amount of open water which varies seasonally.

Pines occur at the south east end and ungrazed pasture with scattered weeds occur on the other margins.

Fauna

Birds: Australasian bittern (Category O threatened species), and common waterbirds were recorded by the OSNZ in early 2000. NZ dabchick (Category C threatened species), spotless crake (Regionally significant species) and Australasian little grebe (Regionally significant species) reported.

Aquatic fauna: short-finned eel.

Significance

A high-quality, relatively unmodified habitat used by a diversity of birds including threatened and regionally significant species.

LAKE NGAKAPUA COMPLEX

Survey no.	N04/030
Survey date	16 January 1996
Grid reference	N04 283 873, N04 285 868, N04 280 866, N04 284 863, N04 280 862, N04 276 862, N04 286 865
Area	30.6 ha
Altitude	50 m asl

Ecological unit

(a) Open water in dune lake

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

(c) Manuka shrubland on lake margin

(d) *Eleocharis sphacelata* reedland on lake bed

(e) Harakeke-manuka association on lake bed

(f) Raupo reedland on lake bed

(g) Manuka swamp shrubland in dune hollow

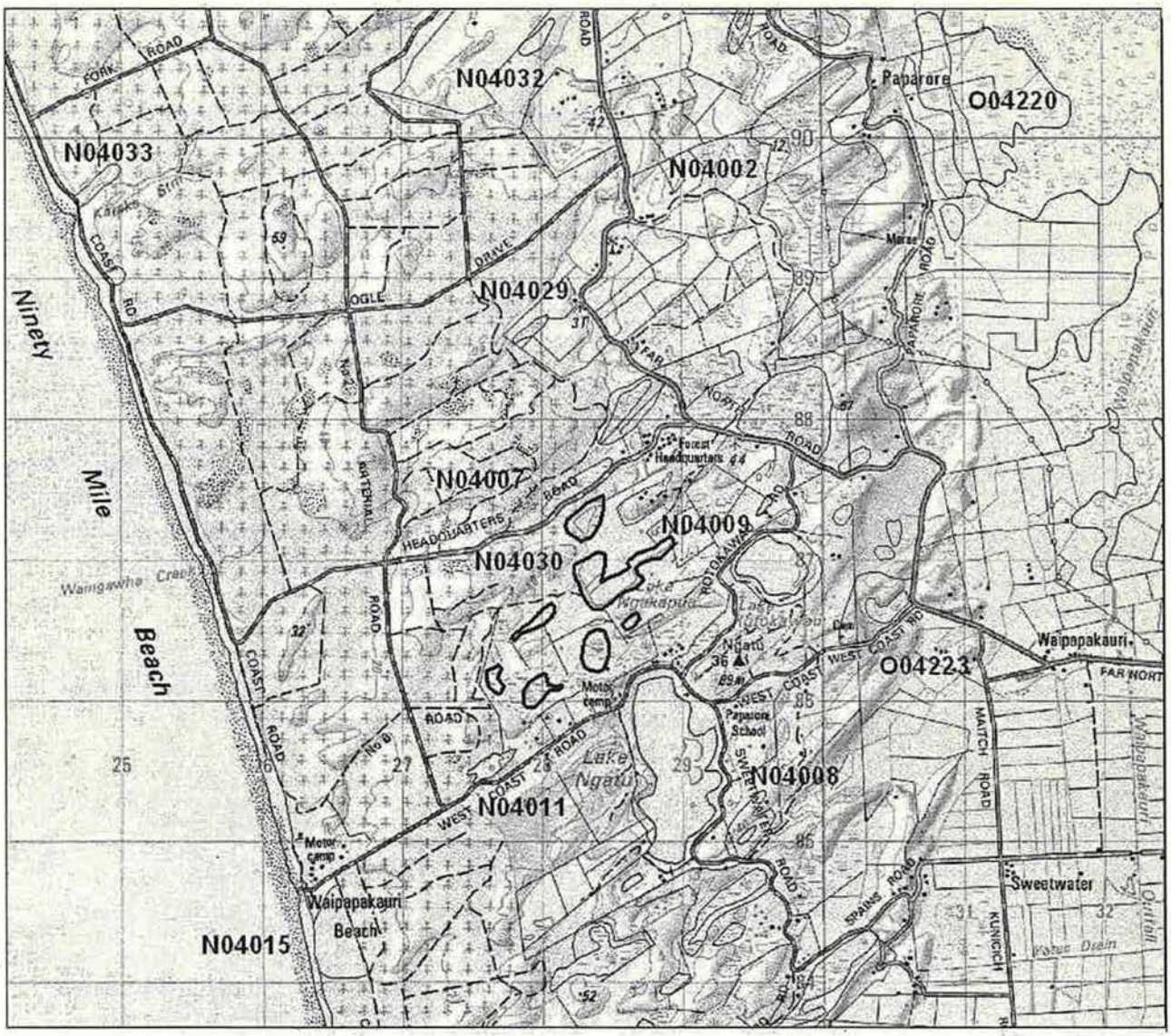
(h) *Eleocharis sphacelata-Baumea articulata* reedland on lake bed

Landform/geology

Freshwater wetlands in interdune hollows on Pleistocene parabolic dunefield ponded by Holocene dunes.

Vegetation

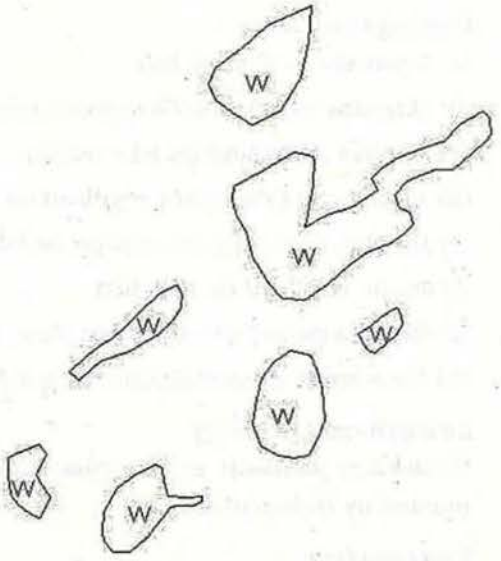
(1) (a) The northernmost site is Pumphouse Pond (N04 283 873), a dune lake (40%).



Lake Ngakapua Complex N04/030

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



(b) There is an adjoining wetland (60%) of abundant *Baumea articulata*, in which *Eleocharis sphacelata* occurs commonly. Raupo, water fern, and brake fern are present.

(c) A narrow fringe of shrubland on the periphery consists of abundant manuka with black wattle and mamaku frequently occurring. Also present are a number of other exotic species and totara.

Eucalyptus sp. and pines join two thirds of the habitat.

(2) Lake Ngakapua (N04 285 868) is three quarters open water type (a) with the remaining area type (d) *Eleocharis sphacelata*-dominant reedbeds with raupo, rushes and sedges.

(e) A small island of harakeke and manuka occurs, and there is scattered gorse, tobacco weed and kanuka on the periphery. Grazed pasture forms three-quarters of the surrounding land, forestry plantations on the remainder.

(3) Lake Ngakapua West (N04 280 866) is a dune lake which is 80% open water type (a) and type (f) 20% raupo with frequent *Eleocharis sphacelata*. Other species occurring are water fern, mamaku, *Myriophyllum* sp., willow weed and gorse.

The margins are a mix of *Eucalyptus* sp. and pasture, and 75% is fenced.

(4) Dunns Swamps

South of Lake Ngakapua West are three small wetland remnants:

(g) A – The easternmost (N04 284 863) contains sedges and wetland plants such as *Eleocharis sphacelata, Baumea teretifolia, Isolepis* spp. under a manuka canopy.

(h) B – The centre site (N04 280 862) is dominated by *Eleocharis sphacelata. Baumea articulata* occurs commonly. *Carex secta* is occasional. Less than 5% is open water.

C – The westernmost (N04 276 862) site is mostly *Eleocharis sphacelata,* type (d). A few water lilies are present.

All areas are grazed to the margins.

(5) Deans Swamp (N04 286 865) is directly south of Lake Ngakapua. It is a shallow *Eleocharis sphacelata* swamp, type (d), with a fluctuating area of open water over bare mud. It is grazed to the margin.

Significant flora

Utricularia protrusa (Vulnerable), *Myriophyllum robustum* and *Hydatella inconspicua*, both Declining, are reported.

Fauna

Birds: NZ dabchick (Category C threatened species), Australasian bittern (Category O threatened species), NZ scaup, NI fernbird and spotless crake (all Regionally significant species).

A year 2000 OSNZ survey also recorded pied shag, black shag, little shag, little black shag, Australasian little grebe (Regionally significant species), and common waterbirds.

Aquatic fauna: common bully.

Significance

A complex of lakes and wetlands, the larger being good examples of dune lakes and are habitat for a diversity of waterbirds including threatened and regionally signfiicant species.

The small wetlands are typical of the Ecological Region and are feeding and breeding sites for waterbirds including threatened and regionally significant species.

The presence of totara on the edge of Pumphouse Pond is of botanical interest.

Representative site for type (a) open water, type (b) *Baumea articulata-Eleocharis sphacelata* reedland, type (d) *Eleocharis sphacelata* reedland, type (e) harakeke-manuka association, and type (g) manuka swamp shrubland.

JONES LAKE

Survey no.	N04/031
Survey date	18 January 1996
Grid reference	N04 270 918
Area	1.7 ha
Altitude	40 m asl

Ecological unit

(a) Open water in dune lake

(b) *Eleocharis sphacelata* reedland in lake bed

Landform/geology

Freshwater wetland in hollow between Pleistocene parabolic dune ridges, ponded by Holocene dunes.

Vegetation

(a) The water level varies in this small lake.

(b) *Eleocharis sphacelata* is dominant with *Baumea* sp., *Juncus* spp. and raupo. *Isolepis prolifer* is frequent and kuta is occasional.

Pines are planted almost to the margins along one third of the lake which is fenced from stock. Some exotic species occur on the margins.

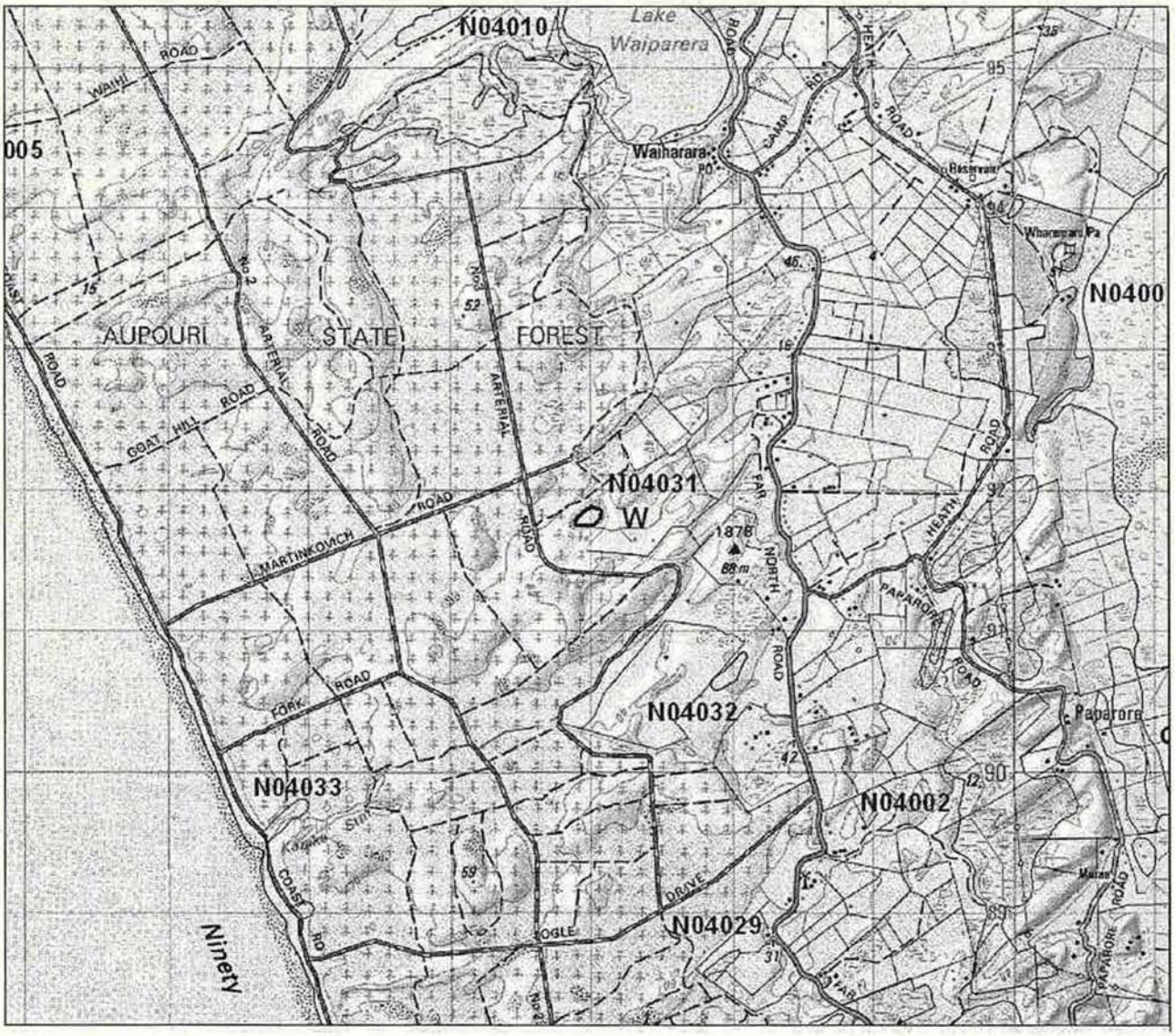
Fauna

Birds: NZ dabchick (Category C threatened species) has been recorded from this site. Australasian little grebe and grey teal (both Regionally significant species), little shag and black shag and common waterbirds were recorded by the OSNZ in early 2000.

Significance

Uncommon habitat type and good feeding areas for waterbirds including threatened and regionally significant species.

Over half of this site (0.98 ha, 56.6%) is protected Conservation Covenant administered by the Department of Conservation.



Jones Lake N04/031

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

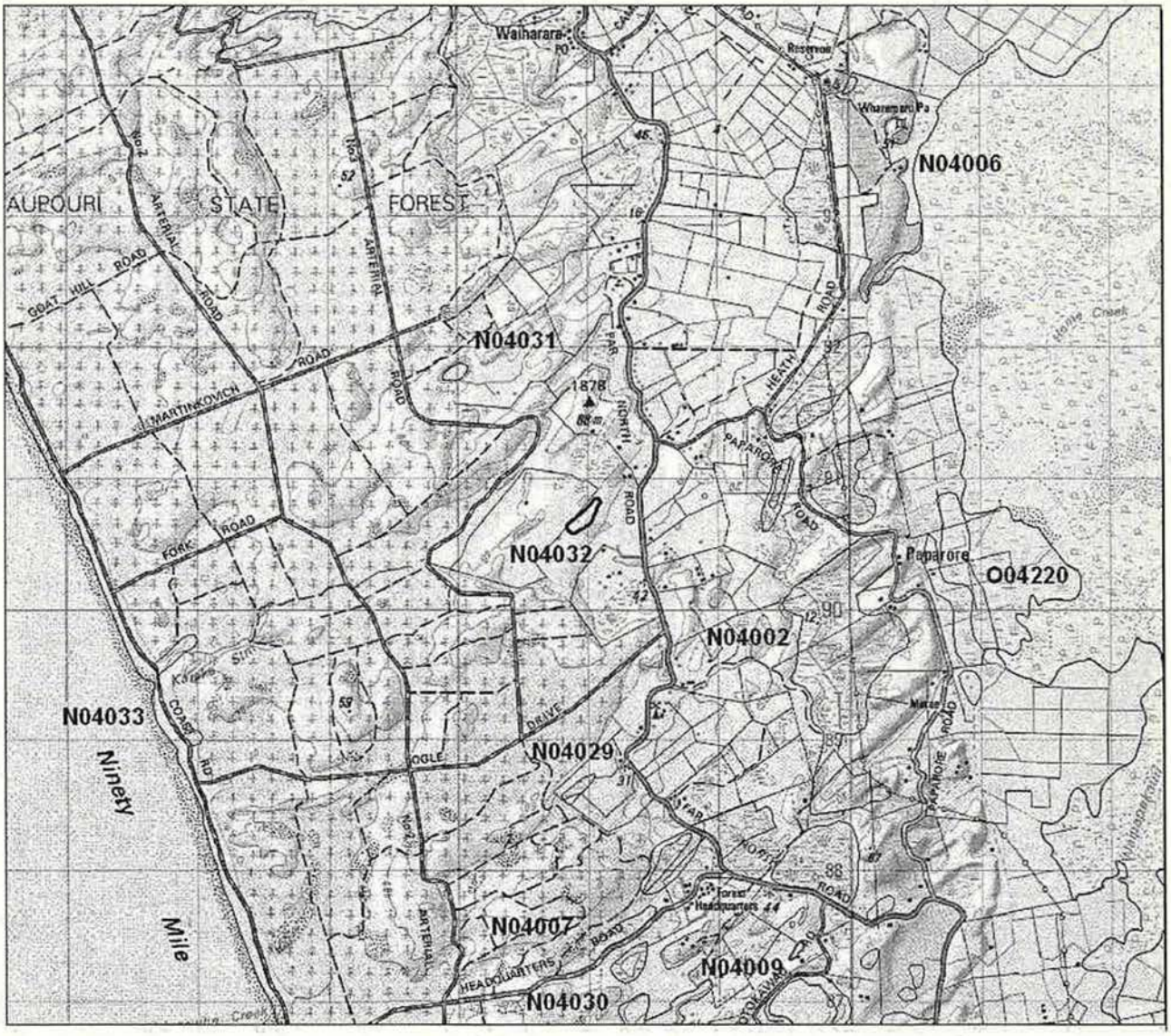
GLEESON'S LAKE

Survey no.	N04/032
Survey date	18 January 1996
Grid reference	N04 280 907
Area	2.6 ha
Altitude	30 m asl

Ecological unit

(a) Open water in dune lake

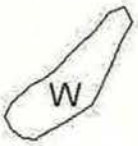
(b) Raupo reedland in dune hollow



Gleeson's Lake N04/032

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Landform/geology

Freshwater wetland on Pleistocene parabolic dunefield.

Vegetation

A raupo fringed lake. *Eleocharis sphacelata* and kuta are present.

The area is grazed to the margin.

Fauna

Common waterbirds.

Significance

Dune lakes are a nationally uncommon habitat type. Habitat for common waterbirds. Potential habitat for threatened and regionally signficant species such as NZ dabchick and spotless crake. Further survey recommended.

NINETY MILE SWAMP

Survey no.	N04/033
Survey date	9 August 1995
Grid reference	N04 248 897, N04 250 890
Area	5.1 ha
Altitude	0–15 m asl

Ecological unit

(a) Raupo-harakeke reedland on dunes

(b) Raupo-sedge association on dunes

(c) Pohutukawa-toetoe coastal forest on dunes

Landform/geology

Freshwater wetlands in Holocene foredune belt.

Vegetation

(a) Along the Karaka Stream harakeke occurs commonly within a raupo swamp. Oioi and sedges are frequent. Also present are knobby clubrush, giant umbrella sedge, toetoe, willow weed and the threatened *Cyclosorus interruptus.*

(b) South of the stream mouth is another raupo wetland where sedges are common. Harakeke and kikuyu occur frequently. Other species occurring are pampas, water fern, kiokio and *Eleocharis acuta.* Harakeke, houpara and toetoe occur on the margins. Pines are present to the margins of both these areas.

(c) The coastal forest is dominated by abundant pohutukawa about 3m, with toetoe commonly occurring. Houpara, harakeke and kanuka are also present.

Significant flora

Cyclosorus interruptus (Declining).

Fauna

Birds: Not surveyed.

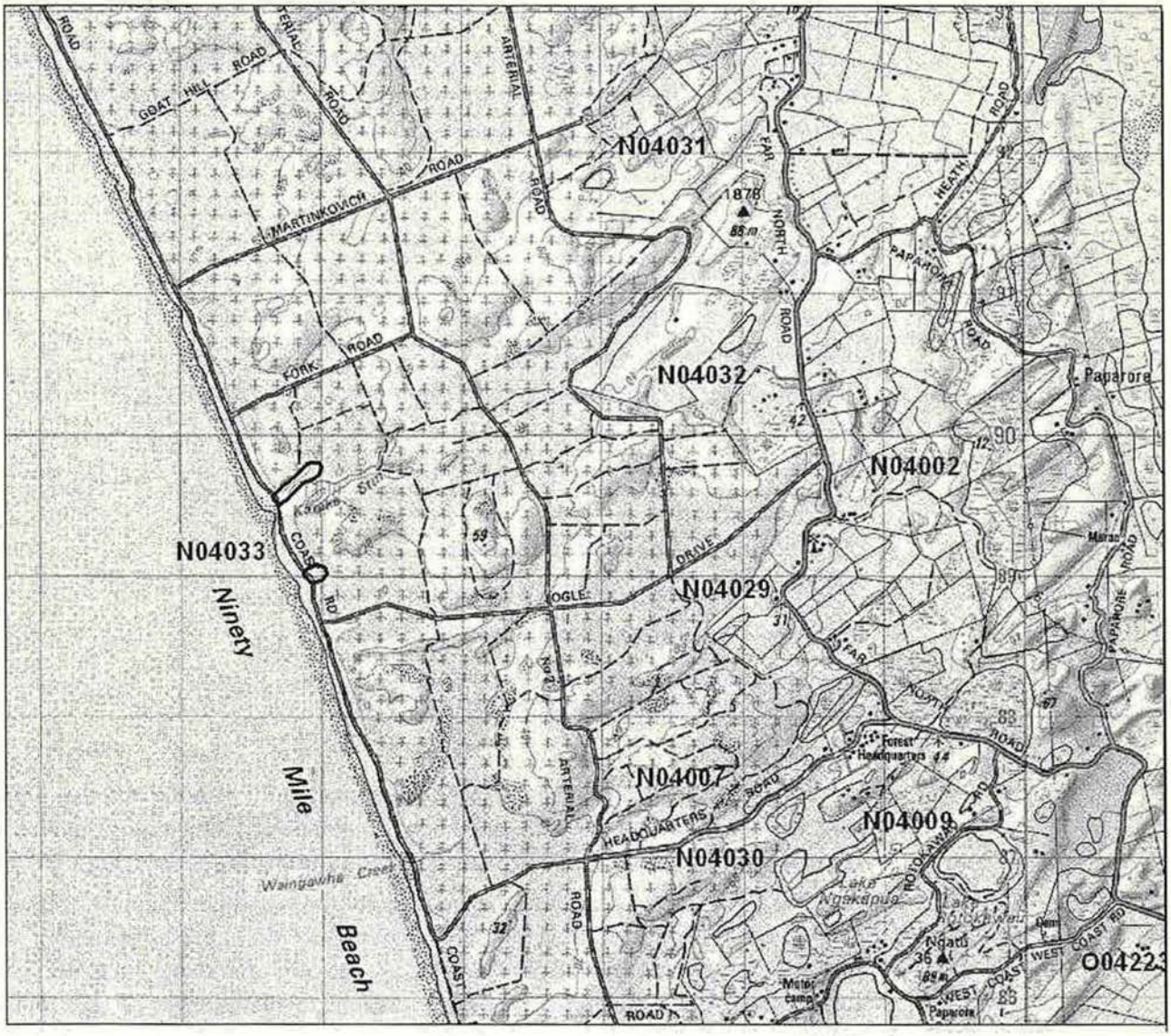
Aquatic fauna: Banded kokopu (Category C threatened species), giant bully (Regionally significant species) and inanga recorded from Karaka Stream.

Significance

The wetlands are good examples of their type and provide habitat for threatened species.

Representative site for raupo-harakeke reedland, and pohutukawa-toetoe coastal forest which is the only record of this type in the Ecological District.

The coastal forest is also a good, if small, example of a nationally uncommon habitat type.



Ninety Mile Swamp N04/033

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

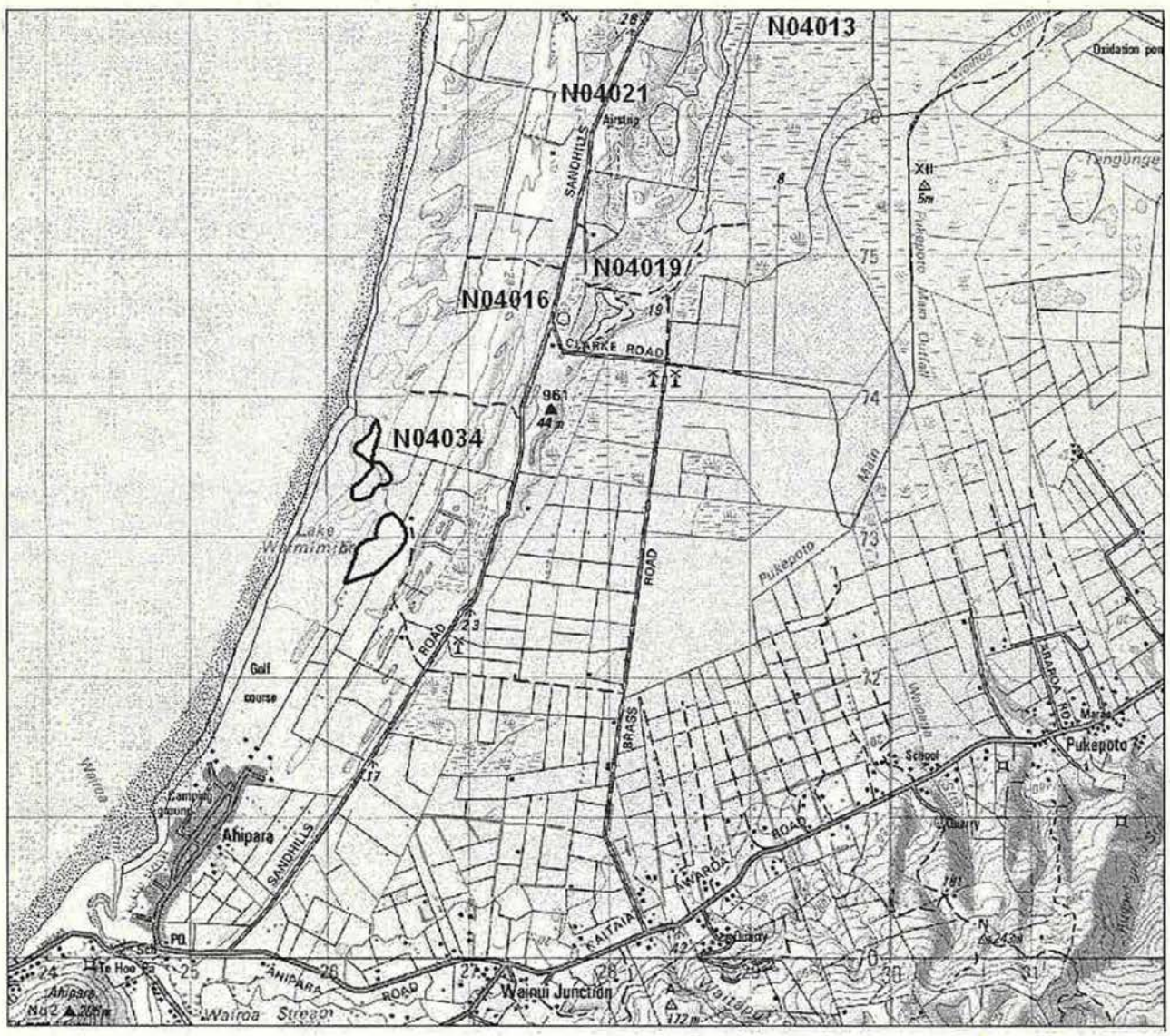
WAIMIMIHA LAKES

Survey no.	N04/034
Survey date	26 February 1996
Grid reference	N04 264 730, N04 263 735
Area	16.4 ha
Altitude	< 20 m asl

Ecological unit

(a) Open water in dune lake

(b) Raupo reedland on dunes



Waimimiha Lakes N04/034

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Freshwater wetlands ponded between last interglacial foredune ridges and late Holocene coastal dunes.

Vegetation

(a) The southern lake is mostly open water with patches of *Eleocharis sphacelata*.

(b) It is fringed by raupo with occasional *Eleocharis sphacelata, E. acuta, Isolepis prolifer*, kuta, willow weed, swamp millet and ti kouka.

The northern lake is about 20% open water, type (a) and 80% raupo type (b). Other species present are ti kouka, water fern, willow weed, *Carex* sp. and *Eleocharis* sp.

Both sites are grazed to the margins.

Significant flora

Historical record of *Thelymitra matthewsii* (Naturally Uncommon-Sparse) which was recorded near here in 1924.

Fauna

Birds: Spotless crake (Regionally significant species) and common waterbirds including a shag breeding area (species unknown but pied and black shag recorded from this site).

Significance

A large area providing good habitat for breeding waterbirds including a shag breeding area and potential habitat for NZ dabchick (Category C threatened species), Australasian bittern (Category O threatened species) and other species.

Representative site for both Ecological units.

KAIKOURA FARMS WETLAND

Survey no.	N04/035
Survey date	26 February 1996
Grid reference	N04 277 769
Area	0.9 ha
Altitude	15 m asl

Ecological unit

(a) Open water

(b) Raupo reedland in interdune hollow

(c) Pampas grassland in lake bed

Landform/geology

Freshwater wetland in interdune hollow on Pleistocene parabolic dunefield.

Vegetation

A small peat depression amongst undulating grass covered sand dunes.

(a) 70% of the area is open water.

(b) The remainder is raupo with frequent *Eleocharis sphacelata* and occasional willow weed, *Myriophyllum propinquum, Baumea articulata* and *Isolepis prolifer.*

(c) A small island in the lake is covered in pampas.

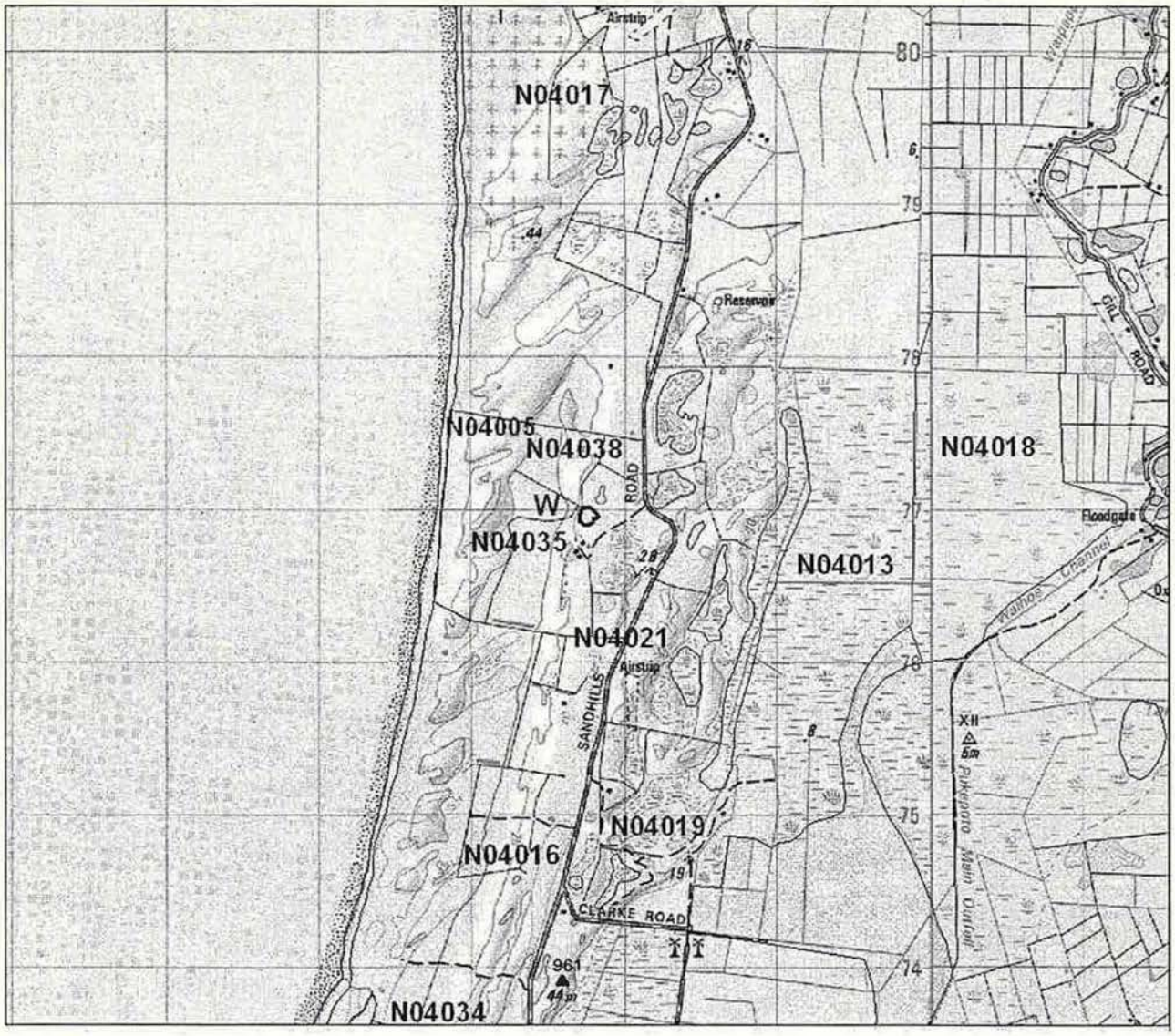
The area is grazed to the margins.

Fauna

Birds: Australasian bittern (Category O threatened species) and common waterbirds.

Significance

Habitat for waterbirds including a threatened species.



Kaikoura Farms Wetland N04/035

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

WOOLSHED SWAMP

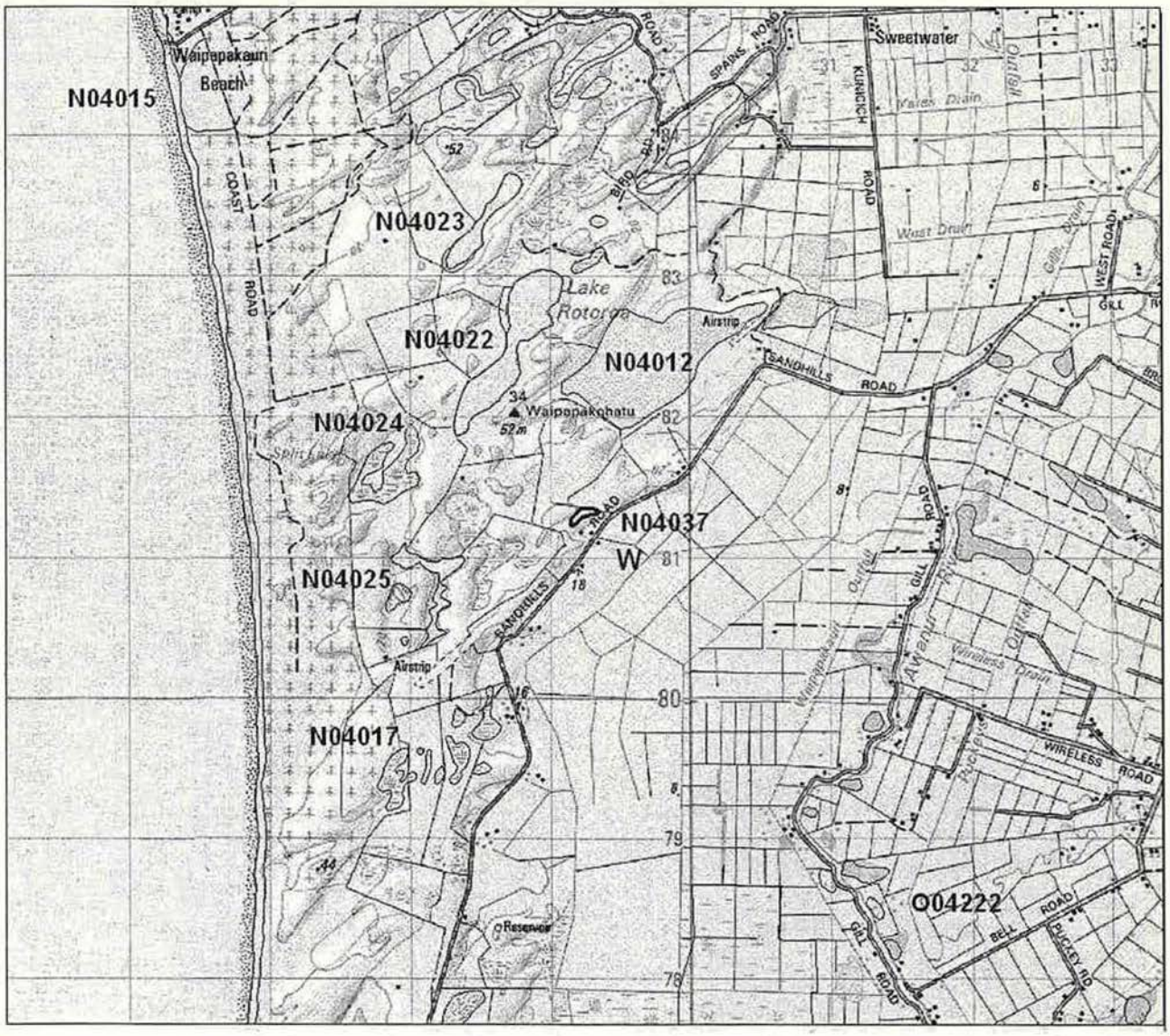
Survey no.	N04/037
Survey date	1993
Grid reference	N04 292 813
Area	1.15 ha
Altitude	20 m asl

Ecological unit

Baumea articulata-Eleocharis sphacelata reedland in interdune hollow

Landform/geology

Freshwater wetland in interdune hollow on Pleistocene parabolic dunefields.



Woolshed Swamp N04/037

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Vegetation

A fertile swamp of *Baumea articulata* and *Eleocharis sphacelata* with *Juncus* sp., swamp millet, willow weed, pondweed and other wetland species.

Fauna

Birds: Spotless crake (Regionally significant species).

Significance

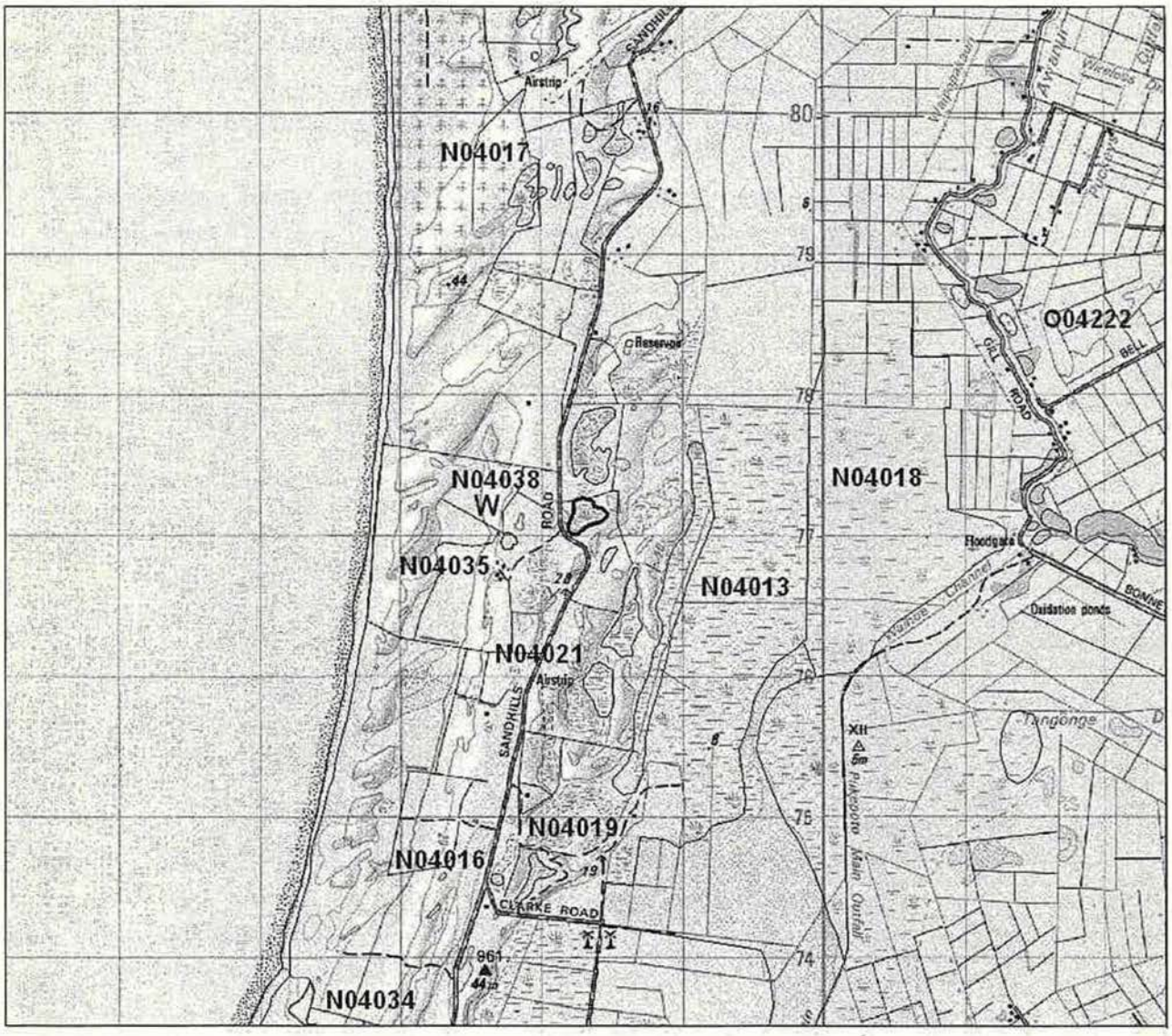
A small but good quality wetland habitat supporting a regionally significant bird species and potential habitat for Australasian bittern (Category O threatened species).

SWEETWATER STATION PEAT BOWL

Survey no.	N04/038
Survey date	7 August 1995
Grid reference	N04 283 772
Area	4.2 ha
Altitude	10 m asl

Ecological unit

(a) Open water



Sweetwater Station Peat Bowl N04/038

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

(b) *Baumea articulata* reedland on interdune flat

(c) *Isolepis prolifer-Myriophyllum propinquum* association on interdune flat

Landform/geology

Interdune flat in dunefield of Pleistocene consolidated parabolic dunes.

Vegetation

(a) Only about 5% of the area is open water, and this varies seasonally.

(b) Most of the area is abundant *Baumea articulata* with *Eleocharis sphacelata* and raupo.

(c) *Isolepis prolifer* and *Myriophyllum propinquum* occur around the edges.

Fauna

Birds: Spotless crake (Regionally significant species).

Significance

A dense habitat suitable for the regionally significant spotless crake and other cryptic marsh species.

A representative site for *Baumea articulata* reedland and *Isolepis prolifer-Myriophyllum propinquum* association, only record of the latter in this Ecological District.

WAIMANGO SWAMP

Survey no.	O03/001
Survey date	21 August 1995
Grid reference	O03 430 044
Area	297 ha (162.5 ha shrubland, 134.5 ha wetland)
Altitude	0-15 m asl

Ecological unit

(a) *Baumea huttonii-B. juncea* sedgeland in dune hollow

(b) Raupo reedland in dune hollow

(c) Manuka swamp-shrubland in dune hollow

(d) Kanuka/manuka shrubland on consolidated dunes

(e) Gorse scrub on consolidated dunes

Landform/geology

Freshwater wetland ponded between a Holocene coastal foredune belt and last interglacial consolidated foredunes. Part mineralised, part peat swamp.

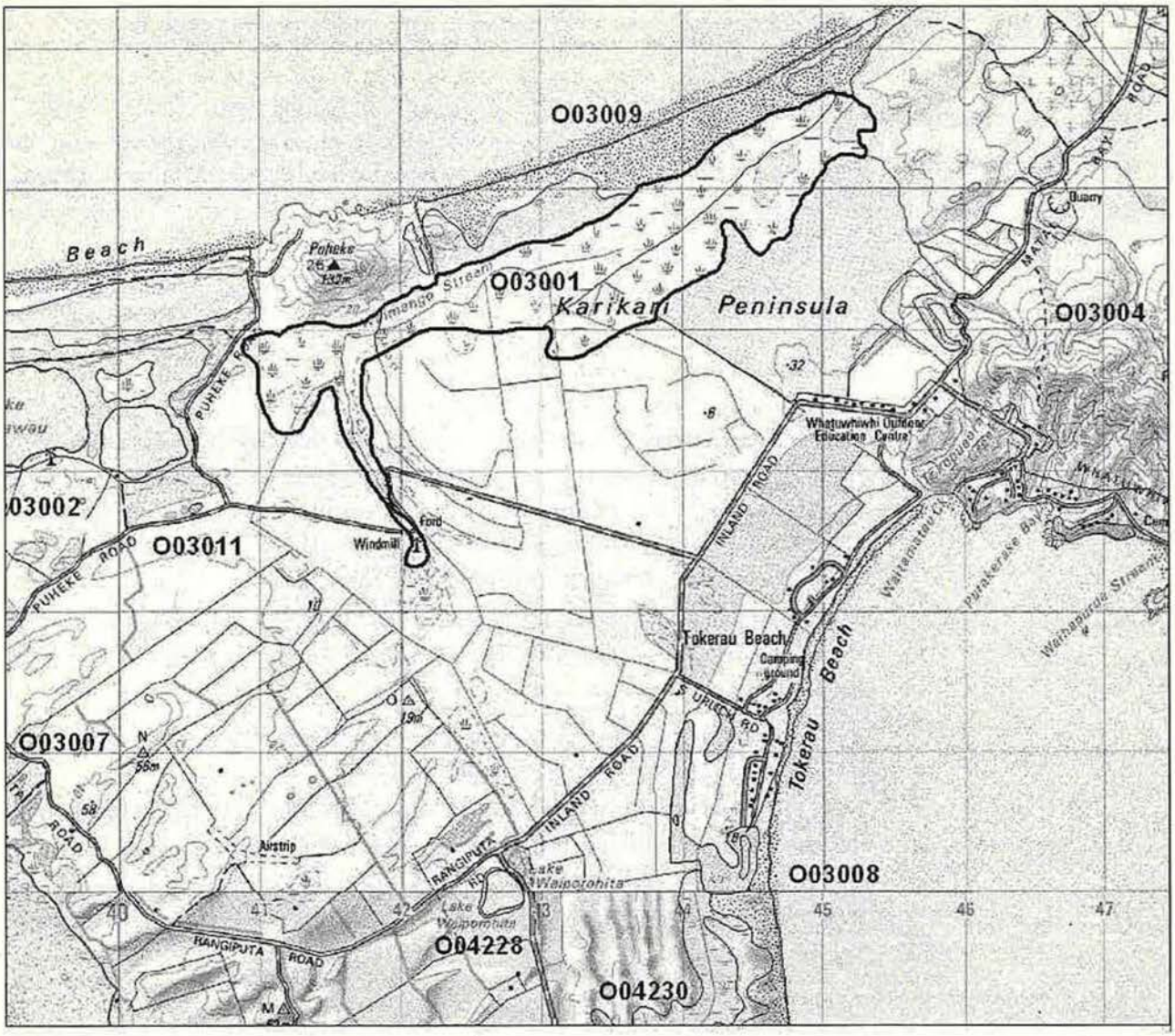
Vegetation

(a) Much of the area is *Baumea huttonii* and *B. juncea* with other sedges such as *Schoenus* sp., *Carex secta* and other *Carex* species. Kiokio and willow weed are also present.

(b) There are some smaller areas of raupo and harakeke.

(c) Manuka is a dominant emergent with *Coprosma tenuicaulis*.

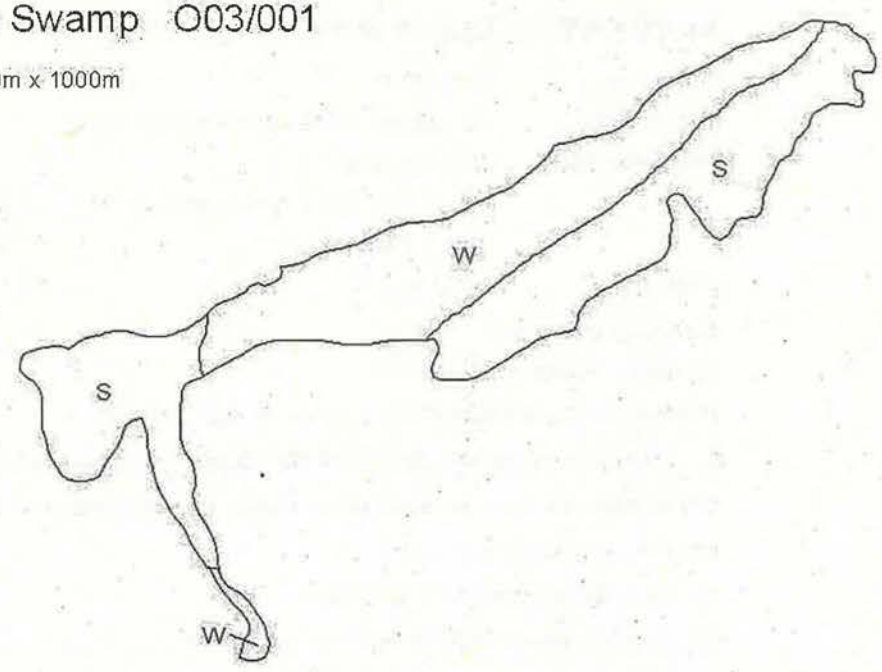
(d) On drier areas kanuka/manuka shrubland occurs with locally frequent gorse, prickly hakea and pampas. Scattered *Cassytha*, kumarahou, ti kouka, mamaku, *Eucalyptus* sp. and brush wattle are also present.



Waimango Swamp O03/001

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



(e) There is a small area of gorse scrub (2%) with scattered pasture.

Significant flora

1995 record of *Lycopodiella serpentina* (Vulnerable). 1998 record of *Cyclosorus interruptus* (Declining) and Bartlett recorded *Thelypteris confluens* (Vulnerable) from this site in 1978. A 1998 threatened plants survey confirmed this record.

1999 record of *Eleocharis neozelandica* (Declining).

Cryptostylis subulata (Naturally Uncommon–Range Restricted) recorded in 1990.

Fauna

Birds: Northern NZ dotterel and wrybill (both Category B threatened species). banded dotterel (OSNZ year 2000 record), variable oystercatcher and white-fronted tern (all Category C threatened species), reef heron (OSNZ year 2000 record), Australasian bittern and Caspian tern (all Category O threatened species), NI fernbird (Regionally significant species), turnstone, several sandpiper species including turnstone and NZ pipit.

Aquatic fauna: 1998 record of black mudfish (Category C threatened species), banded kokopu (Category C threatened species), common bully.

Significance

A good example of a formerly widespread coastal wetland complex which is habitat for many threatened plants and animals.

Representative site for type (a) *Baumea huttonii-B. juncea* sedgeland, type (c) manuka swamp shrubland, and (d) kanuka/manuka shrubland.

Approximately 46.6% of this site is protected; 118 ha is Stewardship Land and 20.6 ha is Recreation Reserve both administered by the Department of Conservation.

ROTOKAWAU LAKES & PUWHEKE BEACH

Survey no.	O03/002
Survey date	22 August 1995, 1 December 2001
Grid reference	O03 390 035
Area	433.6 ha (287.1 ha shrubland, 97.9 ha wetland, 48.6 ha duneland)
Altitude	1–20 m asl

Ecological unit

(a) Open water in dune lake

(b) Pohutukawa coastal association on lake margin

(c) Manuka swamp shrubland on interdune flats and hollows

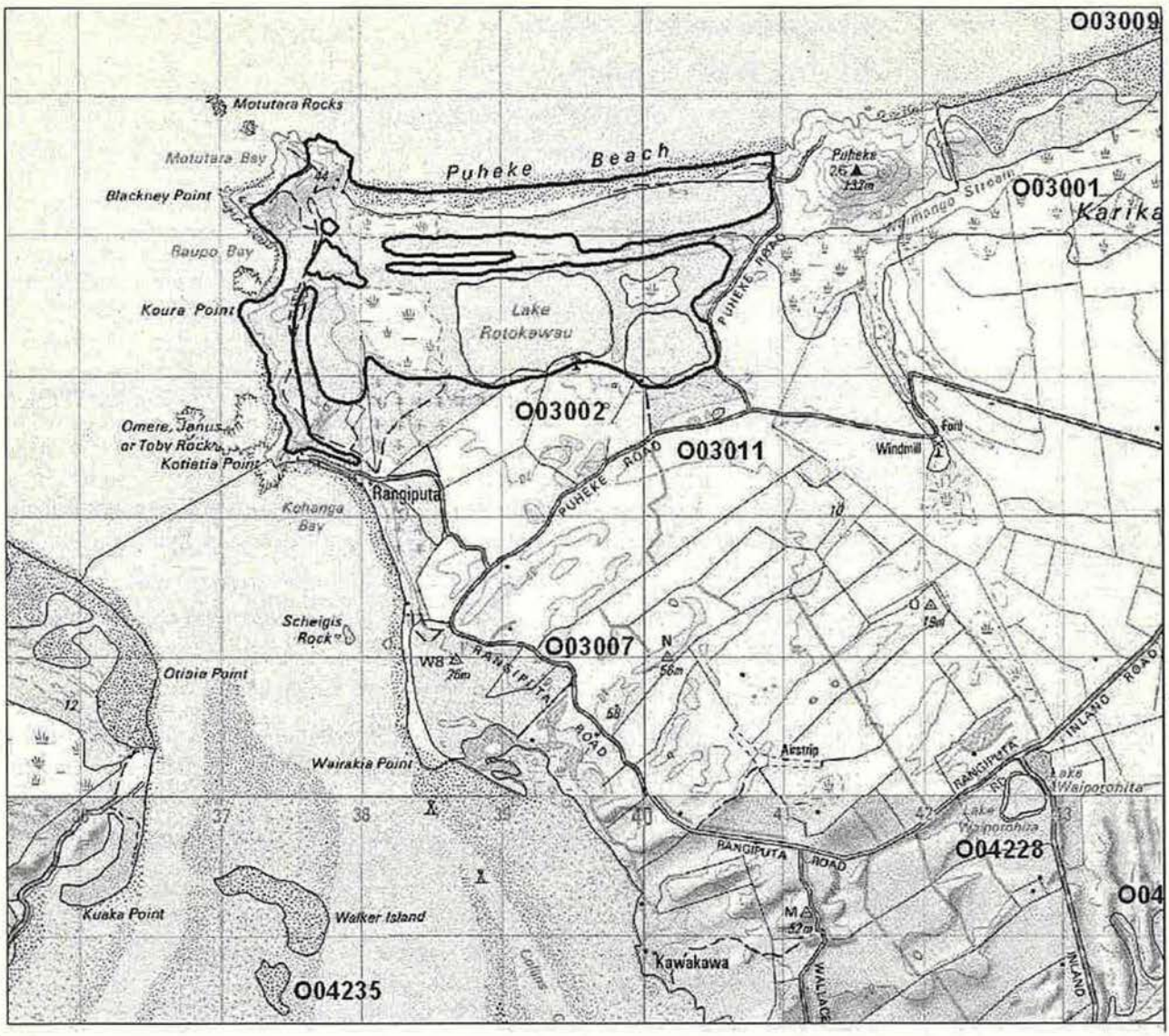
(d) Kanuka/manuka shrubland on dunes and consolidated dunes

(e) Pingao sedgeland on dunes

(f) *Spinifex* grassland on foredune

(g) *Coprosma acerosa*-pohuehue association on dunes

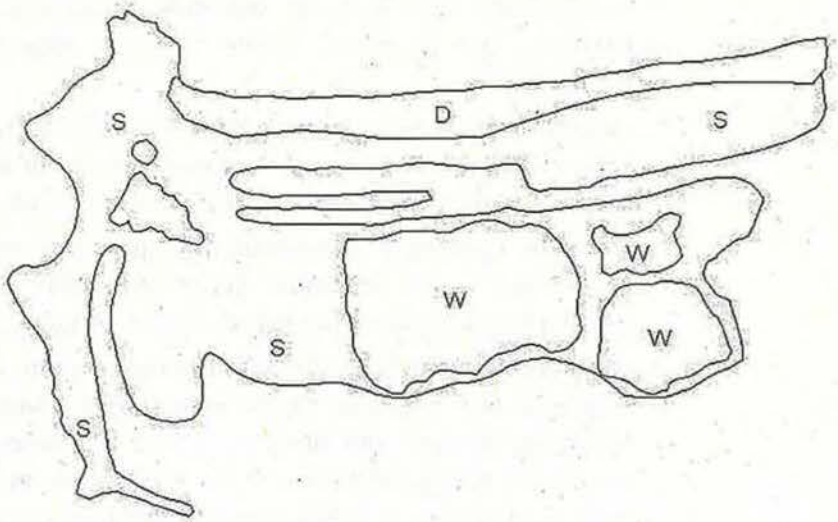
(h) *Coprosma acerosa*-oioi-pohuehue association on dunes



Rotokawau Lakes & Puwheke Beach O03/002

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



(i) Raupo reedland in dune hollow

(j) Gorse-kanuka shrubland on dunes

(k) Oioi rushland on sand flats and in dune hollow

(l) Harakeke reedland in dune hollow

(m) *Coprosma tenuicaulis*-manuka swamp shrubland on alluvium

Landform/geology

Lakes and freshwater wetlands ponded between Pleistocene consolidated parabolic dunes and last interglacial consolidated foredunes.

Vegetation

A complex of lakes with a hard sand pan, wetlands and shrublands linked to the Puwheke Beach dunes.

Lakes

(b) Along the steep southern shore of Lake Rotokawau there are pohutukawa trees emergent over *Hakea salicifolia*, wattle, houpara, taupata and ti kouka.

(c) Manuka is dominant, with harakeke, raupo, umbrella fern, *Baumea* sedges, kuta, *Eleocharis sphacelata, E. acuta* and *Lepidosperma* sedge surrounding the lake.

There is a similar shrub-sedge zone around the smaller lake.

Schoenus and wire rush are locally dense. The smaller lake is slightly eutrophic, with about 10% of the area in aquatic plants. Willow weed and *Myriophyllum* sp. are present.

The threatened bog clubmoss *Lycopodiella serpentina* has been recorded near the small lake.

(d) The surrounding shrubland is mostly kanuka/manuka between 1-3m with locally frequent gorse, Sydney golden wattle and pampas. Other species present in the canopy include mamaku, ti kouka, houpara, black wattle, brush wattle and pine. Near the Rangiputa coast, pohutukawa is frequent.

Dunes

(e) On the shifting foredunes pingao and type (f) *Spinifex* are common.

(g) Behind the foredune at the eastern end, which is more modified, *Coprosma acerosa* and pohuehue are common. *Pimelea arenaria* occurs in isolated patches. The adventive annual *Senecio elegans* is seasonally common throughout.

Landward of the vehicle track behind the dunes, *Spinifex* is common type (f) with pohuehue, buffalo grass and small clumps of knobby clubrush. Bracken is locally common and *Carex flagellifera* is scattered.

Harestail, *Calystegia soldanella*, and apple of Sodom occur rarely. Gorse and kikuyu are locally abundant, gorse comprising about 30% of the area and grading into kanuka on the higher slopes of the back dune.

(h) From about midway towards the stream mouth, *Coprosma acerosa,* oioi and pohuehue are common on the dunes with *Baumea juncea* and occasional harakeke, pampas and bracken. There are fewer exotics here, apart from occasional patches of gorse. On the flats behind the foredune, manuka is found, with clumps of gorse being more common closer to the back dune.

(i) Near the river the dunes are more pristine, with only two patches of gorse. There is a small raupo wetland about 50 × 20 m in a hollow beneath the back dune.

(j) On the back dune gorse and kanuka are dominant with mingimingi, *Leucopogon fraseri*, *Lepidosperma laterale*, *Coprosma rhamnoides*, Sydney golden wattle and ti kouka all occurring rarely. *Tetragonia trigyna* is locally common.

Stream

Where the stream loops around the foredune, oioi is abundant. Raupo, *Eleocharis* sp., harakeke, *Baumea articulata* and jointed rush occur in small numbers. Ten to twenty pampas bushes occur here.

The stream is lined with oioi with some small patches of raupo.

On the sand flats, *Lilaeopsis novae-zelandiae* occurs.

Pingao is abundant type (e) on the dunes around the stream mouth.

Toetoe occurs on the back dune at this part of the beach.

In the lee of the dunes manuka is abundant type (c), with occasional harakeke, hakea and coastal toetoe, with bracken and oioi in the understorey.

Wetlands

A series of wetlands occur in the hollow behind the back dunes. Oioi is dominant type (k), with frequent *Baumea juncea*. *Cryptostylus subulata* is present.

Manuka occurs in small patches, with occasional coastal toetoe, ti kouka and mamaku.

(l) Harakeke is common in an area behind the back dunes (approximately O03 384 041), with frequent manuka and areas of bracken, *Gleichenia dicarpa*, wirerush, *Baumea teretifolia*, *Baumea* sp. and patches of Sydney golden wattle.

(m) Directly west of Lake Rotokawau *Coprosma tenuicaulis* and manuka swamp shrubland occurs with bracken, sedges, giant umbrella sedge, *Carex virgata* and occasional ti kouka and harakeke.

Shrubland

In the hollow behind the backdune, type (c) dense manuka to 3 m occurs. In the understorey, *Schoenus tendo* is common, with occasional mingimingi, *Coprosma tenuicaulis* and kiokio.

This area is seasonally wet, with flow from Puheke Rd parallel to the beach, towards the west.

Significant flora

Lycopodiella serpentina and 1999 record of *Todea barbara* (both Vulnerable), *Pimelea arenaria* (Declining), pingao (Recovering–Conservation Dependent), *Thelymitra* (a) (Taxonomically Indeterminate–Endangered), *Cryptostylis subulata* (Naturally Uncommon–Range Restricted), *Pellaea falcata* (Naturally Uncommon–Sparse) recorded from sea cliffs at Puwheke.

Wire rush, *Utricularia delicatula* and *Hebe diosmifolia* (all Regionally significant species).

Cyclosorus interruptus (Declining) was recorded from the north side of Lake Rotokawau in 1978.

Fauna

Birds: Northern NZ dotterel (2001 record) (Category B threatened species), NZ dabchick, white-fronted tern and variable oystercatcher (confirmed 2001) (all Category C threatened species), Caspian tern and Australasian bittern (both Category O threatened species), NI fernbird (2001), spotless crake and NZ scaup (all Regionally significant species), pied stilt, and Australasian little grebe, and other common waterbirds.

Past records of marsh crake (Regionally significant species).

The site supports a large colony of shags – black shag, pied shag, little black shag and little shag.

Aquatic fauna: 1999 record of black mudfish (Category C threatened species), inanga, common bully, short-finned eel.

Snails: Archey's dune snail (Serious Decline).

Significance

A large area, one of the best examples in the Ecological Region of a wide diversity of habitats including coastal wetlands stretching from the Rangiputa coast to Karikari Moana, containing high wildlife values including many threatened species.

Dune lakes are a rare habitat type in Northland and are especially rare on the east coast of Northland.

Representative site for 10 Ecological units, type (a) open water, type (b) pohutukawa coastal association, type (c) manuka swamp shrubland, type (d) kanuka/manuka shrubland, type (e) pingao sedgeland, type (g) *Coprosma acerosa*-pohuehue association, type (h) *Coprosma acerosa*-oioi-pohuehue association, type (k) oioi rushland, type (l) harakeke reedland, and type (m) *Coprosma tenuicaulis*-manuka swamp shrubland.

Only record of type (b), (g), (h), and (m) in the Ecological District.

Type (b) pohutukawa coastal association associated with dune lakes is a very rare Ecological unit in Northland (P.J. Anderson pers. comm. 2002).

Marginal Strip, 65.4 ha, administered by the Department of Conservation protects Lake Rotokawau and the smaller eastern lake.

MAITAI BAY

Survey no.	O03/003
Survey date	22 August 1995
Grid reference	O03 482 085, O03 495 075
Area	23.9 ha
Altitude	0–10 m asl

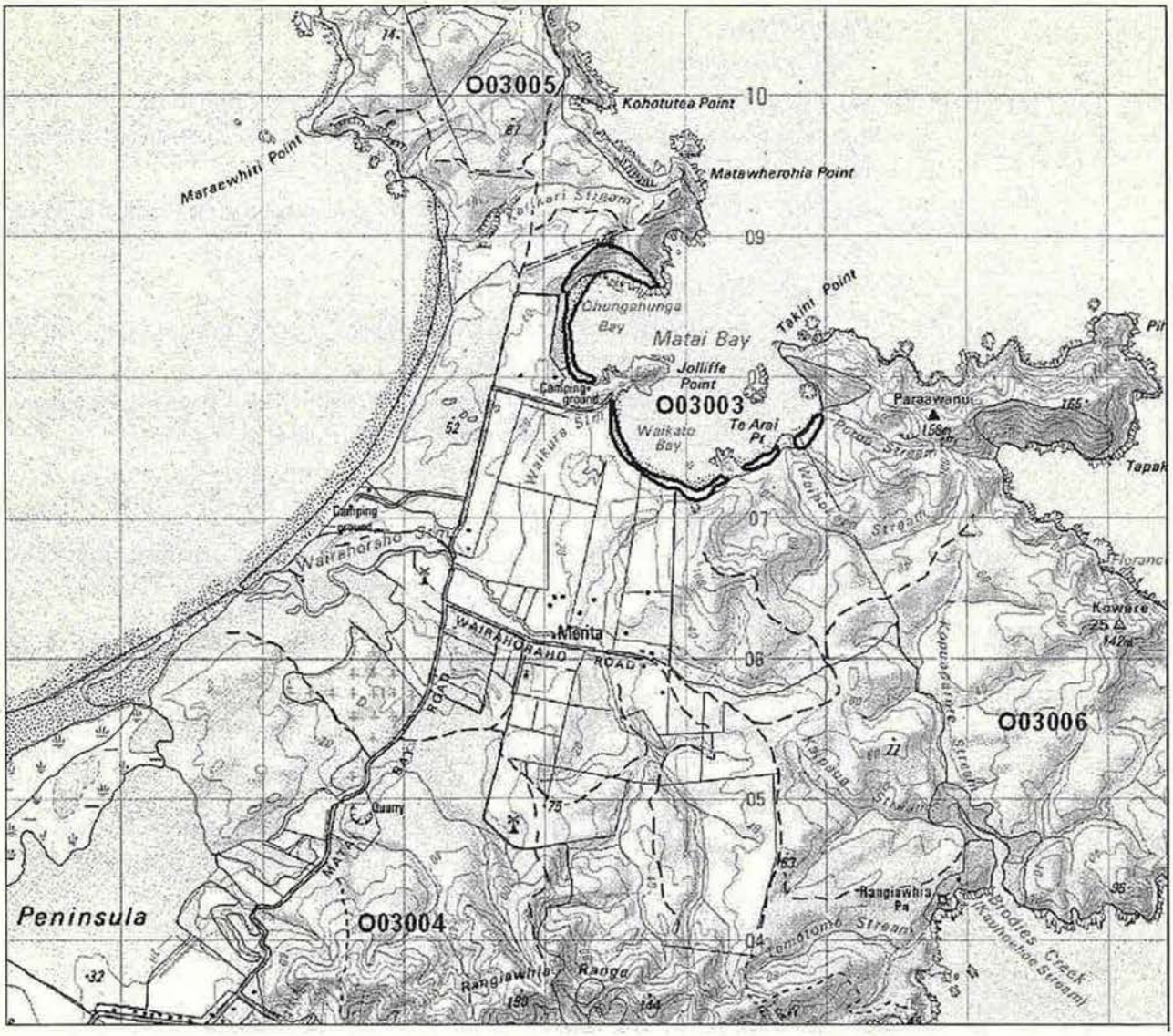
Ecological unit

(a) *Spinifex*-Cape honey flower association on dunes

(b) Pohutukawa treeland on rocky cliffs and headlands

Landform/geology

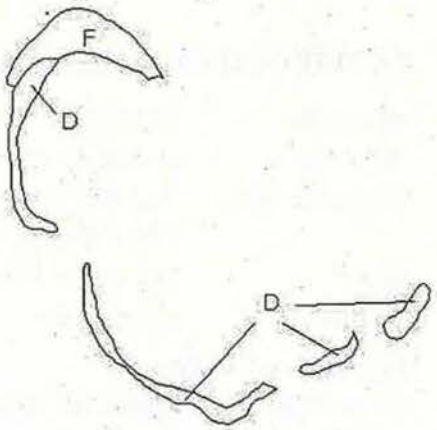
Holocene coastal foredunes.



Maitai Bay O03/003

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Vegetation

A sandy bay with rocky points at either end.

(a) *Spinifex* dominates the sand dune vegetation. Cape honey flower is common and locally dense over kikuyu. *Pimelea arenaria,* pingao, tauhinu and knobby clubrush are scattered.

(b) The rocky points are vegetated with pohutukawa. Mamaku, ti kouka, harakeke and pampas also occur.

Significant flora

Presence of *Pimelea arenaria* (Declining) (1999 record) and pingao (Recovering-Conservation Dependent).

Hebe aff. *pubescens* (Regionally significant species) has been recorded from Maitai Bay, which is the only site known in Northland.

Fauna

Birds: Northern NZ dotterel (Category B threatened species), variable oystercatcher and white-fronted tern (both Category C threatened species), Caspian tern and reef heron (both Category O threatened species).

Lizards: 1990 record of shore skink.

Marine reptiles: 1997 record of leathery turtle.

Significance

A long beach area providing habitat for coastal plant and bird species including several threatened species.

The Maitai Bay beaches are classified as regionally significant in the inventory of important geological and landform sites in the Northland Region for their unspoilt scenic beauty (Kenny & Hayward 1996).

Representative site for pohutukawa treeland.

Approximately 10.4 ha of the northern end of this site is protected by the Maitai Bay Recreation Reserve which is administered by the Department of Conservation.

TAUPIROROA RANGE SHRUBLANDS

Survey no.	O03/004
Survey date	21 August 1995
Grid reference	O03 455 050, O03 476 022, O03 470 040, O03 483 037, O03 470 026, O03 485 035
Area	945 ha (19 ha forest, 926 ha shrubland)
Altitude	1–190 m asl

Ecological unit

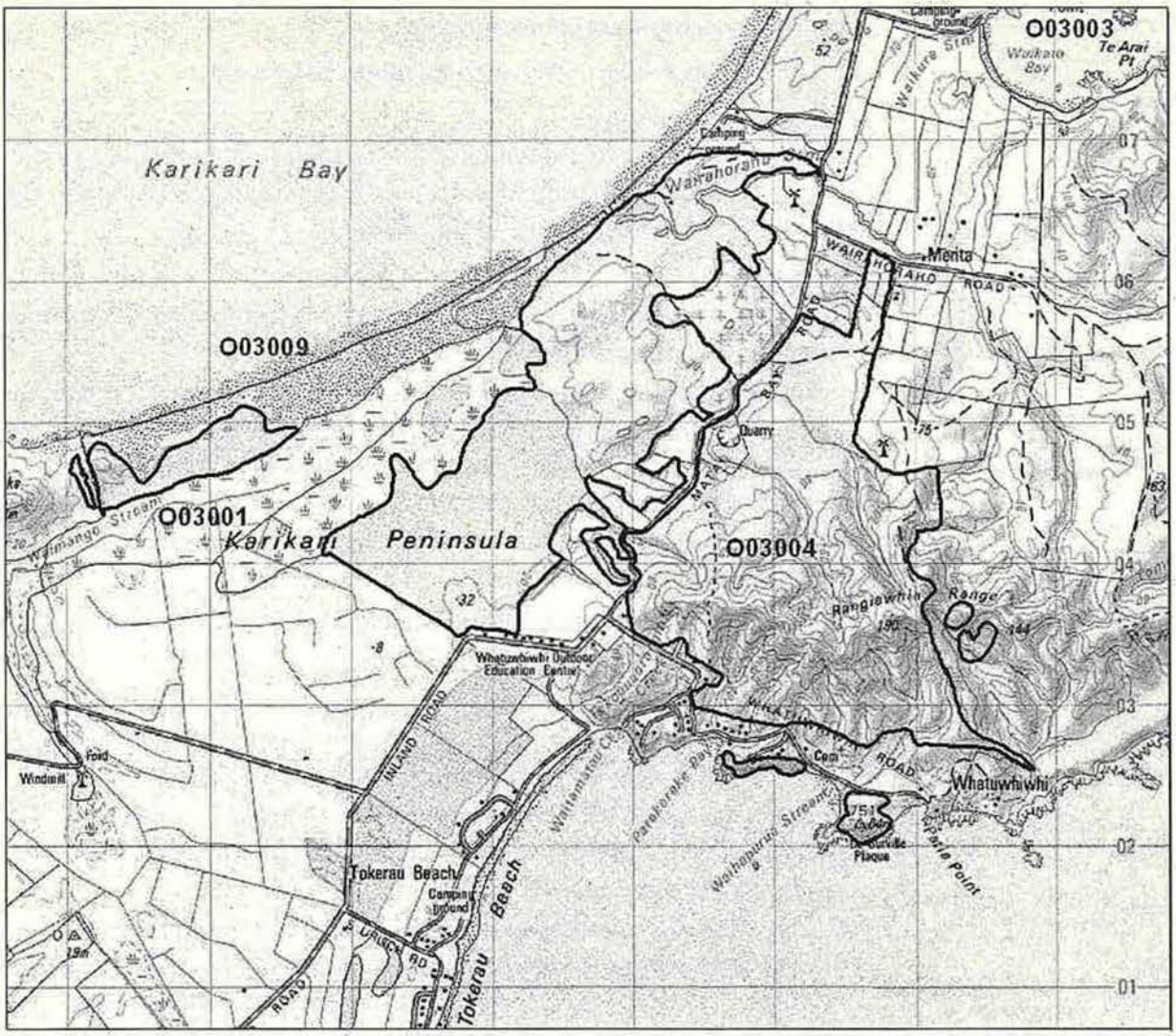
(a) Manuka-kanuka shrubland on hillslope

(b) Gorse-prickly hakea-sedge association on hillslope

(c) Kanuka shrubland on hillslope

(d) Kanuka-puriri forest on hillslope

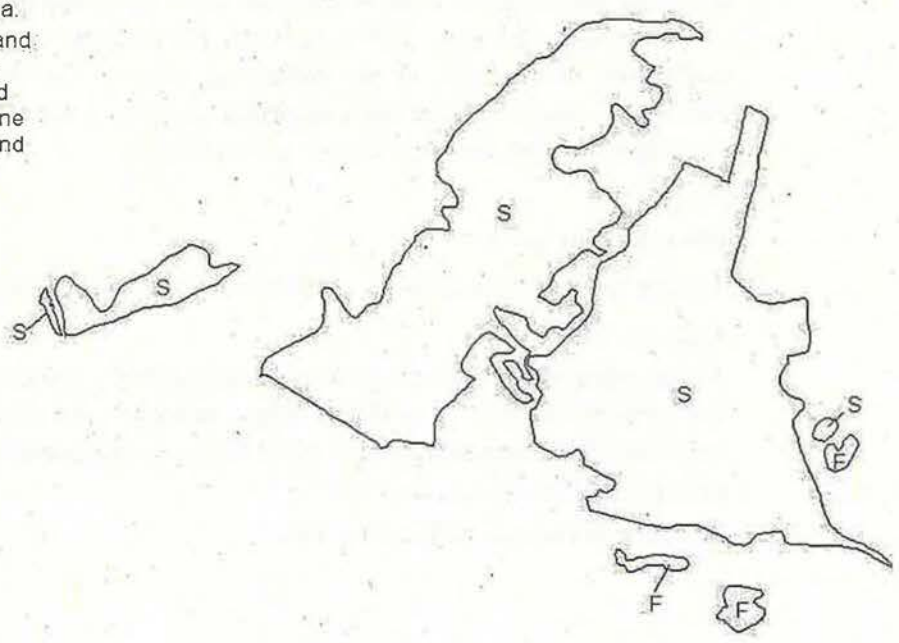
(e) Kanuka-pohutukawa coastal forest on hillslope



Taupiroroa Range Shrublands O03/004

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



(f) Kanuka-gorse shrubland on hillslope

(g) Gorse-kikuyu-sedge association on dunes and sand flats

Landform/geology

Pleistocene consolidated dune sand forming low rolling country in the north and west, with underlying deeply weathered Houhora Complex volcanics forming the Taupiroroa Range in the south-east.

Vegetation

(a) Behind the Whatuwhiwhi settlement, the Taupiroroa Range is a mosaic of manuka-kanuka shrubland 1–2 m.

(b) Gorse is locally abundant and prickly hakea common. Sedges are also common. Other species present are kumarahou, mingimingi, *Epacris pauciflora, Dracophyllum lessonianum*, *Eucalyptus* sp., pampas, prickly moses and brush wattle.

A large area of the heathland types (a) and (b) have been cleared since the original survey.

(c) There is a small area of kanuka shrubland about 3m with frequent mahoe and occasional karaka and houpara.

(d) To the east amongst the pines is a small remnant of tall kanuka forest in which puriri is common and ti kouka occasional, and another similar remnant in which mahoe is frequent and kahikatea and mamaku also occur.

(e) Along the south coast are two areas of secondary coastal forest, kanuka dominant in which pohutukawa is common. Mahoe, ti kouka, tobacco weed and brush wattle are also present.

(f) Across the road to the west is an extensive area of shrubland, most of which is low kanuka. Gorse is common, manuka frequent and mamaku, pampas and *Eucalyptus* sp. occasional. About 20% is manuka-kanuka-gorse to 2–3 m.

(g) Around the tidal stream gorse is abundant. Sedges and kikuyu are common, bracken and tobacco weed frequent, ti kouka and mamaku occasional.

Significant flora

Hibiscus diversifolius (Vulnerable) has been recorded near the Wairahoraho Stream mouth (Bartlett, 1987). In 1978 Bartlett also recorded *Lycopodiella serpentina* (Vulnerable) in the vicinity of what is now the camping ground. *Euphorbia glauca* (Declining) recorded in 1985. 1998 record of *Eleocharis neozelandica* and *Pimelea arenaria* (Declining).

Fauna

Birds: Not surveyed.

Aquatic fauna: Common bully (1993) record from Wairahoraho Stream.

Significance

A large shrubland area with pockets of coastal forest adjoining the coast linking the various wetlands, sand dunes, forest remnants and shrublands that stretch across Karikari Peninsula from Karikari Moana to Doubtless Bay and through the pine plantation to Knuckle Point.

Presence of threatened plant species.

Representative site for type (a) manuka-kanuka shrubland, type (d) kanuka-puriri forest, type (e) kanuka-pohutukawa coastal forest. Only record of type (d) in the Ecological District.

Approximately 21.9 ha (2.3%), is protected within the Puwheke Recreation Reserve which is administered by the Department of Conservation.

CAPE KARIKARI SHRUBLAND

Survey no.	O03/005
Survey date	22 August 1995
Grid reference	O03 474 127, O03 475 090
Area	444 ha (5.4 ha forest, 430 ha shrubland, 8.6 ha wetland)
Altitude	0–106 m asl

Ecological unit

(a) Kanuka/manuka shrubland on cliff tops

(b) Pohutukawa forest on steep coastal slopes

(c) *Eleocharis* sp.-raupo association on dunes

Landform/geology

Rocky promontory of Karikari Plutonics diorite to quartz monzonite intrusions with overlying Pleistocene consolidated dune sands.

Vegetation

(a) Most of the area is kanuka/manuka shrubland 1–3 m. Gorse and prickly hakea are frequent. Other species occurring are kumarahou, mingimingi, akeake and sedges.

(b) Near Cape Karikari is a small remnant of pohutukawa forest. Mamaku and pampas are frequent, and harakeke and ti kouka also present.

(c) A small swamp is found at the head of Whataru Bay with dense *Eleocharis* sp.-raupo, some *Juncus* sp. and occasional open water.

Significant flora

The threatened clubmoss *Lycopodiella serpentina* (Vulnerable) was recorded from this site in 1978.

Fauna

Birds: Australasian bittern (Category O threatened species).

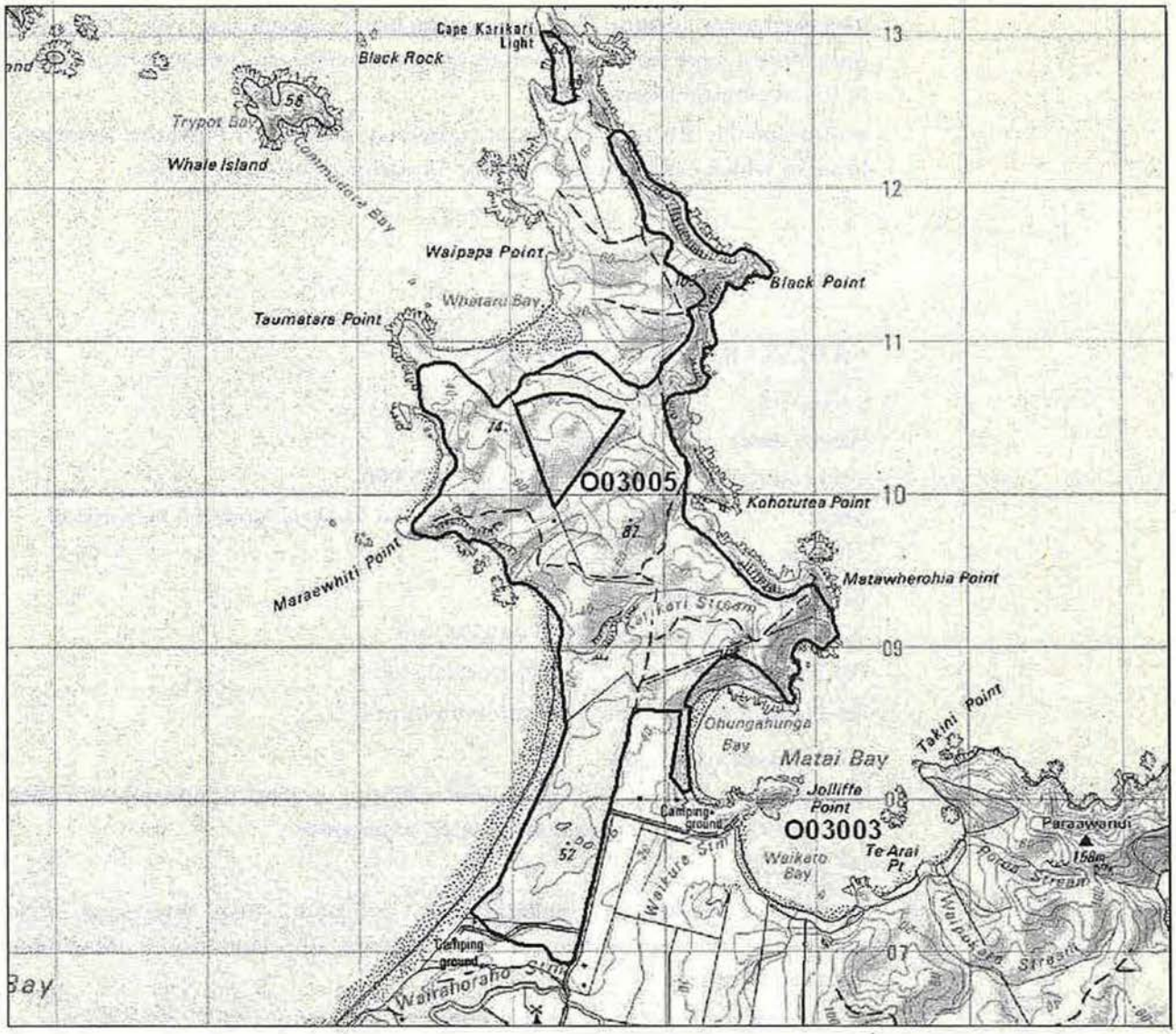
Lizards: Northland green gecko (Regionally significant species). 1980 record of Pacific gecko from just outside this site at Kototutea Point.

Significance

A large shrubland area on Cape Karikari that provides an important function of linking the various wetlands, sand dunes, forest remnants and shrublands of Maitai Bay and Karikari Moana.

A representative site for all three Ecological units.

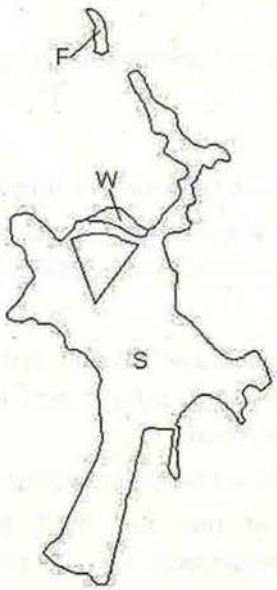
Approximately 14% of this site, 62.5 ha, is protected Scenic Reserve administered by the Department of Conservation.



Cape Karikari Shrubland O03/005

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



WHANGATUPERE BAY

Survey no.	O03/006
Survey date	22 August 1995, 27-28 May 2002
Grid reference	O03 510 060
Area	1,018 ha (65 ha forest, 953 ha shrubland)
Altitude	0–165 m asl

Ecological unit

(a) Kanuka/manuka shrubland on gently sloping gumland and rolling to steep hillslopes

(b) Gorse scrub on coastal hillslope

(c) Kanuka forest on steep coastal hillslope

(d) Kanuka-pohutukawa coastal forest on steep coastal hillslope and coastal fringe

(e) Kohekohe coastal forest on gentle slope

(f) Towai forest in gully

(g) *Baumea* sp. wetland on alluvium

Landform/geology

Hill country of highly weathered diorite to quartz monzonite intrusions of Karikari Plutonics cutting Houhora Complex greywacke.

Vegetation

A mosaic of kanuka/manuka shrubland with broadleaf dominant coastal forest at Poroa Stream, Tapakakeno Point and Brodies Creek.

(a) The shrubland varies between 1 m and 3 m. In about 20% of the area gorse is common and prickly hakea frequent. Other species present are ti kouka, hangehange, kumarahou, mingimingi, akeake, *Cassytha,* sedges, brush wattle, pampas, Cape honey flower and tobacco weed.

Kanuka emergent over shorter kanuka and manuka occurs on gumland. The gumland area stretches from the high point of Koware across to Brodies Creek.

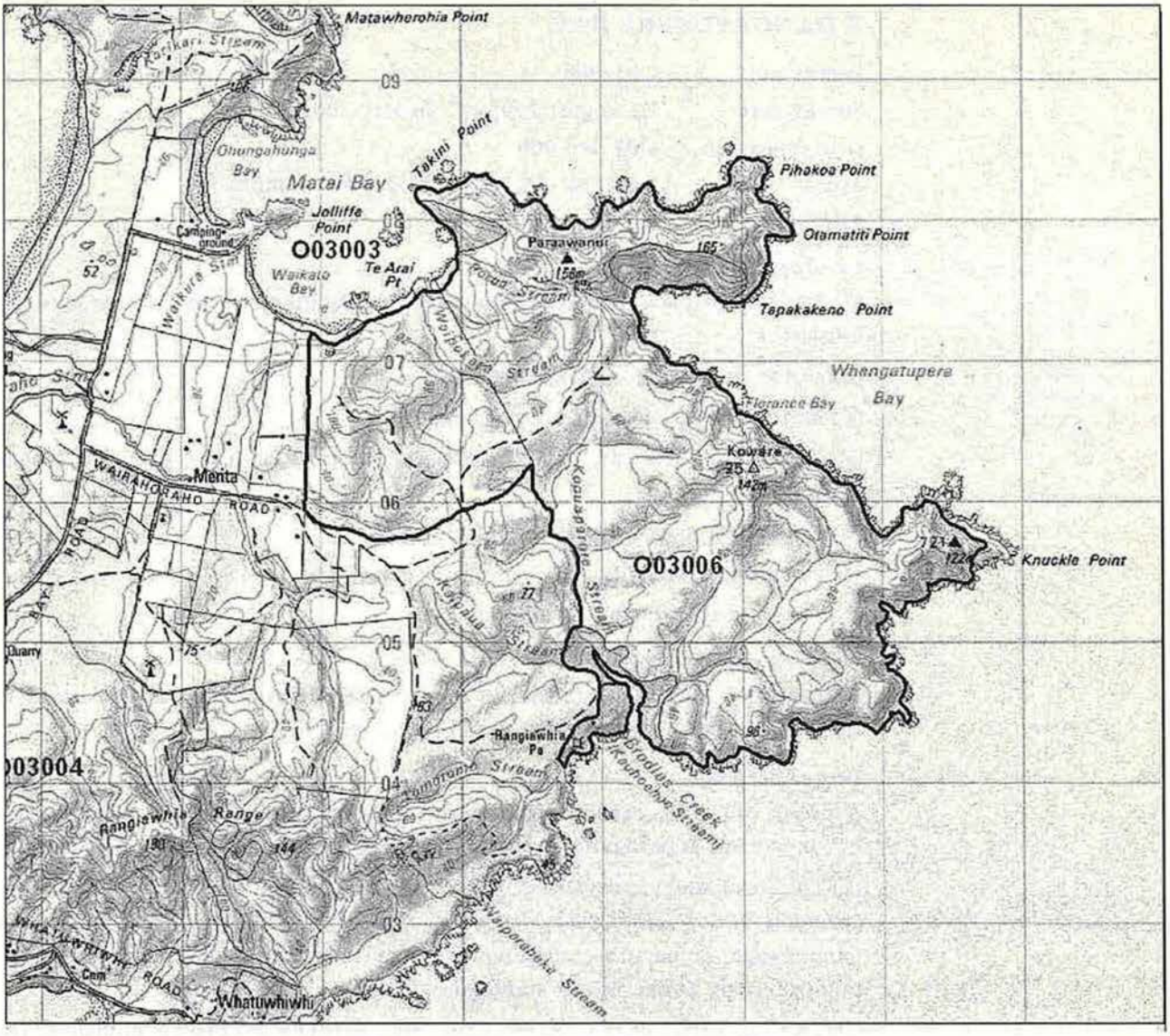
(b) Gorse is abundant in about 10% of the area, towards Pihakoa Point.

(c) Between Takini Point and Poroa Stream there is tall kanuka forest with pohutukawa and puriri. Karaka, wharangi, tawapou and houhere are present. The understorey is open with *Coprosma macrocarpa*, hangehange, rangiora, turepo, mahoe, NZ spinach, *Peperomia urvilleana,* kowharawhara, *Carex* sp., common shield fern, rasp fern, common maidenhair, rosy maidenhair, shaking brake *and Pteris saxatilis* (P. Bellingham unpublished data).

Type (c) also occurs on the ridge where kanuka is dominant with mapou and *Pittosporum umbellatum.* The main understorey consists of hangehange, *Coprosma rhamnoides,* native broom, harakeke, and rasp fern. Also present are mingimingi, *Cyathodes juniperina, Pomaderris phylicifolia,* tauhinu, pohuehue, *Gahnia lacera* and rarely, houpara and ponga.

(d) On the cliffs toward Tapakakeno Point, kanuka and pohutukawa are dominant with puriri. Ti kouka is locally common and harakeke is frequent.

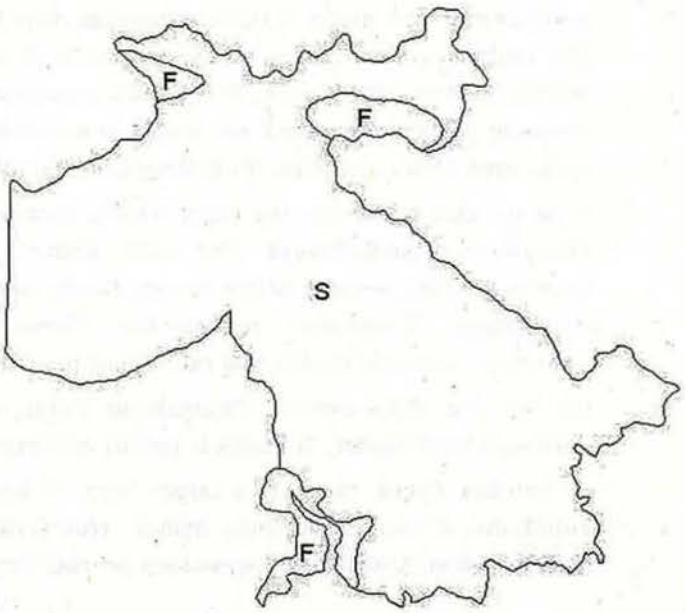
At Brodies Creek there is a larger area of kanuka-pohutukawa forest with kohekohe, ti kouka, tawapou, mahoe, tree ferns, macrocarpa and gum trees. Mature pohutukawa are conspicuous on the coastal fringe. The environmental



Whangatupere Bay O03/006

Each grid is 1000m x 1000m
and = 100 ha

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



weeds Cape honey flower and smilax are also common on the coastal fringe. Around the western point of Brodies Creek pohutukawa is more dominant with harakeke, and kohekohe.

(e) Dominant secondary kohekohe forest occurs on the western side of Brodies Creek. Pohutukawa is frequent, with ti kouka, mahoe, kanuka and wheki occasional.

(f) On the eastern side of the highpoint of Koware, dominant secondary towai forest occurs in a gully with kanuka, mamaku, and the odd pohutukawa. Around this kanuka and towai is common with hangehange.

(g) A small acid wetland (not mapped) dominated by *Baumea* sp. occurs at Knuckle Point in the head of the valley system flowing down to Brodies Creek.

Significant flora

Colensoa physaloides (Declining) (1999 record) and *Fuchsia procumbens* (Naturally Uncommon–Sparse) are recorded from this area (P. Bellingham 1993 unpublished data). Tawapou (Regionally significant species).

Fauna

Birds: kukupa (Category B threatened species), white-fronted tern (Knuckle Point Stack) (Category C threatened species), NI fernbird (Regionally significant species).

Lizards: Suter's skink and ornate skink (both Regionally significant species), Pacific gecko, shore skink.

Snails: *Allodiscus fallax* (Nationally Endangered), found in the forest near Tapakakeno Point which is the type locality (possibly the only site) for this species which is endemic to the Karikari Peninsula. *Cytora* sp. "whangatupere" (Nationally Endangered) known from a small remnant of coastal forest at this site.

Invertebrates: *Onychophoran*, a Peripatus-type organism is recorded from this site, possibly at its northern limit, and certainly the only locality in the Aupouri Ecological Region.

Marine mammals: A small NZ fur seal haul-out site is known from Knuckle Point.

Significance

Large shrubland area on the eastern side of Karikari Peninsula with three pockets of coastal forest adjoining the coast. These remnants are rare in the Ecological Region and in Northland generally. The shrubland links these forest remnants to each other, to Maitai Bay, and through the pine plantations, to Taupiroroa.

Representative site for type (a) kanuka/manuka shrubland, type (c) kanuka forest, type (d) kanuka-pohutukawa coastal forest, type (e) kohekohe coastal forest, and type (f) towai forest. Towai forest is unrecorded elsewhere in the Ecological District.

Forest and shrubland at Whangatupere Bay is the only mainland site in the Ecological District to occur on Karikari Plutonics intruding Houhora Complex.

Knuckle Point is one of a handful of NZ fur seal haul-out sites on the east coast of Northland.

A geopreservation site of regional importance for:

- reasonably well exposed Karikari hornfels from Maitai Bay to Brodies Creek
- older and younger Karikari Plutonics

- most complete and best example in Northland of Cretaceous sedimentary sequence and possibly the only example of autochthonous Cretaceous outcropping (Kenny & Hayward 1996).

Approximately 72% of this site is protected. Recreation Reserve, 347 ha and 0.7 ha of Marginal Strip protects 36% of the site, and a 2002 purchase protects a further 378 ha, at Knuckle Point, as Scenic Reserve; the site is administered by the Department of Conservation.

S URLICH RD WETLAND

Survey no.	O03/008
Survey date	22 August 1995
Grid reference	O03 444 001, O03 443 012
Area	29 ha
Altitude	1–8 m asl

Ecological unit

(a) Gorse-kanuka/manuka shrubland on dunes

(b) Harakeke-raupo reedland in dune hollow

(c) Harakeke reedland in dune hollow

Landform/geology

Holocene foredune belt backed by last interglacial consolidated foredunes and with intercalated Holocene sandy alluvium and freshwater wetlands.

Vegetation

(a) Most of the area is gorse-kanuka/manuka shrubland. Ti kouka, pampas and pine are occasional.

(b) Harakeke and raupo are common in the wetlands, with occasional ti kouka.

(c) Harakeke is locally abundant with frequent manuka and ti kouka and occasional taupata and mamaku. Gorse is locally common.

Fauna

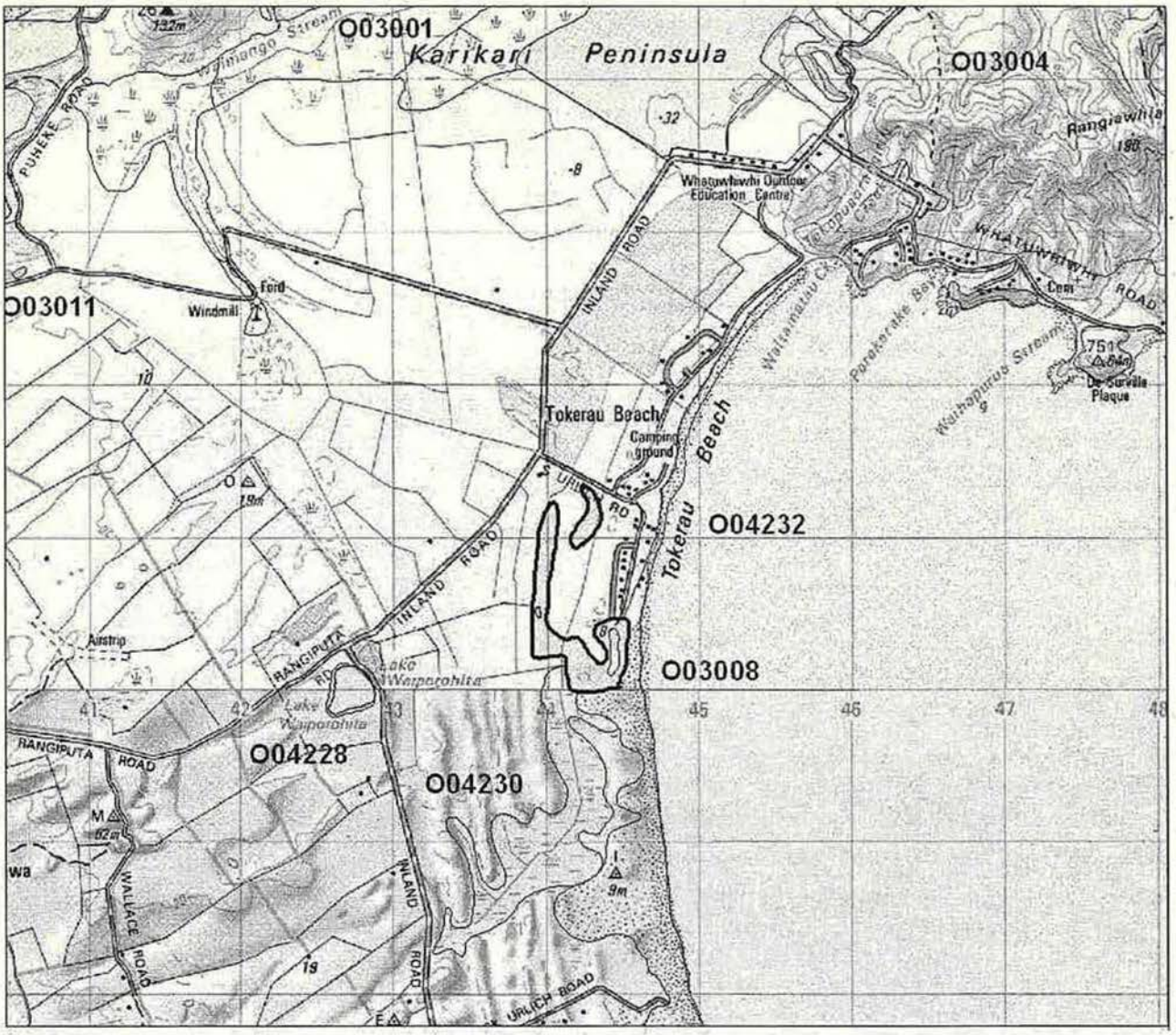
Australasian bittern (Category O threatened species) present in 1994 (T. Beauchamp pers. comm.).

Significance

Harakeke dominant wetlands are rare in the Ecological Region and upper Northland generally.

Representative site for type (b) harakeke-raupo reedland and type (c) harakeke reedland. One of only two records of type (c) harakeke reedland, in the Ecological District, the other occurring on Moturoa Islands (O03/012).

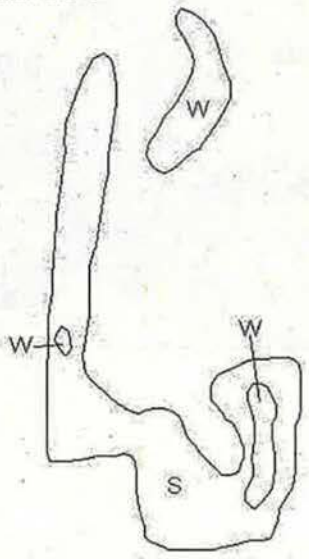
Approximately 12.79 ha of this site (44%) falls under the protection of Tokerau Beach, Department of Conservation administered Stewardship Land.



S Urlich Rd Wetland O03/008

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

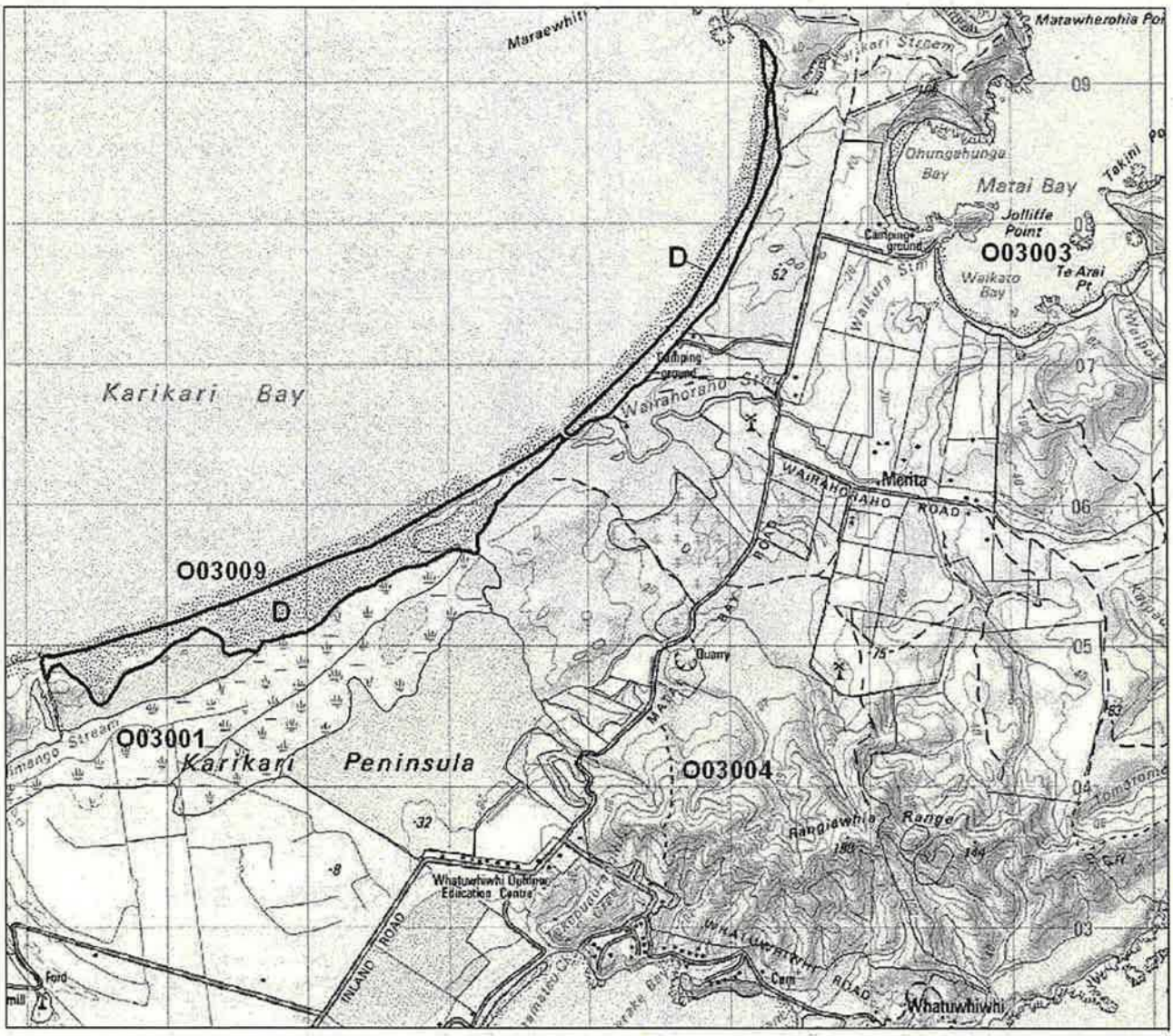


KARIKARI MOANA

Survey no.	O03/009
Survey date	22 August 1995
Grid reference	O03 455 064
Area	136 ha
Altitude	0–8 m asl

Ecological unit

Spinifex grassland on dunes



Karikari Moana O03/009

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Holocene foredune belt with deflation zones at south-western end.

Vegetation

Spinifex is abundant on the dunes at the eastern end of the beach. *Coprosma acerosa* is frequent. Pingao, tauhinu, knobby clubrush and bare areas of sand occur occasionally.

At the western end of the beach the dunes are more sparsely vegetated. However *Spinifex* is common and pingao frequent.

Significant flora

1992 record of the threatened *Austrofestuca littoralis* and *Pimelea arenaria* (both Declining), pingao (Recovering-Conservation Dependent), and a 1949 record of *Atriplex hollowayi* (Critically Endangered).

Fauna

Birds: Northern NZ dotterel (Category B threatened species), banded dotterel, white-fronted tern and variable oystercatcher (all Category C threatened species), reef heron and Caspian tern (both Category O threatened species).

Significance

High-quality and representative duneland habitat for threatened species. Important breeding area for northern NZ dotterel, banded dotterel and variable oystercatcher, and roosting and potential breeding area for white-fronted terns and Caspian terns.

Recreation Reserve administered by the Department of Conservation protects approximately 37 ha or 27.2% of this site.

PUHEKE RD WETLAND

Survey no.	O03/011
Survey date	22 August 1995
Grid reference	O03 406 027
Area	0.4 ha
Altitude	sea level

Ecological unit

Pasture grassland in boggy interdune hollow

Landform/geology

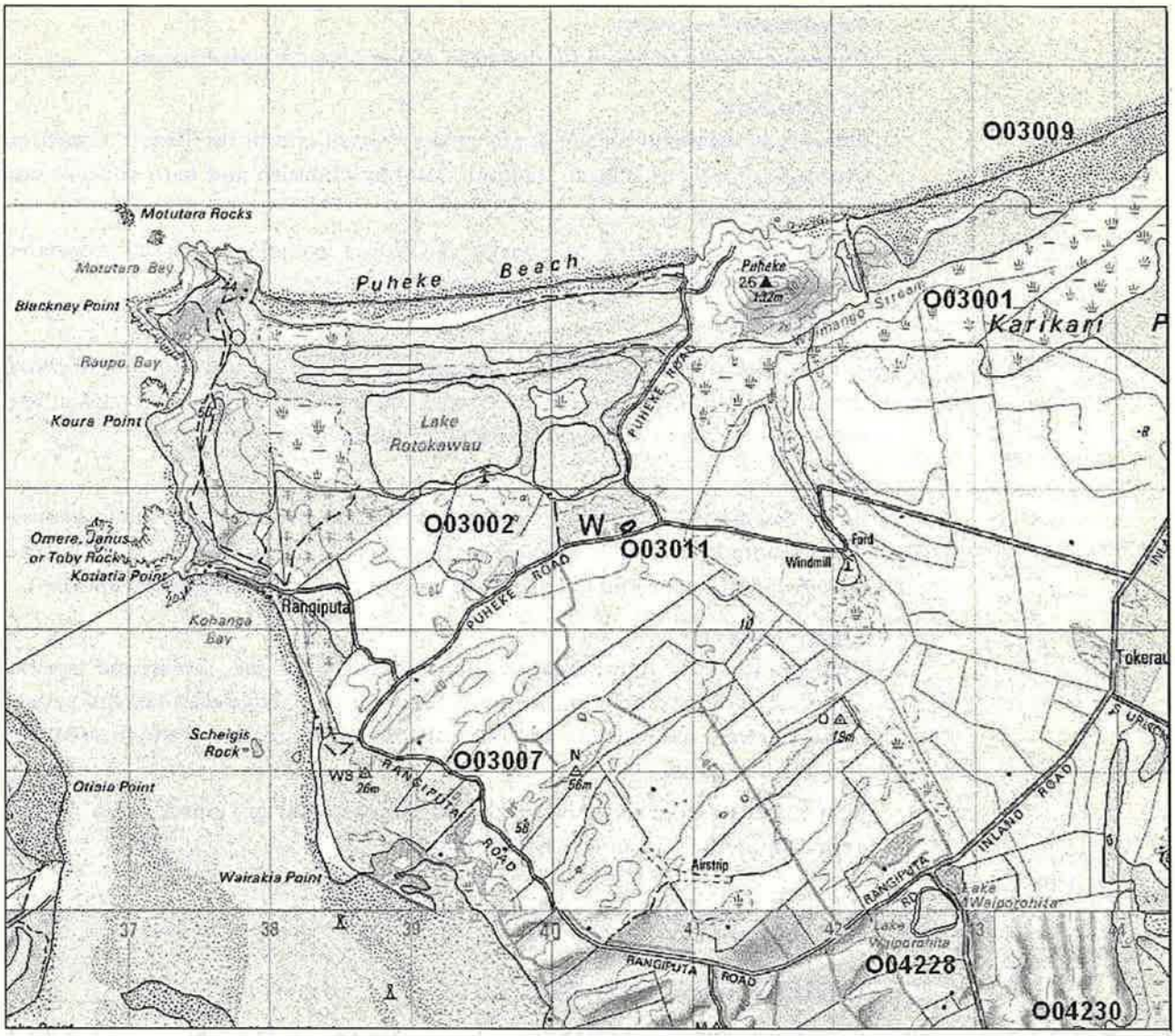
Freshwater wetland in hollow on interdune flat on Pleistocene parabolic dunefield.

Vegetation

Poorly drained pasture with scattered manuka, gorse and rushes.

Significant flora

Lycopodiella serpentina (Vulnerable), *Thelymitra* (a) (Taxonomically Indeterminate-Endangered) and *Utricularia delicatula* (Regionally significant species).



Puheke Rd Wetland O03/011

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Fauna

Not surveyed.

Significance

Habitat for several threatened plants.

MOTUROA ISLANDS

Survey no.	O03/012
Survey date	1968, 1976, 1985
Grid reference	O03 427 145, O03 437 133, O03 440 128, O03 455 125, O03 470 138
Area	27.2 ha – Moturoa Island 9.15 ha; Motutapu Island 3.5 ha; Sugarloaf 0.7 ha; Tuputupangahau Island 12.34 ha; Rocky Island 1.5 ha
Altitude	0–56 m asl

Ecological unit

(a) Buffalo grass grassland on hillslope

(b) *Melicytus novae-zelandiae*-taupata shrubland on hillslope

(c) Herbfield on coastal banks

(d) Harakeke reedland on coastal slopes

(e) Ti kouka-harakeke-manuka-pampas association on hillslope

(f) Karamu-manuka-taupata shrubland on hillslope

(g) *Zoysia pauciflora* grassland on hillslope

(h) *Poa pusilla* grassland on plateau

(i) Native iceplant association on rock

(j) Manuka shrubland on coastal slopes

(k) Giant umbrella sedge-harakeke association on coastal slopes

(l) Pohuehue association on coastal slopes

(m) Karo shrubland on plateau

Landform/geology

Islands formed of Karikari Plutonics intruding Houhora complex rocks.

Vegetation

A group of five named islands, one vegetated stack and several bare rocks and stacks (Miller 1985). Tuputupangahau Island was extensively modified and the current vegetation differs from the other islands, which are covered predominantly with taupata-*Melicytus novae-zelandiae*.

Tuputupangahau Island (Whale Island)

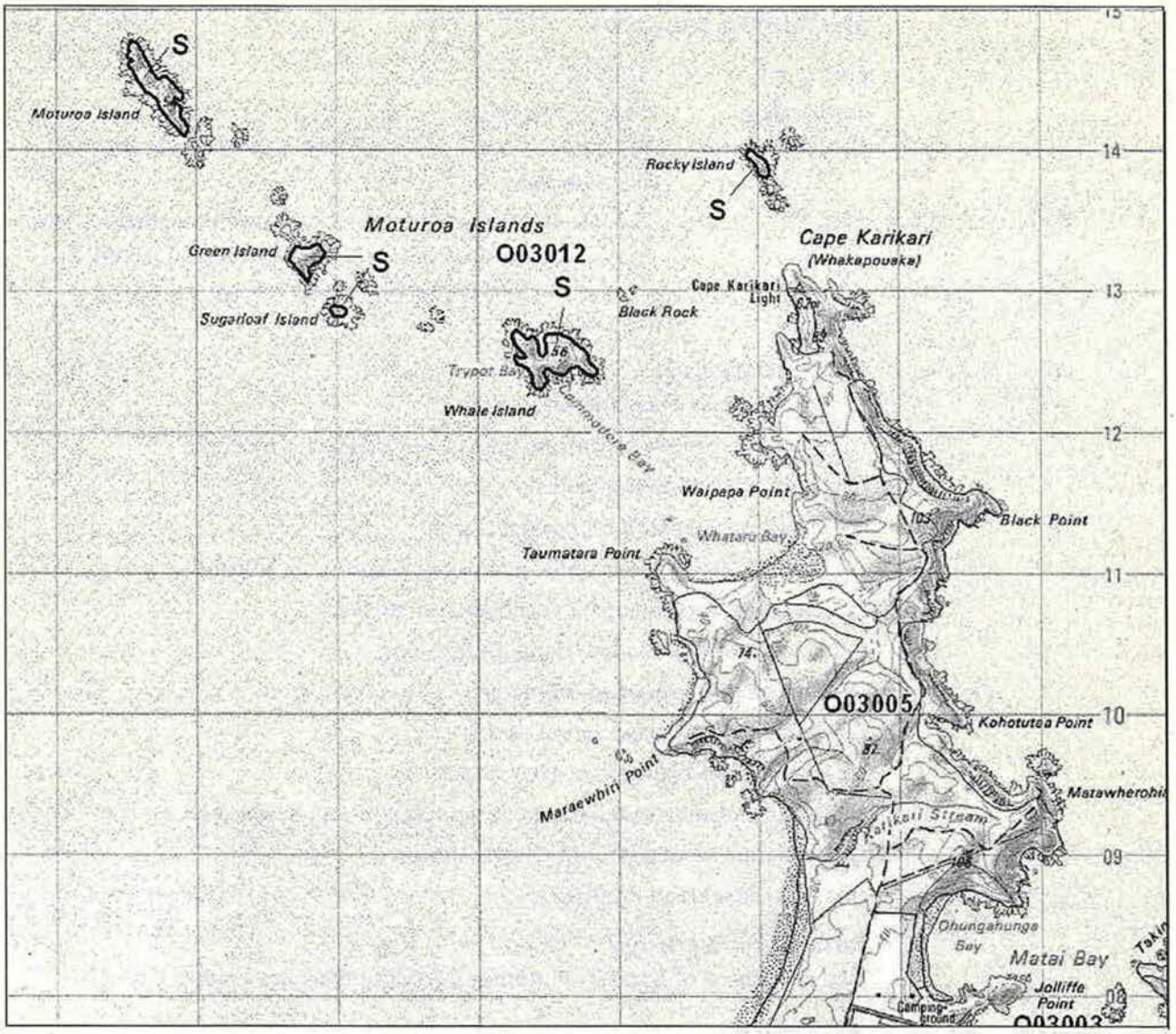
Dense buffalo grass, type (a) occurs above Commodore Bay with scattered mingimingi, manuka, ti kouka and rasp fern, with harakeke common towards the ridge.

(b) *Melicytus novae-zelandiae* and taupata with occasional ti kouka, harakeke and hangehange occurs to the east of Commodore Bay and Driftwood Bay.

(c) An association of caostal species including *Samolus repens* and *Paspalum distichum* grow in crevices just above high water and backed by a belt of oioi with *Deyuexia billardieri* and *Paspalum dilatatum* scattered amongst it.

(d) This is adjoined by dense harakeke with large clumps of shining spleenwort, *Asplenium flaccidum* spp. *haurakiense,* large inkweed plants near the shore, and kiokio, *Pteris* sp. and *Hypolepis* sp. ferns elsewhere.

(e) Ti kouka-harakeke-manuka-purple pampas are dominant between Annie Bay and the eastern side of the island. Cape honey flower also occurs.



Moturoa Islands O03/012

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

(f) On the northeastern coast, karamu-manuka-taupata occur.

(g) *Zoysia pauciflora* occurs in dense swards on the central northern coast with occasional mingimingi, manuka and tauhinu.

(h) A meadow of *Poa pusilla*, occurs on the northern area of the summit, with a wide variety of adventive species scattered amongst it.

(i) Native iceplant, rengarenga lily and the fern *Asplenium obtusatum* spp. *northlandicum* occur on rocky cliffs of stacks, and exposed slopes are covered in pohuehue.

(j) Manuka dominant shrubland with harakeke, ti kouka and mingimingi covers the rest of the summit.

Moturoa Island

Coastal association, type (c), is dominated by knobby clubrush, glasswort, Mercury Bay weed, *Rhagodia triandra* and *Paspalum distichum*.

Most of the vegetation is type (b), with both *Melicytus novae-zelandiae* and taupata being locally dominant. Pohuehue is common, type (l).

Interspersed with this type is type (k), open areas of giant umbrella sedge and harakeke with poroporo. Karo is occasional.

Karaka and houpara occur in a sheltered valley.

Extensive mats of native iceplant type (i), occur.

Trig Rock

A small vegetated rock (approx 0.5 ha) south-east of Moturoa Island.

The vegetation includes type (i) with occasional clumps of *Rhagodia*, sea spurrey, knobby clubrush, umbrella sedge and glasswort, and type (b) with pohuehue.

(m) Karo is locally common near the summit with shining spleenwort and *Asplenium obtusatum* spp. *northlandicum* below.

Sugarloaf Island

Taupata is dominant with *Melicytus novae-zelandiae* and kikuyu locally dominant, type (b). Other species present include umbrella sedge, poroporo, and exotic herbs. Type (i) is present and the splash zone vegetation includes glasswort, Mercury Bay weed and *Paspalum distichum.*

Motutapu Island (Green Island)

Types (b) and (i) predominate. Shining spleenwort is common in damp areas and purple pampas locally dominant on exposed ridges and headlands.

Rocky Island

Type (b) with clumps of purple pampas and umbrella sedge on the summit. Native iceplant, glasswort, Mercury Bay weed, *Samolus repens*, sea spurrey and *Paspalum distichum* occur on the margins.

Fauna

Birds: Breeding site for blue penguin, fluttering shearwater, little shearwater, grey-faced petrel, white-faced storm petrel, diving petrel; possibly Australasian gannet.

Threatened bird species recorded include two Category C threatened species, white-fronted tern and variable oystercatcher. Caspian tern and reef heron (both Category O threatened species).

Lizards: robust skink (Moturoa Island) (Category B threatened species), Suter's skink and ornate skink (Regionally significant species), Pacific gecko and shore skink.

Significance

Considered by Adams (1968) to be one of the more important breeding areas for sea birds in northern New Zealand. Its apparent rat-free status makes it especially valuable as habitat for species such as the robust skink, which is only known on five rat-free islands, and for breeding colonies of seabirds.

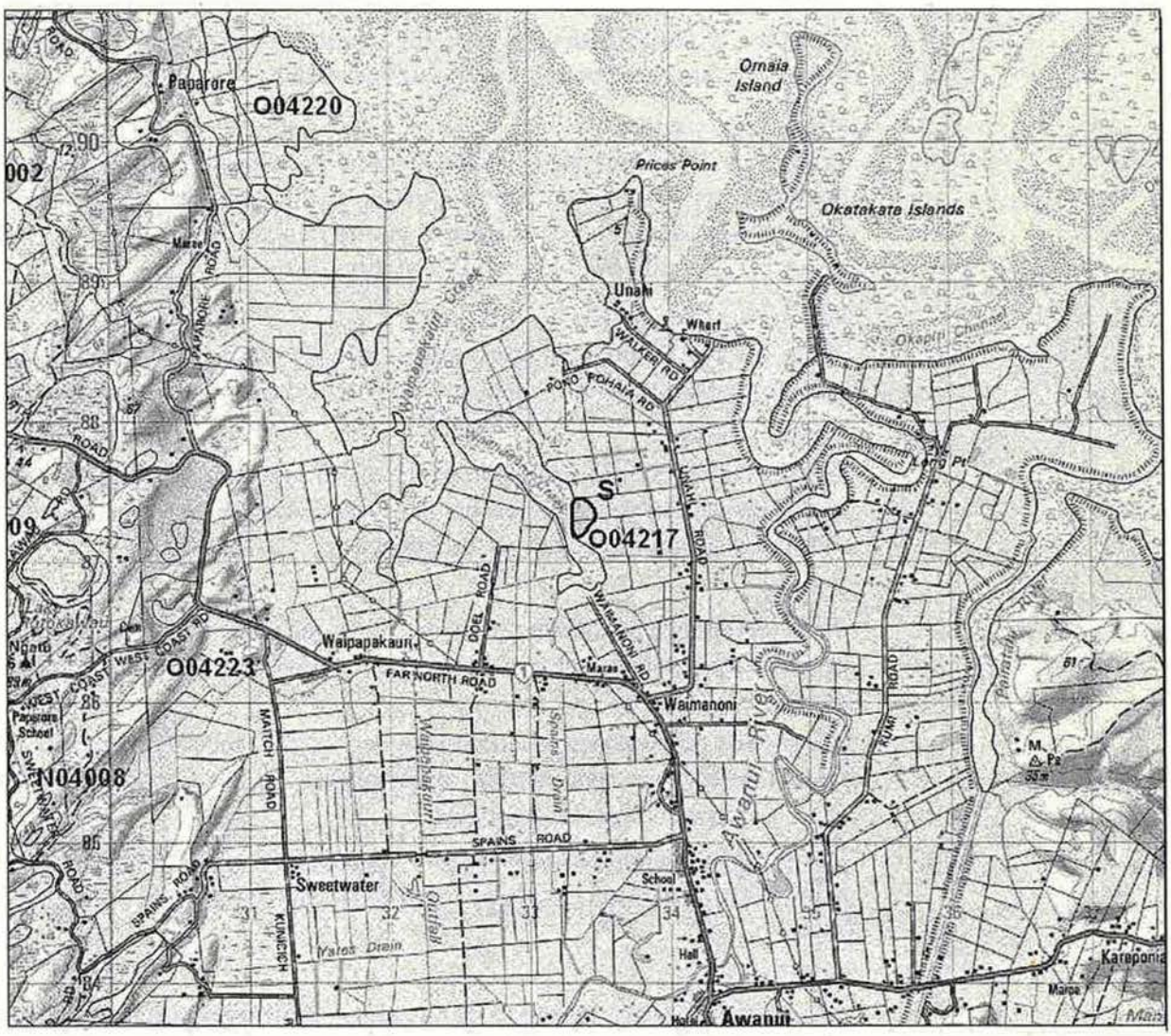
The main vegetation types of native iceplant and *Melicytus novae-zelandiae*-taupata shrubland are now restricted in distribution mainly to offshore islands and are uncommon in both the District and Region.

Representative site for 12 Ecological units, from type (b) through to type (m), all of which are not recorded on other island habitats in the Ecological District.

Site description drawn from: Adams (1968); Farley (1977); Hitchmough (1977); Staveley Parker (1977); Wright (1977); Miller (1985).

WAIMANONI CREEK SHRUBLAND

Survey no.	O04/217
Survey date	8 August 1995
Grid reference	O04 334 873
Area	3.4 ha
Altitude	0–5 m asl



Waimanoni Creek Shrubland O04/217

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

Totara treeland on alluvial flats

Landform/geology

Estuarine/alluvial flats bounding Waimanoni Creek.

Vegetation

Totara to 10 m is emergent over abundant divaricating shrubs. Ti kouka and tobacco weed are frequent and gorse is present.

Fauna

Not surveyed.

Significance

A small shrubland which is an uncommon habitat type and adjacent to mangroves.

A representative site and only occurrence of this Ecological unit in the Ecological District.

Further surveying is recommended as there may be threatened species at this site.

PAPARORE WETLAND & SHRUBLAND

Survey no.	O04/220
Survey date	14 August 1995, 26 February 1996
Grid reference	O04 309 901, O04 309 895
Area	38 ha (17.5 ha shrubland, 20.5 ha wetland)
Altitude	0–10 m asl

Ecological unit

(a) Manuka swamp shrubland on peat

(b) Raupo reedland on alluvium

(c) Kanuka/manuka shrubland on alluvium

Landform/geology

Freshwater wetland on alluvium/estuarine deposits at the head of Rangaunu Harbour.

Vegetation

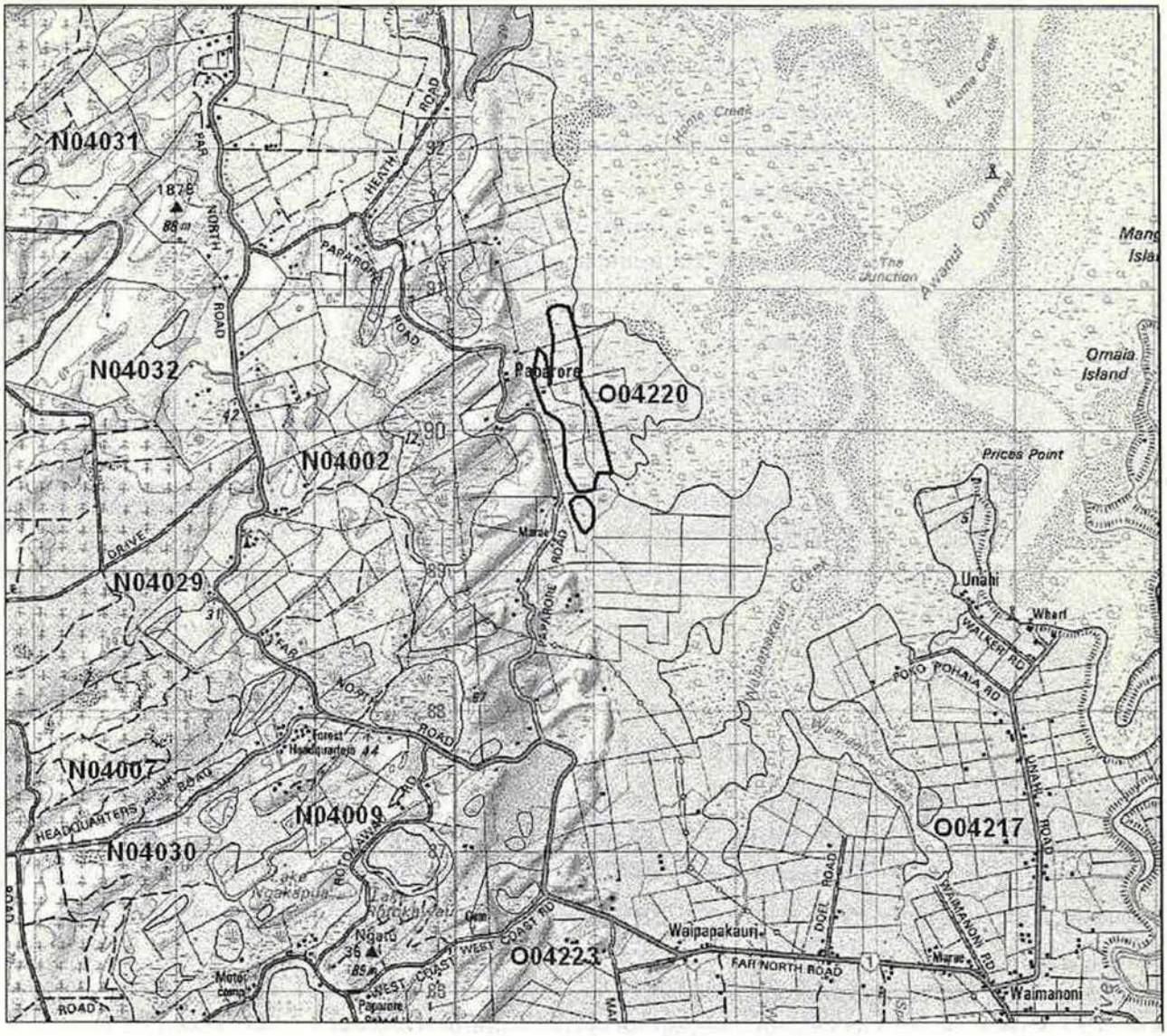
(a) The north of this site is a semi-wet manuka shrubland on peat. Kanuka occurs frequently. Also present are umbrella fern, kiokio, harakeke, water fern, ring fern, rasp fern, wheki, mamaku, pohuehue, *Coprosma tenuicaulis, Astelia grandis, Hebe* and gorse.

(b) Further south near the salt water influence is a raupo swamp with sedges. Gorse occurs frequently. Harakeke, wheki, mamaku, kanuka, mangrove and pampas also occur.

(c) This adjoins kanuka/manuka shrubland 3–4 m tall with gorse locally frequent. Mamaku, tobacco weed, brush and black wattle are also present.

Significant flora

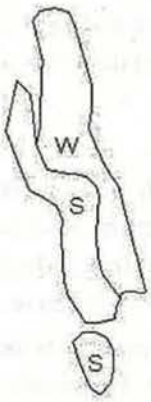
Astelia grandis (Regionally significant species).



Paparore Wetland & Shrubland O04/220

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Fauna

Birds: Australasian bittern (Category O threatened species), NI fernbird and potential habitat for spotless crakes (Regionally significant species).

Aquatic fauna: 1999 record of black mudfish (Category C threatened species), giant bully (Regionally significant species) and short-finned eel.

Significance

One of the few remaining wetland and shrubland associations on the Rangaunu Harbour.

The peat swamp is a good example of a habitat type now uncommon in the Ecological Region.

Provides important habitat for wetland fauna including threatened species.

WAIPARERA CREEK WETLAND

Survey no.	O04/221
Survey date	23 August 1995
Grid reference	N04 303 965 (contiguous site on two maps), O04 306 964
Area	22.5 ha
Altitude	0–5 m asl

Ecological unit

(a) Oioi saltmarsh on estuary

(b) Raupo reedland in swamp

(c) Manuka swamp-shrubland on alluvium

(d) *Coprosma* spp.-giant umbrella sedge association on alluvium

(e) Gorse-pampas-wattle scrub association on stop bank

Landform/geology

Freshwater wetland at head of Waiparera Creek estuary.

Vegetation

(a) The saltmarsh is primarily oioi with sea rush, *Baumea juncea,* saltmarsh ribbonwood, *Selliera radicans* and glasswort.

(b) This grades into a raupo dominant swamp with *Baumea articulata.* In some areas manuka and harakeke are common with pampas and wattle also occurring.

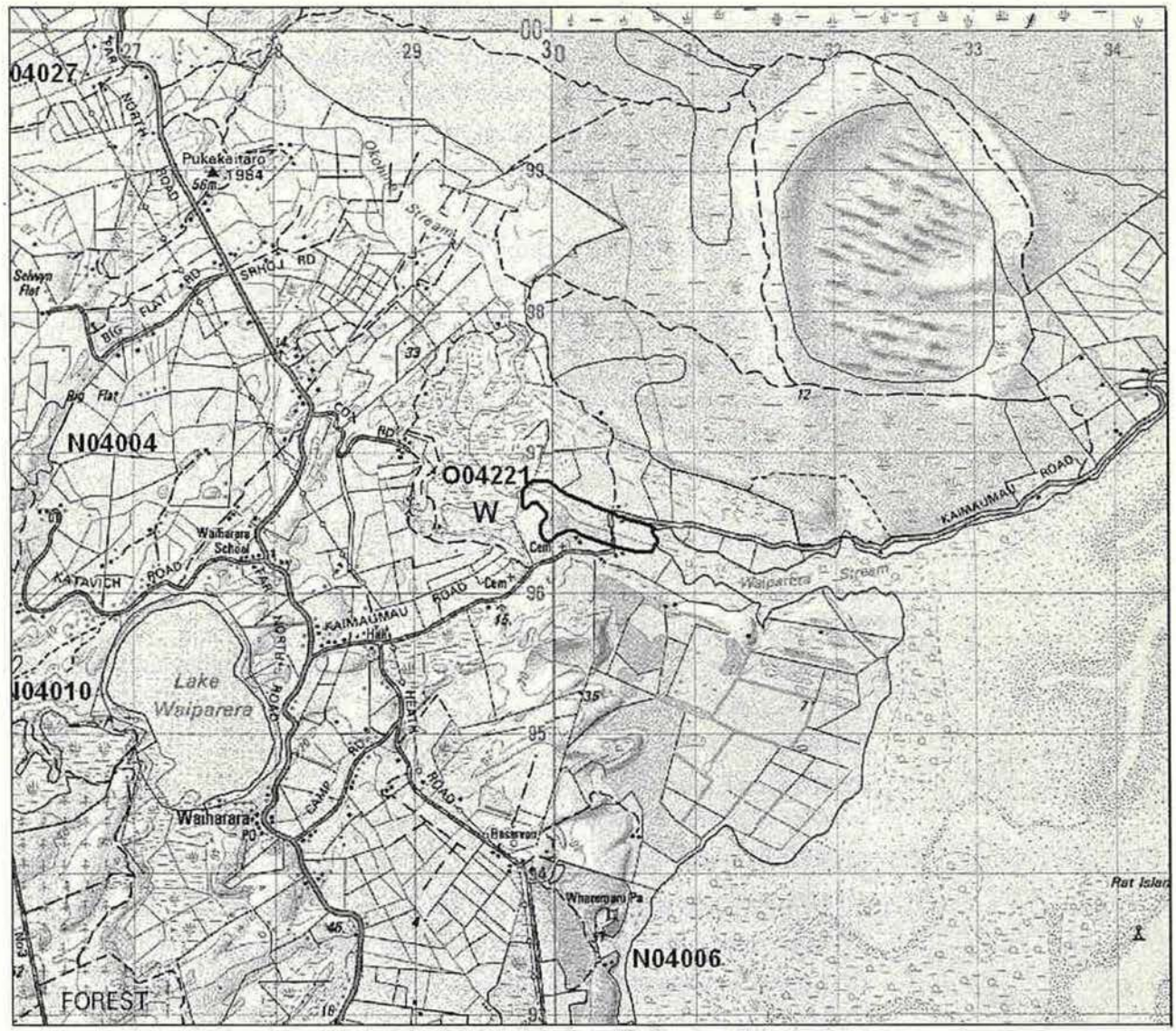
(c) On slightly drier ground manuka is dominant with harakeke and *Baumea juncea.* Umbrella fern is also present. Elsewhere is a mosaic of manuka, wattle, harakeke, raupo, *Baumea juncea* and swamp millet.

(d) There is also and area where *Coprosma propinqua, C. tenuicaulis* and giant umbrella sedge are common.

(e) On the western riverbank, gorse, pampas and wattle are common. Upstream of the road bridge the area is trampled by stock.

Fauna

Birds: Spotless crake and NI fernbird (both Regionally significant species).



Waiparera Creek Wetland O04/221

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Significance

One of the few freshwater wetland areas remaining on the margin of the Rangaunu Harbour.

Representative site for type (a) oioi saltmarsh, type (b) raupo reedland, and type (d) *Coprosma* spp.-giant umbrella sedge association. Only record of type (d) in the Ecological District.

Provides important habitat for wetland fauna.

Approximately 8 ha or 35.5% of this site is protected including 7.4 ha Stewardship Land and 0.6 ha Marginal Strip administered by the Department of Conservation.

AWANUI RIVER FOREST REMNANTS

Survey no.	O04/222
Survey date	9 May 1995
Grid reference	O04 323 824, O04 313 785, O04 327 824, O04 314 783, O04 328 815, O04 333 777, O04 322 811, O04 315 775, O04 313 798, O04 315 774, O04 312 794, O04 316 772, O04 308 793, O04 315 771, O04 309 787, O04 315 770, O04 313 788, O04 322 770
Area	50.5 ha
Altitude	5-15 m asl

Ecological unit

(a) Ti kouka-manuka shrubland on alluvium

(b) Kanuka/manuka shrubland on alluvium

(c) Secondary kahikatea forest on alluvium

(d) Puriri forest on alluvium

(e) Puriri-taraire forest on alluvium

Landform/geology

Alluvial flats along Awanui River Valley.

Vegetation

A number of small forest remnants comprising lowland broadleaf and kahikatea forest and ti kouka shrubland. Most of the remnants are puriri dominant with taraire commonly occurring; others are kahikatea dominant.

Other species present are kowhai, titoki, miro, karaka, nikau, and matai.

Some of the sites are extremely small. Most are grazed, with no understorey.

Significant flora

One of the protected remnants (Foleys Bush) contains several threatened plants *Christella* aff. *dentata* (Taxonomically Indeterminate-Critically Endangered), *Pittosporum obcordatum* (Recovering-Conservation Dependent), *Mazus novaezeelandiae* subsp. *impolitus* f. *hirtus* (Endangered) and Regionally significant species, *Adelopetalum tuberculatum,* black maire and pokaka. Several native orchids have been identified in the bush.

Fauna

Birds: Kukupa (Category B threatened species), Australasian bittern (Category O threatened species).

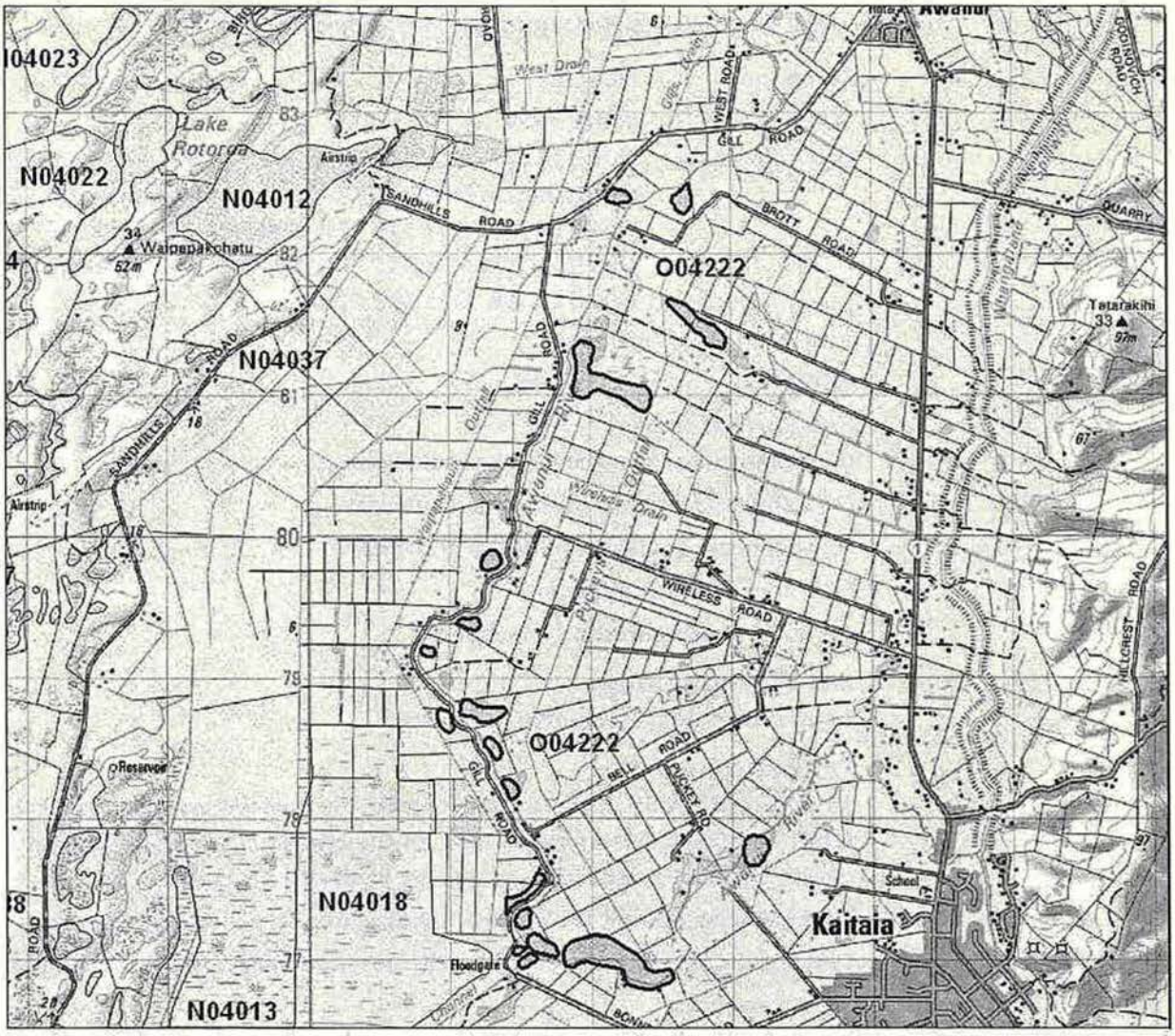
Aquatic fauna: 1999 record of black mudfish (Category C threatened species) from the Awanui River swamp, giant bully (Regionally significant species), and short-finned eel.

Significance

Remnants of once widespread but now rare lowland broadleaf forest on alluvium supporting threatened flora and fauna. Virtually the only example of this type remaining in the Ecological Region and in the Far North generally.

One of the few sites in the Ecological District containing kukupa.

A representative site for all Ecological units, with three units unrecorded elsewhere in the Ecological District: ti kouka-manuka shrubland, kahikatea forest, and puriri forest.



Awanui River Forest Remnants O04/222

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Two areas of Scenic Reserve (O03 315 770, O03 327 824) of approximately 3 ha administered by the Department of Conservation and two Queen Elizabeth II National Trust Open Space Covenants (O04 333 777, O04 322 811) totalling 10.4 ha protect 26.5% of this site.

WEST COAST RD SHRUBLAND

Survey no.	O04/223
Survey date	9 August 1995, 11 August 1995, October 2000
Grid reference	O04 302 873, O04 306 872, O04 304 871, O04 304 866
Area	21.8 ha (16.7 ha shrubland, 5.1 ha wetland)
Altitude	5–20 m asl

Ecological unit

(a) *Eleocharis sphacelata*-manuka association in dune hollow

(b) Manuka shrubland on peat and gently sloping consolidated dunes

(c) Wattle shrubland on peat

(d) *Baumea* spp. on peaty dune hollow

(e) *Baumea juncea*-manuka association in peaty dune hollow

(f) Sydney golden wattle shrubland on gently sloping consolidated dunes

Landform/geology

Pleistocene consolidated parabolic dunes with freshwater wetland in interdune hollow.

Vegetation

(a) The small wetland in the very north of the site is predominately *Eleocharis sphacelata* with manuka.

(b) South-east of this, two small gumland areas are dominated by manuka and in the drier areas, type (c) Wattle shrubland occurs.

Wet boggy areas are dominated by *Baumea* spp., type (d), with occasional *Gleichenia dicarpa*.

Turutu is widespread throughout both areas.

(e) A small peat wetland on the corner of West Coast Rd is *Baumea juncea* and low manuka.

Kanuka, Sydney golden wattle and pampas are also present.

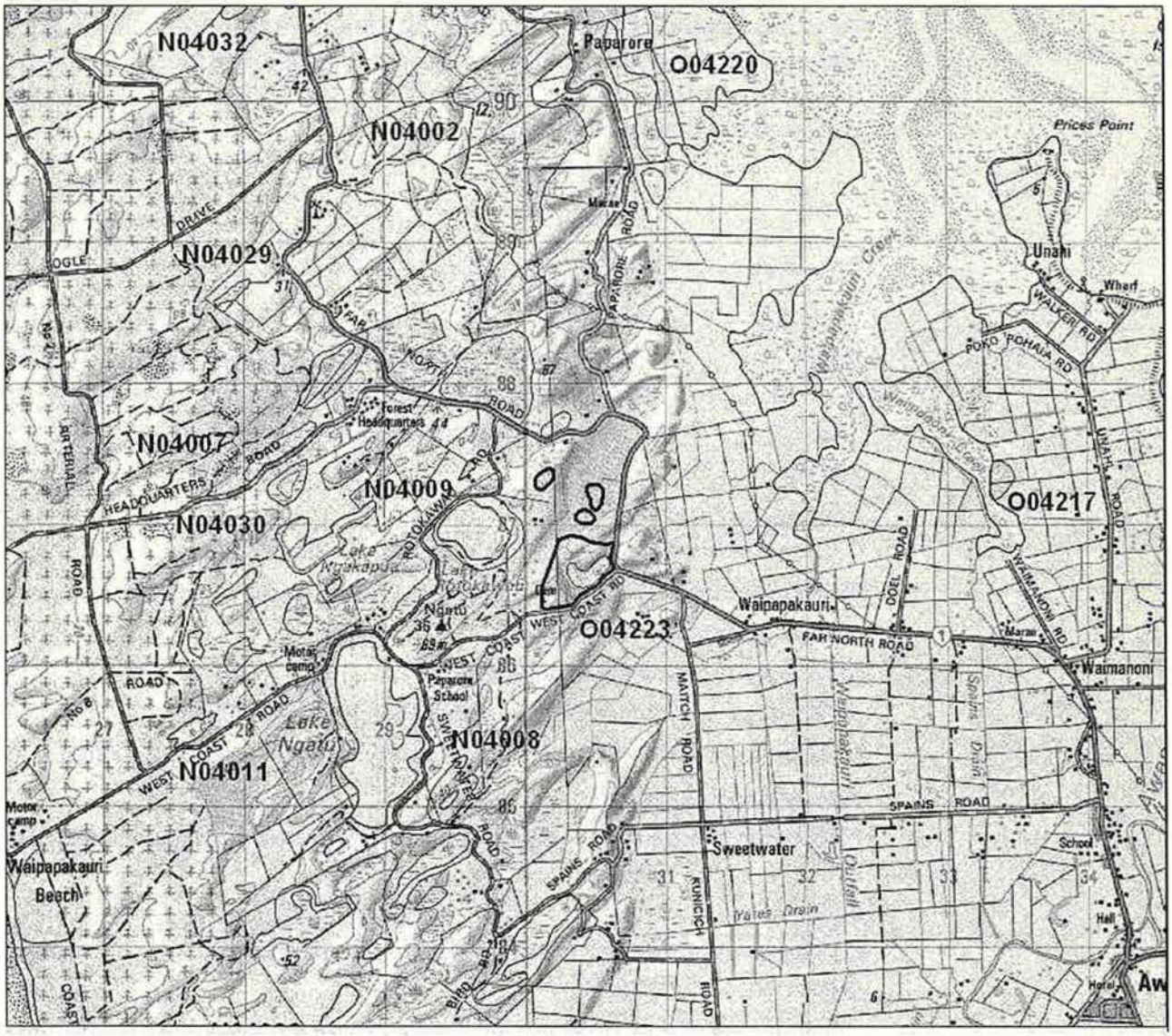
On the margins is low manuka shrubland, type (b), and type (f) Sydney golden wattle to 3 m in which prickly hakea and kanuka occur frequently. There is also an occasional emergent pine.

Significant flora

Thelymitra malvina (Naturally Uncommon–Sparse) and *T. carnea* were recorded from this site in year 2000.

Fauna

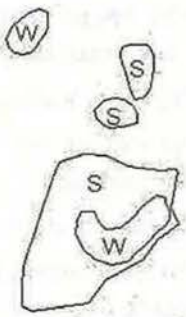
Birds: NI fernbird (Regionally significant species).



West Coast Rd Shrubland O04/223

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



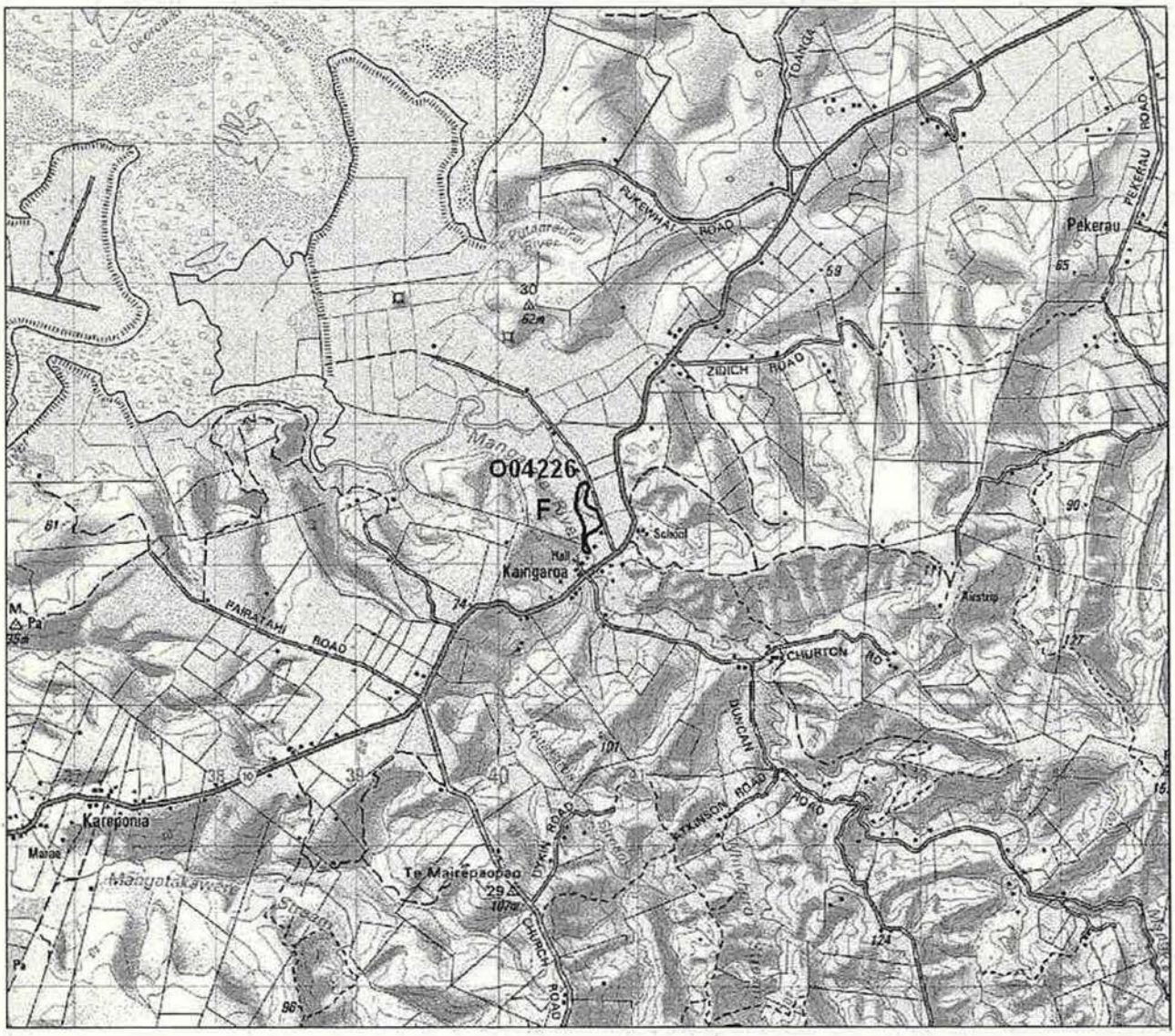
Significance

The peat swamp is one of the few remaining examples of this habitat type and is a representative site for *Baumea juncea*-manuka association.

This area contains the regionally significant NI fernbird, and a threatened orchid. Also potential habitat for the threatened black mudfish.

MANGATETE RIVER BUSH

Survey no.	O04/226
Survey date	21 August 1995
Grid reference	O04 406 863
Area	3.8 ha
Altitude	5-18 m asl



Mangatete River Bush O04/226

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

Kahikatea-kanuka secondary forest on alluvium

Landform/geology

Alluvial flats near mouth of Mangatete River.

Vegetation

Kanuka to 6 m and emergent kahikatea are co-dominant in a discontinuous canopy along a narrow strip of riverbank.

Willow and totara occur frequently, with ti kouka, puriri and brush wattle also present.

Fauna

Not surveyed.

Significance

A small pocket of regenerating riverine forest. Although unfenced and grazed it is important due to the lack of this habitat type in the Ecological Region. A representative site and the only record of kahikatea-kanuka forest in the Ecological District.

LAKE OHIA

Survey no.	O04/227
Survey date	11 August 1995
Grid reference	O04 445 920
Area	1,641 ha (1,613 ha shrubland, 28 ha wetland)
Altitude	0–67 m asl

Ecological unit

(a) Manuka-kanuka shrubland on peat bed

(b) *Baumea juncea* sedgeland on peat bed

(c) *B. buttonii* sedgeland on peat bed

(d) Manuka-kanuka shrubland on dune ridges

(e) Umbrella fern-*Schoenus* sp. association on gently sloping gumland

(f) Manuka-*Schoenus brevifolius* association on dune ridges

(g) *Lepidosperma filiforme* sedgeland on gently sloping gumland

(h) *Schoenus brevifolius* sedgeland on peat beds

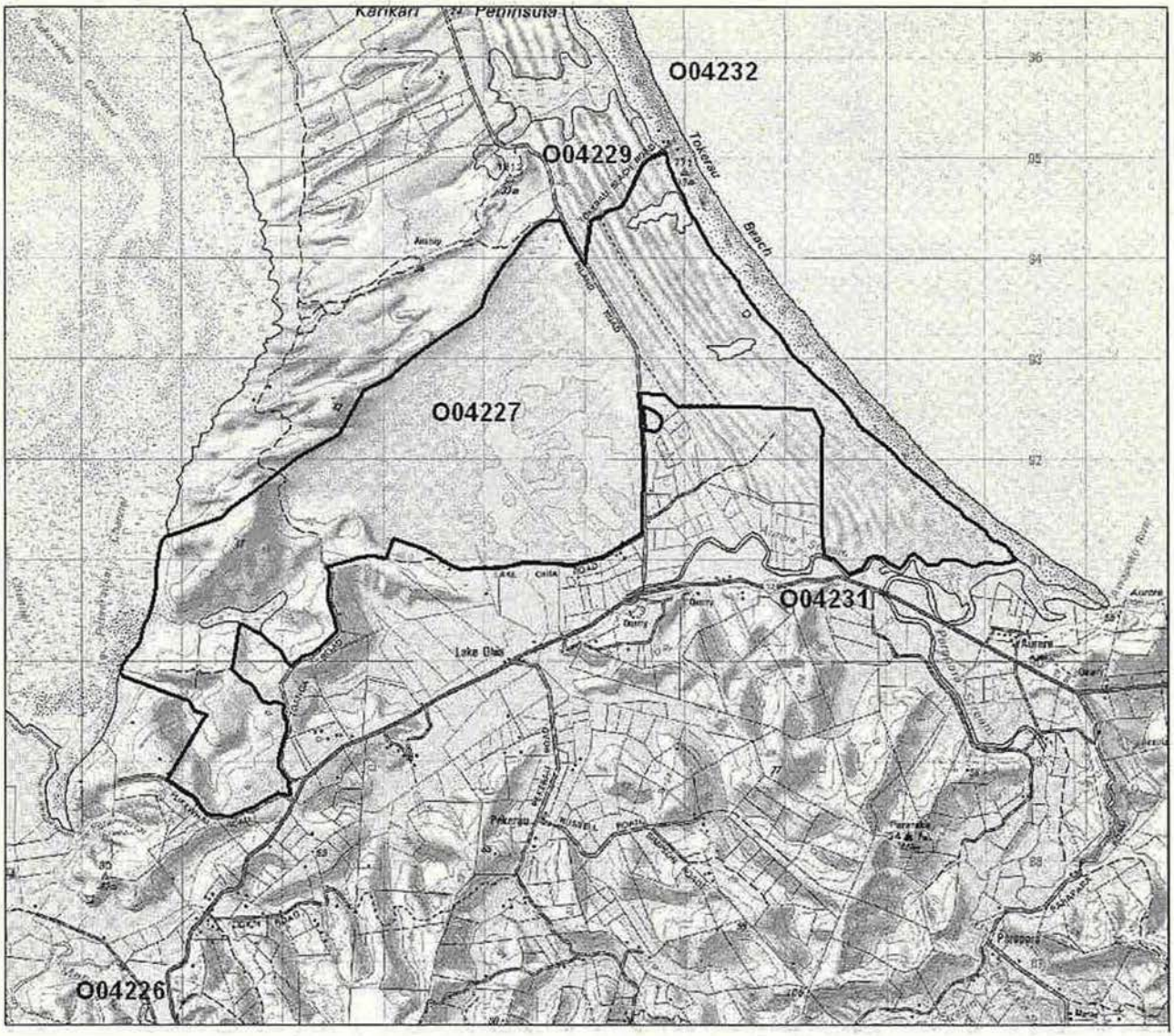
(i) Raupo reedland in dune hollow

(j) Wire rush rushland on peat bed

(k) Manuka-kanuka shrubland on sand ridge

Landform/geology

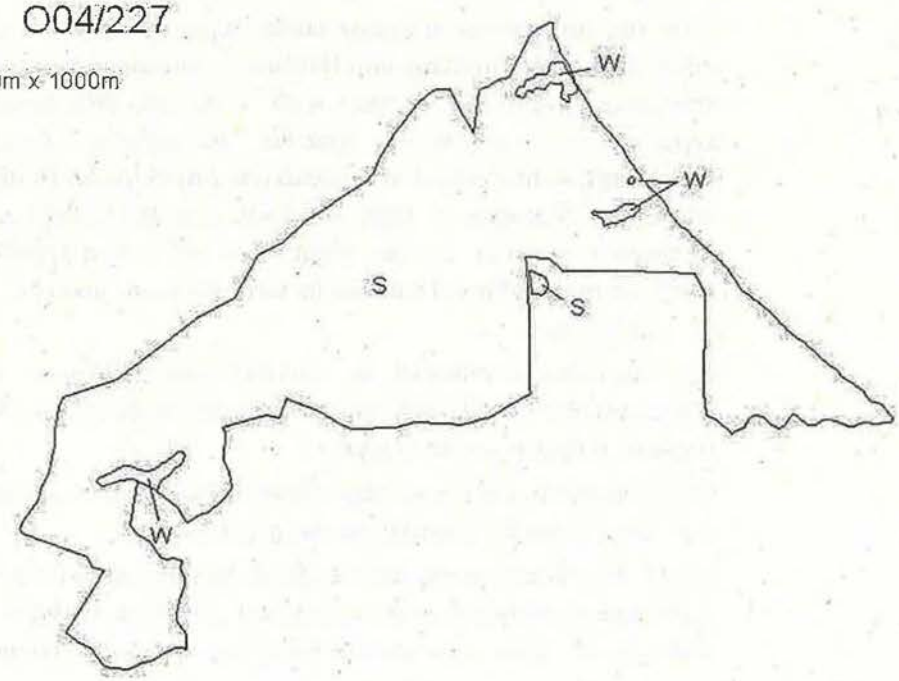
Freshwater wetland (formerly a shallow lake) on interdune flats ponded between a belt of consolidated foredunes of last interglacial age to the east, and Pleistocene consolidated parabolic dunes to the west.



Lake Ohia O04/227

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Soils

Organic soil (Ruakaka Otonga), gley soil (Waipu Te-Kopuru), yellow-brown sand (Ohia), brown granular clay (Bream Te-Kie), yellow-brown earth (Tangitiki).

Vegetation

The lake bed contains well preserved sub-fossil kauri and silver pine, 30,000–40,000 years old (Clunie 1987), forming a mosaic with hard sand pans and patches of sedges and manuka "islands". The area is seasonally wet and contains natural and man-made bog-holes.

(a) Within the old lake bed there are islands where manuka is dominant and kanuka common over dense swards of *Schoenus brevifolius* and *Baumea teretifolia*. Prickly hakea and mingimingi are less common. Bracken, kumarahou, *Dracophyllum lessonianum,* wattle, and gorse are also present with a ground cover of *Lycopodium* sp., *Lepidosperma filiforme* and adventive native herbs.

(b) In the west and north of the lake bed are dense, pure stands of *Baumea juncea* and *Baumea huttonii* type (c), which is more widespread. On slightly raised ground in the central and eastern sectors, the vegetation is open with *Eleocharis sphacelata* on the flats and sea rush and ring fern on mounds.

(d) On low sand ridges on the eastern side of the lake, manuka is dominant with locally occurring kanuka, *Dracophyllum lessonianum,* mingimingi, prickly hakea, scattered gorse, bracken and *Schoenus brevifolius.* Oioi occurs locally on low sandy ridge crests.

(e) On peaty gumlands, on the edges of the lake bed *Schoenus brevifolius* is locally dominant with umbrella fern, scattered low manuka and *Baumea teretifolia. Baumea juncea* and *B. rubiginosa* occur on drier areas. *Gonocarpus micranthus* and *Lycopodiella lateralis* are widespread and *Sphagnum* is abundant. *Spiranthes novae-zelandiae* and *Cryptostylus subulata* are present. *Baumea rubiginosa* and wire rush are locally abundant on old gum diggings. The threatened fern *Todea barbara* is present.

(f) In the south-western sector sandy ridges rising to 70 m asl form a corridor linking Lake Ohia to Rangaunu Harbour. A mosaic of low manuka shrubland and *Schoenus brevifolius* occurs with scattered *Dracophyllum lessonianum, Lepidosperma filiforme, Epacris pauciflora, Lycopodiella lateralis,* mingmingi, kumarahou and *Pomaderris phylicifolia.* In depressions manuka is dense and co-dominant with *Schoenus brevifolius* and on the lower slopes, *Baumea teretifolia.* On the basal slope are found *Schoenus brevifolius* and *Baumea teretifolia* with umbrella fern, frequent manuka, turutu, *Lycopodium* sp. and bracken.

(g) Sedgeland dominated by *Lepidosperma filiforme* occurs towards the Rangaunu Harbour. *Epacris pauciflora, Baumea* sp. and *Schoenus* sp. are also present. Hakea is locally frequent.

On the margins and some ridge crests Sydney golden wattle is locally abundant and some pines are planted on the perimeter.

(h) In the eastern sector near Tokerau Beach, peaty hollows are dominated by *Schoenus brevifolius* with occasional *Baumea teretifolia.* Low manuka is widespread. Wire rush and umbrella fern are locally common.

(i) Behind the dunes, raupo is local with a narrow fringe of harakeke and occasional ti kouka.

The northern lake has harakeke and pohutukawa scattered on its banks.

(j) Wire rush is abundant with local stands of kuta, *Eleocharis sphacelata, Baumea juncea, B. rubiginosa,* raupo and jointed rush. *Myriophyllum propinquum* is locally common.

On drier ground open sedgeland of type (h) *Schoenus brevifolius* is dominant with manuka, kanuka, mingimingi and kumarahou. Prickly hakea is widespread.

(k) The low sand ridges have a discontinuous canopy of manuka-kanuka 2-3 m tall with mingimingi, kumarahou, gorse, prickly hakea, Sydney golden wattle and occasional *Dracophyllum lessonianum* and *Epacris pauciflora. Schoenus brevifolius* is scattered throughout with *Lepidosperma filiforme, Lycopodium deuterodensum, Cyathodes fraseri* locally plentiful and occasional turutu, *Morelotia* sp. and *Pimelea* c.f. *urvilleana* "northern".

Significant flora

Endangered
Phylloglossum drummondii (1999 record).

Vulnerable
Todea barbara, Lycopodiella serpentina and *Thelypteris confluens.*

Naturally Uncommon-Range Restricted
Cryptostylis subulata and *Thelymitra malvina.*

Naturally Uncommon-Sparse
Calochilus paludosus

Taxonomically Indeterminate-Critically Endangered
Calochilus aff. *herbaceus.*

Taxonomically Indeterminate-Endangered
Thelymitra (a) (translocated).

Regionally significant species
Thelymitra "darkie" AK 231761, wire rush and *Utricularia delicatula.*

1968 record of *Pimelea arenaria* (Declining).

Fauna

Birds: Northern NZ dotterel (Category B threatened species), banded dotterel (Category C threatened species), Australasian bittern (Category O threatened species). High numbers of NI fernbird and spotless crake (both Regionally significant species). Other bird fauna include trans-equatorial migrants, e.g. greenshank, Pacific golden plover, sharp-tailed sandpiper and turnstone.

Aquatic fauna: 1993 record of black mudfish (Category C threatened species), long-finned eel, common bully and inanga.

Lizards: 1980 record of copper skink.

Significance

Outstanding habitat which is the last vestiges of heath and boglands on old sand country on the Karikari Peninsula forming a continuous sequence from the eastern shoreline of Rangaunu Harbour through to Tokerau Beach, Doubtless Bay.

NI fernbird population is one of the largest in the Ecological District (R.J. Pierce pers. comm.).

Representative site for type (a) manuka-kanuka shrubland on peat bed, type (b) *Baumea juncea,* and (c) *B. buttonii* sedgeland, (e) umbrella fern-*Schoenus* sp. association, (f) manuka-*Schoenus brevifolius* association, (g) *Lepidosperma filiforme* sedgeland, (h) *Schoenus brevifolius* sedgeland, (j) wire rush sedgeland, and type (k) manuka-kanuka on sand ridge. Sole record of type (c), (g), (h) and (j) in the Ecological District.

A geopreservation site for:

- Lake Ohia gumdigging holes which are one of the best preserved groups in New Zealand and are ranked as being nationally significant.
- Lake Ohia Pleistocene fossil forest dating back 30,000 years. Partly exhumed buried Quaternary kauri forest of regional significance.
- Lake Ohia Quarry pyrite: Egg sized pyrite nodules in shale of regional significance.

(Kenny & Hayward 1996)

The site is also nationally important because of its soils:

- It comprises an extensive area containing a wide range of soils and soil-vegetation associations.
- It is the only example of Waipu and Ohia soils in the national inventory.
- It contains good examples of Otonga soils which are uncommon.
- Most Waipu soils have been developed for farming.

(Arand et al. 1993)

The majority of this site is protected, 76%, by 1,234 ha of Stewardship Land and 29 ha of Marginal Strip both administered by the Department of Conservation.

References: Anderson (1985); Clunie (1987).

LAKE WAIPOROHITA

Survey no.	O04/228
Survey date	22 August 1995
Grid reference	O04 428 300
Area	8.3 ha (1.7 ha shrubland, 6.6 ha wetland)
Altitude	5–15 m asl

Ecological unit

(a) Open water in dune lake

(b) *Eleocharis sphacelata*-raupo reedland on lake bed

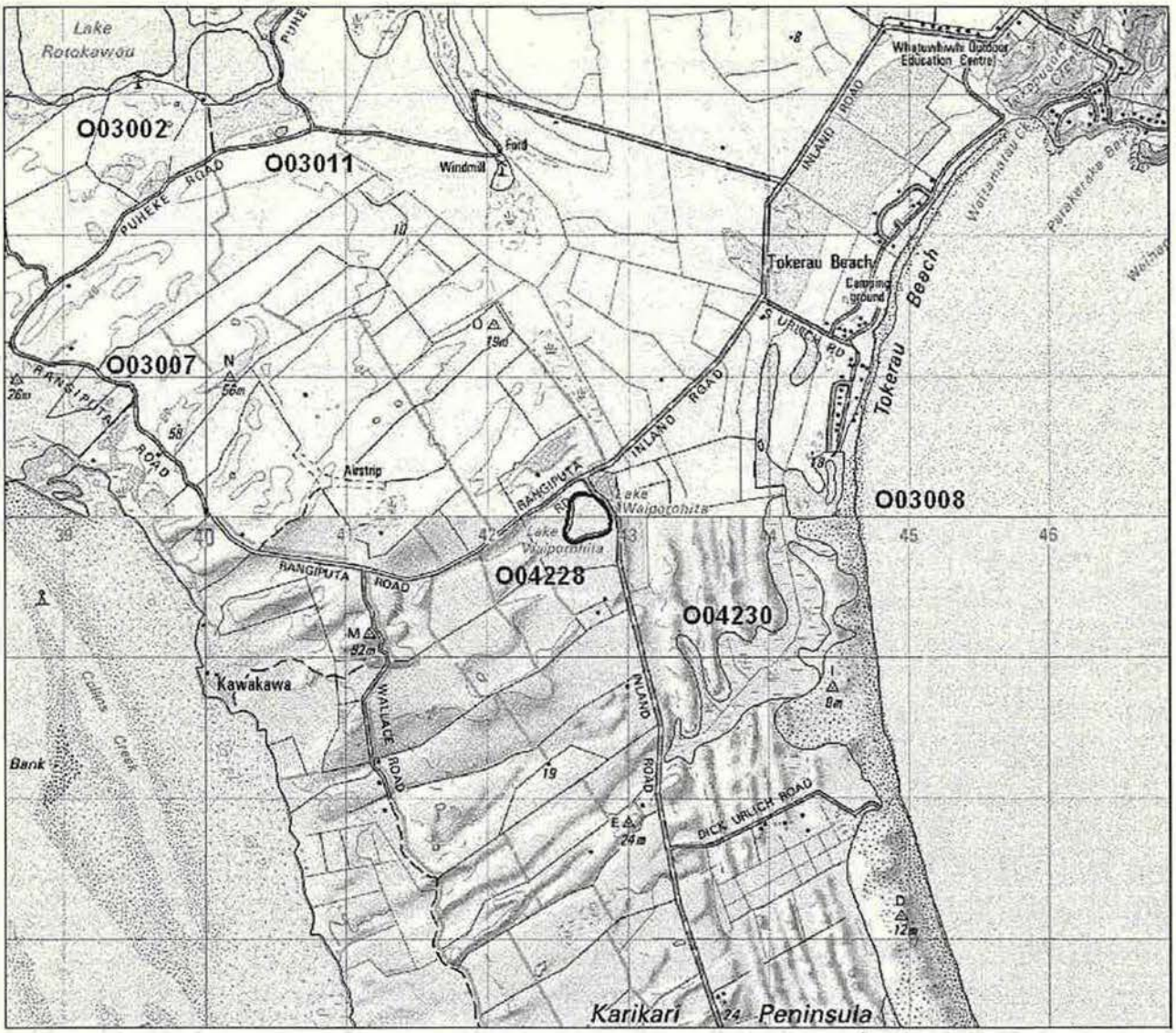
Landform/geology

Lake on interdune flat behind belt of consolidated foredunes of last interglacial age.

Vegetation

(a) This lake is 90% open water.

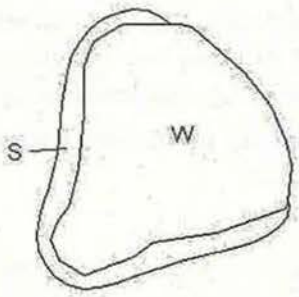
(b) On the margins *Eleocharis sphacelata* is dominant and raupo common. *Baumea articulata* with smaller *Juncus* sp., jointed rush and willow weed are also present. A fringe of manuka, with frequent pohutukawa, poplar (planted),



Lake Waiporohita O04/228

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



gorse, kanuka, bracken, tobacco weed, pampas and brush wattle are also present.

Significant flora

Amphibromus fluitans (Critically Endangered) sighted by Heenan and de Lange in 1998 (P.J. de Lange pers. comm. 2000) and *Gratiola pedunculata* (Naturally Uncommon-Vagrant) recorded in 1996 by de Lange.

Fauna

Birds: NZ dabchick (Category C threatened species), Caspian tern and Australasian bittern (both Category O threatened species), common waterbirds and some rare visitors, e.g. white-winged black tern.

Aquatic fauna: common bully.

Frogs: The green frog (*Litoria aurea*) was recorded from this lake in 1986.

Significance

Small freshwater lake habitat for threatened and common waterbirds. Potential habitat for spotless crake (Regionally significant species).

Unfortunately the pest fish *Gambusia* was recorded from the lake in 1993.

Lake Waiporohita is a protected Scenic Reserve (97.5%), administered by the Department of Conservation.

SOUTHERN TOKERAU SWAMP

Survey no.	O04/229
Survey date	21 August 1995
Grid reference	O04 448 956, O04 440 950
Area	84 ha (73 ha shrubland, 11 ha wetland)
Altitude	5–10 m asl

Ecological unit

(a) Manuka swamp-shrubland on dunes

(b) Harakeke-raupo reedland in dune hollow

Landform/geology

Freshwater wetland ponded by Holocene foredunes.

Vegetation

(a) Peat bog with some fertile areas adjoining beach dunes.

Within the manuka shrubland, gorse and prickly hakea are locally common or frequent over *Baumea* sp. sedge. Ti kouka, mamaku, bracken, pampas, brush wattle and pine also occur in the canopy and *Schoenus* sp., wire rush, turutu, umbrella fern, *Lycopodium* sp. and sundews are also present.

(b) In more fertile sites adjoining the dunes harakeke, raupo and willow weed are found.

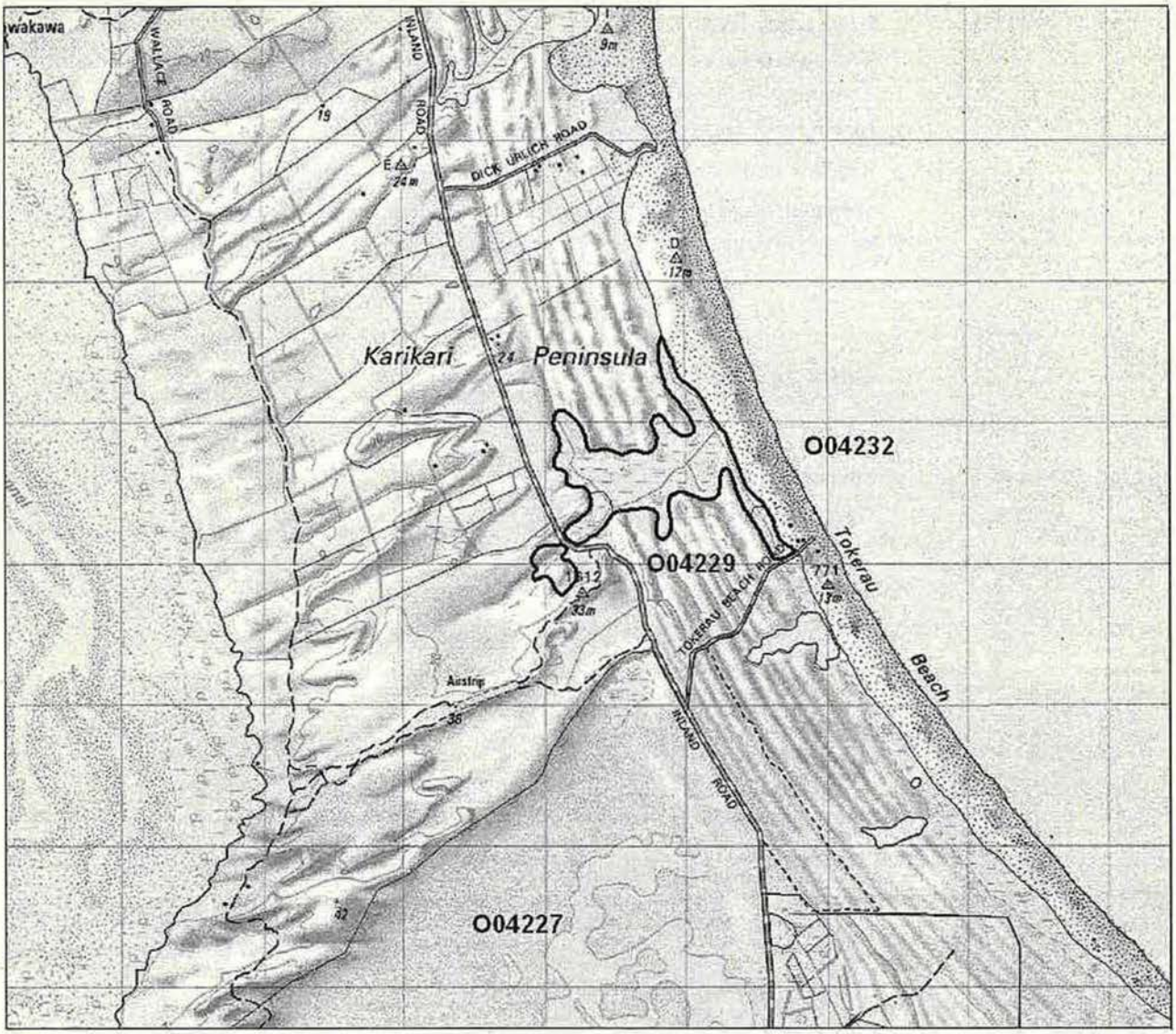
Significant flora

Threatened plants including *Lycopodiella serpentina* (Vulnerable), *Todea barbara* (Vulnerable) and wire rush (Regionally significant species) are present and a large population of *Cyclosorus interruptus* (Declining) was recorded in 1979 by Bartlett.

Fauna

Birds: NI fernbird and potential habitat for spotless crake (both Regionally significant species), NZ pipit and potential habitat for Australasian bittern (Category O threatened species).

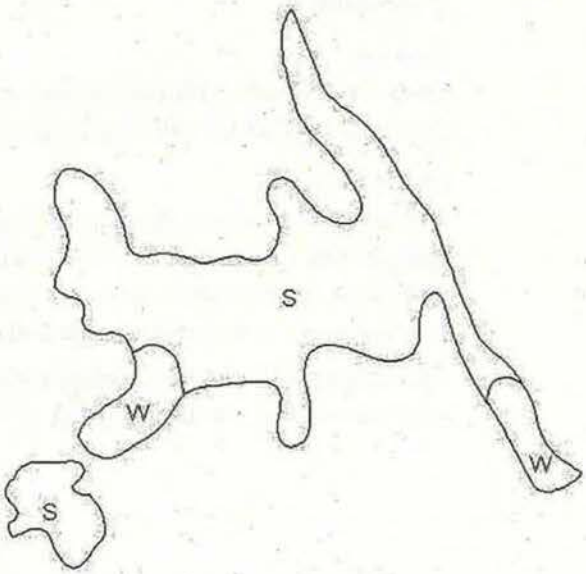
Aquatic fauna: giant bully (Regionally significant species).



Southern Tokerau Swamp O04/229

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Significance

This wetland adjoins Tokerau Beach and is contiguous with the Lake Ohia complex. It is an example of a nationally threatened habitat type and contains threatened and regionally significant species.

Representative site for both Ecological units recorded at this site.

Stewardship Land administered by the Department of Conservation protects approximately 66.8 ha or 79.5% of this site.

NORTHERN TOKERAU SWAMP

Survey no.	O04/230
Survey date	21 August 1995
Grid reference	O04 441 989
Area	71 ha
Altitude	1–10 m asl

Ecological unit

(a) Open water

(b) Raupo reedland in peaty dune hollow

Landform/geology

Freshwater wetland ponded by Holocene foredunes.

Vegetation

(a) A very small area is open water.

(b) Almost all of the area is a raupo swamp with *Baumea* sp., *Carex virgata, Eleocharis acuta*, willow weed, pampas, gorse, harakeke, mamaku, and sporadic to clumped manuka.

Significant flora

The Vulnerable fern *Thelypteris confluens* has been recorded from two locations at this site and in 1967 Rawlings recorded *Lycopodiella serpentina* (Vulnerable).

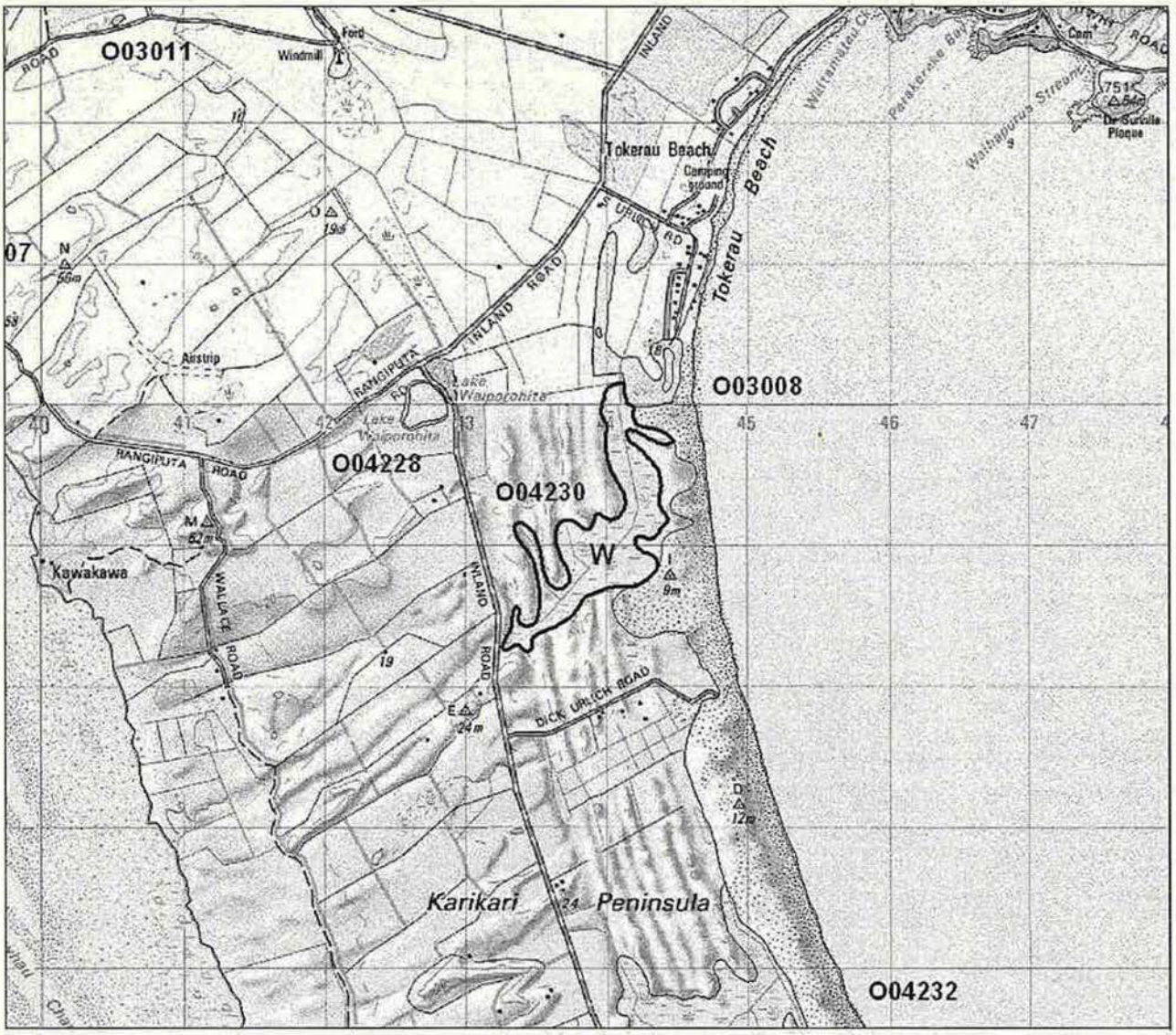
Fauna

Birds: Australasian bittern (Category O threatened species), NI fernbird and potential habitat for spotless crake (both Regionally significant species).

Significance

A mineralised swamp on peat adjoining Tokerau Beach supporting threatened species and an example of an uncommon habitat type. The fertility of this area may have been in some part induced by run-off from adjoining farmland, as it was formerly semi-fertile. Representative site for raupo reedland.

The swamp is protected Stewardship Land, 68.4 ha or 96.3% of the site and is administered by the Department of Conservation.



Northern Tokerau Swamp O04/230

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

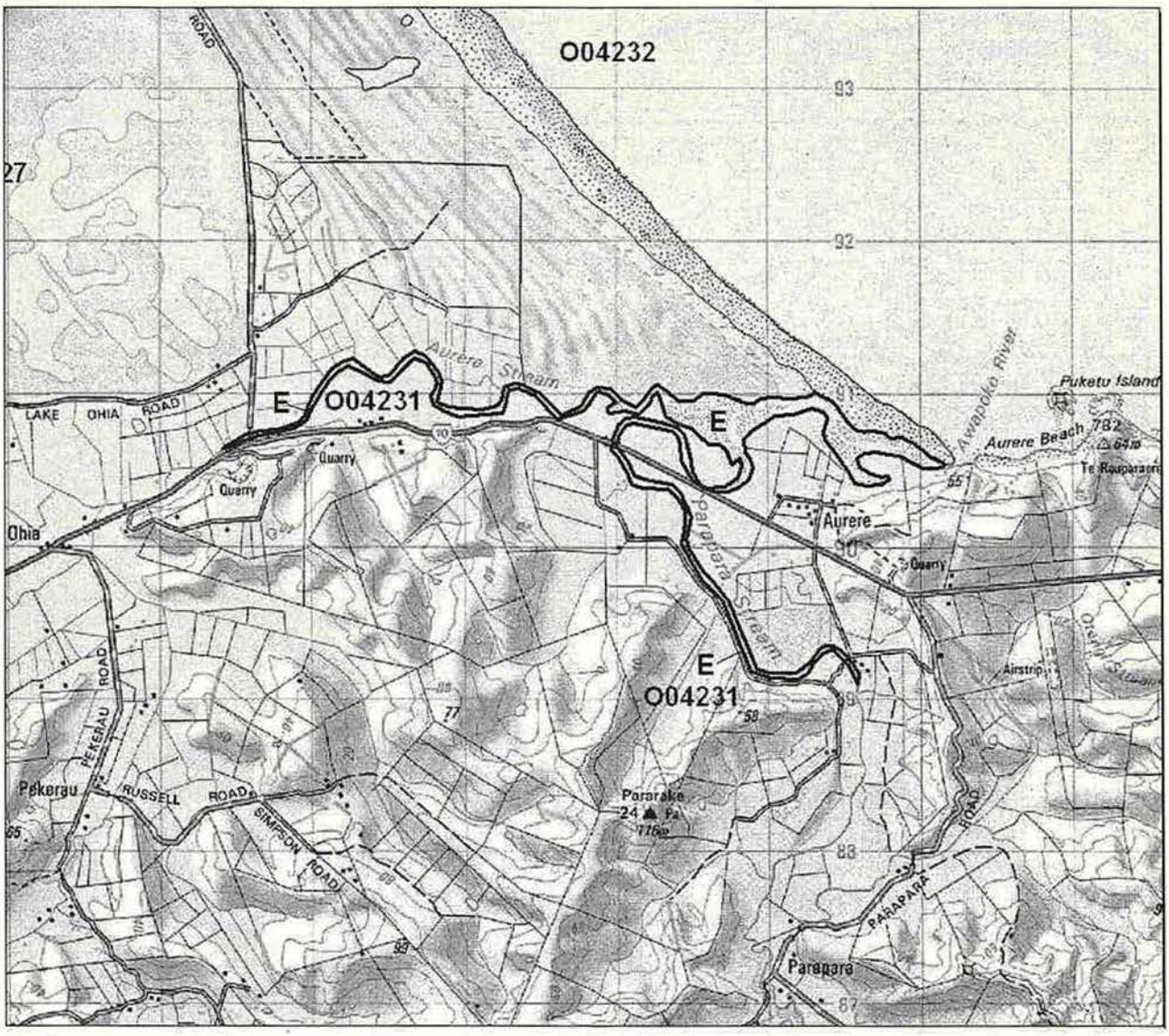
AWAPOKO ESTUARY

Survey no.	O04/231
Survey date	21 August 1995
Grid reference	O04 486 907
Area	65 ha
Altitude	0–15 m asl

Ecological unit

(a) Mangroves on estuary

(b) Sea rush saltmarsh on estuary



Awapoko Estuary O04/231

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Landform/geology

Rivermouth estuary.

Vegetation

(a) Mangroves line this small estuary with mudflats, bordered by sand dunes and farmland, and with a sandspit at the river mouth.

(b) Sea rush is common with oioi occurring occasionally. Glasswort, saltmarsh ribbonwood, harakeke, ti kouka, kanuka, raupo and a variety of exotic species occur scattered along the margins.

Fauna

Birds: Northern NZ dotterel (Category B threatened species), variable oystercatcher, banded dotterel and white-fronted tern (all Category C threatened species), Caspian tern, white heron and reef heron (all Category O threatened species) and potential habitat for banded rails (Regionally significant species).

Significance

A small estuarine area extending approximately 4–5 km inland from Tokerau Beach, with good bird diversity including seven threatened species.

A representative site, and the only record of sea rush saltmarsh in the Ecological District.

TOKERAU BEACH

Survey no.	O04/232
Survey date	21 August 1995
Grid reference	O04 465 944
Area	376 ha
Altitude	0–13 m asl

Ecological unit

(a) *Spinifex* grassland on dunes

(b) Knobby clubrush sedgeland on dunes

Landform/geology

Sandy beach backed by belt of Holocene foredunes.

Vegetation

(a) A long narrow strip of dunes with vegetation of varying density. *Spinifex* dominates the foredune. Bare sand, middens and tauhinu are common. Pingao occurs frequently. Also present are marram, toetoe, *Pimelea arenaria*, pampas, harakeke, native iceplant, Cape honey flower and boneseed.

(b) On the stabilised dunes, knobby clubrush is common. Harakeke, *Spinifex*, pohuehue, *Coprosma acerosa*, pampas, kikuyu, and buffalo grass are frequent. Other species present are tauhinu, *Pimelea* sp., NZ spinach, lupin, apple of Sodom, pine, Norfolk pine, gorse, Cape honey flower and wild gladiolus.

Significant flora

1999 record *Pimelea arenaria* (Declining).

Pingao (Recovering–Conservation Dependent).

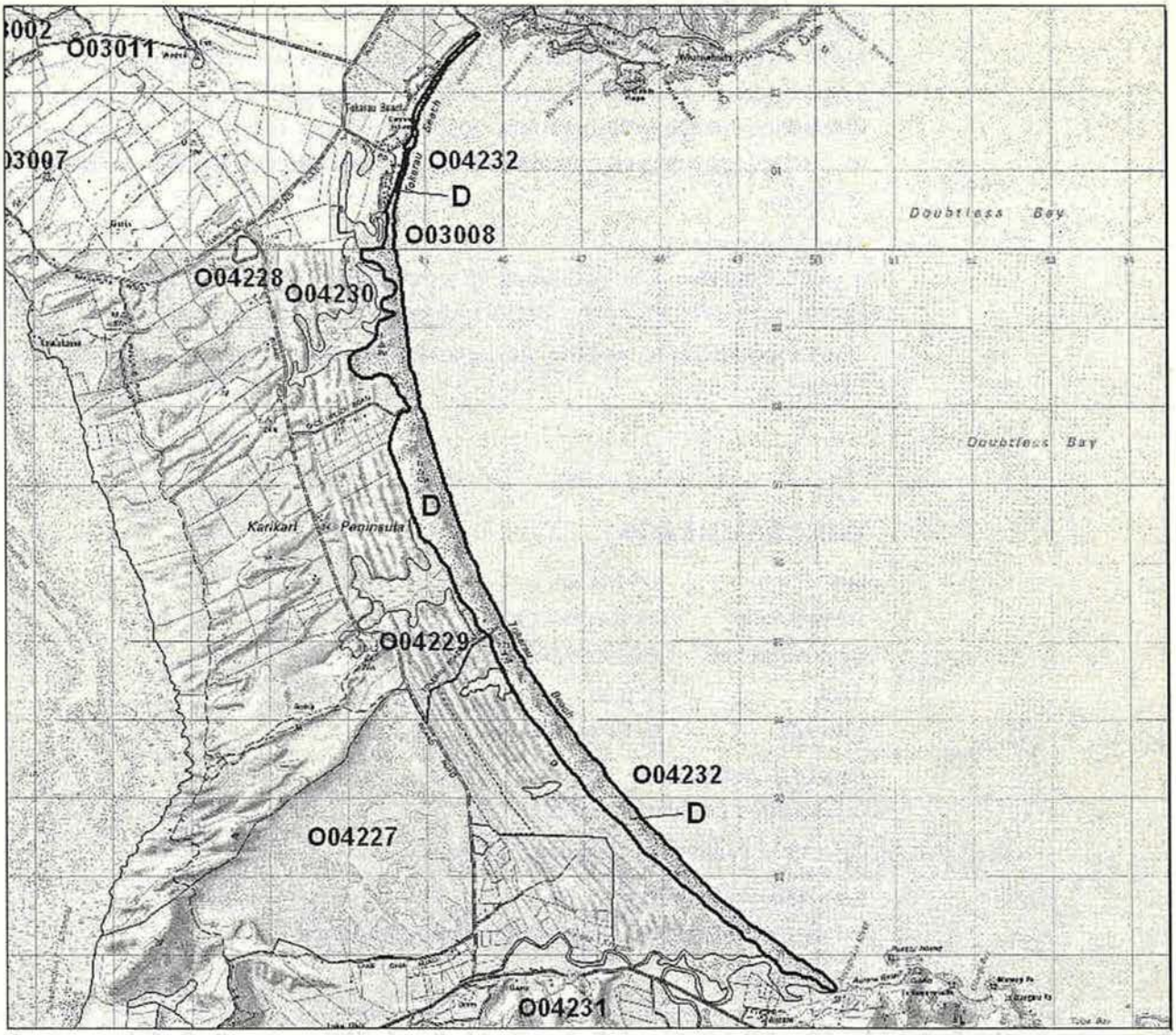
Fauna

Birds: Northern NZ dotterel (Category B threatened species), variable oystercatcher (Category C threatened species), Caspian tern (Category O threatened species), NZ pipit, Australasian gannet.

Snails: Archey's dune snail (Serious Decline).

Aquatic fauna: Giant bully (Regionally significant species), common bully, long-finned eel.

Lizards: 2000 record of shore skink.



Tokerau Beach O04/232

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Marine reptiles: 1985 record of yellow-bellied snake. 1990 record of leathery turtle.

Significance

A long east coast beach system providing habitat for breeding northern NZ dotterel and other threatened species.

Representative site for knobby clubrush sedgeland.

Two separate Stewardship Land areas administered by the Department of Conservation protect approximately 225 ha or 59.8% of this site.

RANGAUNU HARBOUR

Survey no.	O04/233
Survey date	11 August 1995
Grid reference	O04 360 950
Area	10,185 ha
Altitude	<2 m asl

Ecological unit

(a) Mangrove forest on estuary

(b) Eelgrass beds on estuarine flats

(c) Oioi-sea rush saltmarsh on estuary

(d) Glasswort beds on esturary

(e) Shellbanks

Landform/geology

Harbour with intertidal shellbanks, mud and sand flats.

Vegetation

(a) Mangrove areas are extensive (covering 27%, Shaw et al. 1990) throughout the middle and upper tidal flats. These support roosting and nesting shags and the margins are banded rail habitat.

(b) The eelgrass (*Zostera novazelandica*) beds cover extensive tidal flats (covering 19%, Shaw et al. 1990) in the lower and middle tidal zone and are high value habitat for many polychaetes and other marine organisms which waders and other birds and fish rely on for food.

Several pristine islands contain dense stands of rushes with emergent manuka, ti kouka, saltmarsh ribbonwood and *Hebe*.

(c) Oioi and sea rush are both common in salt marsh areas.

(d) On the margins glasswort may be locally abundant. NZ spinach is also present. Saltmarsh ribbonwood and manuka occur on higher ground.

(e) Shellbanks are nesting areas for Caspian tern, white-fronted tern, Northern NZ dotterel, variable oystercatcher and other species and they provide roosts for many other species.

Fauna

Over 60 species of wetland birds have been recorded from this harbour including northern NZ dotterel and wrybill (both Category B threatened species), variable oystercatcher, banded dotterel and white-fronted tern (all Category C threatened species), royal spoonbill, Caspian tern, reef heron, white heron, Australasian bittern (all Category O threatened species). Several trans-equatorial migratory waders utilise this habitat, including bar-tailed godwit, turnstone, whimbrel, lesser knot, eastern long-billed curlew, red-necked stint and eastern little terns.

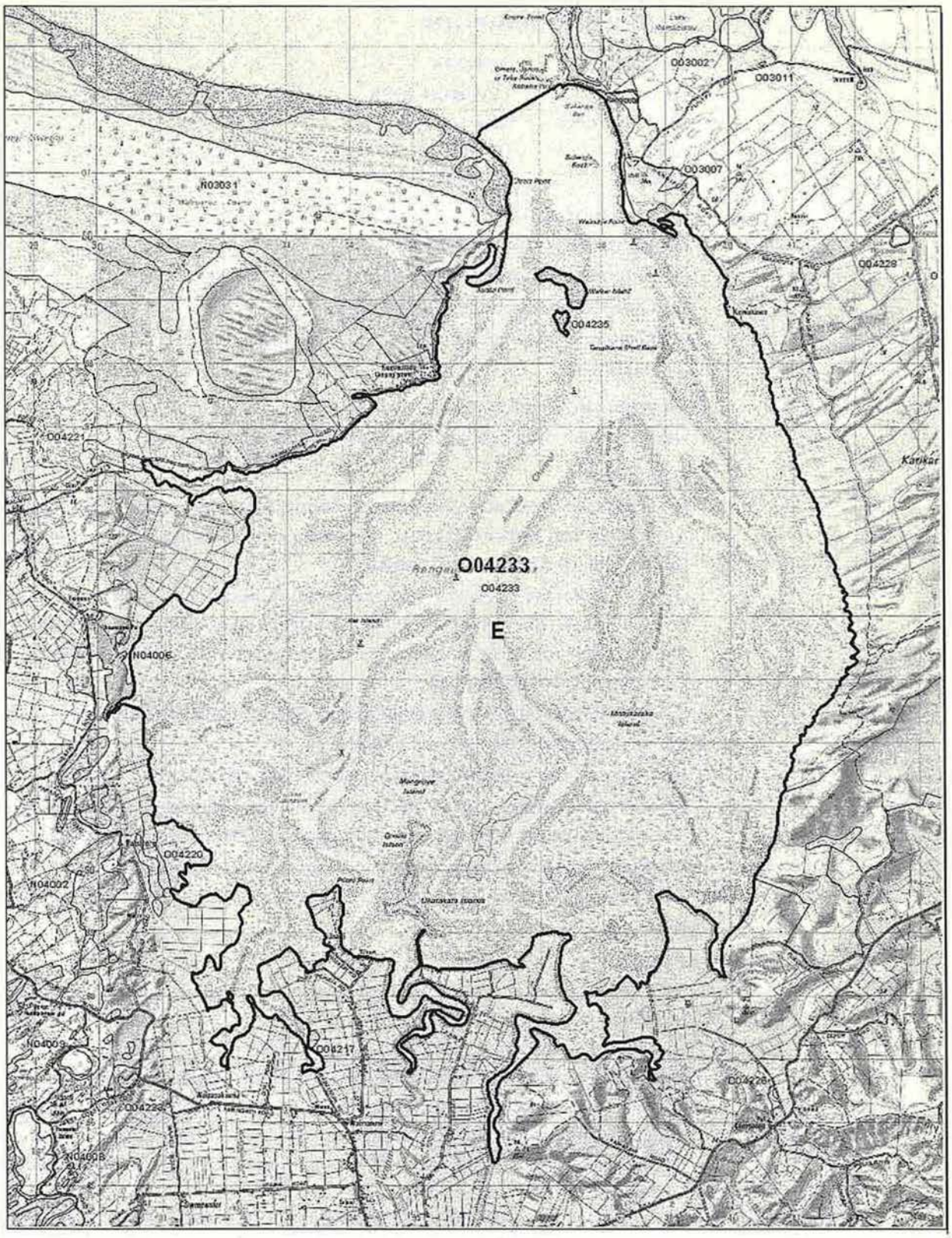
The mangroves provide important habitat for banded rail (Regionally Significant species).

Lizards: 1978 record of Pacific gecko and shore skink.

Significance

A large harbour with extensive mangroves, shellbanks, sand flats, mudflats and islands which contains the largest mangrove area in New Zealand (Ogle 1984).

Mangroves in the harbour have increased by 33% from 1944 to 1981 probably reflecting infilling by sediments from land runoff (Shaw et al. 1990).



Rangaunu Harbour O04/233

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

The Rangaunu Harbour provides an outstanding habitat for national and international migratory waders and is one of the most important bird sites in New Zealand.

The harbour and environs support some of the largest concentrations of species in New Zealand, e. g. banded dotterels (up to 1000 outside the breeding season), lesser knots (up to 10,000), pied stilts (few thousands) and eastern little terns (50–100).

Many species of waders feed and/or roost on pasture on Karikari Peninsula and the Lake Ohia pans, particularly during high tide periods (R.J. Pierce pers. comm.).

Representative site for the five Ecological units recorded at this site.

Rangaunu Harbour has been nominated for RAMSAR status as a wetland of international importance.

Threats to the harbour include habitat loss due to the establishment of marine farms and the spread of *Spartina*.

Approximately 97.83 ha are protected within this site including, 36 ha of Stewardship Land, 53 ha of Marginal Strip, 7.83 ha of Nature Reserve, and 1 ha of Historic Reserve all administered by the Department of Conservation.

WALKER ISLAND

Survey no.	O04/235
Survey date	1992
Grid reference	O04 375 993, O04 274 987
Area	26.5 ha
Altitude	< 5 m asl

Ecological unit

(a) *Spinifex* grassland on shell bank

(b) *Pimelea arenaria-Spinifex* association on shell bank

Landform/geology

Shell banks in Rangaunu Harbour.

Vegetation

Spinifex and *Pimelea arenaria* are the dominant species with pingao, knobby clubrush, exotic grasses and herbs.

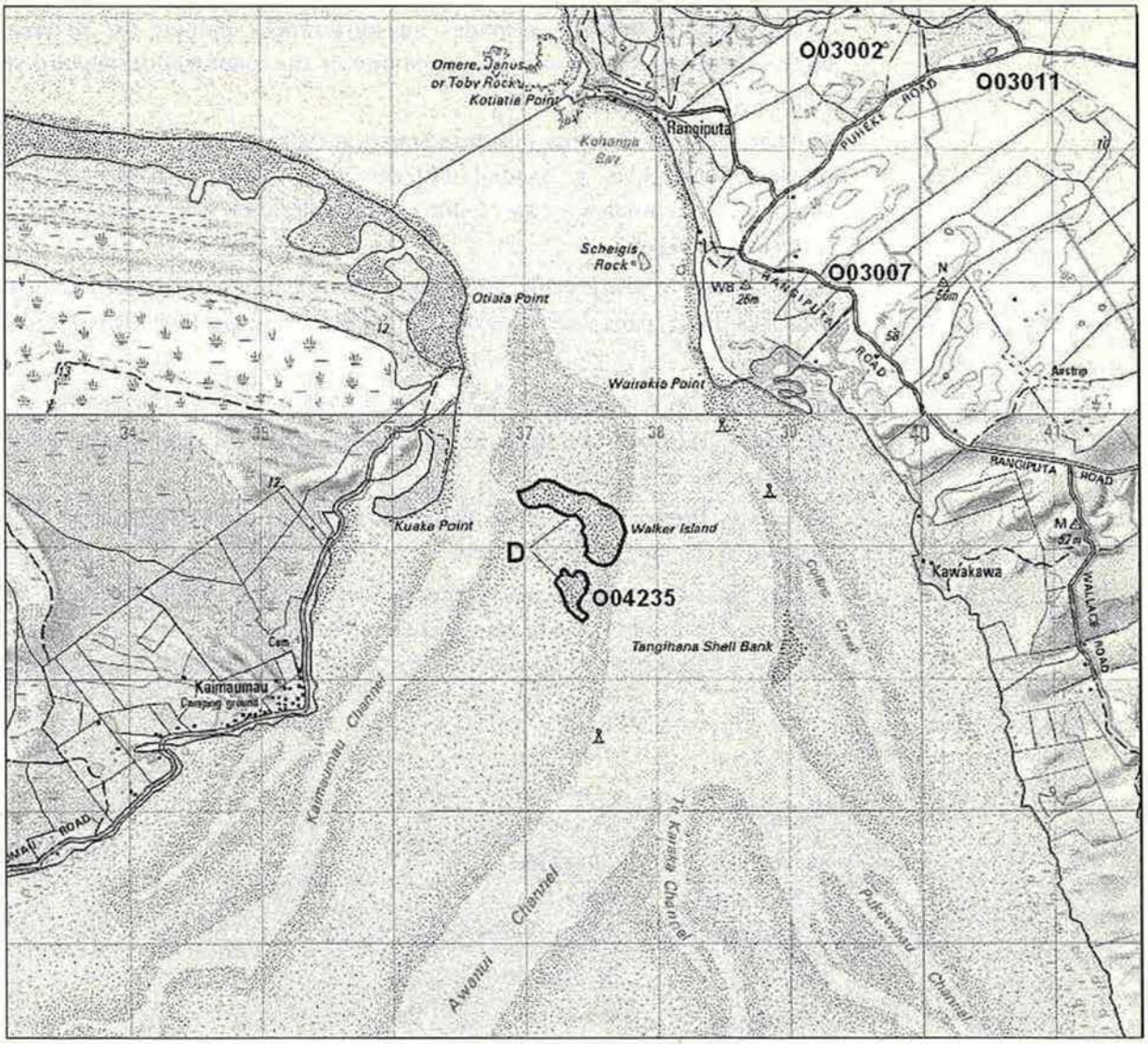
Significant flora

Pimelea arenaria (Declining) and pingao (Recovering–Conservation Dependent).

Fauna

Birds: Breeding site for northern NZ dotterel (Category B threatened species), white-fronted tern and variable oystercatcher (both Category C threatened species), Caspian tern and reef heron (both Category O threatened species), red-billed gull and southern black-backed gull. Roost site for bar-tailed godwit, lesser knot, little tern, turnstone, SI pied oystercatcher and many other species all regularly use this site.

Lizards: 1992 record of shore skink.



Walker Island O04/235

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Significance

Major roost site for up to 10,000 waders (and additional terns and gulls) in the Rangaunu Harbour including migratory species and breeding site for several threatened species.

The only breeding and roosting site at Rangaunu Harbour that is virtually safe from mammalian predator pressure.

Representative site and the only record of *Spinifex* grassland and *Pimelea arenaria-Spinifex* association on island habitats in this Ecological District.

The northern island is Nature Reserve of 7.1 ha administered by the Department of Conservation protecting 26.7% of this site.

4.2 LEVEL 2 SITES

See Section 9 (p. 369) for alphabetical listing of sites.

SITE NAME	SURVEY NO.	GRID REF.
Tetehakehake Stream Shrubland	N02/045	N02 020 395, N02 023 387
Mitimiti Stream & Streak Hill Shrubland	N02/046	N02 058 341
Sandhills Shrubland	N02/048	N02 034 326
Te Karaka Point & Ngakarapu Stream Shrubland	N02/049	N02 075 320, N02 073 310
Parengarenga Shrubland	N02/054	N02 042 407, N02 035 400
Whawhakou Channel Shrublands	N02/059	N02 038 370, N02 040 364 N02 033 358, N02 040 355 N02 035 365
Te Kao Shrublands	N03/001	N03 085 270, N03 093 266
Te Keena Rd Shrublands	N03/005	N03 088 285, N03 089 293
Oromanga Sandfield	N03/006	N03 018 257
Te Kao Trig Shrubland	N03/007	N03 066 266
Arterial Rd Shrublands	N03/008	N03 029 299
Salt Rd Shrubland	N03/011	N03 116 240
Ngatumoroki Shrubland	N03/013	N03 103 245
Pahara Shrublands	N03/017	N03 210 067
Kimberley Shrubland	N03/028	N03 173 154
Cemetery Rd Pond	N03/042	N03 194 117
Onepu Swamp	N03/045	N03 128 213
Gully Lake	N03/047	N03 182 088
Big Flat Shrubland	N04/004	N04 264 971
Airstrip Shrubland	N04/012	N04 298 825, O04 307 827
Sweetwater Station Shrublands	N04/013	N04 284 777, N04 289 765
Rangiputa Rd Shrublands	O03/007	O03 384 022, O03 389 007

TETEHAKEHAKE STREAM SHRUBLAND

Survey no.	N02/045
Survey date	24 August 1995
Grid reference	N02 020 395, N02 023 387
Area	62 ha
Altitude	0–20 m asl

Ecological unit

Kanuka shrubland on coastal hillslope

Landform/geology

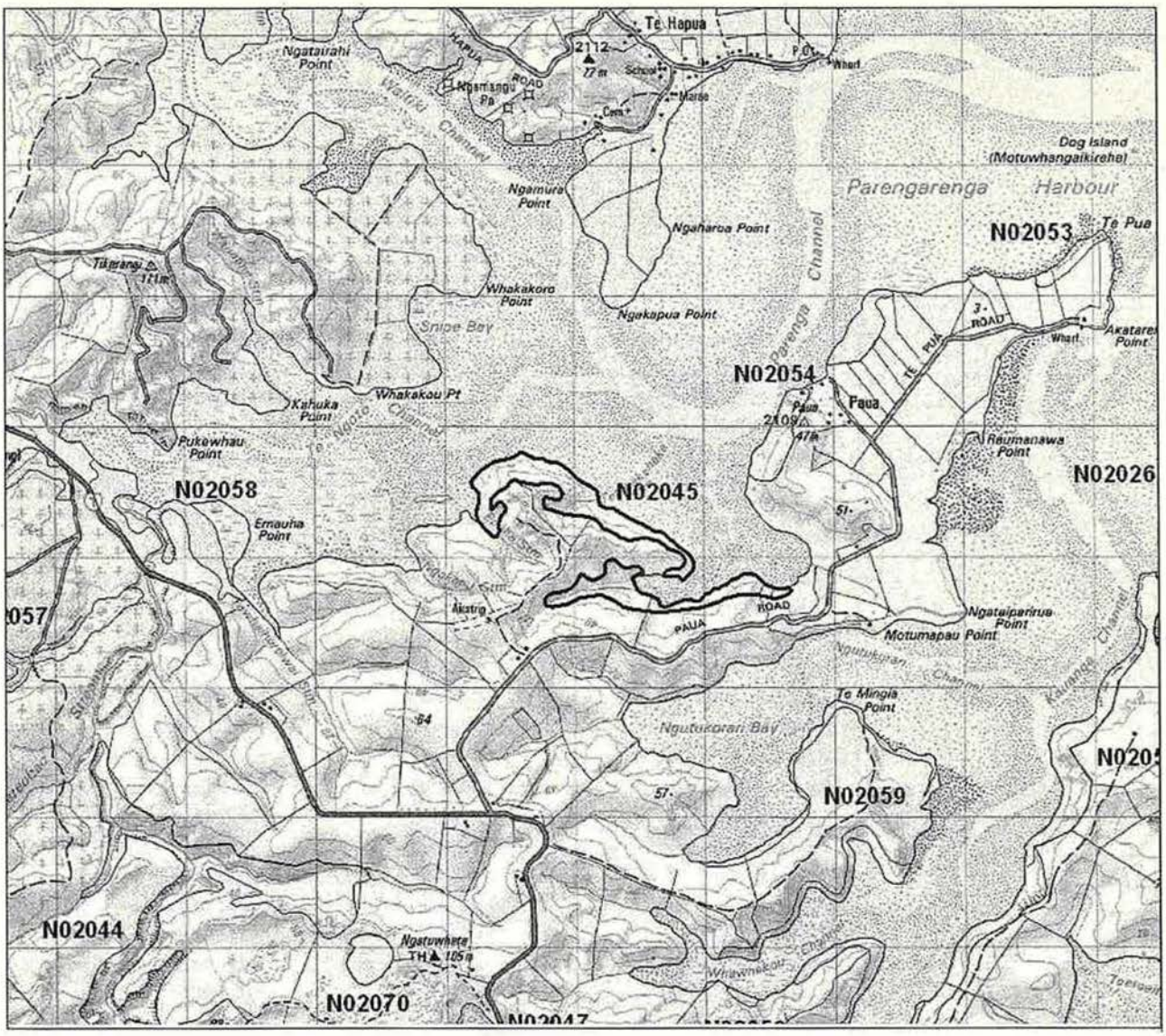
Coastal hillsides and valleys in Mangakahia Complex mudstones.

Vegetation

Kanuka (2–3 m) is dominant with occasional ti kouka.

Fauna

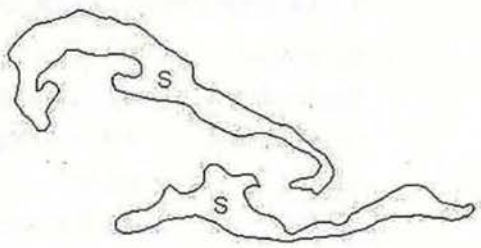
Not surveyed.



Tetehakehake Stream Shrubland N02/045

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



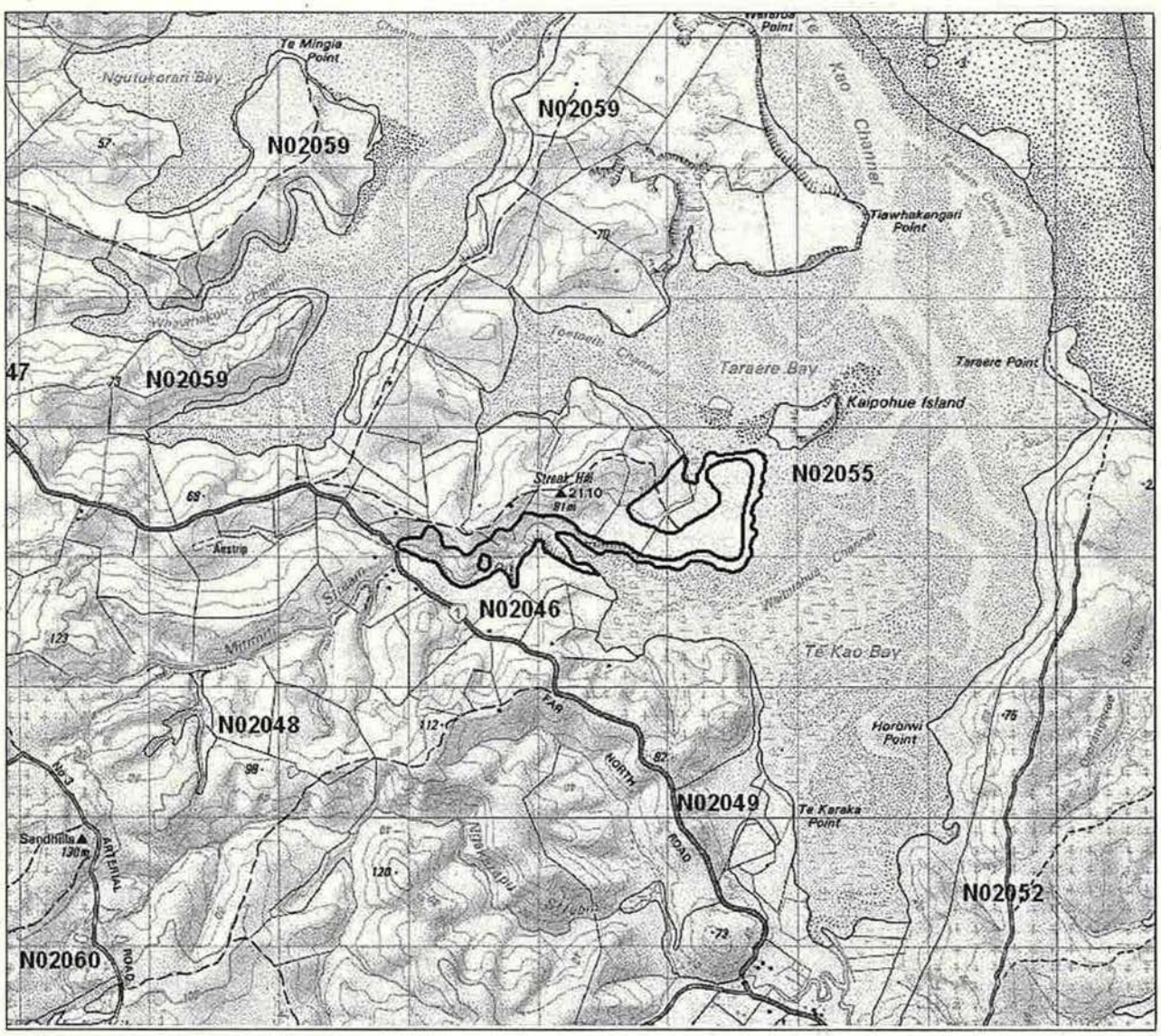
Significance

This shrubland forms a buffer along a stream draining into the Parengarenga Harbour and along two kilometres of estuarine margin.

Further surveying is required to determine the full ecological significance of the site.

MITIMITI STREAM & STREAK HILL SHRUBLAND

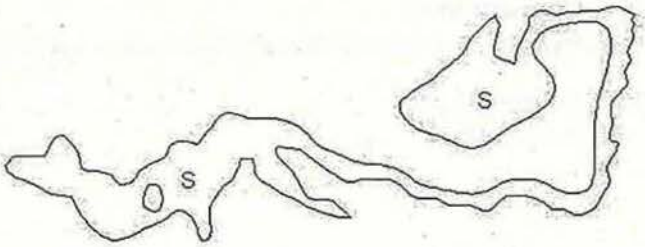
Survey no.	N02/046
Survey date	28 August 1995
Grid reference	N02 058 341
Area	76 ha
Altitude	0-40 m asl



Mitimiti Stream & Streak Hill Shrubland N02/046

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Ecological unit

(a) Kanuka-Sydney golden wattle shrubland on hillslope

(b) Kanuka shrubland on hillslope & consolidated sand

Landform/geology

Mitimiti Stream: Hillslope of deeply weathered Mangakahia Complex mudstone on true left and with Pleistocene consolidated alluvial sand on true right.

Streak Hill: Terraces on last interglacial consolidated estuarine sands.

Vegetation

(a) Kanuka to 2–3 m tall is dominant and emergent and Sydney golden wattle is common over about 70% of Mitimiti Stream. Isolated pohutukawa and pine also occur.

(b) In the remaining area along the stream, the canopy consists solely of kanuka.

Type (b), kanuka shrubland, dominates the shrubland area at Streak Hill, with frequent Sydney golden wattle.

Fauna

Aquatic fauna: 1982 survey of Mitimiti Stream just west of this site recorded red-finned bully, giant bully (Regionally significant species) and banded kokopu (Category C threatened species).

Significance

A contiguous shrubland area providing a buffer to the Parengarenga Harbour from farmland.

Further surveying is required to determine the full ecological significance of the site.

SANDHILLS SHRUBLAND

Survey no.	N02/048
Survey date	22 August 1995
Grid reference	N02 034 326
Area	12 ha
Altitude	40–100 m asl

Ecological unit

Kanuka-Sydney golden wattle shrubland on hillslope

Landform/geology

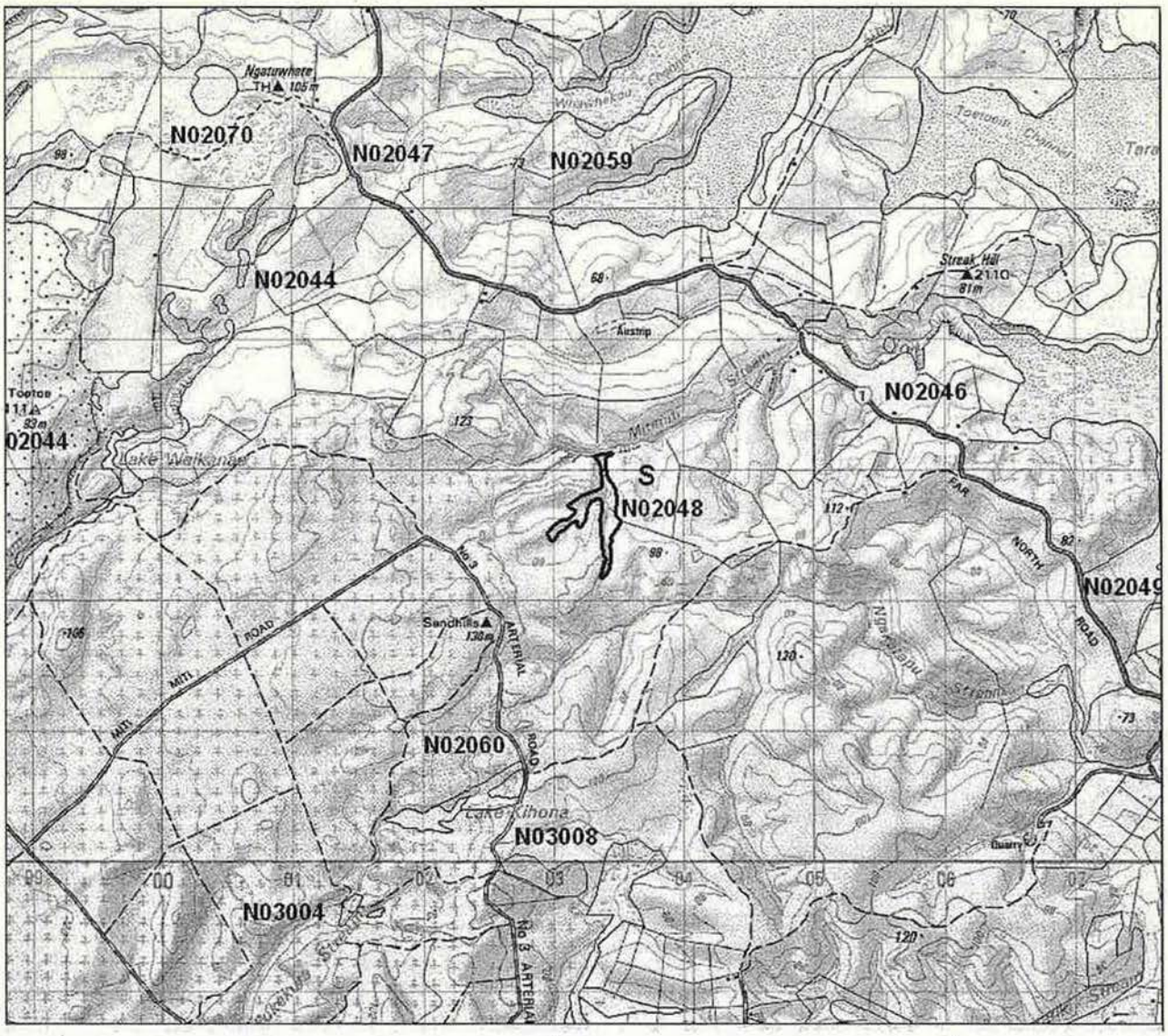
Pleistocene consolidated parabolic dunes.

Vegetation

Kanuka to 2 m is dominant with Sydney golden wattle commonly occurring.

Fauna

Not surveyed.



Sandhills Shrubland N02/048

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Significance

An area of shrubland between exotic forest plantations and farmland.

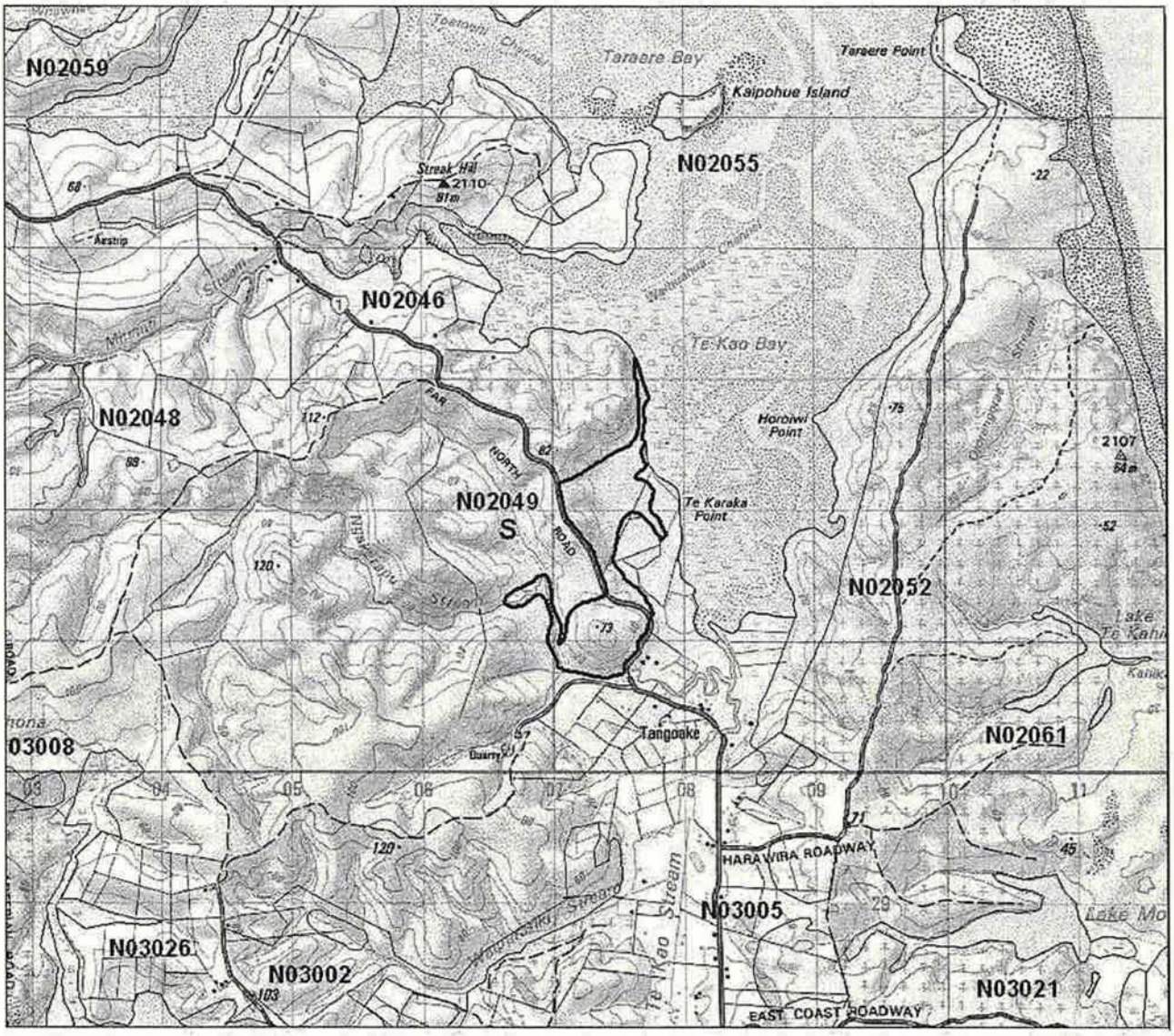
Further surveying is required to determine the full ecological significance of this site.

TE KARAKA POINT & NGAKARAPU STREAM SHRUBLAND

Survey no.	N02/049
Survey date	23 August 1995
Grid reference	N02 075 320, N02 073 310
Area	87 ha
Altitude	5-73 m asl

Ecological unit

(a) Kanuka-manuka shrubland on hillslope



Te Karaka Point & Ngakarapu Stream Shrubland N02/049

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

(b) Kanuka/manuka shrubland on hillslope

(c) Kanuka shrubland on hillslope

Landform/geology

Coastal hills of deeply weathered Parengarenga Group sandstone bounded by last interglacial consolidated estuarine sands.

Vegetation

(a) Abundant kanuka with common manuka dominates the site. Occasional species include *Callistachys lanceolata*, prickly hakea and Sydney golden wattle.

(b) 90% of the shrubland along the stream is kanuka/manuka dominant with frequent Sydney golden wattle and occasional prickly hakea, kumarahou, blue pine, gorse, mingimingi and pines.

(c) A kanuka dominant canopy occurs in the remaining area along the stream.

Fauna

Not surveyed.

Significance

Provides a buffer area along approximately 2 km of coastal margin on the Parengarenga Harbour.

Additional surveying is required to determine the full ecological significance of this site.

PARENGARENGA SHRUBLAND

Survey no.	N02/054
Survey date	24 August 1995
Grid reference	N02 042 407, N02 035 400
Area	27 ha
Altitude	0–42 m asl

Ecological unit

Kanuka shrubland on flat to gently sloping hill country

Landform/geology

North-east: terrace on last interglacial consolidated estuarine sands. South-west: hillslope on Mangakahia Complex mudstone.

Vegetation

Kanuka to 2–3 m in height with occasional Sydney golden wattle.

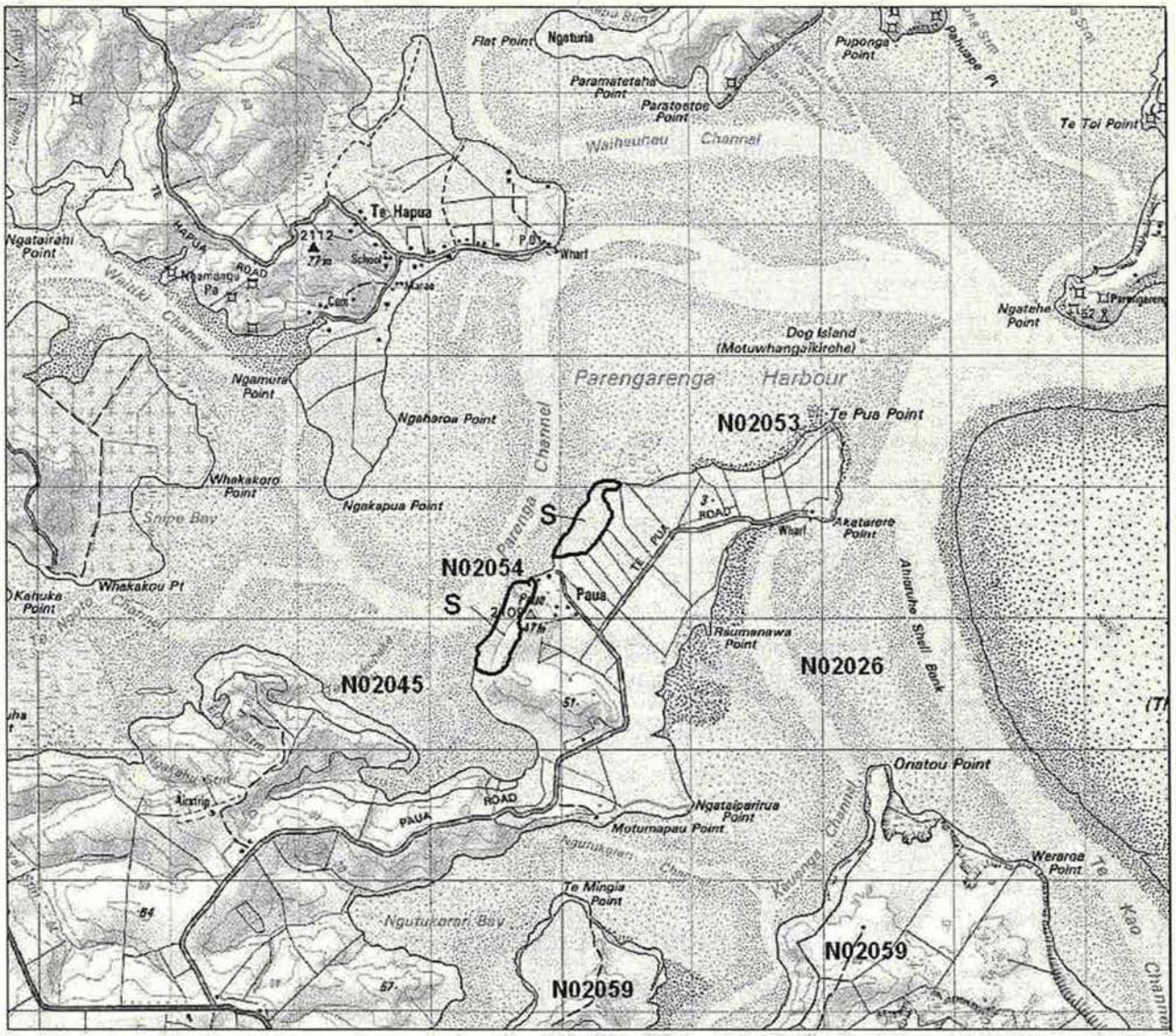
Fauna

SI pied oystercatcher, turnstone, bar-tailed godwit, spur-winged plover, cattle egret and white-faced heron (OSNZ year 2000 survey) (probably recorded from nearby pasture).

Significance

An area of shrubland buffering the Parengarenga Harbour from farmed area.

Additional surveying is recommended to determine the full ecological significance of this site.



Parengarenga Shrubland N02/054

Each grid is 1000m x 1000m
and = 100 ha

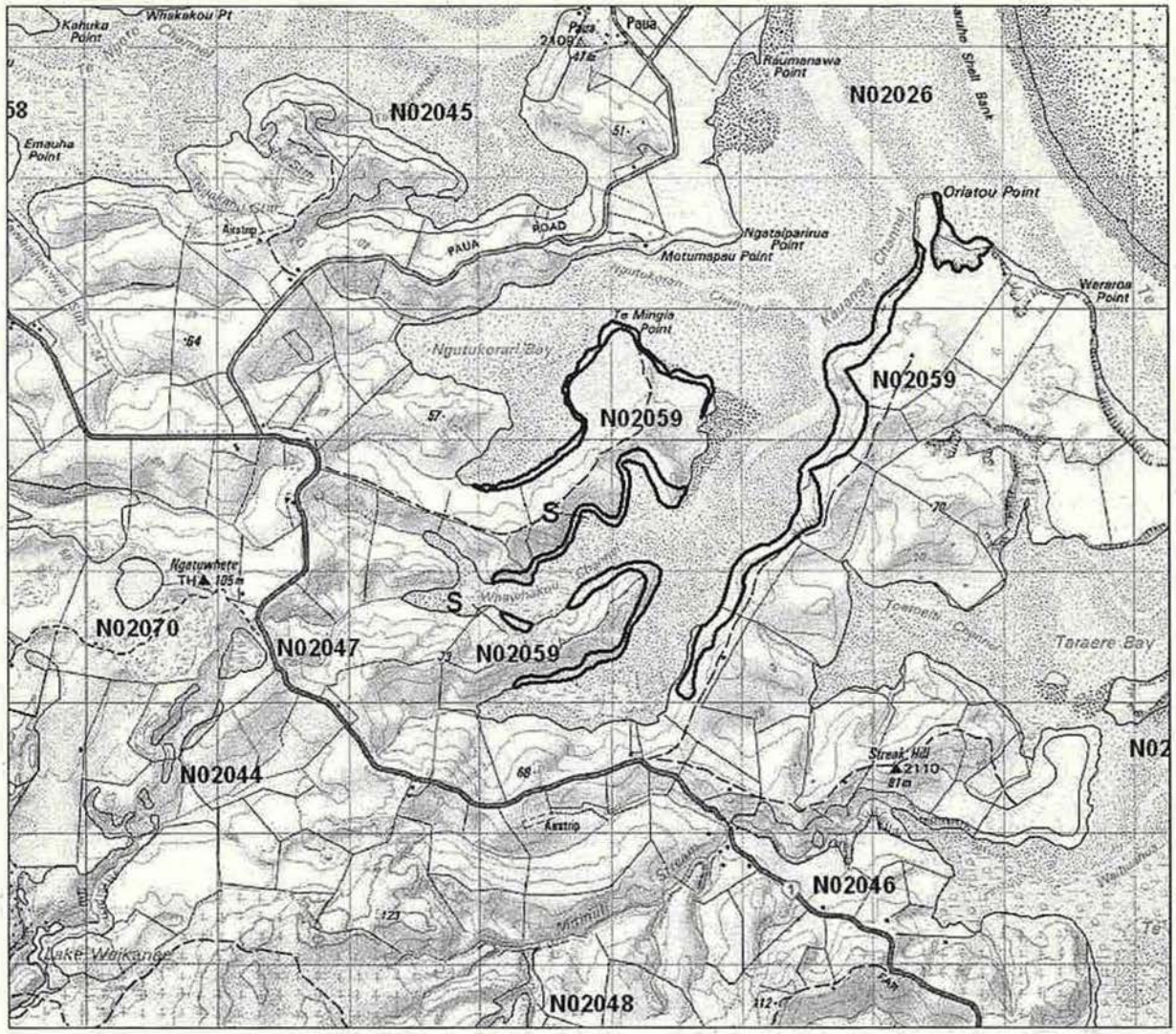
S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

WHAWHAKOU CHANNEL SHRUBLANDS

Survey no.	N02/059
Survey date	August 1995
Grid reference	N02 038 370, N02 040 364, N02 033 358, N02 040 355, N02 055 365
Area	108 ha
Altitude	0–40 m asl

Ecological unit

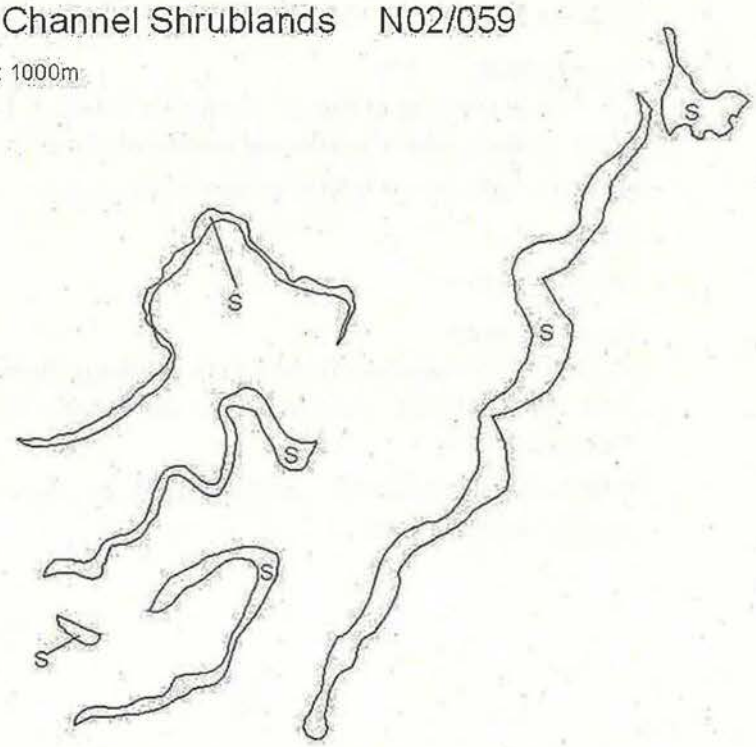
Kanuka shrubland on coastal hillslope



Whawhakou Channel Shrublands N02/059

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Landform/geology

Coastal hillslope on Mangakahia Complex sedimentary rocks and Pleistocene estuarine sands.

Vegetation

Kanuka dominant.

Fauna

Not surveyed.

Significance

This shrubland forms a buffer along several kilometres of estuarine margin on the Parengarenga Harbour.

Additional surveying is recommended to determine the full ecological significance of this site.

TE KAO SHRUBLANDS

Survey no.	N03/001
Survey date	18 August 1995
Grid reference	N03 085 270, N03 093 266
Area	102 ha
Altitude	10–40 m asl

Ecological unit

(a) Kanuka shrubland on consolidated sand hillslopes

(b) Sydney golden wattle scrub on consolidated sand hillslopes

Landform/geology

Gullies in Pleistocene leached consolidated sand.

Vegetation

(a) Most of the area is kanuka shrubland between 1 m and 3 m. Prickly hakea, gorse, Sydney golden wattle and macrocarpa are scattered in the canopy.

(b) The remainder is Sydney golden wattle scrub 3–4 m tall.

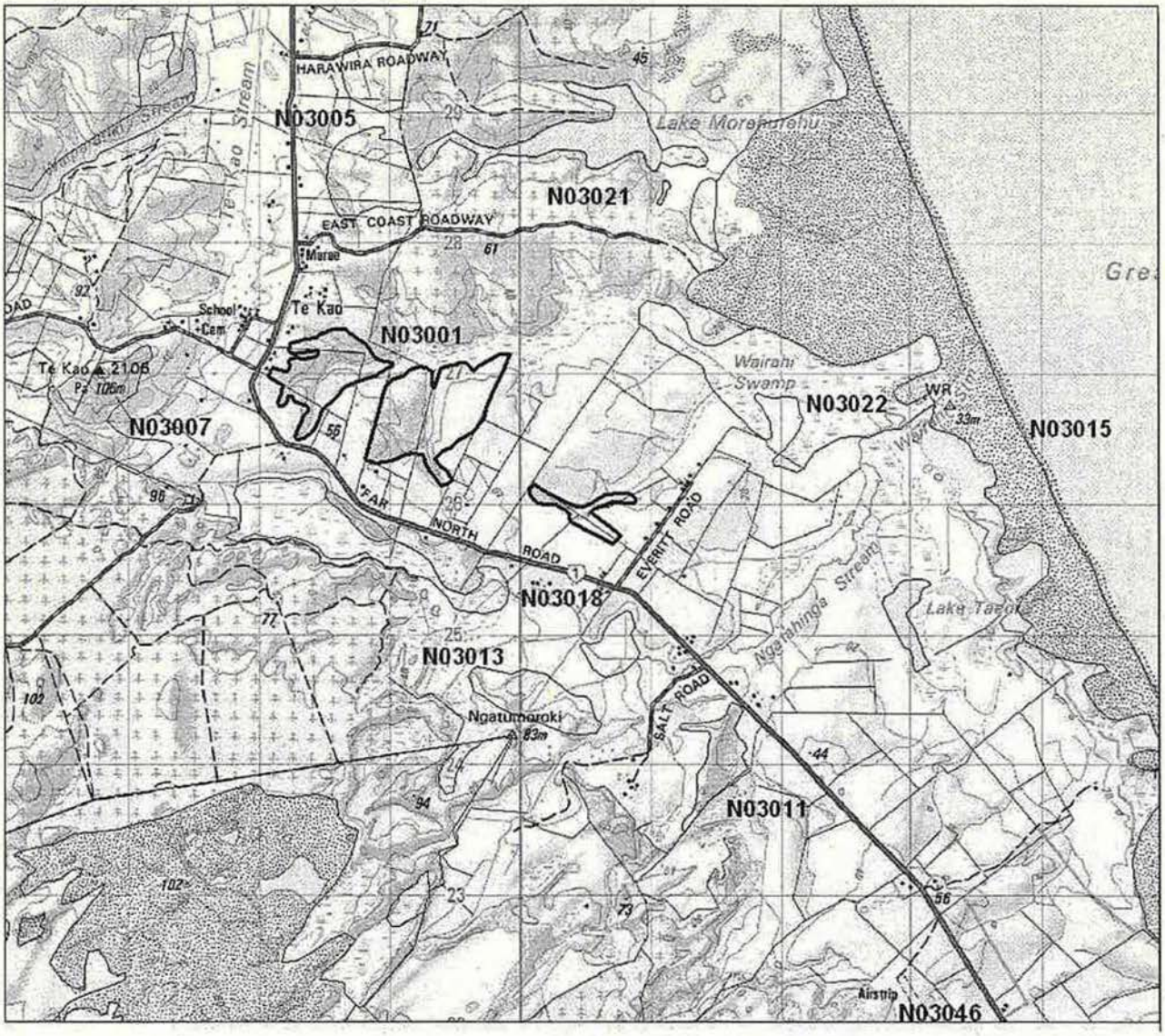
Fauna

Not surveyed.

Significance

Three areas of shrubland providing a linkage between the various wetlands, sand dunes, forest remnants and shrublands that stretch along Aupouri Peninsula.

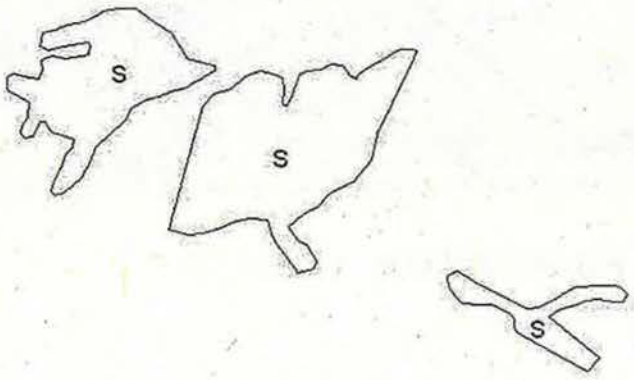
Additional surveying is recommended to determine the full ecological significance of this site.



Te Kao Shrublands N03/001

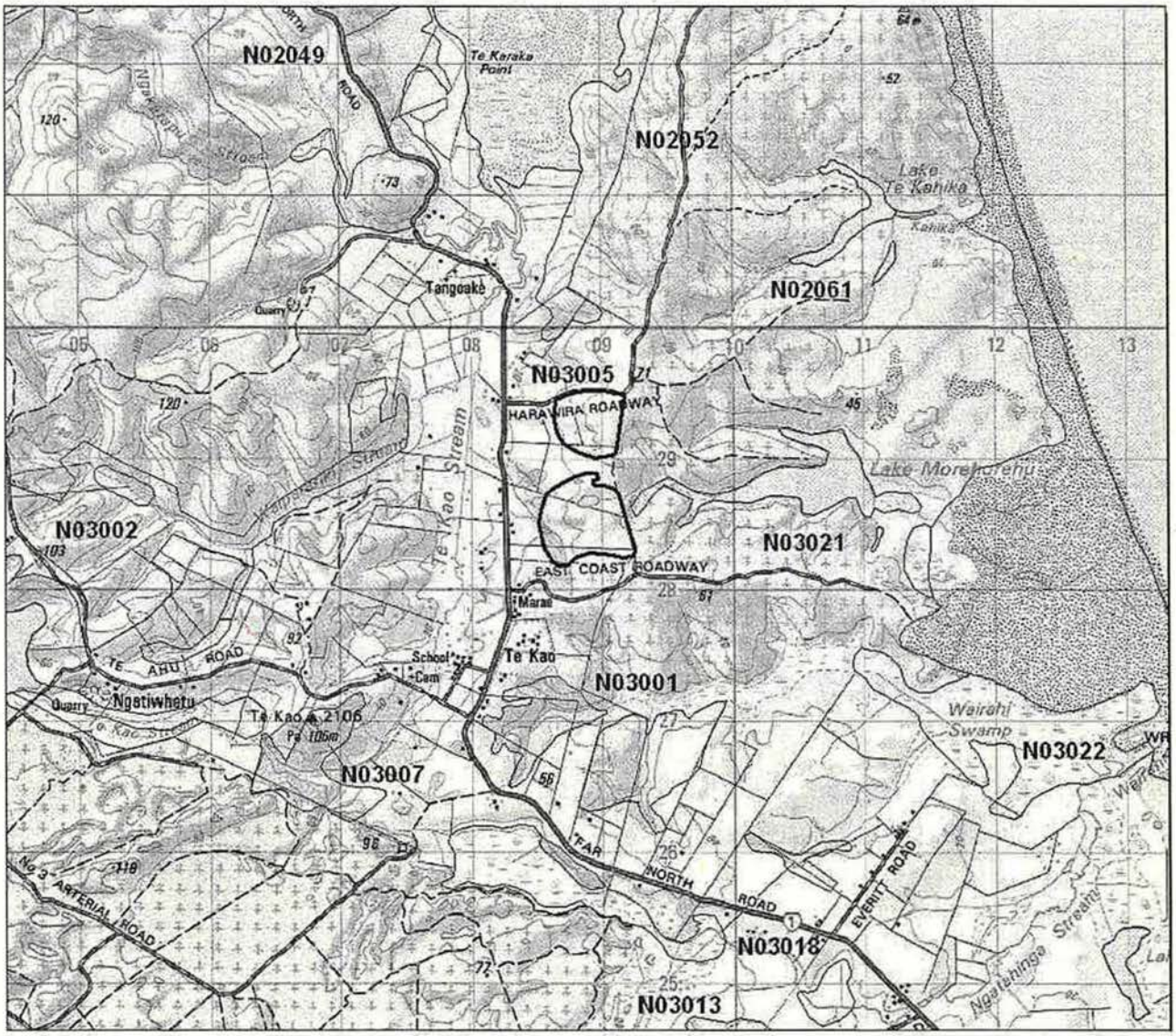
Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



TE KEENA RD SHRUBLANDS

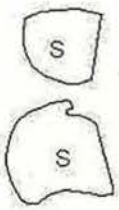
Survey no.	N03/005
Survey date	28 August 1995
Grid reference	N03 088 285, N03 089 293
Area	58 ha
Altitude	20–65 m asl



Te Keena Rd Shrublands N03/005

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Ecological unit
Manuka shrubland on gently rolling hill country

Landform/geology
Low hill country of Pleistocene leached consolidated sand overlying deeply weathered Parengarenga Group sandstone.

Vegetation
Manuka to 2 m is abundant with kanuka and *Callistachys lanceolata* occurring frequently. Rushes, harakeke and prickly hakea also occur.

Fauna
Not surveyed.

Significance
Two areas of shrubland abutting exotic forestry providing a link with the various wetlands, sand dunes, forest remnants and shrublands that stretch along Aupouri Peninsula. Additional surveying is recommended to determine the full ecological significance of this site.

OROMANGA SANDFIELD

Survey no.	N03/006
Survey date	23 August 1995
Grid reference	N03 018 257
Area	2.3 ha
Altitude	45–62 m asl

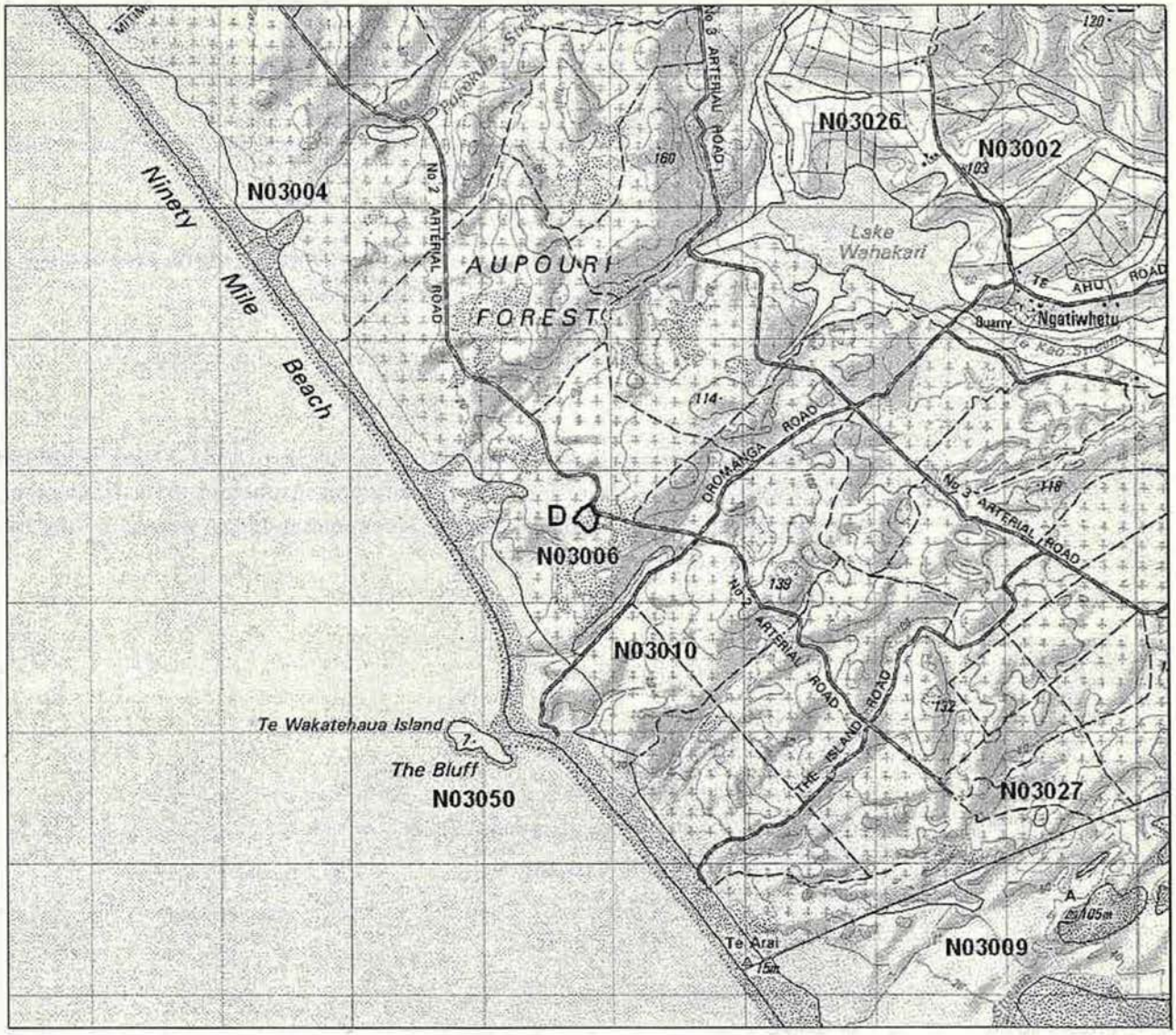
Ecological unit
Sandfield

Landform/geology
Holocene dunes overlying deflated Pleistocene parabolic dunes.

Vegetation
An area of hard sand pans and mobile dunes with sparse vegetation. Marram and toetoe are locally frequent. Tauhinu, *Coprosma acerosa*, sedges and Sydney golden wattle also occur.

Fauna
Not surveyed.

Significance
A small inland dune area.



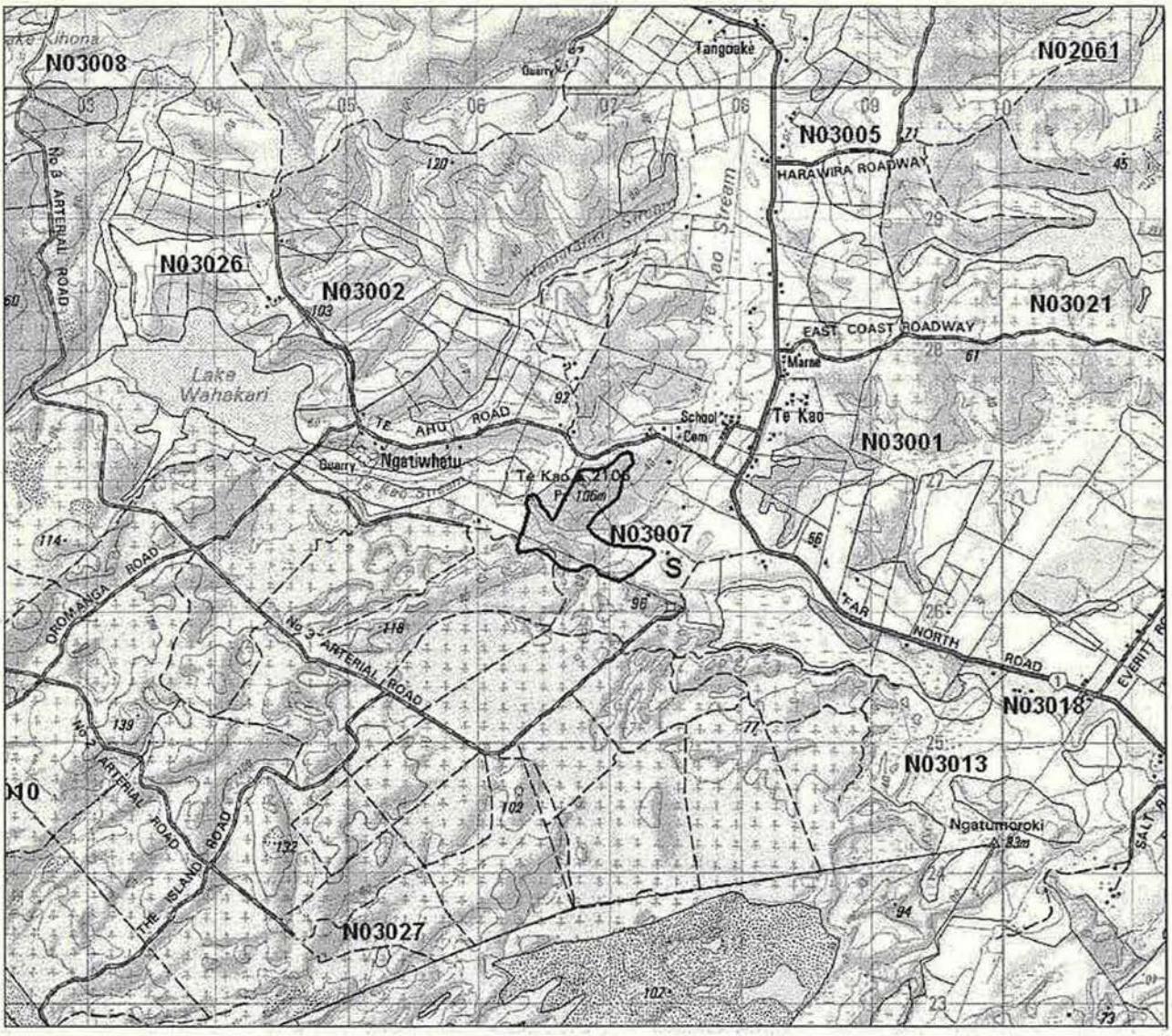
Oromanga Sandfield N03/006

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

TE KAO TRIG SHRUBLAND

Survey no.	N03/007
Survey date	15 August 1995
Grid reference	N03 066 266
Area	44 ha
Altitude	40–106 m asl



Te Kao Trig Shrubland N03/007

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

(a) Kanuka shrubland on hillslope

(b) Sydney golden wattle shrubland on hillslope

Landform/geology

Hill country of deeply weathered Tangihua Complex volcanics bounded by Pleistocene parabolic dunes to the south of Te Kao Stream.

Vegetation

(a) Shrubland partly kanuka dominant and partly type (b), Sydney golden wattle dominant covers the slope south of the Te Kao Trig into a gully of the Te Kao Stream.

Fauna

Not surveyed.

Significance

An area of shrubland midway between east and west coasts providing a buffer to the Te Kao Stream and a linkage between the various wetlands, sand dunes, forest remnants and shrublands that stretch along Aupouri Peninsula. Additional surveying is recommended to determine the full ecological significance of this site.

ARTERIAL RD SHRUBLANDS

Survey no.	N03/008
Survey date	23 August 1995
Grid reference	N03 029 299
Area	12 ha
Altitude	62–100 m asl

Ecological unit

Manuka shrubland on gently sloping consolidated sand

Landform/geology

Pleistocene consolidated parabolic dunes.

Vegetation

Manuka to 2 m is abundant with occasional harakeke and emergent Sydney golden wattle.

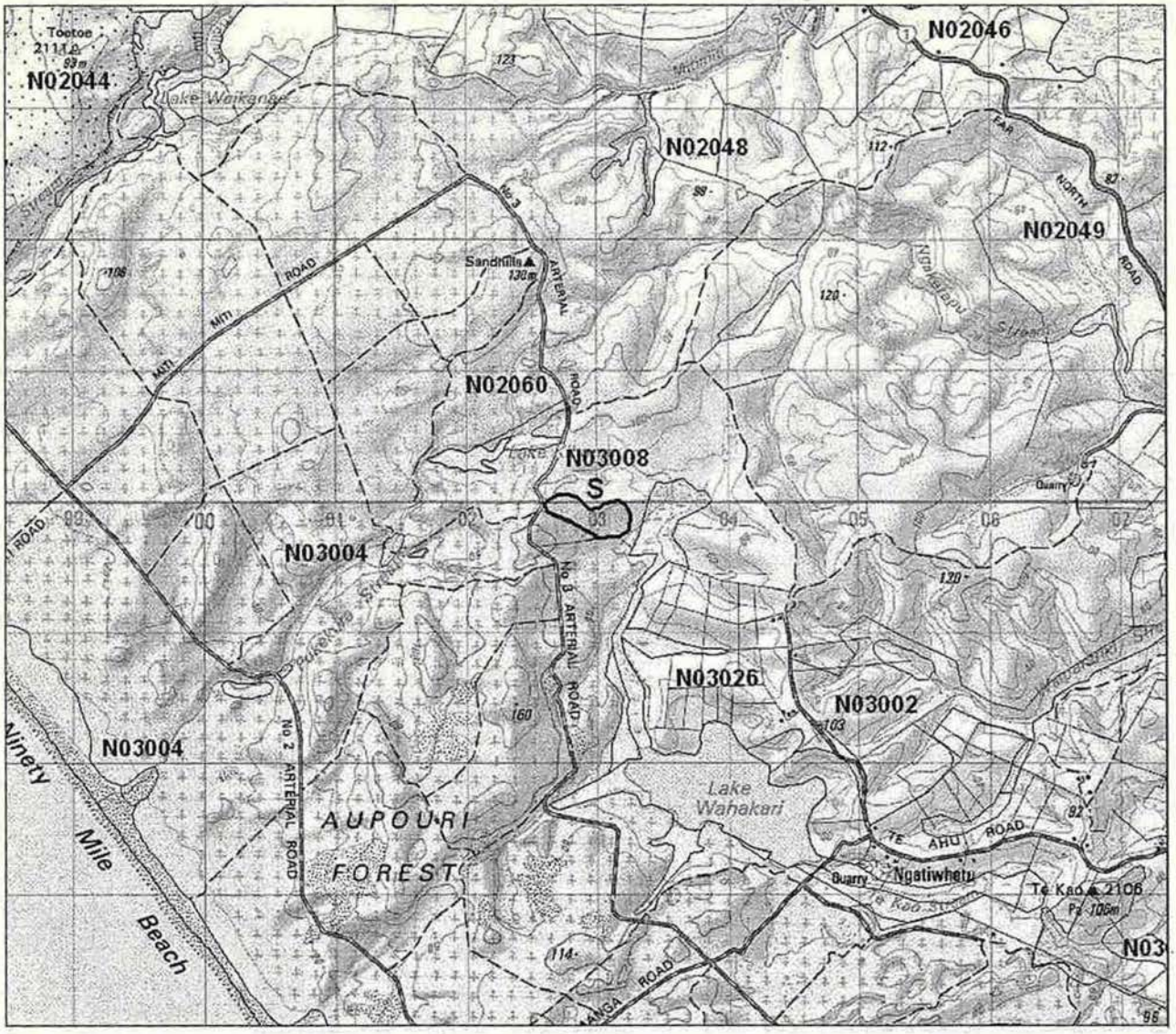
Fauna

Not surveyed.

Significance

Small area of shrubland abutting exotic forest area and providing a linkage from Lake Wahakari to Lake Kihona.

Additional surveying is recommended to determine the full ecological significance of this site.



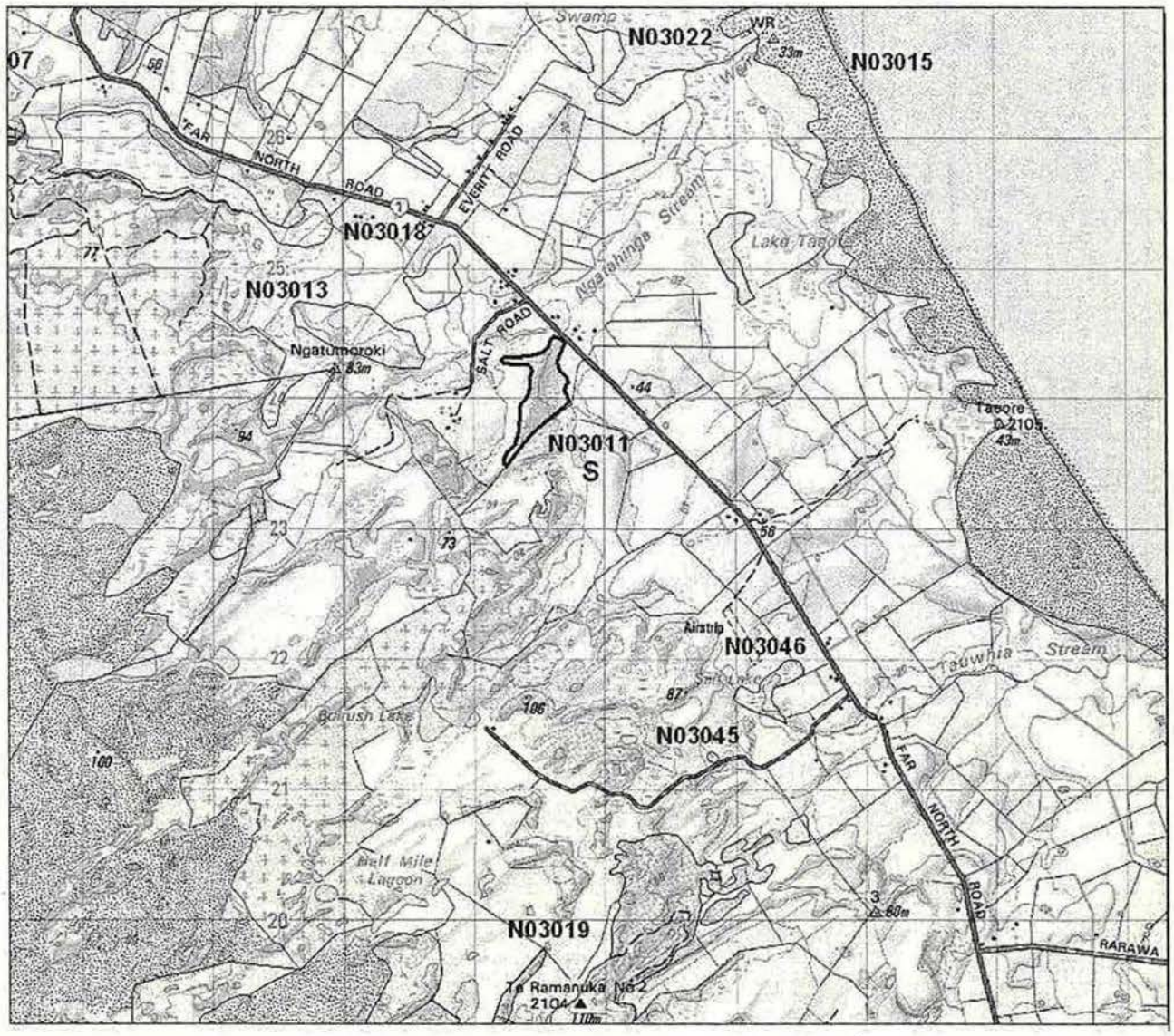
Arterial Rd Shrublands N03/008

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

SALT RD SHRUBLAND

Survey no.	N03/011
Survey date	15 August 1995
Grid reference	N03 116 240
Area	19 ha
Altitude	15–40 m asl



Salt Rd Shrubland N03/011

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

(a) Kanuka shrubland on gentle hill country

(b) Manuka-raupo swamp association on interdune flat

Landform/geology

Late Pleistocene parabolic dunes and interdune flats.

Vegetation

(a) Almost all of the area is kanuka shrubland between 2 m and 6 m with occasional pine, ti kouka, prickly hakea, *Eucalyptus* sp., black wattle, manuka, gorse and Sydney golden wattle.

(b) A small area occurs at the north eastern corner of the habitat with kanuka and raupo, and occasional ti kouka, harakeke, bracken, gorse, tobacco weed and mamaku.

Fauna

Not surveyed.

Significance

A link in the various habitats that stretch along Aupouri Peninsula.

Additional surveying is recommended to determine the full ecological significance of this site.

NGATUMOROKI SHRUBLAND

Survey no.	N03/013
Survey date	15 August 1995
Grid reference	N03 103 245
Area	29 ha
Altitude	20–60 m asl

Ecological unit

Kanuka shrubland on flat to gentle hill country

Landform/geology

Late Pleistocene parabolic dunes.

Vegetation

Kanuka is dominant with frequent Sydney golden wattle and occasional prickly hakea, harakeke and emergent pines.

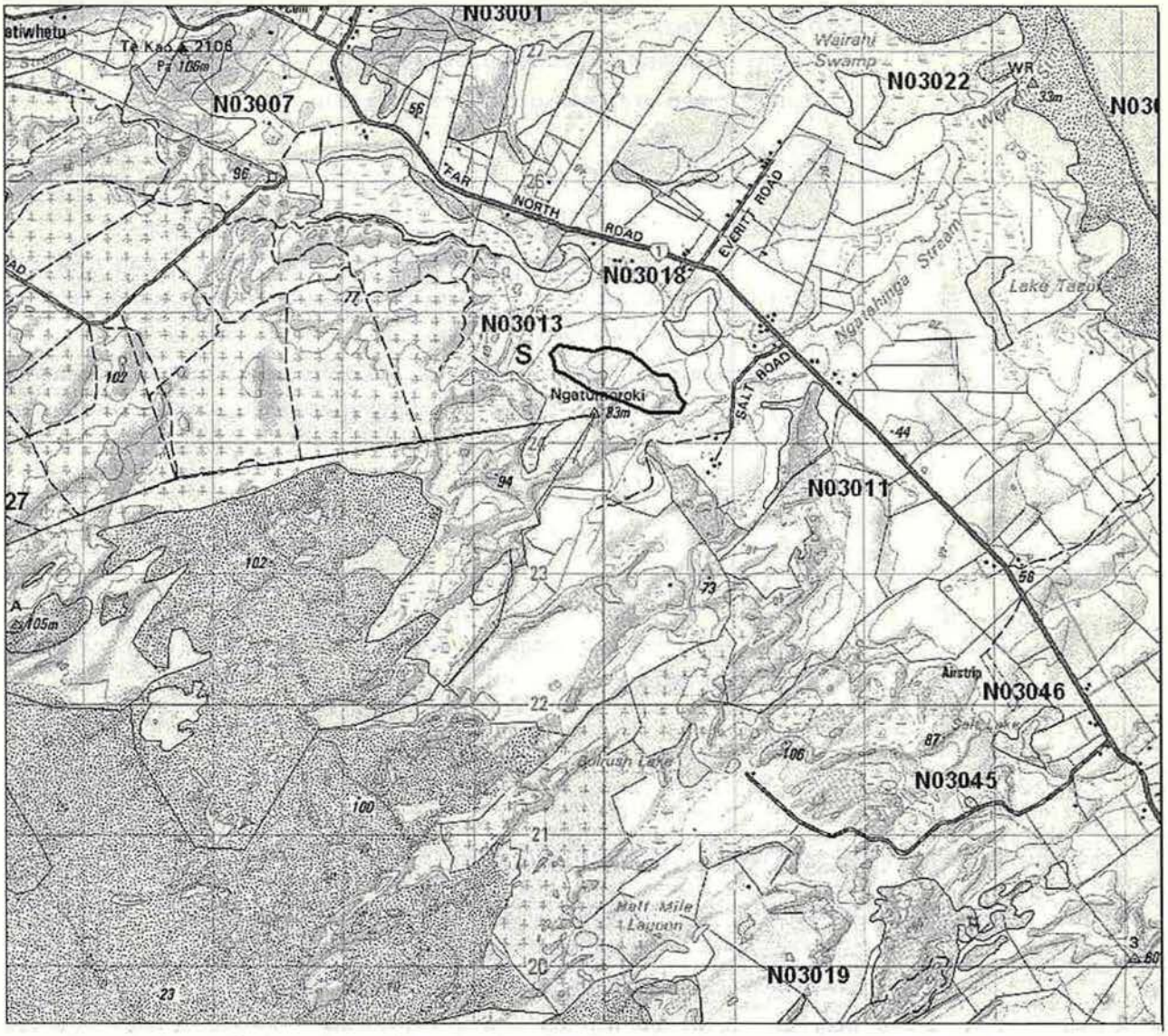
Fauna

Not surveyed.

Significance

A small shrubland area buffering the adjacent wetland and acting as a linkage between habitats on the Aupouri Peninsula.

Additional surveying is recommended to determine the full ecological significance of this site.



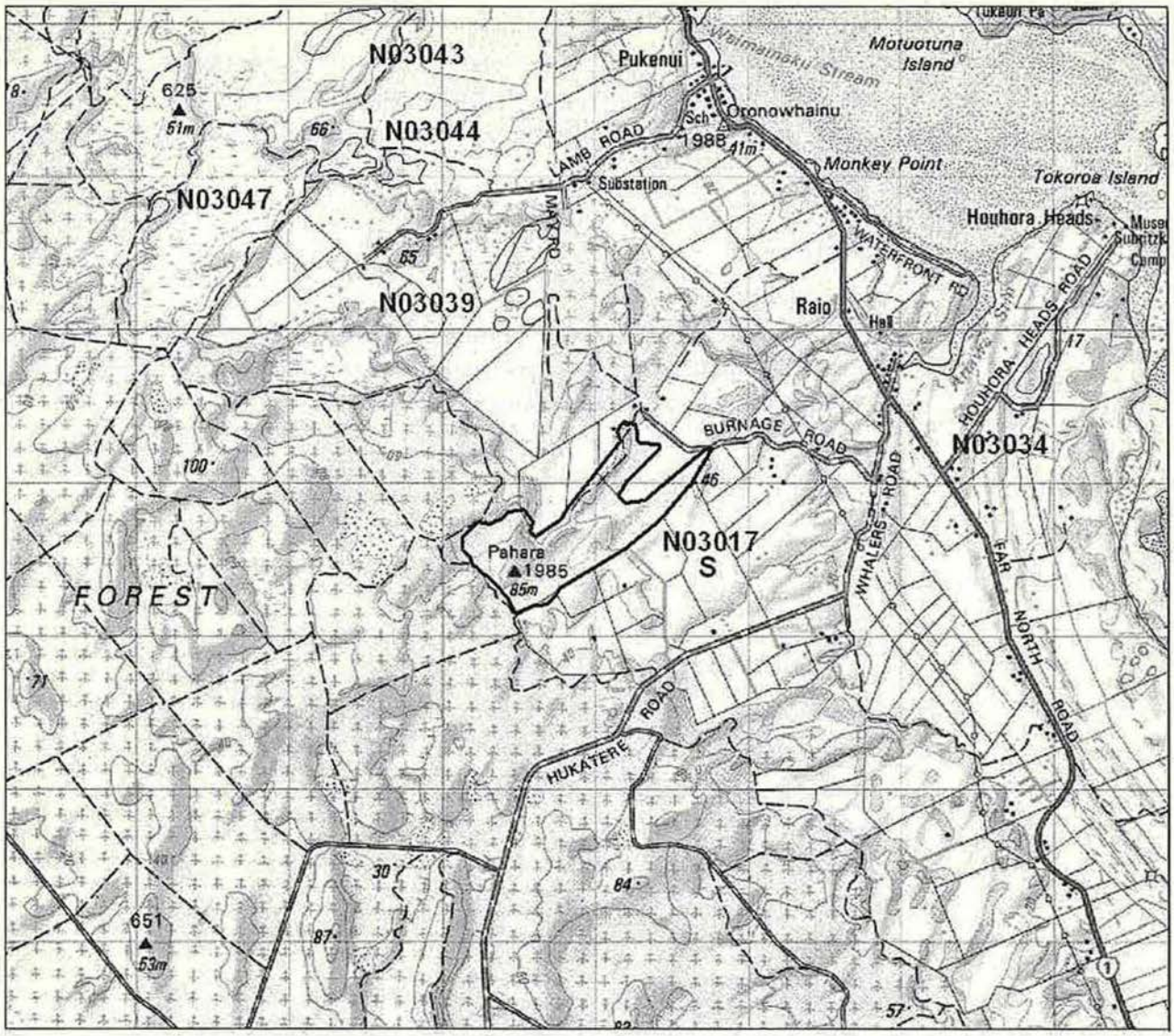
Ngatumoroki Shrubland N03/013

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

PAHARA SHRUBLANDS

Survey no.	N03/017
Survey date	23 August 1995
Grid reference	N03 210 067
Area	69 ha
Altitude	35-85 m asl



Pahara Shrublands N03/017

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit

Kanuka-manuka-wattle shrubland on gentle hillslope

Landform/geology

North-west area: Pleistocene consolidated parabolic dunes and interdune flats.
South-east area: Holocene unconsolidated parabolic dunes.

Vegetation

The northern sector is kanuka-manuka and wattle in association. Other species present are prickly moses, prickly hakea, pine and *Eucalyptus*.

In the south, manuka is absent and scattered pine is the only other canopy species.

Fauna

Not surveyed.

Significance

Shrubland area to the west of Houhora Harbour that provides an important function of linking the various wetlands, sand dunes, forest remnants and shrublands that stretch along Aupouri Peninsula.

Additional surveying is recommended to determine the full ecological significance of this site.

KIMBERLEY SHRUBLAND

Survey no.	N03/028
Survey date	15 August 1995
Grid reference	N03 173 154
Area	8.1 ha
Altitude	< 40 m asl

Ecological unit

Kanuka shrubland on gentle slope

Landform/geology

Pleistocene consolidated parabolic dunes and interdune flats.

Vegetation

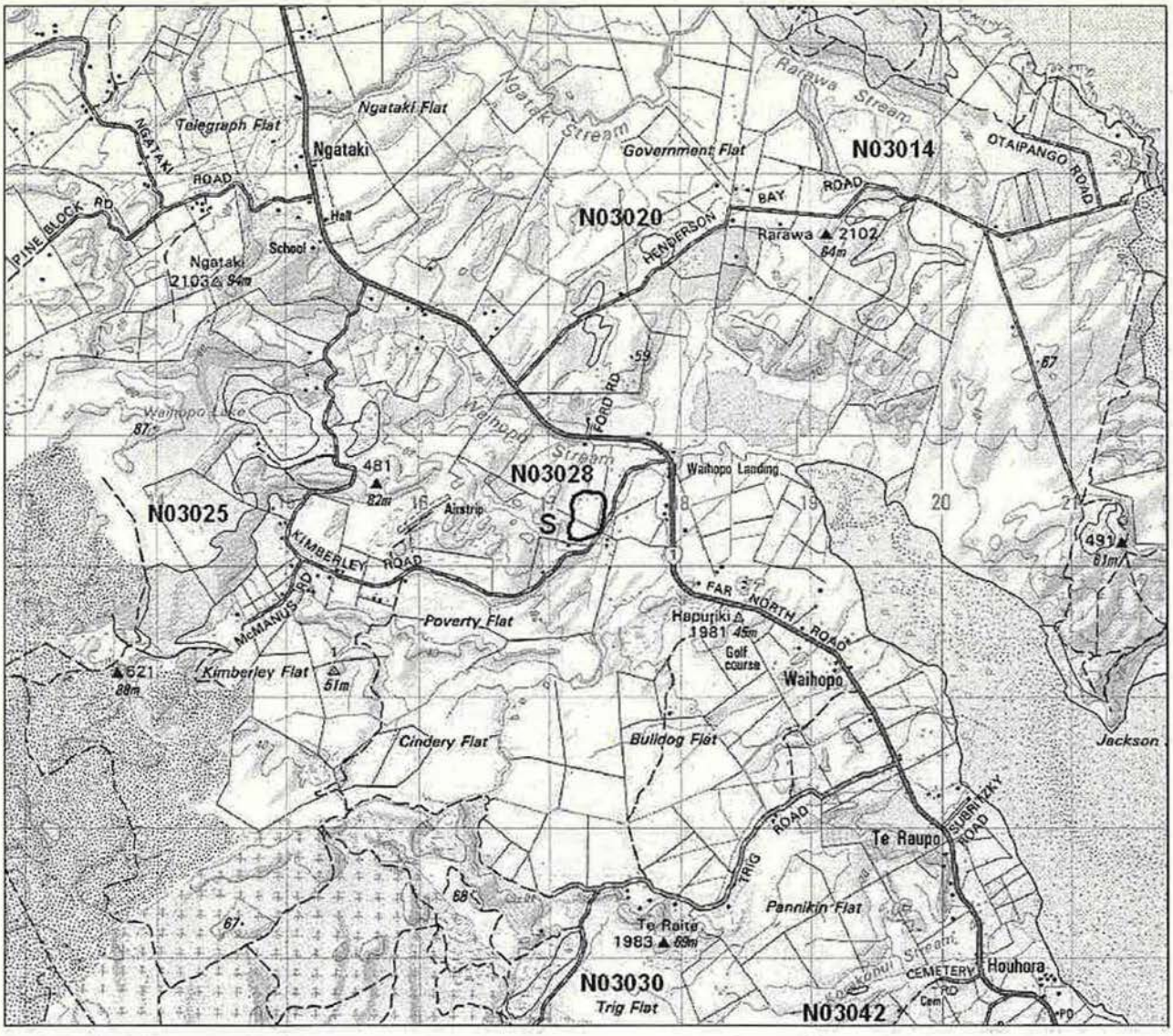
Low kanuka shrubland of 1–2 m dominates the site with Sydney golden wattle occurring occasionally.

Fauna

Not surveyed.

Significance

Small, isolated shrubland area north-west of the Houhora Harbour.



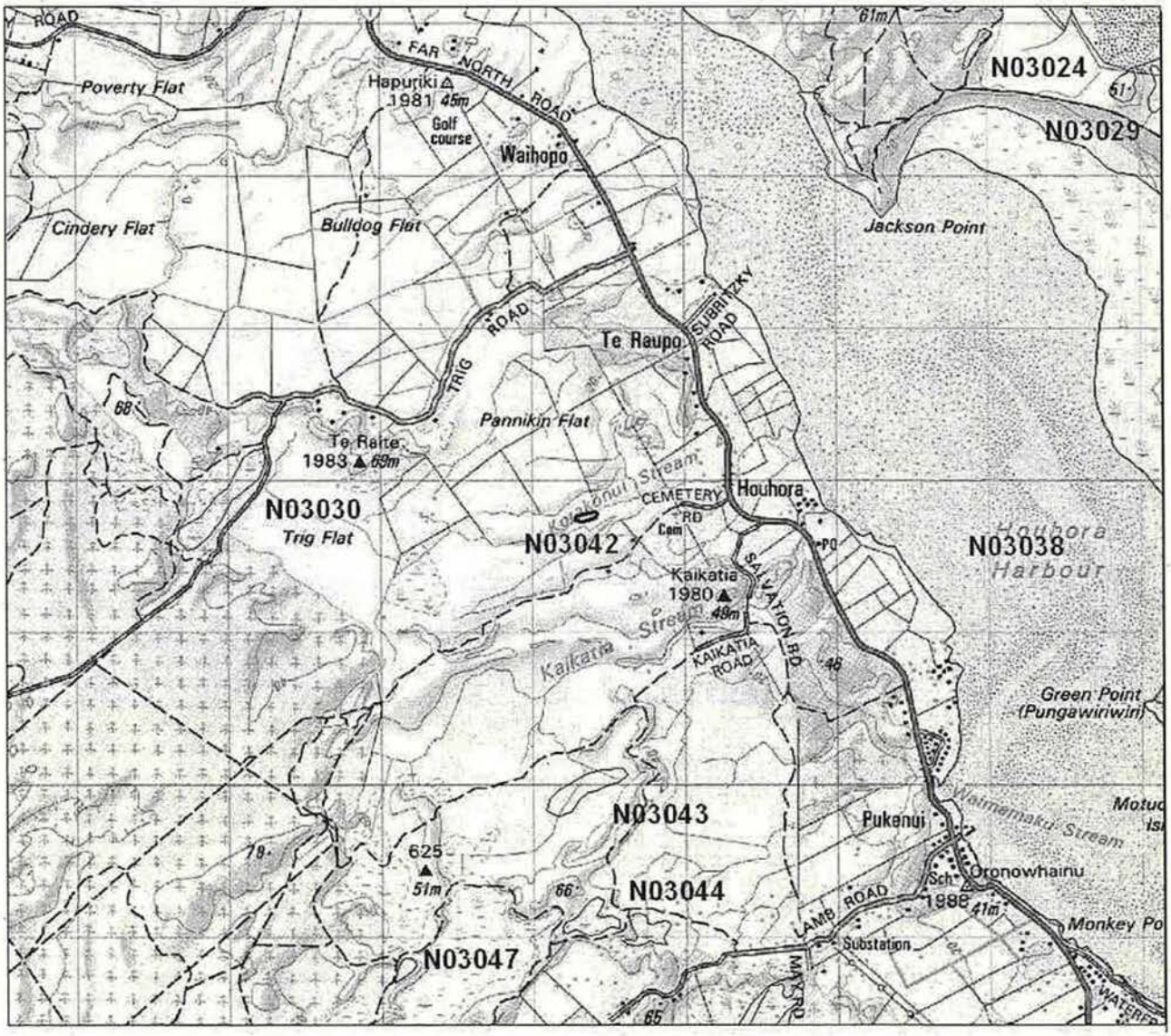
Kimberley Shrubland N03/028

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

CEMETERY RD POND

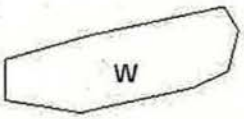
Survey no.	N03/042
Survey date	17 January 1996
Grid reference	N03 194 117
Area	0.59 ha
Altitude	< 20 m asl



Cemetery Rd Pond N03/042

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Ecological unit

(a) *Eleocharis sphacelata* reedland in dune hollow

(b) Open water

Landform/geology

Freshwater wetland on interdune flat of Pleistocene parabolic dunefield.

Vegetation

(a) *Eleocharis sphacelata* is abundant in more than half the area. Raupo and harakeke are present.

(b) The remainder is open water formed by the damming of a creek. Sydney golden wattle occurs on the margins.

Fauna

Common bird species. Other fauna not surveyed.

Significance

A small area providing habitat for common bird species.

ONEPU SWAMP

Survey no.	N03/045
Survey date	18 January 1996
Grid reference	N03 128 213
Area	0.5 ha
Altitude	40 m asl

Ecological unit

Raupo reedland in dune hollow

Landform/geology

Freshwater wetland in gully in Holocene parabolic dunefield.

Vegetation

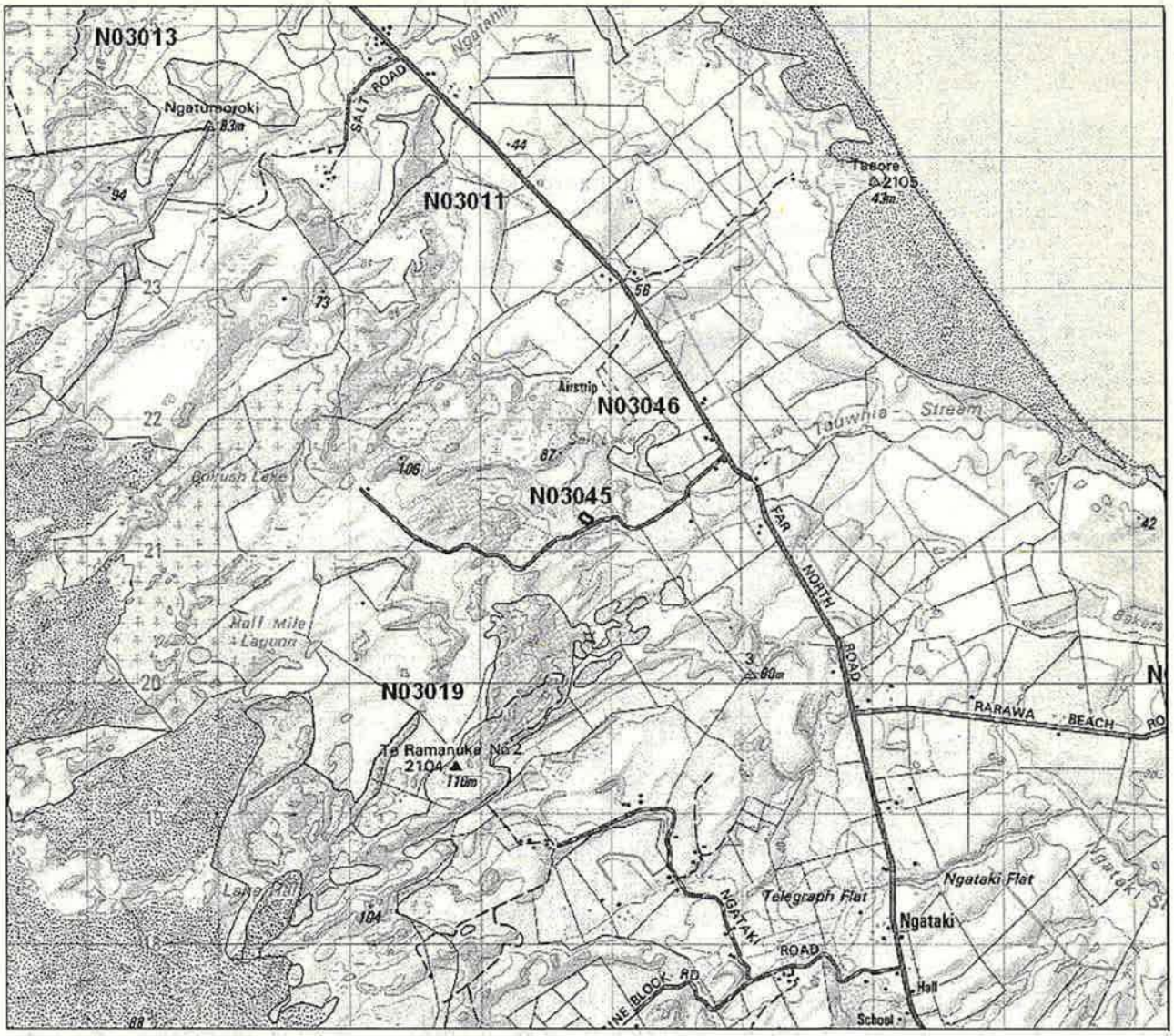
Predominantly raupo. Other species present include *Baumea articulata*, harakeke, ti kouka, bracken, kanuka and manuka.

Fauna

Not surveyed.

Significance

A small fenced raupo wetland with potential wildlife value. Survey recommended for spotless crake (Regionally significant species).



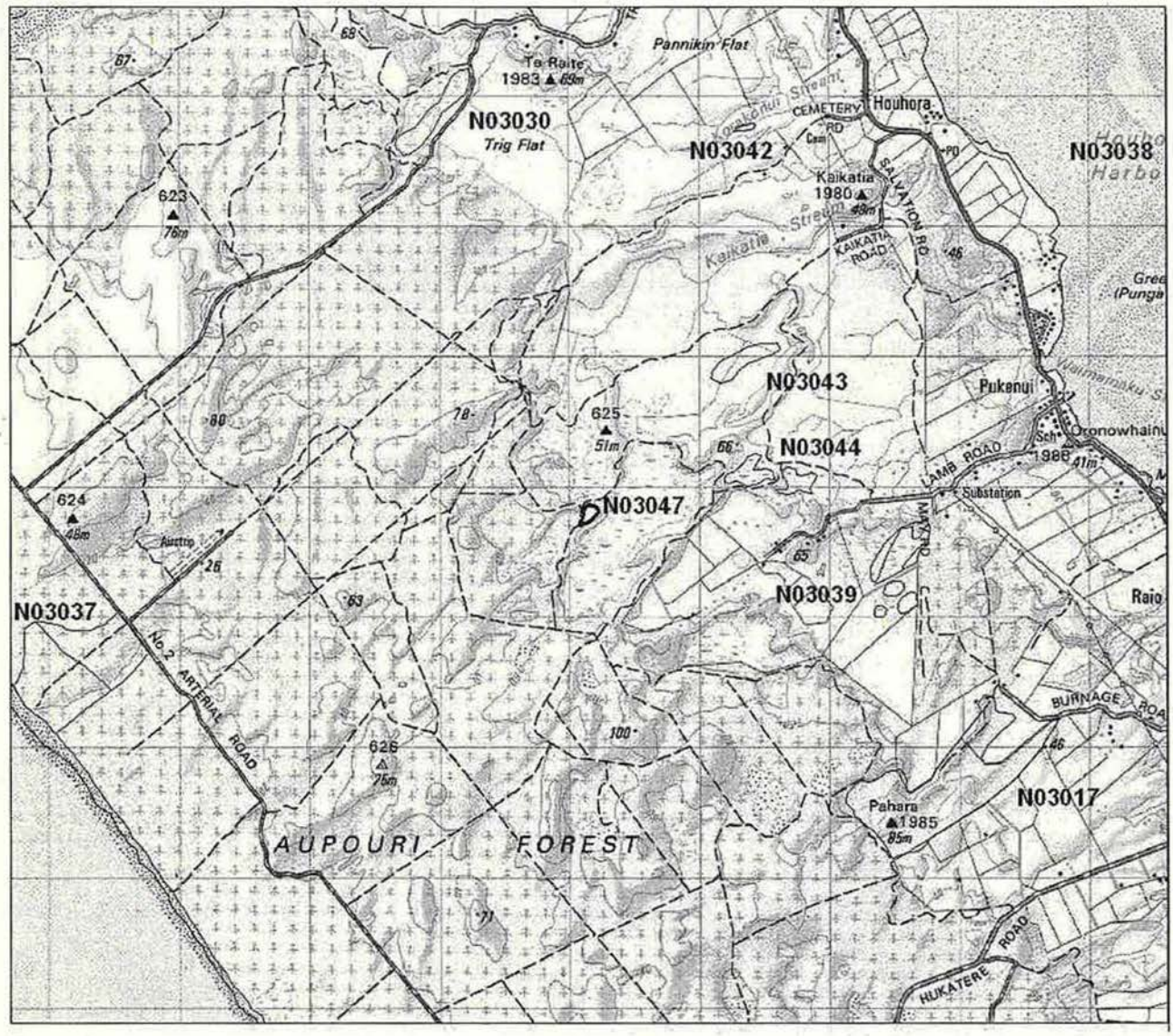
Onepu Swamp N03/045

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

GULLY LAKE

Survey no.	N03/047
Survey date	29 February 1996
Grid reference	N03 182 088
Area	1.2 ha
Altitude	40 m asl



Gully Lake N03/047

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

Ecological unit
Manuka shrubland in dune hollow

Landform/geology
Hollow between dune ridges of Pleistocene parabolic dunefield.

Vegetation
Low manuka is abundant. Sydney golden wattle is frequent. Pampas and ti kouka are also present.

This wetland appears to be drying out possibly from the effects of dense Sydney golden wattle on the eastern periphery and Sydney golden wattle and pines on the remaining boundaries.

Fauna
Grey duck (1986).

Significance
A small area previously habitat for native duck species. Continued monitoring is recommended to record its ecological evolution.

BIG FLAT SHRUBLAND

Survey no.	N04/004
Survey date	14 August 1995
Grid reference	N04 264 971
Area	11.9 ha
Altitude	20–50 m asl

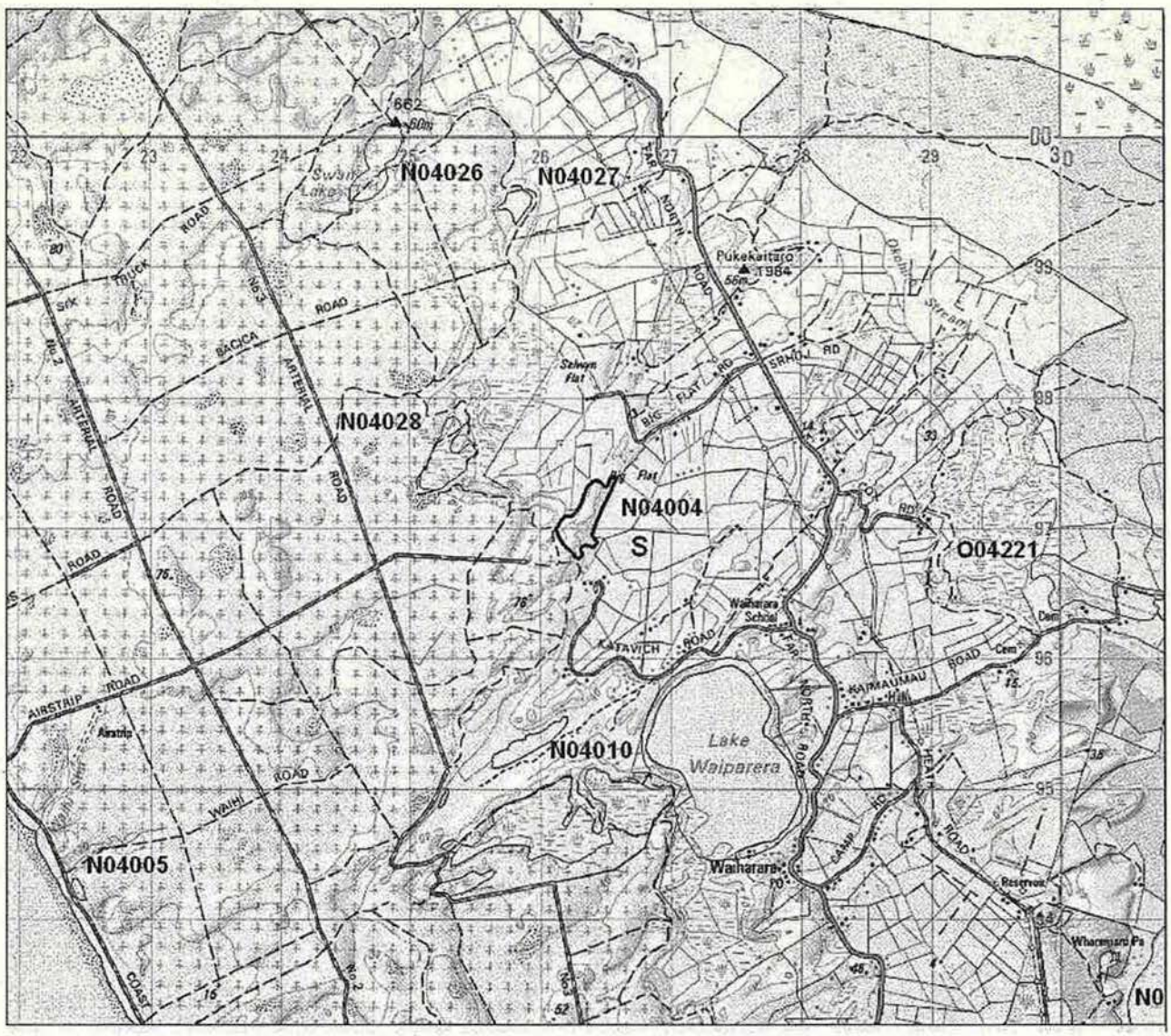
Ecological unit
Kanuka shrubland on gentle hill country

Landform/geology
Pleistocene consolidated parabolic dune.

Vegetation
Kanuka is dominant with Sydney golden wattle locally frequent. Prickly hakea is also present.

Fauna
Not surveyed.

Significance
Small shrubland habitat providing the function of linking the various wetlands, sand dunes, forest remnants and shrublands that stretch along Aupouri Peninsula.



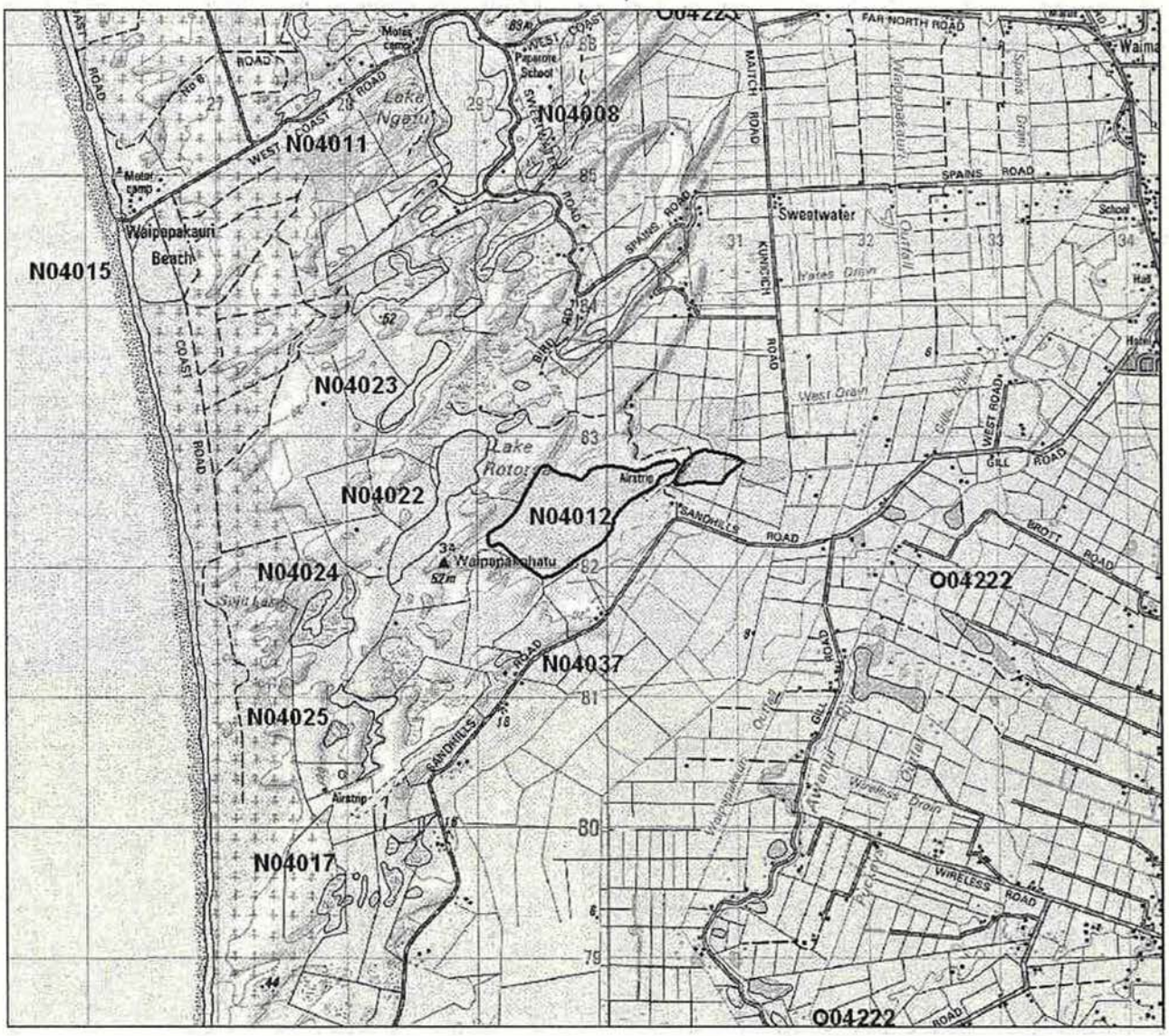
Big Flat Shrubland N04/004

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland

AIRSTRIP SHRUBLAND

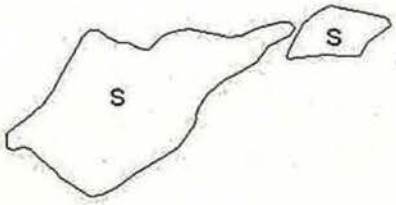
Survey no.	N04/012
Survey date	7 August 1995
Grid reference	N04 298 825, O04 307 827
Area	71 ha
Altitude	5–10 m asl



Airstrip Shrubland N04/012

Each grid is 1000m x 1000m and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Ecological unit

(a) Kanuka shrubland on interdune flat

(b) Gorse-kanuka shrubland on interdune flat

Landform/geology

Interdune flat in dunefield of Pleistocene consolidated parabolic dunes.

Vegetation

Two adjacent habitats in Sandhills Rd. The eastern area is kanuka dominant. Gorse is common and mamaku, tobacco weed and brush wattle are frequent.

The remainder is mostly gorse with frequent brush wattle and tobacco weed and occasional pampas. About 10% is kanuka to 5 m. There is a small area of pine.

Fauna

Not surveyed.

Significance

A large, semi-contiguous shrubland habitat with major weed invasion but a habitat that provides an important function of linking the various wetlands, sand dunes, forest remnants and shrublands that stretch along Aupouri Peninsula.

Additional surveying is recommended to determine the full ecological significance.

SWEETWATER STATION SHRUBLANDS

Survey no.	N04/013
Survey date	7 August 1995
Grid reference	N04 284 777, N04 289 765
Area	43 ha
Altitude	10–20 m asl

Ecological unit

(a) Manuka-gorse shrubland on interdune flat

(b) Kanuka shrubland on peaty swamp deposits

Landform/geology

North-west: Interdune flat in dunefield of Pleistocene consolidated parabolic dunes. South-east: Holocene swamp deposits.

Vegetation

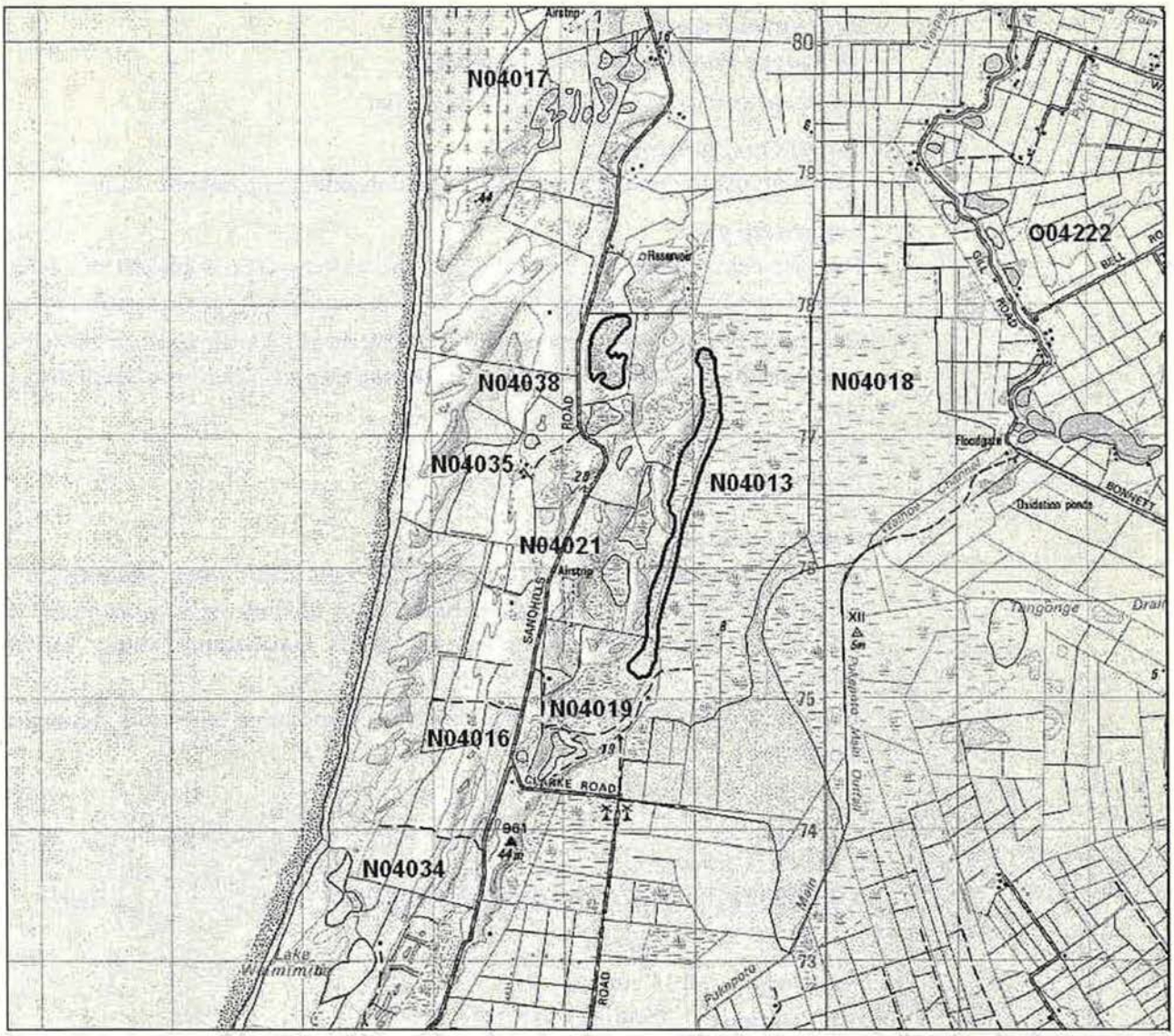
Two shrubland areas between Sandhills Rd and Lake Tangonge.

(a) The western area is manuka dominant with gorse commonly occurring. Ti kouka, sedges, pampas and tobacco weed are also present. This area was a wetland and has dried out.

(b) The eastern area is mostly kanuka with frequent gorse and pampas and occasional ti kouka. There is a small area of pine.

Fauna

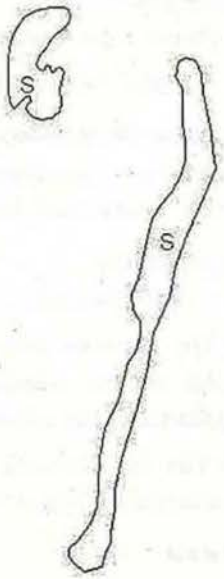
Not surveyed.



Sweetwater Station Shrublands N04/013

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland



Significance

Two small shrubland areas providing a function of linking the various wetlands, sand dunes, forest remnants and shrublands that stretch along Aupouri Peninsula. Additional survey is required to determine their full ecological significance.

RANGIPUTA RD SHRUBLANDS

Survey no.	O03/007
Survey date	22 August 1995
Grid reference	O03 384 022, O03 389 007
Area	73 ha
Altitude	2–26 m asl

Ecological unit

(a) Kanuka-manuka-Sydney golden wattle shrubland on gentle slopes and flats

(b) Manuka shrubland on gentle slopes and flats

Landform/geology

Pleistocene consolidated parabolic dunes and coastal foredunes with intercalated area of Holocene sandy alluvium. Underlying Houhora Complex greywacke and felsic intrusions outcrop in shore platforms and coastal cliffs north of Rangiputa.

Vegetation

(a) The southern area is kanuka shrubland 2–4 m with manuka and Sydney golden wattle commonly occurring. Pohutukawa, pine, ti kouka, brush wattle and prickly hakea are occasional.

(b) Around the Rangiputa settlement low manuka shrubland is abundant. Kanuka, Sydney golden wattle and *Eucalyptus* are frequent. *Epacris pauciflora*, prickly hakea and bottlebrush are also present.

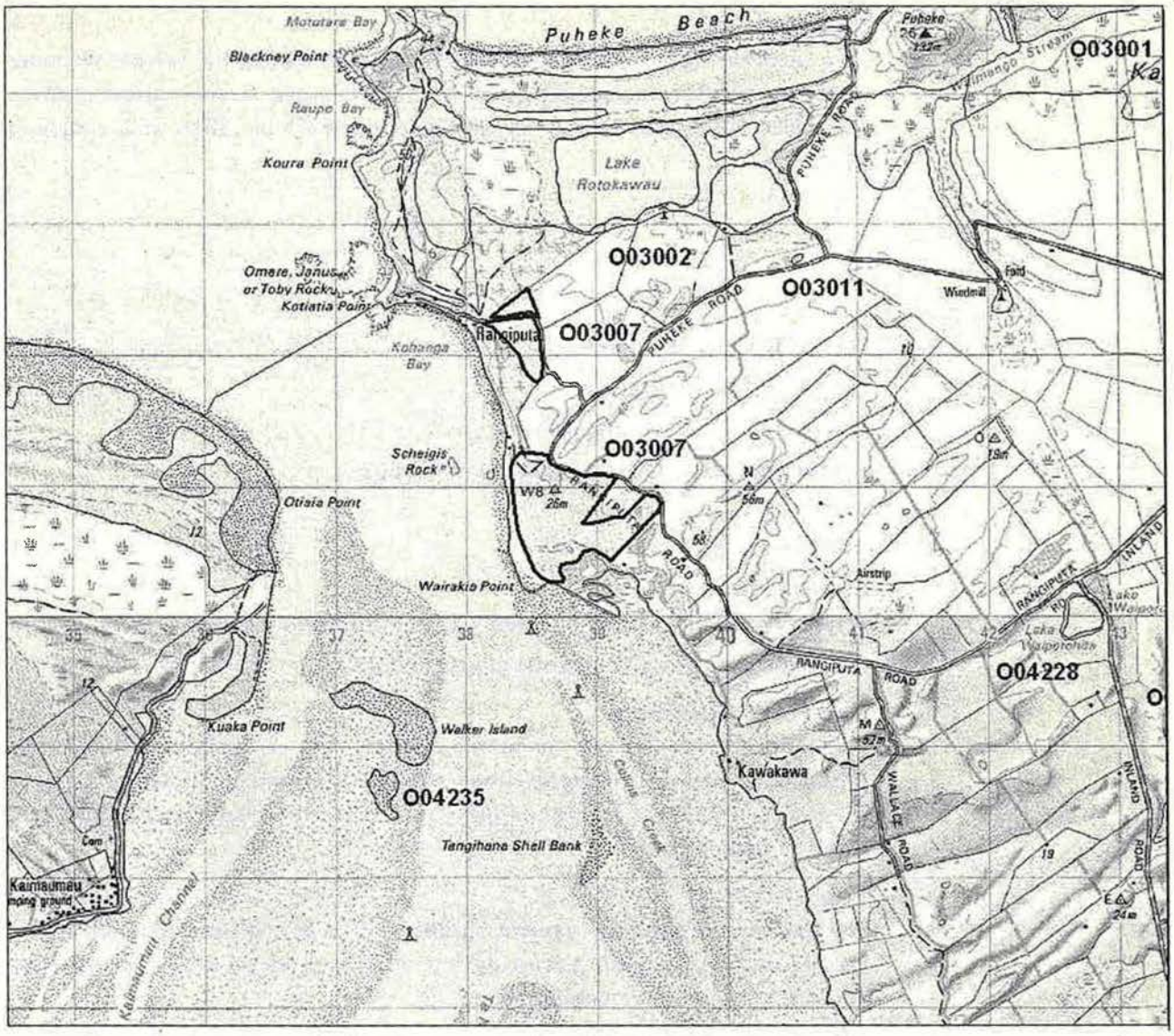
Fauna

Common birds were recorded by the OSNZ in early 2000.

Significance

An area of shrubland on the north eastern side of Rangaunu Harbour mouth providing a buffer to the harbour/coast from exotic forestry and farmland.

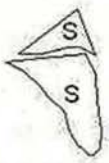
Approximately 5.5 ha of this site is Far North District Council reserve land and 3.3 ha is Marginal Strip administered by the Department of Conservation.

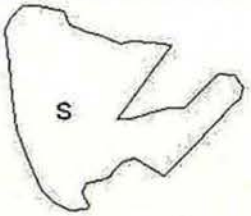


Rangiputa Rd Shrublands O03/007

Each grid is 1000m x 1000m
and = 100 ha.

S = shrubland
F = forest
W = wetland
E = estuarine
D = duneland





5. Summary and conclusions

The Protected Natural Areas network in the Aupouri Ecological District is summarised in Table 1. Including the area of the three harbours, approximately 26.5% of the natural areas of the Aupouri Ecological District are formally protected, which is equivalent to about 9% of the total area of the Ecological District. Excluding the three harbours, approximately 48% of the natural areas of the Aupouri Ecological District are formally protected, which is equivalent to about 10.7% of the total area of the Ecological District. Protected areas are made up primarily of Te Paki Dunes, Te Arai dunelands, East Beach, Kaimaumau, Lake Ohia, and Tokerau Beach.

A list of ecological units recorded in the Aupouri Ecological District and their current protection status is set out in Table 2 (page 300), and a summary of the site evaluations is given in Table 3 (page 328).

TABLE 1. PROTECTED NATURAL AREA NETWORK IN THE AUPOURI ECOLOGICAL DISTRICT (areas in ha).

Key: CC = Conservation Covenant; QEII = Queen Elizabeth II National Trust covenant; SL = Stewardship Land; SR = Scenic Reserve; EA = Ecological Area; WMR = Wildlife Management Reserve; ScR = Scientific Reserve; RR = Recreation Reserve; MS = Marginal Strip; NR = Nature Reserve; HR = Historic Reserve; FNDC = Far North District Council Reserve; RFBPS = Royal Forest and Bird Protection Society

Site	Survey no.	Status													Total prot. area	Total site area
		CC	QEII	SL	SR	EA	WMR	ScR	RR	MS	NR	HR	FNDC	RFBPS		
Te Paki Dunes	N02/013								1871						1871	1936
Te Paki Stream	N02/014								41.5						41.5	43
Parengarenga Harbour	N02/026							39.2							39.2	6449
Ninety Mile Beach & Dunes	N02/042	63.7		103.7						40					207.4	928
Te Arai Sandfields	N03/009			734.24		4.76									739	1253
Great Exhibition Bay	N03/015			271											271	755
Te Ramanuka Lakes & Shrubland	N03/019			340											340	423
Wairahi Swamp & Lake Taeore	N03/022						11.4								11.4	127
Rarawa Beach	N03/023			42											42	59
Kaimaumau-Motutangi Wetlands	N03/031			1889				929.3		7.3					2825.6	4075
Pohutukawa Remnant	N03/037	5.2		2.41											7.61	55
Arethusa Swamp	N03/039													12.5	12.5	15.3
East Beach	N03/040			577.9						0.4					578.3	627
Salt Lake	N03/046			3.4											3.4	9.5
Motu Puruhi Island & Terakautuhaka Island	N03/051										6.34				6.34	6.34
Far North Rd Shrublands & Wetlands	N04/002		30.65												30.65	206.8
Headquarters Pond	N04/007	5.77													5.77	5.77
Lake Ngatu Complex	N04/008								68.7						68.7	154.8
Lake Rotokawau & Pond	N04/009									3.6					3.6	24.9

Site no.	Survey CC	Status QEII	SL	SR	EA	WMR	ScR	RR	MS	NR	HR	FNDC	RFBPS	Total prot. area	Total site area
Lake Waiparera & Wetlands	N04/010	54.4							7.2					61.6	212.3
Waipapakauri Beach Coastal Shrubland	N04/015			15.8										15.8	16.6
Tangonge Wetland	N04/018			43.2										43.2	486
Lake Rotoroa & Wetlands	N04/022			29	0.4									29.4	32
Lake Heather	N04/023			7.5	0.8									8.3	11
Split Lake Wetland	N04/024	10.8												10.8	12.6
Mini & Round Lakes	N04/025	8.7												8.7	9.9
Turks Lake & Wetland	N04/026	8.1												8.1	12.4
Bacica Rd Lake	N04/027	3.5												3.5	3.5
Selwyn Flat Wetland	N04/028	8.9												8.9	11.7
Jones Lake	N04/031	0.98												0.98	1.75
Waimango Swamp	O03/001			118				20.6						138.6	297
Rotokawau Lakes & Puwheke Beach	O03/002								65.4					65.4	433.6
Maitai Bay	O03/003							10.4						10.4	23.9
Taupiroroa Range Shrublands	O03/004							21.9						21.9	945
Cape Karikari Shrubland	O03/005							64.3						64.3	444
Whangatupere Bay	O03/006						378	347	0.7					725.7	1018
Rangiputa Rd Shrublands	O03/007								3.3			5.5		8.8	73
S Urlich Rd Wetland 29	O03/008			12.79										12.79	
Karikari Bay	O03/009							24.2						24.2	136
Waiparera Creek Wetland	O04/221			7.4					0.6					8.0	22.5
Awanui River Forest Remnants	O04/222		10.4		3									13.4	46.3
Lake Ohia	O04/227			1234					29					1263	1641
Lake Waiporohita	O04/228				8.1									8.1	8.3
Southern Tokerau Swamp	O04/229			66.8										66.8	84
Northern Tokerau Swamp	O04/230			68.4										68.4	71
Tokerau Beach	O04/232			225										225	376
Rangaunu Harbour	O04/233			36					53	7.83	1.0			97.83	10185
Walker Island	O04/235									7.1				7.1	26.5

	CC	QEII	SL	SR	EA	WMR	ScR	RR	MS	NR	HR	FNDC	RFBPS	Prot.	Site
TOTAL AREA	170.05	41.05	5827.54	12.3	4.76	11.4	1346.5	2469.6	210.5	21.27	1.0	5.5	12.5	10859.6	34025.2

5.1 PRIORITY NATURAL AREAS FOR PROTECTION IN THIS ECOLOGICAL DISTRICT

1. Habitat types where the remaining examples of each type are limited to remnants or are at risk of disappearing from the Ecological District

(a) Ephemeral wetlands

Tangonge Wetlands (N04/018) – partly protected (8.8%)*.

(b) Dune forest

The rarest forest type in Northland (DOC 1999). Only a few fragmented sites remain in the Aupouri Ecological District including:

Lake Waikanae (N02/044), Te Pua Point Pohutukawa Remnant (N02/053), Puriri-Karaka Remnant (N03/027), Hukatere Lookout (N03/032), Compartment 65 Forest Remnant (N04/003).

(c) Alluvial forest

One of the most under-represented forest types in Northland (DOC 1999). Remaining examples of this habitat type occur at:

Mangatete River Bush (O04/226) and Awanui River Forest Remnants (O04/222) – the latter partly protected (26.5%).

2. Nationally under-represented habitat types

(a) Peat bogs

Kaimaumau-Motutangi Wetland (N03/031) – partly protected (69.3%), Far North Rd Shrublands & Wetlands (N04/002) – partly protected (14.8%), Heath Rd Powerline Swamp (N04/006), Sweetwater Station Depressions (N04/017), Sandhills Rd Wetland No 1 (N04/021), Sweetwater Station Peat Bowl (N04/038), Paparore Wetland & Shrubland (O04/220), West Coast Rd Shrublands (O04/223).

(b) Coastal forest and shrubland, especially pohutukawa forest (includes offshore islands)

Matapia Island (N02/073), Henderson Bay Shrubland (N03/014), Hukatere Lookout (N03/032), Mt Camel (N03/035), Pohutukawa Remnant (N03/037) partly protected (13.8%), Te Wakatehaua Island (The Bluff) (N03/050), Taupiroroa Range Shrubland (O03/004) – partly protected (2.3%), Cape Karikari Shrublands (O03/005) – partly protected (14%), Whangatupere Bay (O03/006) – partly protected (72%), Moturoa Islands (O03/012).

(c) Dune lakes with threatened or endemic species present

Lake Waikanae (N02/044), Lake Te Kahika (N02/061), Lake Kihona & Forest Remnants (N02/060), Lake Austria (N02/069), Ngatuwhete Lake (N02/070), Lake Morehurehu (N03/021), Wairahi Swamp and Lake Taeore (N03/022)

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*cted may not encompass all of the key ecological features.

partly protected (8.9%), Lake Waihopo & Shrublands (N03/025), Lake Wahakari (N03/026), Lake Ngatu Complex (N04/008) - partly protected (44.3%), Lake Rotokawau & Pond (N04/009) - partly protected (14.4%), Lake Waiparera & Wetlands (N04/010) - partly protected (29%), West Coast Rd Lake (N04/011), Turks Lake & Wetland (N04/026), Lake Ngakapua Complex (N04/030).

3. Wetlands and other sites with threatened or endemic species present

Karatia Wetland (N02/056), Upper Karatia Swamp (N02/068), Oromanga Rd Wetlands (N03/010), Te Raite Wetland (N03/030), Kowhai Swamps (N03/036), Lambs Rd Swamp (N03/044), Coal Creek (N04/004), Herberts Swamp (N04/029) and Jones Lake (N04/031) - partly protected (56.6%), Waimimiha Lakes (N04/034), Waiparera Creek Wetland (O04/221), Waimango Swamp (O03/001) - partly protected (46.6%),Rotokawau Lakes & Puwheke Beach (O03/002) - partly protected (15%), Puheke Rd Wetland (O03/011).

4. Other dunelands and dune lakes

(a) Dunelands

Te Paki Dunes (N02/013) - partly protected (96.6%), Ninety Mile Beach & Dunes (N02/042) - partly protected (22.3%), Kokota Spit (N02/051), Great Exhibition Bay (N03/015) - partly protected (35.8%), Rarawa Beach (N03/023) - partly protected (71%), Waikokopu Shrubland (N03/041), Rotokawau Lakes & Puwheke Beach (O03/002) -marginal strip around dunelakes only; Karikari Moana (O03/009) - partly protected (27.2%), Tokerau Beach (O04/232) - partly protected (59.8%).

(b) Foredunes or soft shores where northern NZ dotterel are present

Kokota Spit (N02/051), Henderson Bay & Kowhai Beach (N03/016), Karikari Moana (O03/009) - partly protected (17.7%).

(c) Other dune lakes not included in 1-3 above.

5. Enclaves, extensions or buffers to existing protected areas and ecological sequences

- Kaimaumau, Houhora and Rangaunu Harbours (intrinsically linked ... Beach) and linked to Kaimaumau-Motutangi Wetlands (N03/031) - p... tected (69.3%), with diverse habitats, and featuring an unbroken z... wetland sequences from saltwater to freshwater.
- Waiparera-Sweetwaters complex (see dunelakes and wetlands ab...
- Karikari Peninsula - Rotokawau Lakes & Puwheke Beach (O03o... protected (15%), a large area, containing one of the best exam...ds logical Region of a wide diversity of habitats including ...m stretching from the Rangiputa coast to Karikari Moar... Whatuwhiwhi to Maitai Bay. ...rau
- Lake Ohia links Rangaunu Harbour to Tokerau Beach ... Swamp.

6. Protective measures

Measures which facilitate the exclusion of stock from estuarine zones (especially Parengarenga), protect roost sites for waders (including migratory bird species) around all three harbours, and protect shore birds from off-road vehicles.

7. Priority sites

This District is (or previously was) habitat for approximately 50 plant species listed in de Lange et al. (1999). This very high figure is indicative of the sensitivity of the habitats within the Ecological District to modification. For this reason, it is proposed that sites containing any of these species be considered priority sites, not least as indicators of the rarity of the habitat type and potential to support a diversity of species: (sites not otherwise included above):

Tangoake Shrublands (N02/052), Emauhu Point Shrublands (N02/058), Sandhills Rd Swamp (N04/016).

8. Habitats containing ecological units not represented elsewhere which do not fall into any of the above categories

Whakatereohao Stream Swamp (N02/057), Waipara & Dead Lakes (N02/065), Pretty Lake (N02/066), Wagener's Swamps (N03/024) and Waimanoni Creek Shrubland (O04/217).

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

Key: Pt = Site is partially protected, but unknown whether ecological unit falls within the protected area, CC = Conservation Covenant; QEII = Queen Elizabeth II National Trust Covenant; RR = Recreation Reserve; SL = Stewardship Land; SR = Scenic Reserve; EA = Ecological Area; WMR = Wildlife Management Reserve; NR = Nature Reserve; MS = Marginal Strip; * = Level 2 site; Part of = part of site is within geological description; **Bold pna numbers** = representative ecological units.

	DUNE BELTS					WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
FRESHWATER WETLANDS							
Baumea spp.							
Baumea articulata				**N03/025**			N02/065 **N04/010** (PtCC,MS)
Baumea articulata- *Eleocharis sphacelata*			**N03/019** (PtSL)				N04/029 **N04/022** (PtSL,SR) **N04/026** (PtCC) **N04/030**
Baumea articulata- *Eleocharis sphacelata-* harakeke-manuka							
Baumea articulata- *Eleocharis spacelata-* *Isolepis prolifer*							
Baumea articulata- *Eleocharis sphacelata*-raupo							
Baumea articulata- giant umbrella sedge- manuka-raupo							
Baumea articulata- *Juncus pallidus*							**N02/065**
Baumea articulata-manuka							**N03/022** (PtWMR)
Baumea articulata- raupo							**N04/028** (PtCC)
Baumea buttonii							

WETLANDS	OTHER HOLOCENE		CRETACEOUS–CENOZOIC ROCK UNITS				MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
O04/223							O03/006 (PtRR,MS,SR)	
N04/038								
N04/007 (PtCC) N03/039 N03/ 044 N04/037								
	N02/056							
N04/021								
N03/020								
N04/002 (PtQEII)								
N03/004								
O04/227 (PtSL,MS)								

	DUNE BELTS					WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
FRESHWATER WETLANDS (continued)							
Baumea buttonii–B. juncea							**O03/001** (PtSL,RR)
Baumea juncea							
Baumea juncea–Eleocharis sphacelata–manuka							
Baumea juncea–manuka							**N02/065**
Baumea rubiginosa							
Baumea rubiginosa/teretifolia–manuka							**N02/068**
Baumea teretifolia–Gleichenia dicarpa							
Baumea teretifolia–Schoenus brevifolius							
Coprosma spp.–giant umbrella sedge association							
Coprosma tenuicaulis–manuka							
dune lake/open water		**N03/009** (PtSL,EA)		N03/025			**N02/061** N02/065 N02/066 **N02/069** N03/003 N03/018 **N03/021** N03/022 (PtWMR) N03/046 (PtSL) **N04/010** (PtCC,MS) N04/011

WETLANDS	OTHER HOLOCENE		CRETACEOUS–CENOZOIC ROCK UNITS					MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
O04/227 (PtSL,MS) **N04/009** (PtMS)								
N04/002 (PtQEII)								
O04/223								
	N02/057							
N04/002 (PtQEII)								**N03/031** (PtCC, ScR,MS)
								N03/031 (PtCC, ScR,MS)
N04/008 (PtRR)								
	O04/221 (PtSL,MS)							
O03/002 (PtMS)								
N02/044 N02/070 N03/004 N03/020 N03/024 **N03/026** N03/030 N03/039 *N03/042 N03/043 N03/044 **N04/008** (PtRR)	N02/056 N02/057 N04/018 (PtSL)							N02/060

	DUNE BELTS					WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
FRESHWATER WETLANDS (continued)							
dune lake/open water *(continued)*							**N04/022** (PtSL,SR) **N04/023** (PtSL,SR) N04/024 (PtCC) N04/025 (PtCC) N04/026 (PtCC) N04/029 **N04/030** N04/031 (PtCC) **N04/034** O04/230 (PtSL)
Eleocharis sphacelata				**N03/025**			N02/061 N02/065 **N02/069** N03/021 **N04/010** (PtCC,MS) N04/011 N04/022 (PtSL,SR) **N04/024** (PtCC) **N04/030** N04/031 (PtCC)
Eleocharis sphacelata–Baumea articulata–raupo							
Eleocharis sphacelata–wire rush							
Eleocharis acuta–Isolepis prolifer–jointed rush							**N03/036**
Eleocharis acuta–Isolepis prolifer–Myriophyllum propinquum–willow weed							

WETLANDS	OTHER HOLOCENE		CRETACEOUS–CENOZOIC ROCK UNITS					MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
N04/009 (PtMS) N04/017 N04/019 N04/021 N04/027 (CC) *N04/032 N04/035 N04/038 **O03/002** (PtMS) O04/228 (PtSR)								
N03/004 N03/020 N03/024 *N03/ 042 **N03/043** N03/044 N04/002 (PtQEII) N04/006 **N04/008** (PtRR) N04/009 (PtMS) N04/017 N04/019 N04/021 **N04/027** (CC) N02/044	N02/057							
N04/017 **N03/020**								
		N02/056						
(PtRR)	**N04/008**							

	DUNE BELTS					WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
FRESHWATER WETLANDS (continued)							
Eleocharis sphacelata-raupo		**N03/009** (PtSL,EA)					N04/025 (PtCC) **N03/030** N04/023 (PtSL,SR)
giant umbrella sedge-swamp millet							**N03/036**
Gleichenia dicarpa-manuka							
Gleichenia dicarpa-Schoenus brevifolius							
harakeke							
harakeke-manuka							**N04/030**
harakeke-pampas-raupo							N04/005
harakeke-pampas-reed-toetoe							N02/043
harakeke-raupo							**O04/229** (PtSL) **N04/033**
Isolepis prolifer			**N03/019** (PtSL)			**N02/044**	
Isolepis prolifer-Myriophyllum propinquum							
knobby clubrush-*Juncus* sp.-oioi			**N03/019** (PtSL)				
kanuka							
Lepidosperma filiforme							
manuka-*Cassytha*							

WETLANDS	OTHER HOLOCENE		CRETACEOUS–CENOZOIC ROCK UNITS					MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
N03/020 N03/026 O04/228 (PtSR)								**O03/005** (PtRR)
N03/026								
								N03/031 (PtCC, ScR,MS)
O03/002 (PtMS)								**O03/008** (Pt SL)
								O03/008 (PtSL) **N03/031** (PtCC, ScR,MS)
N04/038								
	N02/056							
O04/227 (PtSL,MS)								
N03/034								

	DUNE BELTS					WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
FRESHWATER WETLANDS (continued)							
manuka-*Eleocharis sphacelata*							**N03/024**
manuka-gorse							
manuka-raupo				*N03/011			**N03/018**
manuka-sedge							
manuka							N02/069 **O03/001** (PtSL,RR) **N04/030** **O04/229** (PtSL)
manuka-*Schoenus brevifolius*							
oioi							N02/069 N03/003 N04/010 (PtCC,MS) **N02/014** (PtRR)
oioi-pampas-water fern							**N02/066**
raupo		N03/009 (PtSL)	N03/019 (PtSL)		N03/014		**N02/061** N03/018 **N03/022** (PtWMR) N03/024 **N03/036** *N03/045 N03/046 (PtSL) N04/010 (PtCC,MS) N04/025 (PtCC) **N04/026** (PtCC) N04/030 **N04/034** O03/001 (PtSL,RR) **O04/230** (PtSL)

WETLANDS	OTHER HOLOCENE		CRETACEOUS–CENOZOIC ROCK UNITS				MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
O04/223								
N04/017	N04/018 (PtSL)							
								N02/060
N04/006 **N04/008** (PtRR) **N04/021** **O03/002** (PtMS)	N02/057 O04/220 O04/221 (PtSL,MS)				N03/035			**N03/031** (PtCC, ScR,MS)
O04/227 (PtSL,MS)								**N03/031** (PtCC, ScR,MS)
N03/004 **O03/002** (PtMS)								
N02/044 N03/002 N03/004 N03/010 **N03/026** N04/002 (PtQEll) N04/027 (CC) *N04/032 N04/035 O03/002 (PtMS) O04/227 (PtSL,MS)	**N02/056** O04/220 **O04/221** (PtSL,MS)							N02/060

	DUNE BELTS					WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
FRESHWATER WETLANDS (continued)							
raupo-sedge							N04/033
raupo-oioi							**N04/005**
raupo-rush							
reed-sedge							
Schoenus brevifolius							
umbrella fern-*Schoenus* sp.							
wire rush							
wire rush-*Gleichenia dicarpa*							**N02/061**
ESTUARY							
Baumea sp.-manuka							
eelgrass							
glasswort							
oioi-sea rush							
mangrove							
mangrove-oioi							

WETLANDS	OTHER HOLOCENE			CRETACEOUS–CENOZOIC ROCK UNITS				MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
N03/010								
N02/070								
O04/227 (PtSL,MS)								
O04/227 (PtSL,MS)								
O04/227 (PtSL,MS)								
		N03/038						
		N02/026 (PtSR) **N03/038** **O04/233** (PtSL,MS,NR,HR)						
		N03/038 **O04/233** (PtSL,MS,NR,HR)						
		N02/026 (PtSR) **O04/233** (PtSL,MS,NR,HR)						
		O04/231 **O04/233** (PtSL,MS,NR,HR) **N02/026** (PtSR)						
		N03/038						

	DUNE BELTS						WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
ESTUARY (continued)							
oioi							
saltmarsh							
sea rush							
shell bank							
COASTAL ASSOCIATIONS/SAND FIELDS							
buffalo grass							
Coprosma acerosa-oioi - pohuehue							
Coprosma acerosa- pohuehue							
Dichondra aff. *brevifolia*- native iceplant							
harakeke- pohuehue							
glasswort							
kikuyu-pohuehue	N02/042 (PtCC,SL,MS)						
kikuyu-sedge		N03/032					
knobby clubrush	**O04/232** (PtSL)						
knobby clubrush-oioi	**N02/042** (PtCC SL,MS)						
knobby clubrush-oioi-pampas	N03/040 (PtSL,MS)						

WETLANDS	OTHER HOLOCENE			CRETACEOUS–CENOZOIC ROCK UNITS				MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
	O04/221 (PtSL,MS) **N02/057**	**N03/038**						N03/023 (PtSL)
			N02/058					
		O04/231						
		O04/233 (PtSL,MS,NR,HR)						
					N03/050			
O03/002 (PtMS)								
O03/002 (PtMS)								
					N03/050			
								N03/023 (PtSL)
					N03/050			

	DUNE BELTS						WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
COASTAL ASSOCIATIONS/SAND FIELDS (continued)							
marram-pohuehue	N03/009 (PtSL,EA)						
marram-*Spinifex*		N03/015 (PtSL)					
mixed coastal turf		N03/009 (PtSL,EA)					**N02/014** (PtRR)
native iceplant							
oioi		**N03/032**					
pingao		**N03/016**					
pingao-*Spinifex*		**N02/051**					
sandfield		**N02/013** (PtRR) **N02/051** *N03/006 **N03/015** (PtSL) **N03/016** **N03/009** (PtSL,EA)					
Spinifex	**N02/042** (PtCC SL,MS) **N03/040** (PtSL,MS) **O03/009** (PtRR) O04/232 (PtSL)	N03/016					
Spinifex-cape honey flower	O03/003 (PtRR)						
Spinifex-kanuka-pohutukawa		**N03/037** (PtCC,SL)					
toetoe	**N02/042** (PtCC SL,MS)						
toetoe-harakeke-oioi	**N02/042** (PtCC SL,MS)						

WETLANDS	OTHER HOLOCENE			CRETACEOUS–CENOZOIC ROCK UNITS				MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
					N03/050			
O03/002 (PtMS)								
O03/002 (PtMS)					**N03/050**			N03/023 (PtSL)

	DUNE BELTS						WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
ISLANDS							
buffalo grass							
coastal herbfield							
Cook's scurvy grass							
giant umbrella sedge–harakeke							
giant umbrella sedge							
glasswort–Mercury Bay weed							
harakeke							
kanuka						**N02/055**	
karo							
karamu–manuka–taupata							
manuka							
Melicytus novae-zelandiae–taupata							
native iceplant							
native iceplant–knobby clubrush							
Pimelea arenaria–Spinifex							
Poa pusilla							
pohuehue							
pohutukawa							
rock platform							
Samolus repens–glasswort							

WETLANDS	OTHER HOLOCENE			CRETACEOUS–CENOZOIC ROCK UNITS				MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
							O03/012	
							O03/012	
						N02/073		
							O03/012	
						N02/073		
						N02/073		
							O03/012	
							O03/012	
							O03/012	
							O03/012	
							O03/012	
							O03/012	
						N02/073		
		O04/235 (PtNR)						
							O03/012	
							O03/012	
					N03/051 (NR)			
						N02/073		
					N03/051 (NR)			

	DUNE BELTS						WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
ISLANDS (continued)							
Spinifex							
tawapou							
ti kouka- harakeke-manuka-pampas							
Zoysia pauciflora							
GRASSLAND							
marram							N02/066
pampas							
pasture							
SHRUBLAND							
black wattle-Sydney golden wattle							
bracken			**N03/019** (PtSL)				
gorse			N03/019 (PtSL)				
gorse-kanuka							
gorse-manuka				*N03/ 013 (Part of)			
gorse-pampas-wattle							

WETLANDS	OTHER HOLOCENE		CRETACEOUS–CENOZOIC ROCK UNITS					MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
		O04/235 (PtNR)						
					N03/051 (NR)			
							O03/012	
							O03/012	
N04/035								
O03/011								
								N03/031 (PtCC, ScR,MS)
	*N04/013 (Part of) N04/018 (PtSL)	*N04/013 (Part of)						
*N04/012								
N04/016 *N03/013 (Part of)								
	O04/221 (PtSL,MS)							

	DUNE BELTS					WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
SHRUBLAND (continued)							
gorse–tobacco weed							N04/023 (PtSL,SR)
Hakea sp.–manuka							N02/061
kanuka			**N03/041** **N03/019** (PtSL)	*N03/011 *N03/013 N03/025 *N03/028 *N04/004	*N03/001	*N02/ 046 (Part of)	N02/065 N02/066 N02/069 N04/010 (PtCC,MS)
kanuka–*Callistachys lanceolata*					N02/052		
kanuka/ manuka			*N02/ 049				N03/022 (PtWMR) N03/036
kanuka–manuka–gorse						N04/022 (PtSL,SR)	
kanuka–manuka–wattle				*N03/017 (Part of)			
kanuka–Sydney golden wattle				*N02/048		*N02/ 046 (Part of)	
manuka				*N03/008	*N03/005		**N02/068** N03/018 N04/010 (PtCC,MS) N03/046 (PtSL) N03/021 N04/026 (PtCC) **N04/030**
prickly hakea–kanuka–kumarahou							

WETLANDS	OTHER HOLOCENE		CRETACEOUS–CENOZOIC ROCK UNITS				MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
N03/026 N04/002 (PtQEII) **N04/008** (PtRR) *N04/012 *N04/013 (Part of) **N02/044**	*N04/013 (Part of) **N02/056**		*N02/045 N02/058					*N02/046 (Part of) *N02/054 *N02/059 *N03/007 *N02/049
N02/047 N04/002 (PtQEII) N04/008 (PtRR) N04/006 **O04/227** (PtSL,MS)	O04/220 **O04/222** (PtQEII, SR)			N03/002				*N02/049 **N03/031** (PtCC, ScR,MS) N02/060
N03/039								*N02/046 (Part of)
N03/010 N03/020 *N03/047 N04/009 (PtMS)								**N02/060**
				N03/002				

	DUNE BELTS					WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
SHRUBLAND (continued)							
sandfield			**N03/019** (PtSL)				
Sydney golden wattle					*N03/001		
Sydney golden wattle–kanuka/manuka							
ti kouka–manuka							
toetoe–bracken–kanuka							
wattle			N03/019 (PtSL)				N03/018
wattle–kanuka							
COASTAL SHRUBLAND							
Astelia sp.–kanuka							
harakeke					**N03/014**		
harakeke–kanuka		**N04/015** (PtSL)					
harakeke–manuka		**N03/032**			**N03/014**		
gorse							O03/001 (PtSL,RR)
gorse–kanuka							
gorse–kikuyu							
gorse–kanuka/ manuka							
kanuka		**N03/009** (PtSL,EA)			N03/014		

WETLANDS	OTHER HOLOCENE		CRETACEOUS–CENOZOIC ROCK UNITS				MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
O04/223								*N03/007
N04/006								
	O04/222 (PtQEll SR)							
N02/044								
O04/223								
N03/034								
					N03/035			
							O03/006 (PtRR,MS,SR)	
O03/002 (PtMS)								
								O03/004 (PtRR)
								O03/008 (PtSL)

	DUNE BELTS					WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
COASTAL SHRUBLAND (continued)							
kanuka-gorse							
kanuka-Sydney golden wattle		N03/037 (PtCC,SL)					
kanuka/ manuka-marram-toetoe		N03/009 (PtSL,EA)					
kanuka-manuka-wattle					N03/014 N03/029		
kanuka-manuka-Sydney golden wattle							
kanuka/ manuka							**O03/001** (PtSL,RR)
manuka		**N03/032**			N03/014 N03/029		
taupata							
wattle		N03/016			N03/014 N03/029		
BROADLEAF FOREST							
kanuka							
kohekohe-puriri-taraire							
puriri							
puriri-taraire							

WETLANDS	OTHER HOLOCENE		CRETACEOUS–CENOZOIC ROCK UNITS				MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
								O03/004 (PtRR)
								*O03/007 (PtFNDC, MS)
O03/002 (PtMS)					**N03/035**		**O03/006** (PtRR,MS, SR)	**O03/005** (PtRR) **O03/004** (PtRR)
O04/223								*O03/007 (PtFNDC, MS)
					N03/050			
								N03/023 (PtSL)
								N02/060
								N02/060
	O04/222 (PtQEIISR)							
N02/044	**O04/222** (PtQEII SR)							

	DUNE BELTS						WETLANDS
	Coastal foredunes	Holocene transverse dunes and deflation zones	Holocene fixed parabolic dunes	Pleistocene consolidated parabolic dunes & interdune flats	Pleistocene eroded and leached Awhitu Complex dunes	Pleistocene consolidated intertidal & estuarine sands forming low terraces	Ponded by Holocene dunes
COASTAL BROADLEAF FOREST							
kanuka							
kanuka–pohutukawa							
kanuka–puriri							
kohekohe							
pohutukawa	**O03/003** (PtRR)	**N03/032** **N04/003** **N03/009** (PtSL,EA)			**N03/014**	**N02/053**	
pohutukawa–kanuka–puriri							
pohutukawa–toetoe							**N04/033**
puriri–karaka				**N03/027**			
towai							
PODOCARP–BROADLEAF FOREST							
kahikatea–kanuka							
PODOCARP FOREST							
kahikatea							
totara							

WETLANDS	OTHER HOLOCENE		CRETACEOUS–CENOZOIC ROCK UNITS				MIXED
Ponded by Pleistocene dunes	Alluvial and swamp deposits	Harbour and estuaries	Mangakahia Complex mudstone & sandstone	Tangihua Complex igneous rocks	Houhora Complex sedimentary & igneous rocks	Matapia Formation pebbly sandstone	Karikari Plutonics intruding Houhora Complex	
							O03/006 (PtRR,MS,SR)	
							O03/006 (PtRR,MS,SR)	**O03/004** (PtRR)
								O03/004 (PtRR)
							O03/006	
O03/002 (PtMS)								**O03/005** (PtRR)
					N03/035			
							O03/006 (PtRR,MS,SR)	
	O04/226							
	O04/222 (PtQEII SR)							
	O04/217							

TABLE 3. SUMMARY OF SITE EVALUATIONS

(e.u. = ecological unit; reg. sign. = regionally significant species; rep. = representative)

LEVEL 1 SITES, Survey no.	REPRESENT-ATIVENESS[1]	RARITY[2]/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURAL-NESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Te Paki Dunes N02/013	Rep. site.	Coastal dunes. Geo-preservation site of national importance. Flora: 1 threatened. Fauna: 2 threatened.	1 e.u.	Absence of adventive species. Pines border southeast.	N02/014 dissects. Adjoins N02/042. Adjacent to Te Paki ED sites.	1936 ha
Te Paki Stream N02/014	Rep. site.	Coastal, freshwater stream. Flora: 2 threatened, 1 reg. sign. Fauna: 3 threatened, 2 reg. sign.	2 e.u.s.	Relatively natural. High public use.	Dissects N02/013.	43 ha
Parengarenga Harbour N02/026	Rep. site.	High water quality. Diversity richness of biota. Important for endemic & indigenous migratory taxa. Geo-preservation site of national importance. Flora: 1 threatened (historical). Fauna: 10 threatened, 4 reg. sign. (1 historical).	3 e.u.s.	Few buffers on western side, some pine.	Vital stepping stone for migratory species; adjoins many other sites including a number in the Te Paki ED.	6449 ha
Ninety Mile Beach & Dunes N02/042	Rep. site for 4 e.u.s.	Coastal foredunes. Fauna: 6 threatened, 1 reg. sign. Flora: 3 threatened	5.e.u.s.	Pine forest adjoins. Weeds present.	Dune band. Buffers N02/043 from pine forestry. Adjoins numerous remnts/habitats.	928 ha, narrow band stretching N- S along W coast-line of ED.
Waikanae Stream Wetland N02/043		West coast dune wetland. Fauna: Not surveyed.[3]	1 e.u.	Weed component.	Enclosed within N02/042, links to N02/044.	2 ha
Lake Waikanae N02/044	Rep. site for 4 e.u.s.	Dune lake, broadleaf forest, shrubland. Flora: 1 threatened. Fauna: 1 threatened, 1 reg. sign.	7.e.u.s.	Weeds present. Pine forest adjoins.	Most of lake is buffered from adjacent pine forest. Partial link to N02/043.	252 ha, 6 remnts[4], irregular shapes.

[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] Not surveyed: The Department of Conservation, Northland Conservancy, has not to date (April 2002) specifically surveyed for threatened species at this site.

[4] Remnants in this column refers to the number of separate areas of habitat within the site.

LEVEL 1 SITES, Survey no.	REPRESENT-ATIVENESS	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURAL-NESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Ngatuwhete Wetland N02/047		Swamp shrubland. Fauna: Not surveyed.	1 e.u.	Occasional willow.	Adjacent to N02/044.	8.7 ha, compact.
Kokota Spit N02/051	Rep. site.	Geo-preservation site of national importance. High tide roost site. Fauna: 7 threatened. Flora: 3 threatened.	2 e.u.s.	Pine forest adjoins; otherwise largely unmodified.	Southern entrance to Parengarenga Harbour. Adjoins N02/052.	1344 ha
Tangoake Shrubland N02/052		Fauna: Not surveyed. Flora: 1 threatened.	1 e.u.	Weeds present. Pine forest adjoins.	Buffer for Parengarenga Harbour.	138 ha, elongated.
Te Pua Point Pohutukawa Remnt N02/053	Rep. site.	Pohutukawa coastal forest. Fauna: Not surveyed.	1 e.u.	Small, isolated remnt.	Small buffer for Parengarenga Harbour.	6.3 ha, narrow strip.
Kaipohue Island N02/055	Rep. site.	Island habitat. Fauna: 5 threatened, 1 reg. sign. (past).	1 e.u.	Some weeds.	Part of Parengarenga Harbour ecosystem.	14.5 ha, compact.
Karatia Wetland N02/056	Rep. site for 4 e.u.s.	Dune wetland. Fauna: 1 threatened, 2 reg. sign. Flora: 2 threatened, 1 reg. sign.	5 e.u.s.	Pine forest adjoins. Limited exotics present, otherwise in good condition.	Links to Parengarenga Harbour & N02/068.	44 ha, elongated.
Whakatereohao Stream Swamp N02/057	Rep. site for 2 e.u.s.	Dune swamp/uncommon ecological sequence. Fauna: 2 threatened, 1 reg. sign.	5 e.u.s.	Good condition, forestry surrounds.	Links to Parengarenga Harbour.	18.4 ha, elongated with fork.
Emauhu Point Shrublands N02/058		Flora: 1 threatened (historical). Fauna: Not surveyed.	2 e.u.s.	Some weeds.	Buffer to upper reaches of Parengarenga Harbour.	31 ha, irregular.
Lake Kihona & Forest Remnants N02/060	Rep. site for 4 e.u.s.	Rare/uncommon vegetation types. Flora: 1 threatened (1984). Fauna: 2 reg. sign.	7 e.u.s. Habitat diversity.	Largely unmodified dune lake, some weeds. Forestry borders.	Part of suite of wetlands.	19 ha, elongated.
Lake Te Kahika N02/061	Rep. site for 3 e.u.s.	Wetland ecosystem/rare mosaic. Flora: 1 threatened, 1 reg. sign. Fauna: 1 threatened, 2 reg. sign.	5 e.u.s.	Unmodified lake/ swamp. Weeds present. Forestry surrounds.	Link to coast & N02/051.	17.4 ha, 2 lakes, Lake Te Kahika is forked, smaller lake is narrow.
Waipara & Dead Lakes N02/065	Rep. site for 2 e.u.s.	Dune lakes. Fauna: 1 reg. sign. (reported).	6 e.u.s.	Some weeds present.	Proximity to N02/066 & N02/044.	9.8 ha, 2 remnts, main one compact.

LEVEL 1 SITES, Survey no.	REPRESENT-ATIVENESS	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURAL-NESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Pretty Lake N02/066	Rep. site for 1 e.u.	Dune lake.	4 e.u.s.	Weeds present. Forestry surrounds.	Part of dune suite.	44.8 ha, elongated.
Upper Karatia Swamp N02/068	Rep. site.	Dune swamp. Flora: 1 threatened. Fauna: 1 reg. sign.	2 e.u.s.	Good condition. Mostly bordered by pines.	Links to N02/056.	34 ha, irregular.
Lake Austria & Shrubland N02/069	Rep. site for 2 e.u.s.	Dune lake. Fauna: 1 threatened, 4 reg. sign.	5 e.u.s.	Weeds present. Forestry surrounds.	Part of suite of wetlands.	19.7 ha
Ngatuwhete Lake N02/070		Large freshwater dune lake. Fauna: 1 threatened.	2 e.u.s.		Part of wetland chain. Close to N02/044. Unbuffered.	10 ha, compact round lake.
Matapia Island N02/073	Rep. site.	Island. Site endemic species Only known outcrop of Matapia Formation rocks. Fauna: 3 threatened, 1 reg. sign. Flora: 1 threatened.	5 e.u.s.	High quality.		2.3 ha
Te Ahu Rd N03/002		Flora: 1 threatened. Fauna: Not surveyed	3 e.u.s.	Weeds conspicuous.	Corridor between habitats.	179 ha, irregular.
Wild Horse Wetland N03/003	Rep. site for 1 e.u.	Dune wetland. Fauna: Not surveyed.	2 e.u.s.	Weeds present. Pines border.	Adjacent to coast & N02/042.	7.9 ha, compact round lake.
Pukekura Stream Wetland N03/004		Dune wetlands. Fauna: 2 reg. sign.	5 e.u.s.	Pines surround. Weeds present.	Series of linking wetlands to coast.	12 ha, 5 small remnts.
Te Arai Sandfields N03/009	Rep. site for 5 e.u.s.	Mobile duneland/rare mosaic of habitat types. Flora: 7 threatened, 2 reg. sign. Fauna: 3 threatened, 1 reg. sign.	9 e.u.s.	Habitat diversity. Pine forest adjacent. Weeds & horses present but retains a high level of naturalness.	Adjacent to coast & N02/042.	1253 ha
Oromanga Rd Wetlands N03/010		Dune wetland. Flora: 1 threatened. Fauna: Not surveyed.	3 e.u.s	Forestry surrounds	Coastal link. Adjacent to N02/042	9.6 ha, elongated.
Henderson Bay Shrubland N03/014	Rep. site for 3 e.u.s.	Coastal shrubland. Flora: 2 reg. sign., at least 7 native orchids present. Fauna: 1 threatened, 1 reg. sign.	8 e.u.s.	Weeds present.	Adjacent to N03/016.	139.5 ha, 4 remnts, irregular shapes.
Great Exhibition Bay N03/015	Rep. site for 1 e.u.	Coastal dunes/rare habitat type. Flora: 1 threatened Fauna: 3 threatened.	2 e.u.s.	Limited modification. Marram & other weeds. Some pines.	Adjacent to N03/021-023, N02/051.	755 ha, stretching along E coast for c. 13 km.

LEVEL 1 SITES, Survey no.	REPRESENT-ATIVENESS	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURAL-NESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Henderson Bay & Kowhai Beach N03/016	Rep. site for 2 e.u.s.	Important roost site. Flora: 1 threatened. Fauna: 5 threatened.	4 e.u.s.	Limited modification. Some weeds.	Adjoins N03/014, N03/024, 016, 036, N03/029, 038.	410 ha
Te Kao South Swamp N03/018	Rep. site for 1 e.u.	Dune wetland. Fauna: 1 threatened.	5 e.u.s.	Modified & weeds present. Portion adjacent to pine forest.	Linking wetlands. Part of suite.	83 ha, 2 remnts.
Te Ramanuka Lakes & Shrubland N03/019	Rep. site for 6 e.u.s.	Complex of lakes, wetlands, shrubland. Rare landform. Flora: 5 threatened. Fauna: 2 threatened, 4 reg. sign.	9 e.u.s.	Some water levels lowering, exotic weeds present.	Part of wetland suite of habitats.	423 ha, 1 main large remnt, sprawling, with 3 small outliers.
Henderson Bay Rd Wetlands N03/020	Rep. site for 1 e.u.	Dune wetlands. Fauna: 2 threatened, 1 reg. sign.	5 e.u.s.	Some weeds (margins). Surrounded by pasture.	Corridor.	10 ha, 3 remnts.
Lake Morehurehu & Wetland N03/021	Rep. site for 1 e.u.	Dune lake/ wetland. Flora: 1 threatened. Fauna: 1 threatened, 1 reg. sign.	3 e.u.s.	Pine forest surrounds majority of site. Good condition but some exotics present.	Adjoins N03/015.	56.6 ha, 3 remnts.
Wairahi Swamp & Lake Taeore N03/022	Rep. site for 2 e.u.s.	Dune wetland/ swamp. Soils of national importance. Flora: 1 threatened. Fauna: 3 threatened (2 past), 4 reg. sign. (1 past).	4 e.u.s	Lake appears to be drying out. Weeds present.	Links to coast. Adjoins N03/015.	127 ha, 1 large & 1 smaller remnt.
Rarawa Beach N03/023	Rep. site for 1.e.u.	Coastal. Flora: 3 threatened. Fauna: 4 threatened.	4 e.u.s.	Mixed - some weeds, some areas in good condition.	Adjacent to N03/015 & N03/014.	59 ha
Wagener's Swamps N03/024	Rep. site for 1 e.u.	Swamp/ wetland. Fauna: 4 threatened.	5 e.u.s.	Pines & pasture border. Weeds present.	Link to coast. Adjoins N03/016 & 033. Close to N03/029	45 ha, 9 irregular shaped remnts.
Lake Waihopo & Shrublands N03/025	Rep. site for 2 e.u.s.	Dune lake/ wetland. Flora: 2 threatened. Fauna: 2 threatened, 1 reg. sign.	4 e.u.s	Weeds present. Pines & pasture border.	Part of wetland suite of habitats.	101 ha, 3 irregular shaped remnts.
Lake Wahakari N03/026	Rep. site for 4 e.u.s.	Lake. Flora: 3 threatened. Fauna: 3 reg. sign.	5 e.u.s.	Generally good condition, some weeds present. Pines & pasture border.	Adjoins N03/002 & 007. Close to N03/008.	239 ha, large sprawling wetland.
Puriri-Karaka Remnant N03/027	Rep. site.	Broadleaf forest. Unique vegetation/ geomorphological combination. Flora: 1 notable.	1 e.u.	Isolated habitat type. Surrounded by pine.	Close to N03/009.	1.2 ha

LEVEL 1 SITES, Survey no.	REPRESENT-ATIVENESS	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURAL-NESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Jackson Point Shrubland N03/029		Harbour habitat.	3 e.u.s.	Weeds present. Forestry borders NW end.	Important buffer to Harbour. Adjoins N03/024.	89 ha, 2 remnts. Elongated.
Te Raite Wetland N03/030	Rep. site for 1 e.u.	Dune wetland. Fauna: 1 threatened, 1 reg. sign.	2 e.u.s.	Weeds to margins.	Part of wetland suite of habitats.	9.9 ha, elongated.
Kaimaumau-Motutangi Wetlands N03/031	Rep. site for 7.e.u.s.	Oligotrophic wetland complex. Diverse habitats. Flora: 14 threatened, 3 reg. sign. Fauna: 8 threatened, 5 reg. sign.	9 e.u.s.	Weeds present. Mixed – some areas in excellent condition, others very weedy depending on water levels. Drier areas the weediest.	Adjoins Rangaunu Harbour & N03/040. Links with Houhora Harbour.	4075 ha
Hukatere Lookout N03/032	Rep. site for 4 e.u.s.	Coastal habitat. Fauna: Not surveyed.	5 e.u.s.	Weeds present but southern area in good condition. Forestry borders landward.	Adjoins N02/042.	207 ha, 5 remnts, 3 main, 2 outliers.
Houhora Heads Rd Wetland N03/034	Rep. site for 1 e.u.	Dune wetland. Fauna: Not surveyed.	2 e.u.s.	Limited modification. Weeds on border.	Buffered by shrubland.	9 ha, compact.
Mt Camel N03/035	Rep. site for 3 e.u.s.	Coastal forest/shrubland. Flora: 6 threatened (incl. 2 historical), 1 reg. sign. Fauna: 3 threatened, 3 reg. sign. (2 historical), & Northland endemic snails.	4 e.u.s.	Highly modified, regenerating. Weeds present, heavily grazed.	Buffer northern entrance to Houhora Harbour. Links N03/035 to Harbour.	291 ha, discon-tinuous, 1 main remnt, 7 outliers.
Kowhai Swamps N03/036	Rep. site for 3 e.u.s.	Wetland system/ uncommon habitat type. Fauna: 2 threatened.	4 e.u.s.	Forestry borders W side. Relatively weed free.	Coastal link. Adjacent to N03/016.	48 ha,frag-mented, 3 remnts.
Pohutukawa Remnant N03/037	Rep. site for 1 e.u.	Rare habitat. Fauna: Not surveyed.	2 e.u.s.	Weeds present. Pine borders majority of site.	Coastal link. Adjoins N02/042.	55 ha, compact.
Houhora Harbour N03/038	Rep. site.	Harbour/ important for endemic & indigenous migratory taxa. Fauna: 9 threatened, 3 reg. sign.	5 e.u.s.	W side of harbour devoid of buffering vegetation. Modified in W & N by settle-ment & agriculture.	Vital habitat link with Rangaunu & Parengarenga Harbours.	c. 1534 ha
Arethusa Swamp N03/039		Dune wetland. Fauna: 1 threatened, 2 reg. sign.	3 e.u.s.	Prevalence of exotic/ weed sp. Pine borders E side.	Part of wetland suite of habitats.	15.3 ha, 4 remnts.
East Beach N03/040	Rep. site for 1 e.u.	Coastal foredune/ rare habitat type. Flora 2 threatened. Fauna: 6 threatened.	2 e.u.s.	Primarily indigenous foredune. Marram present.	Southern entrance Houhora Harbour. Adjoins N03/031 & O04/233.	627 ha

LEVEL 1 SITES, Survey no.	REPRESENT-ATIVENESS	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURAL-NESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Waikokopu Shrubland N03/041	Rep. site.	Rare habitat type. Fauna: Not surveyed.	1 e.u.	Largely devoid of exotics. Surrounded by forestry.	Corridor habitat.	42 ha, rect-angular.
Salvation Rd Swamp N03/043	Rep. site for 1 e.u.	Dune wetland. Fauna: 1 threatened, 1 reg. sign.	2 e.u.s.	Surrounded by pasture.	Part of suite of wetlands.	6.6 ha, rect-angular.
Lambs Rd Swamp N03/044		Dune wetland. Fauna: 1 threatened.	3 e.u.s.	Grazed to margins.	Part of suite of wetlands.	8.4 ha, 2 remnts, irregular.
Salt Lake N03/046		Dune lake. Common waterbirds.	3 e.u.s.	Fenced.	Corridor.	9.5 ha, irregular.
Te Wakatehaua (The Bluff) Island N03/050	Rep. site for 5 e.u.s.	Island. Flora: 2 threatened, 1 notable. Fauna: 2 threatened	6 e.u.s.	Modification leeward side, otherwise high degree of naturalness.	Coastal. Links to N02/042.	7.2 ha
Motu Puruhi I. & Terakauruhaka I. N03/051	Rep. site for 3 e.u.s.	Island. Flora: 2 reg. sign. Fauna: 5 threatened.	4 e.u.s.	Predator & browser free. Good condition.		6.34 ha
Far North Rd Shrublands & Wetlands N04/002	Rep. site for 3 e.u.s.	Mosiac of shrubland & wetland habitats. Fauna: 2 threatened, 2 reg. sign.	8 e.u.s.	Weeds present. Some areas heavily grazed.	Corridor link.	206.8 ha, 8 remnts.
Compartment 65 Forest Remnant N04/003	Rep. site.	Coastal forest. Isolated vegetation type.	1 e. u.	Pines border. Small isolated habitat.	Close to N03/032, N02/042.	2.4 ha, compact.
Coal Creek Wetland N04/005	Rep. site for 1 e.u.	Rare habitat type. Flora: 1 threatened.	2 e.u.s.	3 separate small wetlands. Weeds present, pines border.	Coastal link. All 3 adjoin N02/042.	3.9 ha, 3 remnts.
Heath Rd Power-line Swamp N04/006	Rep. site for 1 e.u.	Swamp. Fauna: 2 threatened.	4 e.u.s.	Weeds present.	Close to Rangaunu Harbour & N04/002.	84.5 ha, 2 remnts.
Headquarters Pond N04/007	Rep. site.	Dune wetland. Flora: 1 threatened . Fauna: 2 threatened, 3 reg. sign.	1 e.u.	Some weeds. Forestry border.	Close to N04/002, 030	5.77 ha, elongated.
Lake Ngatu Complex N04/008	Rep. site for 6 e.u.s.	Dune lakes/wetlands. Flora: 1 threatened, 1 reg. sign. Fauna: 4 threatened, 2 reg. sign.	7 e.u.s.	Some weeds. Forestry & farming partially borders.	Close links to various wetland habitats.	154.8 ha, discon-tinuous, 1 main, 6 outliers.
Lake Rotokawau & Pond N04/009	Rep. site for 1 e.u.	Shallow lake. Flora: 2 threatened. Fauna: 2 threatened, 3 reg. sign.	4 e.u.s.	Good quality. Weeds on margin. 1 remnt grazed to margin.	Close links to various wetland habitats.	24.9 ha, 2 remnts.

LEVEL 1 SITES, Survey no.	REPRESENT-ATIVENESS	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURAL-NESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Lake Waiparera & Wetlands N04/010	Rep. site for 3 e.u.s.	One of the best lake/ wetland systems in ER. Flora: 3 threatened. Fauna: 3 threatened, 3 reg. sign.	7 e.u.s.	High quality. Exotics/ weeds to margins. Forestry border SW portion.	Large area part of ED suite of wetland habitats.	212.3 ha, discon-tinuous, 1 main, 3 outliers.
West Coast Rd Lake N04/011		Dune lake. Flora: 1 threatened. Fauna: 2 threatened, 1 reg. sign.	2 e.u.s.	Good quality. Weedy margins, forestry & grassland border.	Corridor to various wetland habitats.	3.5 ha
Waipapakauri Beach Coastal Shrubland N04/015	Rep. site.	Rare vegetation type. Flora: 1 threatened. Fauna: Not surveyed.	1 e.u.	Kikuyu present.	Coastal link.	16.6 ha, compact, rect-angular.
Sandhills Rd Swamp N04/016		Orchid habitat. Flora: 2 threatened, 2 reg. sign. Fauna: Not surveyed.	1 e.u.	Highly modified, planted exotics & weeds.	Close to N04/019.	0.6 ha
Sweetwater Station Depressions N04/017		Seasonally wet. Fauna: 1 threatened.	5 e.u.s.	Modified, weeds present. Grazed.	Close to N04/013, 021.	15 ha, 8 remnts.
Tangonge Wetland N04/018		Seasonally wet shrubland. Flora: 1 threatened (5 are historical). Fauna: 2 threatened, 2 reg. sign.	3 e.u.s.	Weeds present. Lowered watertable. Highly modified.	Close to O04/222 & various wetlands to the west.	486 ha, elongated.
Clarke Rd Wetland N04/019		Wetland. Common waterbirds.	2 e.u.s.	Grazed to margins.	Close to N04/016, 018.	3.1 ha, triangular.
Sandhills Rd Wetland No 1 N04/021	Rep. site for 1.e.u.	Peat swamp. Flora: 1 threatened. Fauna: 2 threatened.	4 e.u.s.	Some weeds. Areas grazed to margins.	Close to N04/017, N04/018,013.	14.1 ha, 3 remnts.
Lake Rotoroa & Wetlands N04/022	Rep. site for 2 e.u.s.	Dune lake. Flora: 2 threatened. Fauna: 2 threatened, 2 reg. sign.	4 e.u.s.	Some grazed, some weeds to margins/ planted exotics.	Largest lake in wetland suite in this area.	32 ha, discon-tinuous, 1 main, 2 outliers.
Lake Heather N04/023	Rep. site for 1 e.u.	Dune lake. Flora: 4 threatened, (1 historicial). Fauna: 3 threatened, 1 reg. sign.	3 e.u.s.	Weeds present, fenced & being restored.	Part of suite of wetlands.	11 ha, 1 main, 1 outlier.
Split Lake Wetland N04/024	Rep. site for 1 e.u.	Suspended floating bog. Fauna: 1 threatened.	2 e.u.s.	Grazed to margins.	Part of suite of wetlands.	12.6 ha, irregular.
Mini & Round Lakes N04/025		Dune lake. Fauna: 2 threatened, 2 reg. sign.	3 e.u.s.	Grazed to margins.	Part of suite of wetlands.	9.9 ha, 4 remnts.
Turks Lake & Wetland N04/026	Rep. site for 2 e.u.s.	Dune lake. Flora: 1 threatened. Fauna: 1 reg. sign.	4 e.u.s.	Good quality. Exotics planted to margins. Forestry surrounds.	Part of suite of wetlands.	12.4 ha, rect-angular.

LEVEL 1 SITES, Survey no.	REPRESENT-ATIVENESS	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURAL-NESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Bacica Rd Lake N04/027	Rep. site.	Dune lake. Flora: 1 notable. Fauna: 1 threatened, 1 reg. sign.	3 e.u.s.	Fenced. Forestry borders W boundary.	Part of suite of wetlands.	3.5 ha, compact.
Selwyn Flat Wetland N04/028	Rep. site for 1.e.u.	Dune lake. Flora: 1 threatened, 1 notable. Fauna: 1 reg. sign.	1 e.u.	Exotics planted to margins. Weeds present. Forestry border.	Part of suite of wetlands.	11.7 ha, triangular.
Herberts Swamp N04/029		Dune lake. Fauna: 2 threatened, 2 reg. sign.	2 e.u.s.	Relatively unmodified. Forestry SE. Some weeds, otherwise pasture to margins.	Part of suite of wetlands.	1.7 ha
Lake Ngakapua Complex N04/030	Rep. site for 5 e.u.s.	Dune lake/wetland complex. Flora: 3 threatened, 1 notable. Fauna: 2 threatened, 3 reg. sign.	8 e.u.s.	Weeds/exotics, some grazing, some fenced, some pines border.	Part of suite of wetlands.	30.6 ha, discon-tinuous, 7 remnts.
Jones Lake N04/031		Dune lake. Fauna: 1 threatened, 1 reg. sign.	2 e.u.s.	Some exotics to margins, incl. pines. Fenced.	Part of suite of wetlands.	1.75 ha
Gleeson's Lake N04/032		Dune lake. Common waterbirds.	2 e.u.s.	Grazed to margin.	Part of wetland suite.	2.6 ha
Ninety Mile Swamp N04/033	Rep. site for 2 e.u.s.	Freshwater wetlands. Flora: 1 threatened. Fauna: 1 threatened, 1 reg. sign.	3 e.u.s.	Pines border. Some weeds but relatively good condition.	Coastal link.	5.1 ha, 2 remnts.
Waimimiha Lakes N04/034	Rep. site.	Dune lake/wetland. Flora: 1 threatened (hist.). Fauna: 1 reg. sign.	2 e.u.s.	Grazed to margins.	Coastal link.	16.4 ha, 2 remnts.
Kaikoura Farms Wetland N04/035		Fauna: 1 threatened.	3 e.u.s.	Highly modified.	Part of wetland suite.	0.9 ha
Woolshed Swamp N04/037		Dune lake. Fauna: 1 reg. sign.	1 e.u.	Good quality.	Part of wetland suite.	1.15 ha
Sweetwater Station Peat Bowl N04/038	Rep. site for 2 e.u.s.	Dune wetland. Fauna: 1 reg. sign.	3 e.u.s.	Seasonally wet.	Part of wetland suite.	4.2 ha
Waimango Swamp O03/001	Rep. site for 3 e.u.s.	Coastal wetland. Flora: 5 threatened. Fauna: 10 threatened, 1 reg. sign.	5 e.u.s.	Some weeds but generally good condition.	Coastal link. Adjoins O03/004, O03/009.	297 ha, elongated.

LEVEL 1 SITES, Survey no.	REPRESENT-ATIVENESS	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURAL-NESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Rotokawau Lakes & Puwheke Beach O03/002	Rep. site for 10 e.u.s.	Coastal complex/wetlands. Flora: 7 threatened (1 historical), 3 reg. sign. Fauna: 8 threatened, 3 reg. sign. (1 historical).	13 e.u.s. Dunes/ wetlands/ shrubland, dune lakes.	Weeds present, mostly at E end. Forestry adjoins SW corner. Recently cutover by subdivision development.	Coastal link/ buffer. Close to O03/001.	433.6 ha, rect-angular.
Maitai Bay O03/003	Rep. site for 1 e.u.	Sandy bay. Flora: 2 threatened, 1 reg. sign. Fauna: 5 threatened.	2 e.u.s.	Weeds present.	Coastal. Adjoins O03/006, 005.	23.9 ha, 2 remnts, coastal fringe.
Taupiroroa Range Shrublands O03/004	Rep. site for 3 e.u.s.	Large shrubland, coastal forest pockets. Flora: 5 threatened (incl. historical records).	7 e.u.s, sea level to 190 m.	Modified-regenerating by former & present clearance & fire. Some weeds/ exotics. Forestry adjoins SE & some in N.	Coastal & inland. Adjoins O03/009, 001.	945 ha, 6 remnts.
Cape Karikari Shrubland O03/005	Rep. site.	Area of pohutukawa coastal forest. Flora: 1 threatened (historical). Fauna: 1 threatened, 1 reg. sign.	3 e.u.s. Forest/ shrubland/ wetland.	Weeds present.	Link between Maitai & Karikari Moana (O03/009)	444 ha, 1 large area & remnt.
Whangatupere Bay O03/006	Rep. site for 5 e.u.s.	Coastal forest/shrubland. Flora: 2 threatened, 1 reg. sign. Fauna: 4 threatened, 3 reg. sign. & notable invertebrate	7 e.u.s.	Weeds present. Forestry border SW corner. Sense of naturalness aug-mented by size of area.	Coastal. Adjoins O03/003, links to O03/004.	1018 ha, large compact habitat.
S Urlich Rd Wetland O03/008	Rep. site for 2 e.u.s.	Harakeke wetland. Fauna: 1 threatened.	3 e.u.s.	Weeds present in dry areas.	Coastal. Adjoins O04/232, O04/230.	29 ha, 2 remnts, separate wetlands, shrubland.
Karikari Moana O03/009	Rep. site.	Duneland. Flora: 4 threatened (1 historical). Fauna: 6 threatened.	1 e.u.	High quality.	Coastal. Adjoins O03/004 O03/001, 005.	136 ha, coastal band.
Puheke Rd Wetland O03/011		Flora: 2 threatened, 1 reg. sign. Fauna: Not surveyed.	1 e.u.	Drained pasture.	Close to O03/002.	0.4 ha
Moturoa Islands O03/012	Rep. site for 12 e.u.s.	Collection of islands. Important breeding area for seabirds. Fauna: 5 threatened, 2 reg. sign.	13 e.u.s.	Herbaceous weeds. 1 island modified but remainder in good condition. Islands possibly rat-free.		27.2 ha, 5 islands.
Waimanoni Creek Shrubland O04/217	Rep. site.	Alluvial flat. Fauna: Not surveyed.	1 e.u.	Weeds present.	Borders harbour.	3.4 ha
Paparore Wetland & Shrubland O04/220		Peat swamp shrubland. Flora: 1 reg. sign. Fauna: 2 threatened, 2 reg. sign.	3 e.u.s.	Some weeds.	Harbour link.	38 ha, 2 remnts, elongated.

LEVEL 1 SITES, Survey no.	REPRESENT-ATIVENESS	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURAL-NESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Waiparera Creek Wetland O04/221	Rep. site for 3.e.u.s.	Freshwater wetland on margin of Rangaunu Harbour. Fauna: 2 reg. sign.	5 e.u.s.	Weeds present. Some stock damage.	Harbour link.	22.5 ha, rect-angular.
Awanui River Forest Remnants O04/222	Rep. site.	On alluvial flat. Flora: 3 threatened, 3 reg. sign. Fauna: 3 threatened, 1 reg. sign.	5 e.u.s.	Highly modified. Most grazed.	River link, corridor.	50.5 ha, 18 remnts.
West Coast Rd Shrubland O04/223	Rep. site for 1 e.u.	Peat swamp/potential mudfish habitat. Flora: 1 threatened orchid. Fauna: 1 reg. sign.	4 e.u.s.	Weeds present.	Corridor.	21.8 ha, 1 main remnt, 3 outliers.
Mangatete River Bush O04/226	Rep. site.	Riverine forest. Fauna: Not surveyed.	1 e.u.	Unfenced, grazed and exotics, highly modified.	Links with harbour.	3.8 ha
Lake Ohia O04/227	Rep. site for 9 e.u.s.	Heath/ boglands. Nationally sign. soils. Flora: 10 threatened (1 historical), 3 reg. sign. Fauna: 4 threatened, 2 reg. sign.	11 e.u.s.	Some weeds present but large areas in good condition.	Links coast & inner harbour. Adjoins O04/232.	1641 ha, large sprawling habitat.
Lake Waiporohita O04/228		Freshwater lake. Flora: 2 threatened. Fauna: 3 threatened.	2 e.u.s.	Exotics/weeds present. Modified margins.		8.3 ha, compact.
Southern Tokerau Swamp O04/229	Rep. site.	Nationally threatened habitat type. Flora: 3 threatened (1 hist.), 1 reg. sign. Fauna: 2 reg. sign.	2 e.u.s.	Weeds present.	Contiguous with O04/227, 232.	84 ha, 2 remnts, irregular.
Northern Tokerau Swamp O04/230	Rep. site for 1 e.u.	Mineralised swamp. Flora: 2 threatened (historical). Fauna: 1 threatened, 1 reg. sign.	2 e.u.s.	Some weeds.	Adjoins O04/232.	71 ha, irregular.
Awapoko Estuary O04/231	Rep. site for 1 e.u.	Estuarine. Fauna: 7 threatened.	2 e.u.s.	Margins modified.	Coastal link. Adjoins O04/232, O04/227.	65 ha, elongated.
Tokerau Beach O04/232	Rep. site for 1 e.u.	Beach. Flora: 2 threatened. Fauna: 4 threatened, 1 reg. sign.	2 e.u.s.	Weeds throughout.	Adjoins O04/227, O04/229, 230, O03/ 008.	376 ha, coastal band.
Rangaunu Harbour O04/233	Rep. site.	Harbour/important for endemic & indigenous migratory taxa. Fauna: 9 threatened.	5 e.u.s.	High quality.	Vital habitat link with Houhora & Parengarenga Harbours. Adjoins many habitats incl. Lake Ohia, Kaimau-mau & Puwheke.	10 185 ha
Walker Island O04/235	Rep. site.	Island. Major roost site. Flora: 2 threatened. Fauna: 5 threatened.	2 e.u.s		Major roost site.	26.5 ha, 2 islands.

LEVEL 2 SITES, Survey no.	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Tetehakehake Stream Shrubland N02/045	Fauna: Not surveyed.	1 e.u.	Regenerating.	Parengarenga Harbour buffer.	62 ha, discontinuous, 2 remnts, along harbour fringe.
Mitimiti Stream & Streak Hill Shrubland N02/046	Fauna: 1 threatened, 1 reg. sign.	2 e.u.s.	Regenerating. Weeds prevelant.	Buffer along stream, harbour from farmland.	76 ha, along harbour fringe & inland.
Sandhills Shrubland N02/048	Fauna: Not surveyed.	1 e.u.	Regenerating. Weeds common.	Corridor between forestry.	12 ha, narrow forked.
Te Karaka Point & Ngakarapu Stream Shrubland N02/049	Fauna: Not surveyed.	3 e.u.s.	Regenerating. Frequent weeds. Forestry adjacent N & W.	Buffer for harbour.	87 ha, 2 remnts separated by road.
Parengarenga Shrubland N02/054	Common bird species.	1 e.u.	Regenerating. Some weeds.	Buffer to harbour.	27 ha, 2 remnts.
Whawhakou Channel Shrublands N02/059	Fauna: Not surveyed.	1 e.u.	Regenerating.	Buffer to harbour. Narrow strip.	108 ha, discontinuous, 5 remnts, mostly narrow band along harbour edge.
Te Kao Shrublands N03/001	Fauna: Not surveyed.	2 e.u.s.	Regenerating. Weeds throughout. Forestry adjoins portion.	Corridor between habitats.	102 ha, 2 remnts, almost contiguous.
Te Keena Rd Shrublands N03/005	Fauna: Not surveyed.	1 e.u.	Regenerating. Weeds throughout. Forestry E side.	Corridor. Close to N03/021	58 ha, 2 remnts, adjacent, compact.
Oromanga Sandfield N03/006	Inland, dunes. Fauna: Not surveyed.	1 e.u.	Weeds throughout. Forestry surrounds.	Isolated.	2.3 ha
Te Kao Trig Shrubland N03/007	Fauna: Not surveyed.	2 e.u.s.	Regenerating. Weeds throughout. Forestry adjoins south.	Buffer to stream & corridor between N03/018, & 026.	44 ha, irregular.
Arterial Rd Shrublands N03/008	Fauna: Not surveyed.	1 e.u.	Regenerating. Some weeds. Forestry abuts south.	Partial corridor – N03/026 to N02/060.	12 ha, rectangular.
Salt Rd Shrubland N03/011	Fauna: Not surveyed.	2 e.u.s.	Regenerating. Some weeds.	Partial corridor.	19 ha, irregular.
Ngatumoroki Shrubland N03/013	Fauna: Not surveyed.	1 e.u.	Regenerating. Weeds present.	Buffer to wetland & corridor. Close to N03/009.	29 ha, rectangular.
Pahara Shrublands N03/017	Fauna: Not surveyed.	1 e.u.	Regenerating. Weeds conspicuous. Forestry adjoins portion.	Partial link to various habitats.	69 ha, rectangular with fork.

LEVEL 2 SITES, Survey no.	RARITY/ SPECIAL FEATURES	DIVERSITY AND PATTERN	NATURALNESS	BUFFER/ LINKAGE/ CORRIDOR	SIZE AND SHAPE
Kimberley Shrubland N03/028	Not surveyed.	1 e.u.	Regenerating. Some weeds.	Isolated.	8.1 ha, compact.
Cemetery Rd Pond N03/042	Wetland. Common bird species.	2 e.u.s.	Very small area. Weeds on margins.		0.59 ha
Onepu Swamp N03/045	Raupo swamp Fauna: Not surveyed	1 e.u.	Fenced.	Near N03/046.	0.5 ha
Gully Lake N03/047	Common duck species.	1 e.u.	Weeds present. Forestry adjoins. Drying out.	Partial linkage.	1.2 ha
Big Flat Shrubland N04/004	Fauna: Not surveyed.	1 e.u.	Regenerating. Weeds frequent. Forestry borders south.	Partial link between various habitats.	11.9 ha, rectangular.
Airstrip Shrubland N04/012	Fauna: Not surveyed.	2 e.u.s.	Regenerating. Weeds frequent.	Partial link between various habitats.	71 ha, 2 remnts, almost contiguous.
Sweetwater Station Shrublands N04/013	Fauna: Not surveyed.	2 e.u.s.	Highly modified.	Partial link between various habitats.	43 ha, 2 remnts, elongated.
Rangiputa Rd Shrublands O03/007	Common waterbirds.	2 e.u.s.	Weeds present. Some forestry adjoins remnts.	Buffer to harbour/ coast. Close to O03/002 & O04/223.	73 ha, mostly compact.

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8. Appendices

8.1 FIELD SURVEY FORM

DEPARTMENT OF CONSERVATION
PROTECTED NATURAL AREAS PROGRAMME

NAME OF HABITAT:..... **DATE:** .....
GRID REF.: .....**SSBI NO.:** ..... **PNA NO.:** .....
HABITAT TYPE(S):.....

GEOMORPHOLOGICAL TYPE(S): .....

VEGETATION TYPE(S):

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

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

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.

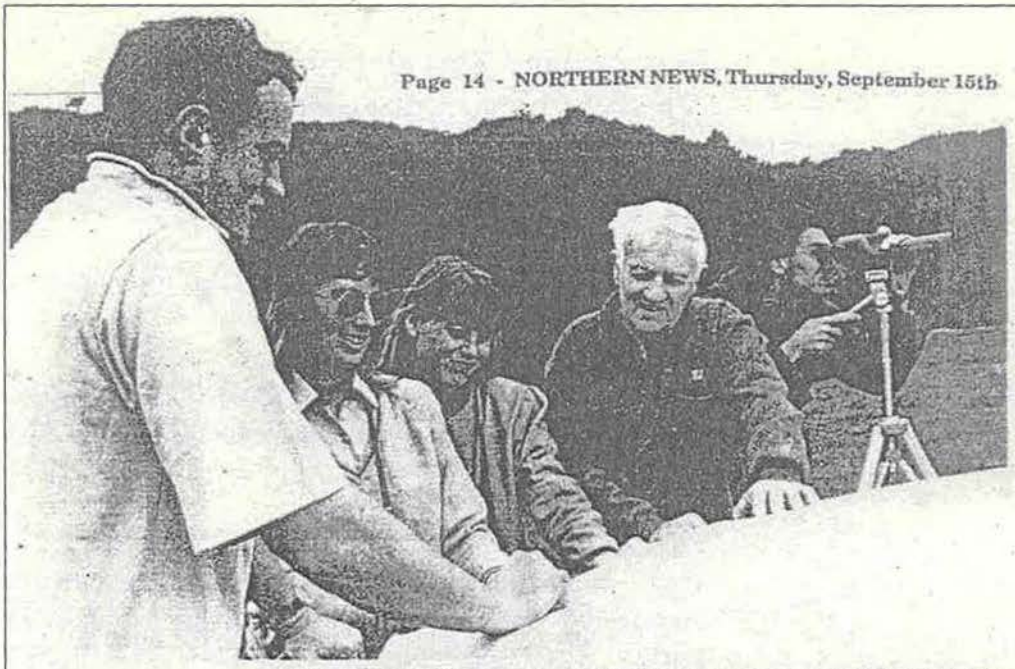
The Resource Management Act 1991 requires District Councils to consider the natural areas they administer when preparing the District Plan. The information compiled from this survey will be given to the Far North District Council to provide them with a "snapshot" of the distribution and condition of 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.

8.3 CATEGORIES OF THREAT

New Zealand Threatened Plant List

In this report, categories of threat are taken from 'Threatened and uncommon plants of New Zealand' (de Lange et al. 1999), which is a revision of Cameron et al. (1995) by the New Zealand Threatened Plant Committee. These categories are:

Appendix 1 New Zealand threatened and uncommon vascular plant list

Presumed Extinct

Taxa that are no longer known to exist in the wild both within New Zealand and (if applicable) their overseas range, or in cultivation after repeated searches of known or likely localities.

Threatened

Taxa whose classification places them within Critically Endangered, Endangered, or Vulnerable categories. These are taxa whose survival is now a matter of conservation priority. Their classification within the three subheadings of threat provides a measure of the degree of risk associated with each taxon.

Critically Endangered

Taxa whose extinction is considered inevitable within a stated time period (10 years) unless there is direct conservation intervention, or which persist as individuals or populations reduced to sufficiently critically low levels that extinction through stochastic events is a distinct possiblility. Some critical taxa are now only known from cultivation.

Endangered

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

Vulnerable

Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Included are taxa of which most or all populations are decreasing because of over-exploitation, extensive destruction of habitat, or other environmental disturbance; and taxa with populations that continue to be seriously depleted and whose ultimate security is not yet assured.

Declining

Taxa that are numerically abundant but which are either under threat from serious adverse factors throughout their range, or occur as widely scattered, typically small populations of which are undergoing declines through loss of reproductive ability, recruitment failure, predation, or through other processes of often subtle habitat change. Declining taxa are listed to highlight their plight, for without some level of management they are destined to become the future threatened plants of New Zealand.

Recovering

Taxa whose populations are either: (1) naturally restricted to susceptible habitats (e.g. offshore islands), where their survival is utterly dependent on continual rigid conservation measures (e.g. rodent control), or (2) taxa whose populations were once under serious threat and, as a result of past conservation intervention (e.g. goat eradication), have shown the capacity to recover naturally without further management measures.

Conservation Dependent

Taxa whose survival is now dependent on the continuation of existing conservation measures.

Natural Population Recovery

Taxa whose populations were once reduced to precariously low levels and still occur as small populations. As a result of past conservation intervention, the candidate taxa have demonstrated the ability to recover their former range through natural means, to such an extent that further conservation assistance is no longer required.

Naturally Uncommon

Taxa that are not considered under immediate or obvious threat but which, for varying reasons, have the potential to become threatened. Three subheadings are recognised to accommodate the different situations whereby taxa can be naturally uncommon.

Sparse

Taxa that, for largely undetermined reasons, occur within typically small and widely scattered populations. This distribution appears wholly natural and is not considered the result of past or recent anthropogenic disturbance. However, as the candidate taxa usually occur in small numbers at any given site, they are naturally susceptible to extirpations within parts of their range.

Vagrant

Taxa whose presence within the New Zealand botanical region is naturally transitory. These are invariable taxa that have failed to establish themselves significantly beyond their point of introduction through reproductive failure or for quite specific ecological reasons. Many vagrants are able to reproduce only by vegetative means and, in such instance, when in suitable habitats, they can form extensive clonal populations.

Range Restricted

Taxa whose distribution is naturally confined to specific substrates (e.g. ultramafic rock), habitats (e.g. high alpine fell field), or geographic areas (e.g. subantarctic islands). Typically, Range Restricted taxa are under no obvious or immediate anthropogenic threat.

Insufficiently known

Taxa that are suspected but not definitely known to belong to any of the above categories because of a lack of information. It is hoped that listing a taxon as 'Insufficiently Known' will stimulate studies to find out its true category of threat.

Taxonomically indeterminate

This appendix includes described taxa about which there is doubt regarding taxonomic status and which require further investigation, and those recently discovered taxa whose taxonomic status has yet to be determined. In both instances, available information suggests that candidate taxa could be under some level of threat. A total of 92 taxa are included.

Molloy & Davis (1994) Categories of Threat

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

The Categories are as follows:

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

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 made 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.

8.4 FAUNA

A. Checklist of birds of the Aupouri Ecological District

Species recorded in the Aupouri Ecological District, including the Parengarenga, Houhora and Rangaunu Harbours [Data from Pierce (unpublished) 1991, Bellingham & Davis 1983 (unpublished), OSNZ classified summarised notes, and Sites of Special Biological Interest database].

Nomenclature follows Turbott (1990) and Heather & Robertson (2000).

Key

PL = Present in large numbers (> 100); P = Present in small numbers (< 100); R = Recorded (< 10); Ex = Presumed extinct locally – not seen since 1980s (brown teal), 1890s (weka)

* Breeding confirmed; ** Introduced

Species	Other name	Scientific name	Parenga-renga	Houhora	Rangaunu	Mainland	Offshore (+ islands)
NZ dabchick	Weweia	*Poliocephalus rufopectus*				P*	
Hoary-headed grebe		*P. poliocephalus*				R	
Australasian little grebe		*Tachybaptus n. novaehollandiae*					P*
Southern giant petrel		*Macronectes giganteus*					R
Grey-faced petrel	Oi	*Pterodroma macroptera gouldi*					P*
Black-winged petrel		*P. nigripennis*					P*
Buller's shearwater		*Puffinus bulleri*					P
Fluttering shearwater	Pakaha	*P. gavia*					P*
NI little shearwater		*P. assimilis haurakiensis*					P*
Blue penguin	Korora	*Eudyptula minor*	P	P	P		P*
White-faced storm petrel	Takahikare-moana	*Pelagodroma marina*					P*
Common diving petrel	Kuaka	*Pelecanoides u. urinatrix*					P*
Red-tailed tropic bird	Amokura	*Phaethon rubricauda*	R				R
Australasian gannet	Takapu	*Morus s. serrator*	P	P	P		P
Brown booby		*Sula leucogaster plotus*		R			
Black shag	Kawau	*Phalacrocorax carbo novaehollandiae*	P	P	P*	P*	
Pied shag	Karuhiruhi	*P. v. varius*	P*	P	P*	P*	P
Little black shag		*P. sulcirostris*	P	P	P	P*	
Little shag		*P. melanoleucos brevirostris*	P*	P	P*	P	
Darter		*Anhinga melanogaster rufa*				R	
White-faced heron		*Ardea novaehollandiae*	PL*	PL*	PL*	PL*	
White-necked heron		*A. pacifica*				R	
White heron	Kotuku	*Egretta alba modesta*	R	R		R	
Little egret		*E. garzetta nigripes*	R			R	
Reef heron	Matuku-moana	*E. s. sacra*	R	R	R	R	P*
Cattle egret		*Bubulcus ibis coromandus*	P		P	P	
Australasian bittern	Matuku	*Botaurus poiciloptilus*	P	P	P	P	
Glossy ibis		*Plegadis falcinellus*	R			R	
White ibis		*Threskiornis molucca strictipennis*				R	
Royal spoonbill	Kotuku-ngutupapa	*Platalea regia*	P*		P	P	
Yellow-billed spoonbill		*P. flavipes*			R	R	
**Black swan		*Cygnus atratus*	PL*	PL*	PL*	PL*	
**Canada goose		*Branta canadensis*		P		P	

Species	Other name	Scientific name	Parenga-renga	Houhora	Rangaunu	Mainland	Offshore (+ islands)
Paradise shelduck	Putangi-tangi	*Tadorna variegata*	PL*	P*	PL*	PL*	
Chestnut-breasted shelduck		*T. tadornoides*				R	
**Mallard		*Anas platyrhynchos*	PL*	P*	PL*	PL*	
Grey duck	Parera	*A. s. superciliosa*	P*	P*	P*	PL*?	
Grey teal	Tete	*A. gracilis*				P	
Brown teal	Pateke	*A. aucklandica chlorotis*				Ex	
NZ shoveler	Kuru whengi	*A. rhynchotis variegata*	P			P	
NZ scaup	Papango	*Aythya novaeseelandiae*				P*	
Australasian harrier	Kahu	*Circus approximans*	P*	P*	P*	P*	P
Nankeen kestrel		*Falco cenchroides*				R	
**California quail		*Callipepla californica*				P*	
**Brown quail		*Synoicus ypsilophorus*				P*	
**Ring-necked pheasant		*Phasianus colchicus*				P*	
Banded rail	Moho-pereru	*Rallus philippensis assimilis*	PL*	P*	PL*	P	
NI weka	Woodhen	*Gallirallus australis greyi*				Ex	
Marsh crake	Koitareke	*Porzana pusilla affinis*				P*	
Spotless crake	Puwheto	*P. tabuensis plumbea*	P	P	P	P	
Pukeko	Purple swamphen	*Porphyrio porphyrio melanotus*		P*	P*	P*	P*
Pied oystercatcher	Torea	*Haematopus ostralegus finschi*	P	P	P	P	
Variable oystercatcher	Torea	*H. unicolor*	P*	P*	P*	P*	P*
Pied stilt	Poaka	*Himantopus himantopus leucocephalus*	PL*	PL*	PL*	P*	
Northern NZ dotterel	Tuturi-whatu	*Charadrius obscurus aquilonius*	P*	P*	P*	P*	
Banded dotterel	Tuturi-whatu	*C. b. bicinctus*	PL*	PL	PL*	P*	
Black-fronted dotterel		*C. melanops*			R	R	
Large sand dotterel		*C. l. leschenaultii*	R		R		
Mongolian dotterel		*C. mongolus*	R				
Oriental dotterel		*C. veredus*	R		R		
Wrybill	Ngutu-parore	*Anarhynchus frontalis*	PL	P	P	P	
Pacific golden plover	Eastern golden plover	*Pluvialis fulva*	PL	PL	PL	P	
American golden plover		*P. dominica*			R		
Grey plover		*P. squatarola*	R	R	R		
Spur-winged plover	Masked lapwing	*Vanellus miles novaehollandiae*	PL*	P*	P*	PL*	
Turnstone	Ruddy turnstone	*Arenaria interpres*	PL	PL	PL	P	
Lesser knot	Huahou	*Calidris canutus rogersi*	PL	PL	PL	P	
Great knot		*C. tenuirostris*				R	
Sanderling		*C. alba*	R		R		
Curlew sandpiper		*C. ferruginea*	P		P	P	
Sharp-tailed sandpiper		*C. accuminata*	P		P	P	
Pectoral sandpiper		*C. melanotos*	R		R	R	
White-rumped sandpiper		*C. fuscicollis*	R				
Red-necked stint		*C. ruficollis*	P	R	P	P	
Western sandpiper		*C. mauri*	R		R		

Species	Other name	Scientific name	Parenga-renga	Houhora	Rangaunu	Mainland	Offshore (+ islands)
Broad-billed sandpiper		*Limicola falcinellus*	R				
Eastern curlew		*Numenius madagascariensis*	R	R	R		
Asiatic whimbrel		*N. phaeopus variegata*	P	P	P		
American whimbrel		*N. phaeopus hudsonicus*	R		R		
Little whimbrel		*N. minutus*	R				
Bar-tailed godwit	Kuaka	*Limosa l. lapponica*	PL	PL	PL	P	
Asiatic black-tailed godwit		*L. limosa melanuroides*	R		R	R	
Hudsonian godwit		*L. haemastica*	R		R	R	
Wandering tatler		*Tringa incana*	R		R		
Siberian tatler		*T. brevipes*	R		R		
Common sandpiper		*T. hypoleucos*			R		
Greenshank		*T. nebularia*	R	R		R	
Marsh sandpiper		*T. stagnatilis*	R		R	R	
Terek sandpiper		*T. terek*	R		R		
Arctic skua		*Stercorarius parasiticus*	P	P	P	P	P
Pomarine skua		*S. pomarinus*	P				P
Black-backed gull	Karoro	*Larus dominicanus*	PL*	PL*	PL*	PL	PL
Red-billed gull	Tarapunga	*L. novaehollandiae scopulinus*	PL	PL	PL*	PL	PL
White-winged black tern		*Chlidonias leucopterus*				R	
Black-fronted tern		*Sterna albostriata*				R	R
Caspian tern	Taranui	*S. caspia*	P*	P*	PL*	P	P
White-fronted tern	Tara	*S. striata*	PL	PL	PL*	P	PL
Eastern little tern		*S. albifrons sinensis*	R	R	P		
White-capped noddy		*Anous tenuirostris*		R		R	
Kukupa	NZ pigeon, kereru	*Hemiphaga novaeseelandiae*				R	
**Eastern rosella		*Platycercus eximius*				P	
Oriental cuckoo		*Cuculus saturatus*				R	
Fan-tailed cuckoo		*Cacomantis flabelliformis*				R	
Shining cuckoo	Pipi-wharauroa	*Chrysococcyx lucidus*				P	
Long-tailed cuckoo	Koekoea	*Eudynamis taitensis*				R	
Channel-billed cuckoo		*Scythrops novaehollandiae*				R	
Morepork	Ruru	*Ninox n. novaeseelandiae*				P	
NZ kingfisher	Kotare	*Halcyon sancta vagans*	PL*	P*	PL*	PL*	
Dollarbird	Eastern broad-billed roller	*Eurystomus orientalis*				R	
**Skylark		*Alauda arvensis*				PL	
Welcome swallow		*Hirundo tahitica neoxena*	PL*	PL*	PL*	PL*	
**Dunnock	Hedge sparrow	*Prunella modularis*				PL	
NZ pipit	Pihoihoi	*Anthus novaeseelandiae*	P	P	P	P	
**Blackbird		*Turdus merula*				PL*	
**Song thrush		*T. philomelos*				PL*	
NI fernbird	Matata	*Bowdleria punctata vealeae*	P*	P*	P*	PL*	
NI fantail	Piwaka-waka	*Rhipidura fuliginosa placabilis*				PL	
Grey warbler	Riroriro	*Gerygone igata*				PL	
Silvereye	Tahou, whiteye	*Zosterops l. lateralis*				PL	
Tui		*Prosthemadera n. novaeseelandiae*					P
**Yellowhammer		*Emberiza citrinella*				PL	
**Chaffinch		*Fringilla coelebs*				PL	

Species	Other name	Scientific name	Parenga-renga	Houhora	Rangaunu	Mainland	Offshore (+ islands)
**Greenfinch		*Carduelis chloris*				PL	
**Goldfinch		*C. carduelis*				PL	
**Redpoll		*C. flammea*				PL	
**House sparrow		*Passer domesticus*				PL*	
**Starling		*Sturnus vulgaris*				PL*	
**Common myna		*Acridotheres tristis*				PL*	
**Australasian magpie		*Cymnorhina tibicern*				PL	
**Rook		*Corvus frugilegus*				R	

B. Other fauna in the Aupouri Ecological District

Aquatic fauna

Fish		
long-finned eel	*Anguilla dieffenbachii*	
short-finned eel	*A. australis*	
inanga	*Galaxias maculatus*	
banded kokopu	*G. fasciatus*	
koaro	*G. brevipennis*	
common bully	*Gobiomorphus cotidianus*	
giant bully	*G. gobioides*	
red-finned bully	*G. huttoni*	
common smelt	*Retropinna retropinna*	
grey mullet	*Mugil cephalus*	
black mudfish	*Neochanna diversus*	
cockabully	*Tripterygion nigripenne*	
Introduced fish		
goldfish	*Carassius auratus*	
mosquito fish	*Gambusia affinis*	
rudd	*Scardinius erythropthalmus*	
rainbow trout	*Oncorhynchus mykiss*	
Freshwater crustacea		
mussel	*Hydriella menziesii*	
shrimp	*Paratya curvirostris*	
Lizards		
Northland green gecko	*Naultinus grayi*	Restricted to Northland
Pacific gecko	*Hoplodactylus pacificus*	Northland Island only
shore skink	*Oligosoma smithi*	East Coast to Te Paki in Northland
Suter's skink	*O. suteri*	Few mainland sites in North Island, more widespread on islands
robust skink	*Cyclodina alani*	Restricted to islands
copper skink	*C. aenea*	Widespread
ornate skink	*C. ornata*	Fairly widespread
	Hoplodactylus "Matapia Island"	Matapia Island and also Motuopao Island (Te Paki ED)

Snails		
Archey's dune snail	*Succinea archeyi*	Cape Maria van Diemen to Bay of Plenty
	Allodiscus fallax	Known from a single population on Karikari Peninsula
	Allodiscus sp. "Houhora"	Apparently endemic to Mt Camel
	Climocella reinga	Endemic to northern Aupouri Peninsula
	Cytora sp."whangatupere"	Single population at Whangatupere Bay
	Egestula pandora	Endemic to northern Aupouri Peninsula
	Onychophoran	
	Serpho matthewsii	Endemic to northern Aupouri Peninsula
Spiders		
Black katipo	*Latrodectus atritus*	Native occurring in both North and South Islands
Frogs		
green frog	*Litorea aurea*	Introduction from Australia to New Zealand
Marine reptiles		
leathery turtle	*Dermochelys coriacea*	
loggerhead turtle	*Caretta caretta*	
yellow-bellied sea snake	*Pelamis platurus*	
hawksbill turtle	*Eretmochelys imbricata*	
green turtle	*Chelonia mydas*	
Marine mammals		
NZ fur seal	*Arctocephalus forsteri*	
Introduced mammals		
house mouse	*Mus musculus*	
ship rat	*Rattus rattus rattus*	
Norway rat	*R. norvegicus*	
weasel	*Mustela nivalis*	
stoat	*M. erminea*	
ferret	*M. furo*	Extending its range into the ED
house cat	*Felis catus*	
house dog	*Canis familaris*	
cattle	*Bos taurus*	
goat	*Capra hircus*	
brushtail possum	*Trichosurus vulpecula*	
pig	*Sus scrofa*	
hedgehog	*Erinaceus europeus occidentalis*	

8.5A 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	
akeake	*Dodonaea viscosa*
black maire	*Nestegis cunninghamii*
bracken	*Pteridium esculentum*
brake fern	*Pteris tremula*
Cassytha	*Cassytha paniculata*
common maidenhair	*Adiantum cunninghamii*
common shield fern	*Polystichum richardii*
Cook's scurvy grass	*Lepidium oleraceum*
eelgrass	*Zostera capricorni, Z. novazelandica*
five-finger	*Pseudopanax arboreus*
giant umbrella sedge	*Cyperus ustulatus*
glasswort	*Sarcocornia quinqueflora*
hangehange	*Geniostoma rupestre*
harakeke, flax	*Phormium tenax*
Hebe	*Hebe* sp.
hook grass	*Uncinia uncinata*
hound's tongue	*Microsorium pustulatum*
houhere, lacebark	*Hoheria populnea*
houpara	*Pseudopanax lessonii*
kahikatea	*Dacrydium dacrydioides*
kanono	*Coprosma grandifolia*
kanuka	*Kunzea ericoides*
karaka	*Corynocarpus laevigatus*
karamu	*Coprosma robusta*
karo	*Pittosporum crassifolium*
kauri	*Agathis australis*
kawakawa	*Macropiper excelsum*
kiokio	*Blechnum novae-zelandiae*
knobby clubrush	*Isolepis nodosa*
kohekohe	*Dysoxylum spectabile*
kowhai	*Sophora microphylla*
kowharawhara	*Astelia banksii*
kumarahou	*Pomaderris kumeraho*
kuta	*Schoenoplectus tabernaemontani*
leather-leaf fern	*Pyrrosia eleagnifolia*
mahoe	*Melicytus ramiflorus*
maire tawake	*Syzygium maire*
mamaku	*Cyathea medullaris*
mangrove	*Avicennia marina*
manuka	*Leptospermum scoparium*
mapou	*Myrsine australis*
matai	*Prumnopitys taxifolia*
Mercury Bay weed	*Dichondra repens*
mingimingi	*Leucopogon fasciculatus*
miro	*Prumnopitys ferruginea*

Indigenous plants

native broom	*Carmichaelia australis*
native iceplant	*Disphyma australe*
ngaio	*Myoporum laetum*
nikau	*Rhopalostylis sapida*
NZ spinach	*Tetragonia* sp.
oioi	*Apodasmia similis*
pingao	*Desmoschoenus spiralis*
pohuehue	*Muehlenbeckia complexa*
pohutukawa	*Metrosideros excelsa*
Pondweed	*Potamogeton* sp.
ponga	*Cyathea dealbata*
poroporo	*Solanum aviculare*
pokaka	*Elaeocarpus hookerianus*
puriri	*Vitex lucens*
rangiora	*Brachyglottis repanda*
rasp fern	*Doodia australis*
raupo	*Typha orientalis*
rengarenga lily	*Arthropodium cirratum*
rewarewa	*Knightia excelsa*
ring fern	*Paesia scaberula*
rosy maidenhair	*Adiantum hispidulum*
saltmarsh ribbonwood	*Plagianthus divaricatus*
sea primrose	*Samolus repens*
sea rush	*Juncus kraussii*
sea spurrey	*Spergularia media*
shaking brake	*Pteris tremula*
shining spleenwort	*Asplenium oblongifolium*
shore bindweed	*Calystegia soldanella*
silver pine	*Manoao colensoi*
Spinifex	*Spinifex sericeus*
sundew	*Drosera* sp.
swamp millet	*Isachne globosa*
taraire	*Beilschmiedia tarairi*
tauhinu	*Ozothamnus leptophyllus*
taupata	*Coprosma repens*
tawa	*Beilschmiedia tawa*
tawapou	*Pouteria costata*
ti kouka, cabbage tree	*Cordyline australis*
titoki	*Alectryon excelsus*
toetoe	*Cortaderia splendens*
totara	*Podocarpus totara*
towai	*Weinmannia silvicola*
turepo	*Rhabdothamnus solandri*
turutu	*Dianella nigra*
tutu	*Coriaria arborea*
umbrella fern	*Gleichenia* sp.
water fern	*Histiopteris incisa*
wharangi	*Melicope ternata*
wheki	*Dicksonia squarrosa*
willow weed	*Polygonum* sp. (native or introduced)
wire rush	*Empodisma minus*

Adventive plants	
apple of Sodom	*Solanum linnaeanum*
balsam	*Impatiens sodenii*
blackberry	*Rubus fruticosus*
black wattle	*Racosperma mearnsii*
blue pine	*Psoralea pinnata*
boneseed	*Chrysanthemoides monilifera*
bottlebrush	*Callistemon rigidus*
broom	*Cytisus scoparius*
brush wattle	*Paraserianthes lophantha*
buffalo grass	*Stenotaphum secundatum*
Cape honey flower	*Melianthus major*
dandelion	*Taraxacum officinale*
downy hakea	*Hakea gibbosa*
Eucalyptus	*Eucalyptus* sp.
flame tree	*Erythrina x sykesii*
fleabane	*Pulicaria dysenterica*
gorse	*Ulex europaeus*
hakea	*Hakea* sp.
harestail	*Lagarus ovatus*
inkweed	*Phytolacca octandra*
jointed rush	*Juncus articulatus*
kikuyu	*Pennisetum clandestinum*
lupin	*Lupinus arboreus*
macrocarpa	*Cupressus macrocarpa*
marram	*Ammophila arenaria*
Mexican devilweed	*Ageratina adenophora*
Norfolk pine	*Araucaria heterophylla*
papyrus	*Cyperus papyrus*
pampas	*Cortaderia selloana*
pine	*Pinus radiata*
prickly hakea	*Hakea sericea*
prickly moses	*Racosperma verticillatum*
poplar	*Populus* sp.
purple pampas	*Cortaderia jubata*
sand wind grass	*Lachnagrostis billardierei*
sea rocket	*Cakile edentula*
shore groundsel	*Senecio lautus*
Spartina	*Spartina alterniflora, S. anglica, S* x *townsendii*
Sydney golden wattle	*Racosperma longifolia*
thistle	*Carduus* sp.
tobacco weed	*Solanum mauritianum*
wattle	*Racosperma* sp.
watercress	*Rorippa nasturtium-aquaticum*
water lily	*Nymphaea* sp.
wild gladiolus	*Gladiolus undulatus*
willow weed	*Polygonum* sp. (Note: there is one native *Polygonum*)

8.5B ORCHID SPECIES RECORDED WITHIN THE AUPOURI ECOLOGICAL DISTRICT

From St George (1999) (as editor for New Zealand Native Orchid Group from records post-1972) and information gained from several sources in the writing of this report. (* = historical records.)

Acianthus sinclairii	*Microtis unifolia* agg.
Adelopetalum tuberculatum	*Orthoceras novae-zeelandiae*
Caleana minor *	*Petalochilus alatus*
C. bartlettii	*Prasophyllum colensoi*
Calochilus aff. *herbaceus*	*Pterostylis micromega* *
C. paludosus	*P. nutans* *
Chiloglottis formicifera *	*P. tasmanica*
Corybas carsei *	*P. trullifolia*
C. oblongus	*Spiranthes sinensis*
C. rotundifolius	*S.* aff. *novae-zelandiae*
C. trilobus agg.	*Thelymitra aemula*
Cryptostylis subulata	*T. carnea*
C. oblonga	*T.* "darkie" AK 231761
C. reniformis	*T. malvina*
Earina mucronata	*T. matthewsii*
Gastrodia minor	*T. pauciflora*
Genoplesium pumilum	*T. pulchella*
Ichthyostomum pygmaeum	*T.* "rough leaf" AK 229531
Microtis arenaria	*T. sanscilia*
M. parviflora	

8.6 GLOSSARY

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

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

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

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

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

Dune complex
An association of mobile and consolidated sand dunes, which may include small interdune lakes, wetlands and shrubland communities.

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

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

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

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

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

Exotic
Introduced from outside New Zealand.

Fernland
Dominated by ferns such as umbrella fern, bracken, tree ferns, with occasional woody plants.

Foredune
Mobile and fixed transverse dunes along coastal margins.

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

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

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

Hemi-parasitic
A plant which is attached to another living plant where it derives part of its nourishment. In this Ecological District, *Cassytha paniculata* is a relatively common hemi-parasitic plant.

Indigenous
Native to and occurring naturally within the New Zealand Biogeographic Region.

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

Linkages/corridors
Vegetated or aquatic areas (can be forest, shrubland, wetland, streams, beach or exotic vegetation such as pine) that link up two or more habitats. With a link between habitats, the gene pool for a species is greater, which enhances the viability of that population. The corridor does not have to be continuous for

many species to utilise it. Small remnants can act as stepping stones between two larger habitats so that birds such as kiwi can move from remnant to remnant up to 500 m apart.

Natural area

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

Naturalness

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

Oligotrophic

Wetlands with low fertility that are either fed by rainwater alone or are open water wetlands in stable catchments that receive high rainfall.

Podsol

A soil type formed under some types of forest and characterised by very strong leaching and the development of whitish-grey clay sub-soils.

Rarity

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

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

Reedland

Vegetation in which the cover of reeds in the canopy is 20–100% and in which the reed cover exceeds that of any other growth form or open water. Reeds are herbaceous plants growing in standing or slowly running water that have tall, slender, erect, unbranched leaves or culms that are either hollow or have a very spongy pith. Examples include: *Typha*, *Bolboschoenus*, *Scirpus lacustris* [*Schoenoplectus tabernaemontani*], *Eleocharis sphacelata*, and *Baumea articulata* (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.

Rushland

Vegetation in which the cover of rushes in the canopy is 20–100% and in which the rush cover exceeds that of any other growth from or bare ground. Included in the rush growth form are some species of *Juncus* and all species of *Sporadanthus, Leptocarpus* [*Apodasmia*], and *Empodisma*. Tussock-rushes are excluded (Atkinson 1985).

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).

Sedgeland

Vegetation in which the cover of sedges in the canopy is 20-100% and in which the rush cover exceeds that of any other growth form or bare ground. Included in the sedge growth form are many species of *Carex, Uncinia,* and *Scirpus* [*Isolepis*]. Tussock-sedges and reed-forming sedges (cf. ***Reedland***) are excluded (Atkinson 1985).

Seral

Describes a plant community in the process of succession.

Shrubland

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

There are two main types:

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

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

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

Site

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

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

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

Survey no.
The identity number given to each site. The first three figures refer to the NZMS 260 topographical map sheet that the habitat is on.

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

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

Swamp shrubland
A transitional type of wetland with woody co-dominants, primarily manuka, but including kanuka, *Coprosma propinqua*, ti kouka, *Coprosma tenuicaulis*, and other shrubs, as well as rushes, sedges or reeds.

Tombolo
A spit or bar joining an island to the mainland or to another island.

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

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

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

9. Index of sites

Site	Level	Survey no.	Page
Lake Rotoroa & Wetlands	1	N04/022	183
Lake Te Kahika	1	N02/061	77
Lake Wahakari	1	N03/026	120
Lake Waihopo & Shrublands	1	N03/025	118
Lake Waikanae	1	N02/044	60
Lake Waiparera & Wetlands	1	N04/010	169
Lake Waiporohita	1	O04/228	248
Lambs Rd Swamp	1	N03/044	148
Maitai Bay	1	O03/003	216
Mangatete River Bush	1	O04/226	243
Matapia Island	1	N02/073	87
Mini & Round Lakes	1	N04/025	189
Mitimiti Stream & Streak Hill Shrubland	2	N02/046	263
Motu Puruhi Island & Terakautuhaka Island	1	N03/051	153
Moturoa Islands	1	O03/012	231
Mt Camel	1	N03/035	134
Ngatumoroki Shrubland	2	N03/013	279
Ngatuwhete Lake	1	N02/070	85
Ngatuwhete Wetland	1	N02/047	62
Ninety Mile Beach & Dunes	1	N02/042	56
Ninety Mile Swamp	1	N04/033	203
Northern Tokerau Swamp	1	O04/230	252
Onepu Swamp	2	N03/045	285
Oromanga Rd Wetlands	1	N03/010	96
Oromanga Sandfield	2	N03/006	273
Pahara Shrublands	2	N03/017	280
Paparore Wetland & Shrubland	1	O04/220	235
Parengarenga Harbour	1	N02 026	53
Parengarenga Shrubland	2	N02/054	267
Pohutukawa Remnant	1	N03/037	138
Pretty Lake	1	N02/066	80
Puheke Rd Wetland	1	O03/011	229
Pukekura Stream Wetlands	1	N03/004	92
Puriri-Karaka Remnant	1	N03/027	112
Rangaunu Harbour	1	O04/233	257
Rangiputa Rd Shrublands	2	O03/007	293
Rarawa Beach	1	N03/023	114
Rotokawau Lakes & Puwheke Beach	1	O03/002	212
S Urlich Rd Wetland	1	O03/008	226
Salt Lake	1	N03/046	149
Salt Rd Shrubland	1	N03/011	278
Salvation Rd Swamp	1	N03/043	146
Sandhills Rd Swamp	1	N04/016	174
Sandhills Rd Wetland No 1	1	N04/021	181
Sandhills Shrubland	2	N02/048	264
Selwyn Flat Wetland	1	N04/028	194
Southern Tokerau Swamp	1	O04/229	250
Split Lake Wetland	1	N04/024	187