

Natural areas of Te Pahi Ecological District

Reconnaissance survey report for the
Protected Natural Areas Programme

Jenny Lux, Wendy Holland, Stephen Rate, Sarah Beadel

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

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Cataloguing-in-Publication-data

Natural areas of Te Paki Ecological District : reconnaissance survey report for the Protected Natural Areas Programme / Jenny Lux, Wendy Holland, Stephen Rate, Sarah Beadel.

Whangarei, N.Z. : Dept. of Conservation, Northland Conservancy, 2009.

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

ISBN 9780478144710 (hard copy)

ISBN 9780478144741 (Web pdf)

ISSN 0112-9252

(New Zealand Protected Natural Areas Programme (Series))

Notes Includes bibliographical references (p. 253-261).

1. Ecological surveys 2. Natural areas 3. New Zealand 4. Northland Region (N.Z.) 5. Te Paki Ecological District (N.Z.). I. Lux, Jenny. II. Holland, Wendy. III. Rate, Stephen. IV. Beadel, S. M. (Sarah M.)

Cover: Cape Reinga. Photo: Chris Rudge.

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

Foreword

Te Paki is a place of great cultural, spiritual, and natural significance for all New Zealanders.

Te Ara Wairua (spiritual pathway) winds its way up both east and west coasts to join at Te Rerenga Wairua (Cape Reinga). The solitary pohutukawa is the departure point for the spirits of the dead before the travel back to Hawaiki-Nui. This makes Te Rerenga Wairua one of the most significant sites for Māori.

The Te Paki Ecological District contains numerous archaeological sites with evidence from the earliest periods of human occupation in New Zealand.

The geological history of Te Paki, particularly the long periods of separation from the rest of the North Island, has resulted in the development of a high degree of endemism found nowhere else on the New Zealand mainland.

Just over 87% of the natural areas identified within this report are formally protected. This equates to around 65.5% of the total extent of the Ecological District. Unlike most ecological districts where the direct impacts of humans can be seen, with numerous dwellings, pasture and plantation forests, Te Paki Ecological District comprises relatively continuous indigenous habitat over two-thirds of its area.

Being the 'end of the land' always has its own attraction, but as well as this geographical position Te Paki contains scenic and wilderness qualities seldom found in the North Island.

The North Cape area is a magnet for botanists, zoologists and geologists. On the serpentine soils of the Surville Cliffs a range of plant species exhibit dwarfism and other variations in form not seen elsewhere. Within this single site there are at least 17 endemic plant taxa.

In the animal world the Te Paki Ecological District in particular stands out with an incredibly high level of snail endemism with more than 30 species recorded.

Over the years many scientists, conservation specialists and enthusiasts have been drawn to Te Paki to study its special natural features. This document is an attempt to bring together in one place some of the information which has been produced. Inevitably, much of interest still resides in the heads and notes of some eminent people, and we hope that maybe this volume will spur those people on to publish their work.



Chris Jenkins
Conservator Northland

Abstract

Te Paki Ecological District covers approximately 30,917 ha and is located at the northern extremity of the North Island, adjoining Aupouri Ecological District to the south. It is characterised by extensive areas of indigenous shrublands and gumlands linking long sandy beaches, dunes, freshwater wetlands and forest remnants.

Forty-five natural areas of ecological significance covering approximately 23,234.5 ha were identified from a field reconnaissance survey undertaken in 1995-1997, together with information from existing databases and reports.

Te Paki Ecological District contains a high diversity of flora and fauna species, including many endemic taxa. Of particular significance are the 101 indigenous landsnail taxa known to inhabit the Ecological District (ED), including 39 locally endemic taxa. There are 20 locally endemic plant taxa, of which 17 are restricted to the Surville Cliffs serpentinite formation at North Cape and at least four lizards which are either endemic to the Te Paki ED or the Te Paki - Aupouri ED's.

There are high numbers of rare or threatened species in the Ecological District, as well as rare ecosystem types. At present, nationally threatened taxa include 98¹ plants, 23 birds, 63 landsnails, 6 beetles, one weta, one moth, one slug, one earthworm, one spider, two freshwater invertebrates, 7 lizards and two² fish. There are also a further 82 regionally significant taxa, which are considered rare or threatened in Northland (including 69³ plants, 10 birds, two reptiles and two fish).

Virtually all natural areas in Te Paki Ecological District are of nationally significant conservation and ecological value with several areas reaching international significance. A large proportion of the natural areas identified are protected (87.1% or 20,244.4 ha), however most of this legal protection is Recreation Reserve (65% of the natural areas protected), which does not adequately provide for biodiversity protection. Priorities for land protection in Te Paki ED include the change in status of Te Paki Recreation Reserve to a higher level of formal protection, protection of sites with locally endemic species, legal protection of a buffer to the North Cape Scientific Reserve, protection of sites which provide habitat for threatened or regionally significant species, protection of buffers to Parengarenga Harbour (in adjacent Aupouri ED), and protection of unprotected enclaves within Mokaikai Scenic Reserve.

-
1. Four taxa are pre-1975 records
 2. Includes unconfirmed record of black mudfish
 3. Including one doubtful record and 7 pre-1975 records

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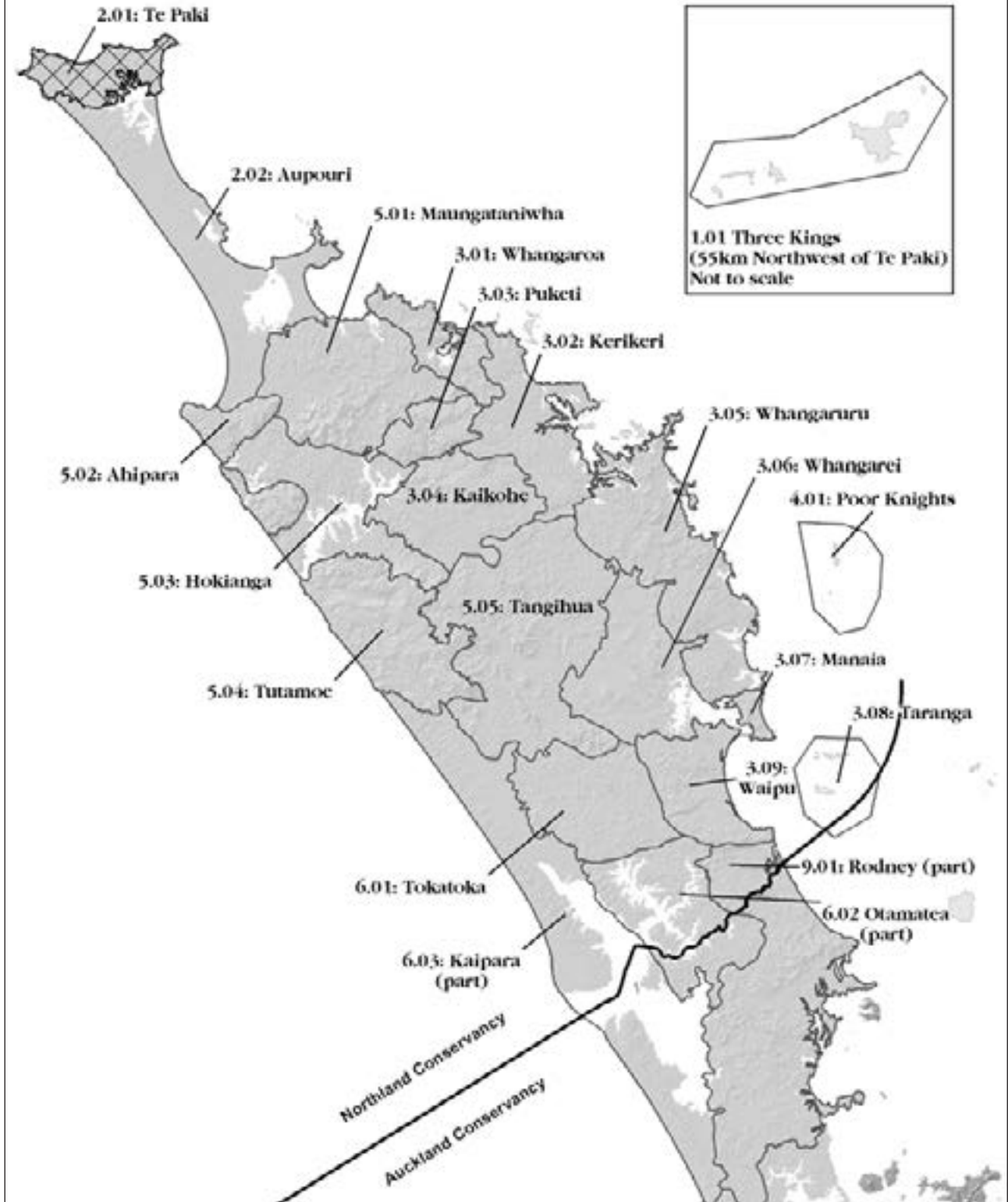
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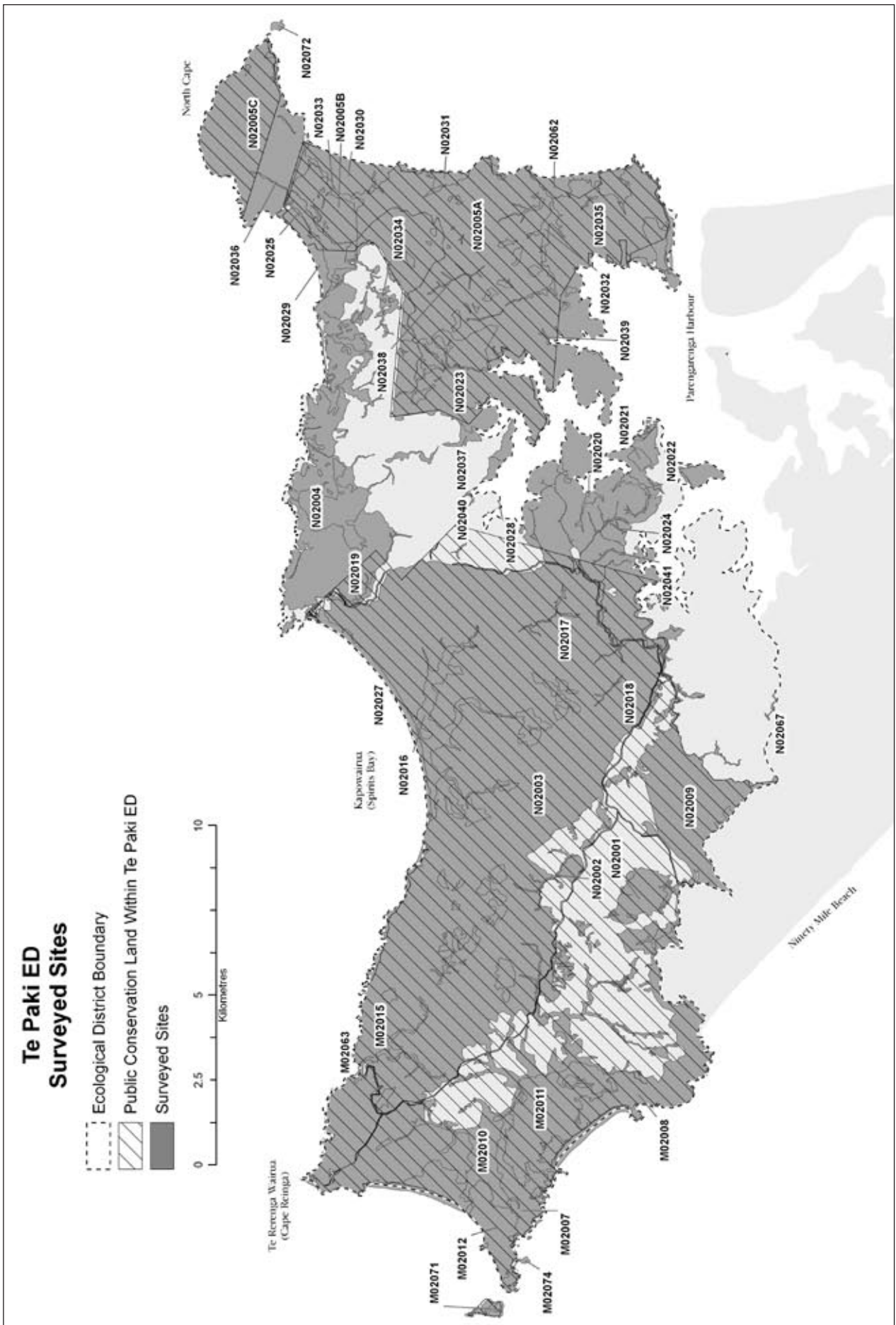
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Location of Te Pahi Ecological District (Brook 1996)

 Te Pahi ED



Map 1. Location map of Te Pahi Ecological District.



Map 2. Survey sites, Te Pahi 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.

1. Introduction

1.1 THE PROTECTED NATURAL AREAS PROGRAMME

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

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

The goal of the programme is:

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

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

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

This report is based on a reconnaissance survey, and existing published and unpublished data, and includes descriptions of natural areas within Te Pahi Ecological District boundaries.

The natural areas described have been evaluated according to two levels of significance based on specified criteria (see Section 2).

This approach was adopted so that the survey report 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

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

'The protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna.'

The Convention on Biological Diversity (1992), under the auspices of the United Nations Environment Programme, has promoted the concepts of biodiversity and ecosystems. These concepts are reflected in this report by the number of sites, their size, and the emphasis on buffers and linkages in the identification and assessment of sites.

1.2 ECOLOGICAL REGIONS AND DISTRICTS

New Zealand's physical environment is very diverse, and this is reflected in the diversity of indigenous plant and animal communities. In recognition of the biogeographic differences between various parts of New Zealand, a map and classification of ecological regions and districts was developed (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 coordinated the mapping of the country into more than 268 Ecological Districts in 1982. Ecological Regions and Districts in northern New Zealand were redefined in 1996 to more accurately classify ecological variation within the Northland and Auckland areas (Brook 1996).

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

1.3 CONTENTS OF THIS REPORT

This report presents the findings of the reconnaissance phase of the PNAP survey of Te Paki Ecological District. It includes maps and brief descriptions of most of the indigenous natural areas within Te Paki Ecological District, together with an analysis of the main vegetation types and information on threatened species and other taxa of scientific interest to be found there.

The reconnaissance survey of the Te Paki Ecological District was predominantly undertaken between 1995 and 1997. It was not possible to re-survey and so the ecological units in the site descriptions apply to the date of survey, although where available updated information was added and referenced accordingly. We were however able to use the latest aerial photography (2003) to produce the site maps as a check against the original survey. Generally sites changed very little or not at all, whilst the site boundary of some sites was improved upon with the benefit of an aerial view compared to the predominantly topographical interpretation used for the original survey.

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

1.4 TE PAKI ECOLOGICAL DISTRICT

Te Paki Ecological District covers approximately 30,917 ha. It is located at the northern extremity of North Island, bounding the Aupouri Ecological District to the south. The boundary runs from the northern end of Ninety Mile Beach at Te Paki Stream, skirting the north and eastern flank of the Te Paki sand dunes then crossing to Thom's Landing. The boundary then follows the edge of the Parengarenga Harbour northwards to Ohao Point. It takes in all of the land north of Parengarenga Harbour.

The area from Te Rerenga Wairua (Cape Reinga) to North Cape shows visible evidence of past occupation by Māori, with numerous camps, pa, terraces, middens and garden systems.

Te Rerenga Wairua itself is a deeply significant place for Māori. The spiritual pathway of Te Ara Wairua winds its way up both the east and west coasts to join at Te Rerenga Wairua. The solitary pohutukawa that rests on the slopes at Te Rerenga Wairua is the departure point for the spirits of the dead before the travel back to Hawaiki-Nui.

A striking physical feature of Te Paki Ecological District is that unlike other Ecological Districts, especially in the North Island, over 75% of it is under some form of indigenous vegetative cover, with the vast majority regenerating after modification from predominantly natural and human-induced fires and cultivation and agriculture practices. Indigenous cover

includes remnant forest containing kauri stands, broadleaf-podocarp and coastal broadleaf forests, gumland, shrubland, wetlands and dunes. The extensive and unbroken tract of indigenous shrubland provides conditions where natural regeneration can occur largely unimpeded by human activity.

A total of 23,234.5 ha of significant natural areas were identified; approximately 4% are forest, 83.7% shrubland, 7% duneland/sandfield, 5% freshwater wetland and less than 0.1% estuarine habitat.

Contained within these habitats are at least 20 locally endemic plants and many more locally endemic invertebrates such as the large landsnails *Paryphanta watti* and *Placostylus ambagiosus*.

The northernmost forms of several vegetation types occur in this Ecological District, and some cool climate species occur well beyond their usual distribution limits. These species are thought to be relicts of earlier wide distribution during cool periods of the Pleistocene (Gardner and Bartlett 1980).

The Parengarenga Harbour is regarded as part of Aupouri Ecological District and is therefore not included within Te Paki Ecological District. However it is important to recognise the significance of vegetation sequences which cross the Ecological District boundary, i.e from mangrove forest and saltmarsh in the harbour (Aupouri ED) to freshwater wetlands and terrestrial shrubland and forest in several catchments of Te Paki ED. This protective buffer of indigenous vegetation is a significant factor in the high water quality of Parengarenga Harbour and contributes to its importance as a refuge, feeding and breeding ground for a large number of birds and fish.

Key features of Te Paki Ecological District are outlined in Millar and Rough (1976) as follows:

- Distinctive and unique plant communities on the serpentine soils at North Cape, including a high degree of local endemism and dwarfism
- Northernmost mainland broadleaf forest, with and without conifers;
- high number of threatened plant species
- Examples of vegetation types uncommon elsewhere, such as gumland vegetation
- Sub-fossil remains of ancient kauri trees
- Extensive wetlands
- Sandy beaches and dunelands unmodified by exotic species such as marram grass and lupin
- Paucity of indigenous forest bird fauna
- Colonies of large indigenous landsnails (e.g. *Placostylus ambagiosus*; *Paryphanta watti*)
- High number of endemic species of landsnail and other invertebrates
- Holocene dune sequences containing abundant subfossil bird and landsnail remains

This is one of the most distinctive Ecological Districts in New Zealand because of its:

- Physical characteristics of geography and geology;
- High degree of local endemism of flora and molluscan fauna on serpentine soils;
- Relatively extensive dunes, wetlands and gumfields
- High floristic diversity, with 330 indigenous vascular species in the North Cape-Waikuku area alone (Cameron and Jones 1996).

2. Methods

2.1 GENERAL APPROACH

Information on the composition, extent and ecological values of indigenous natural areas within 13¹ Ecological Districts in Northland was gathered during rapid reconnaissance surveys using semi-quantitative methods predominantly between 1994 and 1997. Since 1997, survey work on a further 5² Ecological Districts was started. The survey of Te Pahi Ecological District was part of this larger study. Field work was carried out mainly by three Department of Conservation staff and co-ordinated in the Whangarei Office of the Northland Conservancy. A draft report initially written by Linda Conning and revised by Wendy Holland was updated by Wildland Consultants in May and June 2007 and further updated by Wendy Holland (DOC) who produced the final report for publication.

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 and as already stated above in 1.3 the original topographical mapping was checked against the latest aerial photography. Aerial orthophotography was provided courtesy of Northland Regional Council and Far North District Council. Copyright reserved.

-
1. Northland contains 19 mainland EDs: Te Pahi, Aupouri, Maungataniwha, Ahipara, Whangaroa, Hokianga, Puketi, Kerikeri, Kaikohe, Tutamoe, Tangihua, Whangaruru, Whangarei, Otamatea (part), Rodney (part), (Rodney ED was one of the original PNAP surveys to be conducted in the country with work carried out in 1983/84), Waipu, Kaipara (part), Tokatoka, Manaia. The first 13 were surveyed/or survey was started between 1994-97 in Northland Conservancy: to date 16 reports have been published.
 2. The EDs are Manaia, Tokatoka, Otamatea (part), Waipu, Kaipara (part).

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

Having evaluated the sites (see Criteria 2.4 below), they were grouped according to one of two levels of ecological significance (See Section 2.4). Scientific names of species for which common names have been used are given in Appendix 7 (Fauna) and Appendix 6 (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) Information System, Bioweb Threatened Plants Database (accessed May–December 2007), NIWA Freshwater Fish Database (accessed June 2007), Bioweb Herptofauna Database (accessed May–December 2007), Geopreservation and Soils Inventories, published information and Department of Conservation internal reports. In particular, the Northland Conservancy SSBI information system was the source of a considerable amount of information. In sections 3.3 and 3.4 the SSBI site number is referenced where relevant. The SSBI information is available on request from Department of Conservation, Northland Conservancy.

In order to compile up-to-date plant records for Te Paki ED, over 470 observations were drawn from the DOC Bioweb threatened plants database and 3,986 herbarium records were consulted from the following herbaria: Auckland Museum Herbarium (AK), University of Auckland Herbarium (AKU), Te Papa Museum (WELT) Landcare Research's Allan Herbarium (CHR) and the Otago Regional Herbarium (OTA). Information on invertebrate collections was received from Auckland Museum. 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 Te Paki Ecological District. It is important to note that, because of a tight timetable and budget constraints, some important natural areas, or important features within areas assessed, may have been overlooked.

2.2 CONSULTATION WITH LANDOWNERS

Personal contact with all landowners was not possible because of the magnitude and geographic range of the surveys being undertaken.

Therefore all ratepayers were advised by way of a leaflet delivered by mail (Appendix 2) informing them of the programme and the reasons for it. The leaflet was signed by the then Regional Conservator of the Department of Conservation, Northland Conservancy, and provided contacts for further information. The Conservancy's Protection Manager undertook iwi consultation throughout Tai Tokerau advising of the pending PNAP surveys prior to commencement of the programme in 1995.

A press release on the survey methodology and photograph of the survey team was issued and featured in the local newspapers (Appendix 2).

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

2.3 DATA ACQUISITION AND ANALYSIS

A rapid, reconnaissance field survey was carried out between 1995-97³ 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. Te Paki Ecological District was covered in a methodical fashion based on geography, i.e. moving north to south and east to west. Where large mosaics occurred, field survey encompassed several days spread over the entire area.

Some sites were not sighted or surveyed in full, 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 existing information and/or aerial photographs. Information on some of these sites, therefore, remains limited, and it is likely that some ecological units have not been recorded.

Natural areas were mapped using five broad categories of habitat class: forest, shrubland, wetland, duneland/sandfield, and estuary. Rockland was used for the first time in Northland in the Waipu Ecological District PNAP report (Lux, Martin and Beadel 2007) however this report did not categorise or specifically survey rockland (see Glossary).

At each site, the composition and relative abundance of canopy plant species was recorded on the field survey sheet (Appendix 1) in the following four categories: greater than 50% cover was defined as “abundant”; 20-50% cover as “common”; 5-20% cover as “frequent”; and less than 5% cover as “rare” or “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 and Rogers 1996; Park and Walls 1978) and in other parts of the world (see Kershaw and Looney 1985; Mueller-Dombois and Ellenberg 1974). The specific technique for vegetation description at each site is based on the approach set out in Myers *et al.* (1987).

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

3. Unfortunately the 1997 survey sheets cannot be located and therefore were unable to be double-checked before publication.

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 Te Pahi Ecological District. This information was used to determine the representativeness of each ecological unit (Table 2, page 26).

Landform and geology was described by Dr. Fred Brook 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.

Completed survey forms⁴ 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, 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 value of these areas was then assessed using a two-level classification of habitat significance based on the PNAP ecological criteria of representativeness, rarity and special features, diversity and pattern, habitat structure and characteristics important for the maintenance of ecosystems (buffer, linkage or corridor, size, and shape).

2.4.1 Level 1 sites

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

4. Please note that survey sheets from 1997 are missing and are currently not available.

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

2.4.2 Level 2 sites

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

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

Categories of species rarity and threat are based on Molloy *et al.* (2002), with flora and fauna listed in Hitchmough *et al.* (comp.) (2007) (see Appendix 3).

2.5 UPDATING OF DATA

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

Human-induced activities and changes, both within or adjoining significant natural areas can rapidly speed up the processes of change. Fire, followed by 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, eliminate some habitats.

The natural areas identified in this survey will require monitoring in order to observe changes in both species and habitat composition, condition and extent.

TABLE 1: LINKS BETWEEN THE PNAP CRITERIA AND LEVELS 1 AND 2

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

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

3. Ecological character

3.1 TOPOGRAPHY/GEOLOGY

Topography

Te Paki Ecological District is mostly dissected hill country up to 310 m elevation, with local erosional remnants of marine cut terraces on ridges at 110–220 m elevation. The open coast has stretches of high cliffs with gravel pocket beaches and rocky headlands and reefs, interspersed with long sand beaches backed by dunelands. There is a small estuary immediately east of Te Rerenga Wairua on the northern coast (Tapotupotu Stream: 12 ha), and a number of swamps and freshwater wetlands ponded by coastal dunes and along streams draining into Parengarenga Harbour. Nearly all of Te Paki Ecological District is within 5 km of the sea.

Geology

Te Paki Ecological District comprises a series of west-north-west trending fault blocks of allochthonous Cretaceous-Paleocene ophiolitic (Tangihua Complex) and marine sedimentary (Mangakahia Complex) rock units, and lower Miocene marine cover strata (Parengarenga Group).

Tangihua Complex units form the rocky coast between Scott Point and Cape Maria van Diemen, the prominent range extending between Te Rerenga Wairua and the Parengarenga Harbour, coastal hill country between Kapowairua and Te Huka Bay, and North Cape headland. Submarine basalt and associated subvolcanic intrusions are the dominant Tangihua rock types, but serpentinite and plutonic gabbro are also present on North Cape headland.

Mangakahia Complex Sandstone, mudstone and limestone outcrop cover a small area of low hill country north of Parengarenga Harbour entrance. Parengarenga Group sandstone forms low hill country between Kapowairua and the Parengarenga Harbour, and an igneous conglomerate forms prominent bluffs and higher hill country to the east of this area.

Pleistocene and Holocene dune sands mantle the older rock units along and inland from the west coast and at Parengarenga North Head, and form the tombolo linking North Cape headland to the rest of Te Paki Ecological District. Low coastal terraces in the Te Hapua area are underlain by last interglacial alluvial and estuarine sands.

Elevated parts of Te Paki Ecological District formed islands that were isolated from the rest of Northland during mid Miocene to Pliocene time, prior to formation of the Aupouri tombolo linking it to the rest of Northland in the Pleistocene.

(Brook 1996)

3.2 CLIMATE

The climate of Te Paki Ecological District is dominated by the 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 warm humid summers and mild winters. In addition, the northern maritime situation of Te Paki ED causes its lengthy coastlines to be swept by warm oceanic currents, which moderate temperatures on the land.

Due to its position on the end of a long peninsula, Te Paki experiences some climatic differences from the rest of Northland. The prevailing winds come from the south, whereas over the rest of Northland, south-westerlies are predominant. Strong winds (>40 km per hour) may come from the north, northeast, south, or southwest. Of 15 meteorological stations in Northland, Te Rerenga Wairua is the windiest with gales occurring on an average of 45 days per year.

Te Rerenga Wairua is also by far the driest weather station in Northland, having an average annual rainfall of only 1083 mm and only 30 days per year with more than 10 mm of rain, but averaging 47.5 days per year of fog. Rainfall in other parts of Te Paki Ecological District, apart from North Cape which is similar to Te Rerenga Wairua, varies from 1200-1400 mm per year. Rainfall is influenced to a large extent by subtropical depressions during winter with 53% of the annual rainfall occurring between April and August.

Mean monthly temperatures range from 12.5 °C in July to 19 °C in February. The driest period usually extends from December to March. Sunshine averages about 2100 hours per year. On average, fewer than six ground frosts per year are recorded at Te Paki station. (Moir *et al.* 1986)

3.3 VEGETATION

There is a preliminary plant species checklist for the Te Paki Ecological District in Appendix 5, which was compiled largely from herbarium records, SSBI records and other published references with a full list of common names used in the text with their botanical name in Appendix 6. Herbarium records largely concentrate on the threatened, uncommon or unusual plants present in the Ecological District, thus it is likely that some common species have been omitted from this preliminary list.

3.3.1 Historical

Much of Te Paki Ecological District was once covered in dense kauri forest (Millar and Rough 1976), some of which was destroyed by rising sea levels (e.g. Waikuku Flat) and most of the remainder by human activity. Conifers were likely to have been predominant on ridges and spur crests in the western area, on less fertile soils in eastern areas, and locally on floodplains. Mixed broadleaf forest was likely to have

occurred elsewhere (Clunie 1984), with kohekohe, karaka, tawapou, and pohutukawa increasing in abundance towards the coast (Kelly 1967).

The early botanist/naturalist Dieffenbach described a large expanse of manuka and bracken with taller vegetation in the gullies “...*in not very remote times the kauri pine...must have covered all these hills, as is proved by the burnt remains of large trees of this species*” (1843—quoted in Gardner and Bartlett 1980).

Repeated burning has transformed the area into primarily shrubland communities which are subject to frequent erosion. Only pockets of broadleaf forest remain in some gullies and on coastal cliffs. The reduction in pollinating and seed-dispersing bird and insect species, and the survival of mainly fire-resistant plant species has slowed regeneration to forest (Clunie 1984). Due to a long period of vegetation clearance, pasture establishment, and extensive grazing, much of the Mokaikai area for instance, is only relatively recently ‘reverting’ from pasture.

The very large number of archaeological sites is indicative of intensive occupation since the time of early Polynesian settlement.

3.3.2 Broad pattern

Today only isolated pockets of indigenous forest remain. Several centuries of human occupation, with its associated burning and clearance of vegetation, have resulted in a landscape that is now dominated by regenerating shrubland.

A collection of kauri forest remnants occur south of Te Paki Trig. In this vicinity at Radar Bush⁵ (part of N02/003) emergent kauri over a canopy of kanuka with frequent kawaka and monoao occurs.

Within Unuwaho Bush and Shrublands (N02/004) taraire occurs in the gullies and coastal broadleaf forest occurs closer to the coast. Emergent pohutukawa (20 m tall) over puriri, kohekohe, taraire, and karaka occurs west of Te Huka.

Secondary forest in Te Paki ED is dominated by kanuka.

Whilst in prehistoric times, kauri forest occupied most of Waikuku Flat (N02/005(b)), today, peaty depressions are predominantly covered in manuka shrubland and *Baumea arthrophylla*, *B. juncea* and *Eleocharis sphacelata* sedgelands.

Manuka and kanuka dominate shrubland areas. Kanuka is dominant in the older shrublands. Areas affected more recently by fires are dominated by kanuka and manuka with various amounts of prickly hakea and gorse.

Gumland shrubland occurs on more impoverished soils. Manuka is dominant in association with species including mawhai, *Dracophyllum* spp., *Baumea* spp., *Epacris pauciflora* and *Pimelea* spp.

A distinctive feature of Te Paki ED is the serpentine shrubland on the cliffs and plateau area between Kerr Point and Surville Cliffs. Like many

5. Radar Bush refers to the area of forest located in sheltered valleys south of Te Paki Trig (around Grid Reference M02/N02 900 477)

parts of Te Paki, this area too has been repeatedly burnt (natural and human-induced). Many endemic plant species are exclusively associated with the ultramafic substrate and many of the non-endemic plant species are affected by the substrate so as to cause prostrate and dwarf growth forms. For example, common forest plants such as tanekaha, kanuka and houpara grow in a stunted form within this habitat.

The foredunes support a variety of indigenous species including pingao, spinifex, pohuehue, and *Coprosma acerosa*. Harakeke, coastal toetoe, bracken and various sedges and rushes occur behind the foredunes on consolidated dunes.

Wetlands are well represented in Te Paki ED. Te Werahi Wetland (M02/010) is the largest wetland system in Te Paki ED and one of the largest mineralised wetland system (swamps) in Northland (the Motatau Wetland Complex in the Tangihua ED and Kaipaha Swamp in the Kaikohe ED are also very large systems).

Paranoa Swamp (part of N02/016) is a large mesotrophic swamp contained within a fully vegetated catchment. This wetland is essentially undisturbed by anthropogenic processes.

3.3.3 Main vegetation types

DUNELANDS / SANDFIELDS

Along with the adjoining Aupouri ED, and the Pouto Peninsula area of the Kaipara ED in the south of Northland, the Te Paki ED is one of few EDs in New Zealand containing large areas of dunelands. These dunelands include large expanses of open sand and vegetated dunes, and hard pans.

The dunes at Te Paki ED are neither as extensive nor as high as those occurring further south, and oioi is less common here. Coastal toetoe is also less common than in Ahipara ED, especially along the beaches in the north and east of Te Paki ED.

- The largest areas of duneland occur at Twilight Beach (M02/011) (551.5 ha) and Te Werahi Beach and Cape Maria van Diemen (M02/012) (394.4 ha). At Tom Bowling Bay (N02/029), Waikuku Flat (N02/005(b)), Kapowairua (N02/027), Whareana Bay (N02/031) and Ngakengo Beach (N02/062), areas of bare sand tend to occur behind the foredunes in the central parts of long sandy beaches. Dunes which are largely unvegetated may have sparse or frequent spinifex, pingao, tauhinu, shore bindweed, and knobby clubrush. Harakeke, coastal toetoe, *Austrofestuca littoralis*, and *Pimelea arenaria* are also present in isolated patches. *Coprosma acerosa* is common at Te Werahi Beach but more local and less plentiful elsewhere. Lupin is present in isolated populations and pampas is invading at Te Werahi Beach and Waikuku Flat.
- Where foredunes are vegetated, spinifex is dominant. Tauhinu, pingao and coastal toetoe are locally frequent with occasional *Pimelea arenaria*, knobby clubrush, shore bindweed, pohuehue, lupin, and marram grass.

- On back dunes at Te Werahi Beach (part of M02/012) and Waikuku Beach (N02/030), clumps of knobby clubrush form open swards. At both these sites, pampas is invading. At Waikuku, tauhinu, *Baumea juncea*, and exotic herbs and grasses (including hare's-tail) are scattered amongst the dominant vegetation.
- Oioi-dominant rushlands occur on sand flats (Waihakari Wetland (N02/035)), dune hollows (Te Werahi (part of M02/012) with pampas and knobby clubrush), in hollows on consolidated sands (Scott Point Shrubland and Coastal Associations (M02/008)), on dunes (Twilight Beach (M02/011)), and on coastal cliffs and hillslopes (Scott Point (M02/008), Maungatiketike Point Shrubland (M02/007)).
- On consolidated dunes at Tom Bowling Bay (N02/029), Twilight Beach (M02/011) and Waikuku Beach (N02/030), pohuehue and kikuyu intertwine in dense swards. Scattered within this are isolated lupin, clumps of harakeke, and knobby clubrush. At Scott Point Shrubland and Coastal Associations (M02/008), coastal toetoe and *Coprosma acerosa* also occur. Where dunes have been heavily modified by stock, kikuyu, lotus, and buffalo grass are locally dominant. Between Te Werahi and the coast, pampas is locally plentiful.
- *Coprosma acerosa* and knobby clubrush occur in association on back dunes (just behind the foredunes) at Te Werahi Beach (part of M02/012) and Kapowairua (N02/027). On Motuopao Island (M02/071), *Coprosma acerosa* and pohuehue occur together.
- Coastal toetoe tussockland with scattered knobby clubrush, harakeke and pohutukawa occurs on both consolidated and unconsolidated dunes at Twilight Beach (M02/011), Te Werahi Beach (part of M02/012) and Ngakengo Beach (N02/062).
- Areas of sand sedge sedgeland occur on sand flats at most beaches.
- Harakeke is dominant in a few small areas on consolidated dunes (Te Werahi Beach (part of M02/012) and Tom Bowling Bay (N02/029)), and on Motuopao Island (M02/071). Coastal toetoe is present amongst the harakeke at these sites (frequent at Te Werahi and common at Tom Bowling Bay). Dense harakeke flaxland occurs on cliff edges at Ohao Point at the southern end of Ngakengo Beach (N02/062).
- Bracken fernland occurs on consolidated dunes inland from Scott Point Shrubland and Coastal Associations (M02/008).

ESTUARINE WETLANDS

The southeastern Te Paki ED boundary extends along the northern Parengarenga Harbour coastline. The Parengarenga Harbour is in Aupouri ED, and there are no estuarine habitats of this harbour within Te Paki ED. The few estuarine wetland habitats which occur in Te Paki ED are in the north of the ED, as summarised below.

- Mangroves occur in the small estuary at Tapotupotu Stream Wetland and Estuary (M02/015).
- Areas of saltmarsh, oioi and sea rush, occur at Tapotupotu Stream Wetland and Estuary (M02/015) and Waitahora Lagoon (part of N02/016).

- A small area of salt meadow, with remuremu and sea primrose, occurs at the eastern end of Kapowairua (N02/027).

FRESHWATER WETLANDS

Dune Lakes

There are five small dune lakes on the south-western side of Te Paki ED: Lake Ngakeketa (12.5 ha) and Te Paki Lake (12.7 ha) are the largest (both in N02/001), Heart Lake (5.8 ha) and Te Paki Dune Lake⁶ (1.9 ha) are next in size (both within N02/009), and The Big Lake (N02/067) (500sqm (0.0.5 ha) which is ironically the smallest. The four largest lakes are on consolidated Pleistocene dunes, ponded behind large Holocene sand dunes in Te Paki ED. The Big Lake is essentially more of a wetland and is located in a shallow depression on a consolidated Pleistocene sand dune.

Lake Ngakeketa and Te Paki Lake are relatively deep lakes with narrow, intermittent fringes of raupo reedland with *Baumea articulata* and *Eleocharis sphacelata*. Kuta and harakeke are also present on the fringes of Lake Ngakeketa, and the aquatic weed hornwort is present. Te Paki Lake has occasional *Juncus pallidus* on its margins. Both of these lakes have a protective buffer of kanuka shrubland.

Of the Shenstone Block lakes, Te Paki Dune Lake has only a small area of open water, most of its area being covered by dense beds of *Eleocharis sphacelata* with small clumps of *Baumea articulata*. *Eleocharis acuta*, *Baumea teretifolia*, *B. rubiginosa* and *B. juncea* occur on the margins, merging into manuka shrub-sedgeland with occasional harakeke and mamaku. In contrast, Heart Lake has a larger area of open water fringed by *Eleocharis sphacelata* reedland with patches of *Baumea articulata* and raupo. On the margins, a sedgeland of *Baumea articulata*, *B. rubiginosa* and *B. juncea* occurs, with scattered manuka, harakeke and mamaku. Both these lakes have bare sand on their western edge and a good buffer of shrubland on the other edges.

The Big Lake has a small area of shallow open water surrounded by *Eleocharis sphacelata* reedland and a band of low manuka shrubland in a seasonally wet shallow depression. Manuka 1-2 m tall occurs on the periphery. The surrounding land is covered in exotic pasture, and is therefore not well buffered.

There are several pristine small lakes east of Waitahora Lagoon (all part of N02/016), the largest of which is 2.3 ha. Waitahora Lagoon and Waitahora Lakes have saline and freshwater influences. (Wells *et al.* 2007)

Some open water also occurs within the larger wetlands at Te Werahi Wetland (M02/010), Ponaki Wetland (N02/032) and Haupatoto/Whareana Bay Wetlands (N02/038).

In the 2007 Northland lakes status report by NIWA (Wells *et al.* 2007), Waitahora Lagoon, Waitahora Lakes and Te Paki Dune Lake were ranked Outstanding within the Te Paki Ecological District (15 out of the 74

6. Called New Lake in SSBI M02/N02/H027

assessed lakes were ranked as Outstanding throughout Northland). Te Pahi Lake was ranked as High.

Fertile and intermediate wetlands

Fertile wetlands are Northland's most common wetland type. Raupo is a characteristic of fertile wetlands and is the most common wetland type in Te Pahi ED, occurring at more than two dozen sites. Many of these areas are extensive, and raupo-lined valley bottoms are considered a feature of Te Pahi ED. In most of the other Northland ecological districts, land development has resulted in the disappearance of many of these areas, but in Te Pahi ED, the large areas retaining indigenous vegetation enable this pattern to be clearly seen. Most of these wetlands grade into estuarine wetlands of the Parengarenga Harbour (in Aupouri ED) or onto sandflats on the open coast.

Species commonly present in these wetlands include ti kouka (especially common on margins), kuta, swamp millet, *Calystegia sepium*, *Myriophyllum propinquum*, *Persicaria decipiens*, harakeke, mamaku, kiokio, *Ranunculus* species (including the uncommon and regionally significant *Ranunculus urvilleanus*), *Baumea articulata*, *B. rubiginosa*, *B. arthropphylla* and *B. juncea*. *Baumea articulata* and *B. arthropphylla* are plentiful and locally dominant in the extensive wetland complexes at Te Werahi Wetland (M02/010), Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) and Ponaki Wetland (N02/032), but uncommon elsewhere. At Tawakewake Wetland (N02/036), harakeke and ti kouka are plentiful, along with raupo.

On margins of wetlands, streams, and lake beds at the Shenstone Block (N02/009), Te Werahi Wetland (M02/010) and Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016), associations of *Eleocharis acuta*, *E. gracilis*, *Baumea rubiginosa*, *B. articulata*, *B. teretifolia*, *Juncus* spp., and giant umbrella sedge may be found. Giant umbrella sedge is also found with scattered harakeke at Waikuku Wetlands (N02/033).

Baumea articulata and *Eleocharis sphacelata* are both much less widespread in Te Pahi ED compared to the adjoining Aupouri ED. *Eleocharis sphacelata* reedland occurs at only six sites in Te Pahi ED. Outside the large wetland complexes mentioned above, it occurs only in small populations. On Waikuku Flat (N02/005(b)), *Eleocharis sphacelata* occurs with *Baumea articulata* and *B. arthropphylla* in small bogs, with *B. juncea* abundant on the margins beneath manuka. *Baumea juncea* and *B. arthropphylla* also occur together in bogs on Waikuku Flat. *Baumea juncea* occurs in a monotypic stand within the Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016), and with giant umbrella sedge at the Waiwhero Stream Wetland outlet (N02/025).

Infertile wetlands—peat bogs and gumlands

Infertile wetlands such as peat bogs and gumland are characteristically acidic with a low pH. Infertile wetlands are a very rare wetland type in Northland.

Peat bogs

A species typical of peat bogs is wirerush, an uncommon and regionally significant species in Te Paki ED and in the whole of Northland. In this ED it is found at several sites and is a dominant ecological unit in the mid to lower catchment of the Shenstone Block (N02/009).

Sphagnum sp., another indicative bog plant, occurs in small depressions and old gumholes on Waikuku Flat (N02/005(b)).

Gumland

Gumlands are a very rare wetland type in Northland and are typically dominated by manuka occurring on strongly leached, podzolised acidic, infertile soils where drainage is impeded. Seasonally these areas can be very waterlogged and also very dry.

Pure manuka stands on gumland are found from Hiriki Pa west of Te Rerenga Wairua to Kapowairua (within N02/003), Taumatara Flat (within N02/005(a)), parts of North Cape (N02/005(c)), Maungatiketike Point Shrubland (M02/007) (harakeke and tauhinu also present), and at The Big Lake (N02/067).

Species commonly associated with this type are *Dracophyllum lessonianum*, umbrella fern, *Pomaderris* spp., *Schoenus brevifolius*, *Lepidosperma filiforme*, *L. australe*, *Lycopodiella lateralis*, *L. cernua*, *Thelymitra* orchids and both prickly and woolly hakea. The occurrence of particularly the sedge species reflects the different soil types.

Umbrella fern is locally dominant in the bottom of shallow side gullies on gumland soils north of Te Hapua, and in shallow valley bottoms near Pandora Gate (part of N02/003).

SEDGELAND AND SEDGE-SHRUBLAND GUMLAND

- *Schoenus brevifolius* and *Baumea juncea* form a dense sward in broad gullies in the Tawakewake catchment at North Cape (N02/005(a)). This association also occurs on raised sites within bogs at the Shenstone Block (N02/009).
- Associations of manuka and *Schoenus brevifolius* with frequent *Lepidosperma filiforme* occur in the vicinity of the North Cape Trig (part of N02/005(c)), and on gumland soils at Kapowairua and the area between Te Hapua Road and Waitiki Stream and Channel on the Parengarenga Harbour (part of N02/003) (the area referred to as the “Te Marua Block” in Clunie 1985). *Gleichenia dicarpa* is locally common within this type, with occasional kumarahou, *Pomaderris edgerleyi*, mingimingi, *Leptecophylla juniperina*, turutu, and *Lepidosperma laterale*. On the gumland soils, *Epacris pauciflora*, *Dracophyllum lessonianum*, *Baumea teretifolia*, *Lycopodium deuterodensum*, *Lycopodiella cernua* and *Thelymitra* spp. orchids also occur. At Kapowairua, there is often a dense infestation of low-growing woolly hakea.
- *Baumea teretifolia*-manuka sedge-shrubland occurs on raised infertile flats at the Shenstone Block (M02/009), where umbrella fern is also locally common. *Baumea juncea* also occurs on infertile margins at Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016).

SHRUBLANDS

Manuka and kanuka shrublands comprise the majority of the indigenous vegetation in Te Paki ED. These provide important linkages between other habitats, and are more extensive than in most other parts of Northland. The shrublands are not uniform, and reflect the underlying substrate and history of disturbance (mainly burning).

Manuka and kanuka

Much of this seral shrubland type has formed on areas formerly covered in mixed forest, which were burnt by early human settlers. These shrublands have persisted as a result of recurrent burning and later clearance for farming (Clunie 1984). They occur from Te Rerenga Wairua to Te Hapua (within N02/003), on slopes of Mokaikai Scenic Reserve and Surrounds (N02/005(b)), and on higher ground at the Shenstone Block (N02/009). A mixture of manuka and kanuka forms the dominant cover. Commonly associated species include ti kouka, hangehange, kohuhu, mamaku, rewarewa, kumarahou, mingimingi, bracken, akeake, lancewood, karamu, tutu, *Dracophyllum lessonianum*, *Lepidosperma laterale*, the twining parasite vine mawhai, gorse, and prickly hakea. Mature puriri persist at isolated sites, particularly gullies, where they have survived fire.

Species composition and diversity can vary substantially in the regenerating woody vegetation, especially near seed sources in remnant forest stands and on sites with special soil or habitat conditions. At Radar Bush (within N02/003) shrubland up to 3 m tall contains dense saplings of kawaka, kauri, monoao, tanekaha, toru, kumarahou, rewarewa, and lancewood.

At Scott Point Shrubland and Coastal Associations (M02/008) and in the Shenstone Block (N02/009), *Pomaderris amoena* and *Epacris pauciflora* occur respectively. Harakeke, coastal toetoe and pohutukawa also occur at Scott Point, and the sedges *Schoenus brevifolius*, *Morelotia affinis*, *Baumea juncea* and *B. teretifolia* are present at both sites, being common at Shenstone.

At Waikuku Flat (N02/005(b)), manuka and kanuka form a mosaic with taller kanuka on raised ground, and manuka dominating wetter areas. The adventive oxycobium is locally dominant also on higher ground.

Manuka-Cassinia amoena

At North Cape Scientific Reserve (N02/005(c)), this unique assemblage occurs on ultramafic soils on the plateau, characterised by the stunted stature of the vegetation, the range of species endemic to the site, and the semi-lianoid habit of many species (Gardner and Bartlett 1980). This is described in detail in the site description for N02/005(c).

Kanuka/manuka-hakea

On some ridges and upper slopes south of Tapotupotu, at Pandora, north of Te Hapua (all within N02/003), and at Mokaikai Scenic Reserve and Surrounds (N02/005(a)), prickly hakea is common and sometimes abundant in manuka shrubland. Woolly hakea is dense in extensive low-growing stands in the Kapowairua catchment (within N02/003). Gorse, bracken, sedges and ground orchids are sometimes present. Kanuka

shrubland occurs mainly on volcanic soils or consolidated sands. Manuka may be frequent or common. Other commonly associated species are ti kouka and mamaku.

Shrubland on Surville Cliffs

On the Surville Cliffs, a unique assemblage of species occurs, and is fully described in the site description for North Cape Scientific Reserve and Surrounds (N02/005(c)). Vegetative cover is estimated at only 50%, and no individual species dominance is apparent.

Manuka-harakeke

At Te Rerenga Wairua and on some upper slopes near Te Paki Trig (within N02/003) stunted manuka and harakeke occur with hangehange, mingimingi, *Coprosma macrocarpa* subsp. *minor*, *Corokia cotoneaster*, scattered ti kouka, pohutukawa, *Hebe diosmifolia*, *H. ligustrifolia* and many other species.

At Scott Point Shrubland and Coastal Associations (M02/008), harakeke is co-dominant with manuka and kanuka, and other coastal species such as knobby clubrush, tauhinu, coastal toetoe and pohutukawa are present.

Kikuyu is co-dominant with manuka and harakeke on some coastal hillsides, and coastal toetoe, bracken and oioi occur in this association on cliffs at Scott Point.

Kanuka, harakeke and ti kouka are dominant on the cliffs at Whareana, within Mokaikai Scenic Reserve and Surrounds (N02/005(a)).

Taupata

On Motuopao Island (M02/071), taupata shrubland with occasional native iceplant is found in patches on the steep coastal cliffs and banks on the main island and on the northern rock stack (Forester 1993).

FOREST

Although a variety of forest types occur within Te Paki ED, all are small remnants in gullies within large areas of shrubland, or in small remnants scattered along the coast.

The largest single forest remnant is at Unuwahao, (part of N02/004) (230 ha), but there are also quite large forest remnants:

- N02/003—at Radar Bush (by the Te Paki Trig) (65 ha), at Kohuronaki Trig (54 ha), north of Cape Reinga Road (48 ha) and along the Te Rerenga Wairua walkway (ranging from 26–28 ha).
- N02/004—in gullies draining into Te Huka Bay (ranging from 22–50 ha), behind Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (45 ha),
- N02/005(a)—in the Ponaki catchment (39 ha).

Broadleaf

Ti kouka

Ti kouka is the dominant vegetation at only one coastal site, Murimotu Island (N02/072).

Pohutukawa

Pohutukawa is a feature of the coastal cliffs from Te Rerenga Wairua to North Cape, although it is present in forest and shrubland throughout Te Paki ED.

On cliff faces, the vegetation is usually discontinuous with pohutukawa emergent over harakeke, kowharawhara, taupata, knobby clubbrush, houpara, rengarenga lily, coastal toetoe, pohuehue and grasses.

In closed canopy pohutukawa forest remnants (pohutukawa is emergent in many remnants), associated species include karaka, tawapou, puriri, taraire, kowhai, rewarewa, mangeao, kanuka, and houhere. Tawapou is a distinctive associate of this type with Te Paki ED.

Pohutukawa-kohekohe forest occurs at Mokaikai Scenic Reserve and Surrounds (N02/005(a)) by Whareana Bay and pohutukawa-puriri forest in the upper Waitangi Stream catchment (within N02/005(a)).

An association of taraire, kohekohe, mangeao, puriri, rewarewa, willow-leaved maire and *Astelia grandis* occurs in the Ngaroku Stream valley at North Cape (within N02/005(c)).

Very little pohutukawa forest occurs on sand with the exception of Twilight Beach (M02/011) where pure stands with dense foliage occur. The sparse understorey contains scattered taupata and *Tetragonia* sp.

Other broadleaf forest types

- Taraire forest is found at Pandora Gate⁷ and east of Te Paki Trig (within N02/003). Ponga is common in both areas, and nikau and kohekohe are also present.
- Taraire-puriri forest occurs at Unuwahao, Kohuronaki (within N02/004) and in the central gullies of Mokaikai Scenic Reserve and Surrounds (N02/005(a)) with ponga, rewarewa, kohekohe and houhere and a wide range of other species. Puriri-rewarewa-taraire forest, with only very occasional and isolated kauri, occurs east of the Money Tree⁸ (within N02/005(a)).
- Kohekohe-taraire forest occurs at Poroiki Hill (within N02/005(a)). Puriri, kohuhu, lancewood, nikau, and rewarewa are associated species.
- Kohekohe-puriri-taraire forest occurs at Tirikawa, Broughton's Gully (Kohoroanaki) (both within N02/003) and at Unuwahao (within N02/004). Mangeao and hinau are present at Tirikawa, maire tawake and Bartlett's rata at Broughton's Gully (Kohuronaki), and kowhai, pohutukawa, northern rata and several podocarps at Unuwahao. A variety of other species occur at each of these locations.
- Ponga-taraire forest occurs at Pandora and Kohuronaki (both within N02/003) with nikau, mamangi, houhere, mahoe, and rewarewa.

7. Pandora Gate is the intersection of Te Rerenga Wairua Walkway and track down to Pandora

8. The Money tree is an old pohutukawa tree found on the road to Waikuku in the Mokaikai Scenic Reserve. For many years coins have been deposited in the trunk of the tree, some of which are now very embedded.

- Taraire-kohekohe-nikau forest with kanuka and ponga occurs at Te Paki Trig (within N02/003).
- Puriri forest with ponga and mamaku occurs at Kohuronaki (within N02/003) and Akura Stream (within N02/004).
- Puriri-kohekohe forest with kanuka and ti kouka, and frequent taraire houhere, karaka, mahoe, and mapou, occurs at Tapotupotu (within N02/003). A coastal influence is apparent here with kowhai, pohutukawa, and tawapou also present.
- Puriri-kohekohe-karaka forest occurs at Kaiwhetu Pa (within N02/005(a)).

Within the Shenstone Block (N02/009) a small remnant of puriri, kanuka, kohekohe and rewarewa occurs on a steep streamside scarp.

Kanuka features extensively in regenerating forest stands at Te Paki, often as the sole dominant canopy species, but also in association with other broadleaf species:

- Kanuka forest occurs at Kohuronaki and in gullies below Hiriki Pa (both within N02/003), Unuwahao (N02/004), Poroiki Hill, Hauptototo Bush, upper Waitangi Stream, near the coast at Whareana and Ngakengo and the upper Ponaki catchments (all within N02/005(a)).
- Kanuka-taraire-nikau forest with puriri, ponga and kohuhu occurs at Cape Reinga Road (with N02/003).
- Kanuka-puriri forest occurs at Lake Ngakeketa (part of N02/001), Poroiki Hill, upper Ponaki catchment, and upper Waitangi Stream (all within N02/005(a)).
- Kanuka-kohekohe-mamaku forest with pohutukawa occurs at Waitangi Stream Wetland and Riparian Strip (N02/034).
- Kanuka-kohekohe-karaka forest occurs near Whareana Bay (within N02/005(a)).
- Kanuka-tree fern (species not identified) forest with puriri, taraire, rewarewa, mamangi, hinau, kauri, and nikau occurs at Darkies Ridge⁹.

Kauri forest

Kauri forest occurs in the collection of forest remnants south of Te Paki Trig, (including Radar Bush) as small stands on spurs, with monoao, tanekaha rimu, kanuka and kawaka. A very wide diversity of other species is also present, including miro, matai, totara, Hall's totara, manoao, hinau, toru, white maire and Bartlett's rata.

Kauri forest also occurs in a small stand with monoao east of the Te Paki Trig.

There are occasional isolated trees in a stand to the east of the Money Tree.

9. Darkies Ridge is part of the Te Rerenga Wairua Walkway that aligns with Tirikawa Pa and heads down to Tapotupotu Bay.

3.3.4 Species of botanical interest

Threatened and regionally significant species

Te Paki Ecological District has a very high number of threatened and regionally significant plant species for its size (30,917 ha). Molloy *et al.* (2002) classifies threatened taxa as being either: Acutely Threatened, Chronically Threatened or At Risk. The threat status of species was derived from Hitchmough *et al.* (comp.). 2007). 98 species have been listed in the above three divisions with an additional 9 taxa in the Data Deficient, Vagrant and Coloniser categories. This report lists 69 regionally significant plants with these species determined by the Department of Conservation, Northland Conservancy. Each of these species and its occurrence in Te Paki ED is treated briefly in the following sections (3.3.5 and 3.3.8). Records as far back as 1975 have been included as it has been assumed that most of these records will still be valid due to the relatively stable environment at Te Paki ED compared to the rest of Northland. Many of the plants have multiple herbarium records; an effort was made to only reference the most up to date record.

Endemism

Although New Zealand's flora is relatively small in world terms (c. 2300 vascular plant species), it is globally recognised as a 'biodiversity hotspot', with over 80% of the flora endemic to these islands (Myers *et al.* 2000). The north of the North Island and the north of the South Island are the two most 'endemic-rich' areas of New Zealand, and northern North Island endemics are predominantly woody (McGlone 1985).

Te Paki ED is an area of high endemism for plant species, with 19 endemic taxa recorded to date (17 of which are endemic to the Surville Cliffs). Knowledge of endemic taxa in this Ecological District has benefited from a great amount of taxonomic work carried out during the 1990s and 2000s (see section 3.3.5 for references on particular species).

According to our present knowledge of plant distributions, all of the Te Paki ED endemic plant species are narrow-range endemics restricted to particular sites within Te Paki ED. Most of these are ranked as 'Range Restricted' or in higher categories of threat (Hitchmough *et al.* (comp.) 2007). For example, Bartlett's rata (Nationally Critical) is only found in a few forest remnants in central Te Paki ED. The liverwort *Frullania wairua* (Nationally Critical) is epiphytic on Bartlett's rata and further restricted to only one of these forest remnants: Radar Bush (part of N02/003). *Hebe adamsii* (Range Restricted) is endemic to rock pinnacles within Unuwahao Bush and Shrublands (N02/004).

The Surville Cliffs serpentinite formation, within North Cape Scientific Reserve N02/005(c), supports a flora with one of the highest degrees of plant endemism on the New Zealand mainland. Druce *et al.* (1979) drew attention to the 'semi-lianoid' habit (long flexible stems that scramble or trail) of many Surville Cliffs plants, and the high number of locally endemic plant species. Eight species, three subspecies, one variety and 5 taxonomically indeterminate entities are endemic to this 120 ha ultramafic rock formation (Table 2). In addition to these *Trisetum serpentinum* is

only known from the Surville Cliffs in the North Island, and from other serpentine formations in the South Island (e.g. Mt. Dun, D'Urville Island, and Red Hills), and *Pomaderris paniculosa* subsp. *novae-zelandiae* is only known from the Surville Cliffs, Mt Manaia and Mt Aubrey near Whangarei (NZPCN 2007). Druce *et al.* (1979) commented that the degree of convergence in form was evidence of intense selection in a unique environment.

TABLE 2: ENDEMIC TAXA OF THE SURVILLE CLIFFS, NORTH CAPE SCIENTIFIC RESERVE (N02/005(C)), WITH CURRENT THREAT CATEGORY (HITCHMOUGH *ET AL.* (COMP.) 2007).

TAXON	THREAT CATEGORY (HITCHMOUGH <i>ET AL.</i> (COMP.) 2007)
Endemic species	
<i>Cassinia amoena</i>	Range Restricted
<i>Coprosma distantia</i>	Range Restricted
<i>Carex opbiolithica</i>	Range Restricted
<i>Hebe brevifolia</i>	Range Restricted
<i>Leucopogon xerampelinus</i>	Range Restricted
<i>Parsonsia praeruptis</i>	Range Restricted
<i>Pittosporum serpentinum</i>	Nationally Endangered
<i>Uncinia perplexa</i>	Nationally Critical
Endemic subspecies	
<i>Coprosma spatbulata</i> subsp. <i>bikuruana</i>	Nationally Critical
<i>Haloragis erecta</i> subsp. <i>cartilaginea</i>	Range Restricted
<i>Pittosporum pimeleoides</i> subsp. <i>majus</i>	Range Restricted
Varieties	
<i>Geniostoma ligustrifolium</i> var. <i>crassum</i>	Range Restricted
Taxonomically indeterminate	
<i>Hebe</i> aff. <i>ligustrifolia</i> (AK 207101; Surville Cliffs)	Range Restricted
<i>Helicbrysum</i> aff. <i>aggregatum</i> (AK 54473; Surville Cliffs)	Range Restricted
<i>Phyllocladus</i> aff. <i>trichomanoides</i> (AK 138439; Surville Cliffs)	Range Restricted
<i>Pimelea</i> aff. <i>tomentosa</i> (b) (AK 130893; Surville Cliffs)	Range Restricted
<i>Pseudopanax</i> aff. <i>lessonii</i> (AK 46066, Surville Cliffs)	Range Restricted

Orchid diversity

In a comprehensive survey covering the entire Te Paki area (broadly the same as Te Paki ED), McCrae (1990) recorded 41 orchid species. Following taxonomic changes and further surveys since then, there are currently 51 taxa known from Te Paki ED, some of which are taxonomically indeterminate (see Appendix 5). This represents approximately 36% of New Zealand's orchid flora. Many of the species found in Te Paki ED also occur in Australia and it is thought that the geographic position of Te Paki favours the establishment of orchid seed blown across the

Tasman Sea. Ground orchids predominate and are common under stunted or low manuka and areas of disturbed ground e.g. along track sides. The generally dry conditions and small forest remnants are likely to account for the lower abundance of epiphytic species.

Tropical affinities

Cheeseman (1897) observed that despite the warm climate of the Te Pahi area, the flora contains few 'tropical' species (i.e. warmth-loving plants of places northwards outside New Zealand). Gardner and Barlett (1980) concur with this view, and add that in forest remnants this deficiency is most marked. They note that in coastal shrubland and wetlands there are 'a fair number of Australian and Pacific plants (e.g. *Bidens pilosa*, mawhai, *Hibiscus richardsonii*, *H. diversifolius*, *Ipomoea pes-caprae* subsp. *brasiliensis*, *I. cairica*, the *Pomaderris* genus, thelypteroid ferns such as *Thelypteris confluens*, *Christella dentata*, *Macrothelypteris torresiana* and *Cyclosorus interruptus*, etc.), however forest remnants largely lack species with tropical affinities (the main exception being *Metrosideros* spp.). A large number of the species present at North Cape have a relatively wide natural range and can grow in cooler climates.

Gardner and Bartlett (1980) support Kelly's (1967) theory that the Te Pahi area lost its tropical and endemic species during the colder climate of the Pleistocene, when cool climate species became more predominant. Relicts of this cooler climate flora include Hall's totara, horopito, manoao, and rohutu, all of which are considerably north of their common distribution. Gardner and Bartlett (1980) suggest the present-day dry climate may have contributed to the absence of other cool climate species found at higher altitudes in western Northland. It is also suggested that species with tropical affinities that are currently present have recolonised the area in the last 20,000 years.

Distribution limits

Te Pahi Ecological District is at the northern tip of the North Island, thus a significant proportion of New Zealand's endemic species reach their northern limit of distribution here. The only opportunities for species to occur further north in New Zealand are on the Three Kings and Kermadec Islands. Species that reach their northern limit at Te Pahi ED include kauri, tanekaha, kawaka, the podocarps rimu, kahikatea, totara, Hall's totara, miro, matai, manoao, and many broadleaf species such as taraire, tawa, titoki, lancewood, northern rata, kanono, karamu, rangiora, kohuhu, nikau, kiekie and five-finger.

Lichens

Te Pahi ED has particular significance for New Zealand with regard to the diversity and distribution of lichens. This is due to the area's proximity to the sub-tropics, the presence of several Australasian species, several type collections having been made in the area, and a similarity to lichen communities near Puponga at the base of Farewell Spit (David Galloway pers. comm. 2007).

3.3.5 Threatened plant species

The following species are included in a list of nationally threatened plant taxa (Hitchmough *et al.* (comp.) 2007). Appendix 3 gives the definitions of threat categories as set out in Molloy *et al.* (2002). Of the 107 plant taxa listed in Table 3; 34 are Acutely Threatened, 18 Chronically Threatened, 46 At Risk, 6 Data Deficient, 2 Colonisers and 1 Vagrant.

TABLE 3: THREATENED PLANT TAXA (HITCHMOUGH *ET AL.* (COMP.) 2007) RECORDED IN TE PAKI ECOLOGICAL DISTRICT.

*=pre-1975 records, refer to Section 3.3.4

+ = Te Paki ED Endemics

PLANT GROUP	TAXON	THREAT CATEGORY	QUALIFIER	NO. TAXA PER CATEGORY
Dicot herb	<i>Atriplex bollowayi</i>	Nationally Critical	CD EF	
Orchid	<i>Calochilus</i> aff. <i>herbaceus</i> (CHR65825, Kaimaumau)	Nationally Critical	EF SO	
Dicot herb	<i>Centipeda minima</i> subsp. <i>minima</i>	Nationally Critical	SO EF	
Fern	<i>Cbristella dentata</i>	Nationally Critical	CD HI OL SO	
Liverwort	<i>Cololejeunea falcidentata</i>	Nationally Critical		
Dicot tree/shrub	+ <i>Coprosma spatbulata</i> subsp. <i>bikuruana</i>	Nationally Critical	CD HI OL	
Moss	<i>Erpodium glaucum</i>	Nationally Critical	SO	
Liverwort	+ <i>Frullania wairua</i>	Nationally Critical	OL	
Orchid	<i>Linguella puberula</i>	Nationally Critical	EF HI	
Dicot herb	<i>Mazus novaezeelandiae</i> subsp. <i>impolitus</i> f. <i>hirtus</i>	Nationally Critical	CD HI	
Dicot tree	+ <i>Metrosideros bartlettii</i>	Nationally Critical	CD HI	
Dicot herb	<i>Sicyos australis</i> sens. str.	Nationally Critical	CD TO	
Orchid	<i>Thelymitra</i> (a) (WELT 79140; Ahipara)	Nationally Critical	CD DP EF HI	
Orchid	<i>Thelymitra sanscilia</i>	Nationally Critical	DP EF	
Sedge	+ <i>Uncinia perplexa</i>	Nationally Critical	CD HI OL	15
Liverwort	<i>Cololejeunea</i> sp. 1	Nationally Endangered		
Dicot herb	* <i>Epilobium birtigerum</i>	Nationally Endangered	SO HI	
Liverwort	<i>Goebelobryum unguiculatum</i>	Nationally Endangered	HI SO	
Dicot tree/shrub	* <i>Hebe speciosa</i>	Nationally Endangered	CD HI	
Dicot herb	<i>Hibiscus richardsonii</i>	Nationally Endangered		
Dicot herb	<i>Lepidium oleraceum</i>	Nationally Endangered	CD EF HI	
Fern	<i>Ophioglossum petiolatum</i>	Nationally Endangered	CD HI SO	
Fern ally	<i>Phylloglossum drummondii</i>	Nationally Endangered	EF HI SO	
Dicot herb	<i>Picris burbridgeae</i>	Nationally Endangered	SO	
Dicot tree/shrub	+ <i>Pittosporum serpentinum</i>	Nationally Endangered	CD RF OL	
Dicot tree/shrub	<i>Pomaderris phyllifolia</i>	Nationally Endangered	HI SO	
Dicot herb	<i>Senecio scaberulus</i>	Nationally Endangered	EF HI	
Liverwort	<i>Stenolejeunea acuminata</i>	Nationally Endangered		
Fern	<i>Todea barbara</i>	Nationally Endangered	SO	
Dicot herb	<i>Utricularia australis</i>	Nationally Endangered	HI, SO, CD	15

PLANT GROUP	TAXON	THREAT CATEGORY	QUALIFIER	NO. TAXA PER CATEGORY
Dicot shrub	<i>Hibiscus diversifolius</i>	Nationally Vulnerable	SO	
Dicot herb	<i>Leptinella rotundata</i>	Nationally Vulnerable	RF	
Fern ally	* <i>Lycopodiella serpentina</i>	Nationally Vulnerable	TO	
Orchid	<i>Prasophyllum hectorii</i>	Nationally Vulnerable	CD DP	4
Dicot herb	<i>Daucus glochidiatus</i>	Serious Decline	SO DP	
Dicot herb	<i>Euphorbia glauca</i>	Serious Decline	EF	
Dicot tree	<i>Kunzea ericoides</i> var. <i>linearis</i>	Serious Decline	HI	
Dicot shrub	<i>Pimelea tomentosa</i>	Serious Decline	EF	
Orchid	<i>Plumatichilos tasmanicum</i>	Serious Decline	EF HI SO	5
Monocot herb	<i>Arthropodium bifurcatum</i>	Gradual Decline		
Grass	<i>Austrofestuca littoralis</i>	Gradual Decline	CD HI SO	
Dicot herb	<i>Colensoa physaloides</i>	Gradual Decline		
Fern	<i>Cyclosorus interruptus</i>	Gradual Decline	SO	
Sedge	<i>Cyperus insularis</i>	Gradual Decline		
Sedge	<i>Desmoschoenus spiralis</i>	Gradual Decline	CD EF	
Sundew	<i>Drosera pygmaea</i>	Gradual Decline	SO	
Sedge	<i>Eleocharis neozelandica</i>	Gradual Decline	EF	
Dicot tree/shrub	<i>Mida salicifolia</i>	Gradual Decline	RF	
Dicot herb	<i>Myriophyllum robustum</i>	Gradual Decline	CD	
Dicot tree/shrub	<i>Pimelea arenaria</i>	Gradual Decline	HI	
Dicot herb	* <i>Sonchus kirkii</i>	Gradual Decline	HI EF	
Fern	<i>Thelypteris confluens</i>	Gradual Decline	CD SO	13
Sedge	<i>Baumea complanata</i>	Range Restricted	HI	
Sedge	+ <i>Carex opbiolithica</i>	Range Restricted	CD OL ST	
Dicot tree/shrub	+ <i>Cassinia amoena</i>	Range Restricted		
Dicot tree/shrub	+ <i>Coprosma distantia</i>	Range Restricted	CD OL	
Dicot tree/shrub	<i>Coprosma neglecta</i>	Range Restricted		
Dicot tree	<i>Cordyline obtecta</i>	Range Restricted		
Moss	<i>Ectropoibectium sandwichense</i>	Range Restricted	SO	
Dicot tree/shrub	+ <i>Gentostoma ligustrifolium</i> var. <i>crassum</i>	Range Restricted	CD OL ST	
Dicot herb	+ <i>Haloragis erecta</i> subsp. <i>cartilaginea</i>	Range Restricted	CD OL ST	
Liverwort	<i>Harpalejeunea filicuspis</i>	Range Restricted	SO?	
Dicot tree/shrub	+ <i>Hebe adamsii</i>	Range Restricted	OL	
Dicot tree/shrub	+ <i>Hebe</i> aff. <i>ligustrifolia</i> (AK 207101; Surville Cliffs)	Range Restricted		
Dicot tree/shrub	+ <i>Hebe brevifolia</i>	Range Restricted	CD OL ST	
Dicot tree/shrub	+ <i>Helicbrysum</i> aff. <i>aggregatum</i> (AK 54473; Surville Cliffs)	Range Restricted	CD OL ST	
Dicot vine	<i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i>	Range Restricted		
Dicot tree/shrub	+ <i>Leucopogon xerampelinus</i>	Range Restricted	CD OL ST	
Moss	<i>Macromitrium brevicaule</i>	Range Restricted	SO?	
Dicot vine	+ <i>Parsonia praeurptis</i>	Range Restricted	CD OL	
Orchid	<i>Petalochilus alatus</i>	Range Restricted	DP TO	

PLANT GROUP	TAXON	THREAT CATEGORY	QUALIFIER	NO. TAXA PER CATEGORY
Gymnosperm	+ <i>Phyllocladus</i> aff. <i>trichomanoides</i> (AK 138439; Surville Cliffs)	Range Restricted	CD OL ST	
Dicot shrub	+ <i>Pimelea</i> aff. <i>tomentosa</i> (b) (AK 130893; Surville Cliffs)	Range Restricted	CD OL ST	
Dicot tree/shrub	+ <i>Pittosporum pimeleoides</i> subsp. <i>majus</i>	Range Restricted	CD OL ST	
Dicot tree/shrub	<i>Pomaderris paniculosa</i> subsp. <i>novae-zelandiae</i>	Range Restricted		
Dicot tree/shrub	+ <i>Pseudopanax</i> aff. <i>lessonii</i> (AK 46066, Surville Cliffs)	Range Restricted	CD	
Orchid	<i>Thelymitra</i> (b) CHR 518036 "darkie"			
Orchid	<i>Thelymitra</i> (c) (CHR 518036; "rough leaf")	Range Restricted	EF	
Grass	<i>Trisetum serpentinum</i>	Range Restricted		27
Orchid	<i>Anzybas rotundifolius</i>	Sparse		
Fern	<i>Botrychium australe</i>	Sparse	DP SO EF	
Dicot vine	<i>Calystegia marginata</i>	Sparse	SO EF	
Orchid	<i>Corunastylis pumila</i>	Sparse	SO EF	
Dicot tree/shrub	* <i>Fuchsia procumbens</i>	Sparse		
Dicot tree	<i>Halocarpus kirkii</i>	Sparse	RF	
Dicot woody parasite	<i>Kortbalsella salicornioides</i>	Sparse	EF	
Gymnosperm	<i>Libocedrus plumosa</i>	Sparse		
Fern	<i>Macrothelypteris torresiana</i>	Sparse	SO EF	
Dicot herb	<i>Mimulus repens</i>	Sparse	DP SO	
Dicot tree	<i>Pisonia brunoniana</i>	Sparse	SO HI	
Dicot tree	<i>Pittosporum ellipticum</i>	Sparse		
Orchid	<i>Petalocbilus bartlettii</i>	Sparse	DP EF	
Dicot tree	* <i>Pseudopanax ferox</i>	Sparse	CD EF	
Fern	<i>Sticherus flabellatus</i>	Sparse	SO	
Orchid	<i>Thelymitra</i> aff. <i>ixioides</i> (AK 251348; New Zealand)	Sparse	DP SO EF	
Orchid	<i>Thelymitra tholiformis</i>	Sparse	EF	
Monocot herb	<i>Tbismia rodwayi</i>	Sparse	DP EF SO	
Fern ally	<i>Tmesipteris sigmatifolia</i>	Sparse		19
Red alga	<i>Cephalocystis furcellata</i>	Data Deficient		
Liverwort	<i>Drepanolejeunea</i> aff. <i>ternatensis</i>	Data Deficient		
Moss	<i>Fissidens oblongifolius</i> var. <i>oblongifolius</i>	Data Deficient		
Dicot tree/shrub	<i>Olearia angulata</i>	Data Deficient		
Orchid	<i>Nematoceras rivulare</i>	Date Deficient		
Orchid	<i>Spiranthes</i> aff. <i>novae-zelandiae</i> (CHR 518297; Motutangi)	Data Deficient	HI EF	6
Fern	<i>Doodia aspera</i>	Vagrant	EW SO	1
Orchid	<i>Thelymitra malvina</i>	Coloniser	SO	
Orchid	<i>Thelymitra matthewsii</i>	Coloniser	TO	2
Total				107

ACUTELY THREATENED

Holloway's crystalwort *Atriplex hollowayi* (Nationally Critical CD, EF)

Holloway's crystalwort is an endemic beach herb, formerly known from the northeastern North Island coast, from Te Paki to Hicks Bay, and Lyall Bay, Wellington (T. Kirk 1875, WELT 43401) (de Lange *et al.*, 2000). It now only occurs at Waikuku Beach (N02/030) and Whareana Bay (N02/031) on the east coast of Te Paki ED. Considerable conservation effort has gone into protecting this species and it has effectively been managed back from the brink of extinction since 2001. This species is an annual therefore numbers tend to fluctuate dramatically throughout the season, however the most recent census recorded a healthy population of 3123 plants in November 2006, and 1438 plants in February 2007 (J. Collings pers. comm.). Outside the Te Paki ED the odd plant has recently been recorded in the Aupouri ED at the base of Kokota Spit and on Great Exhibition Bay (J. Collings pers. comm.)

***Calochilus* aff. *herbaceus* (CHR65825, Kaimaumu) (Nationally Critical EF, SO)**

Calochilus aff. *herbaceus* is an orchid only known from Te Paki to Albany in New Zealand, but is also present in Australia (NZPCN 2007). All recent records are from the Far North (P. de Lange, B. Molloy pers. comm.). It is threatened by habitat loss and plant collectors (NZPCN 2007). Within Te Paki ED it has been recorded in shrubland near Cape Reinga Road, Te Paki Shrublands and Forest Remnants (N02/003) (McCrae 1988 and Crowcroft and de Lange, 1990, DOC Bioweb 2007), Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (unsubstantiated) and at the Shenstone Block (N02/009) (1995, SSBI M02/N02/H049).

***Centipeda minima* subsp. *minima* (Nationally Critical EF, SO)**

Centipeda minima subsp. *minima* is a small prostrate herb in the daisy family that has been found in waste places and damp stream or lake margins from the Waikato northwards. Historic records from Te Paki ED include Waikuku Flat (N02/005(b)) by Parris in 1970 (AK 127981). The most recent collection is from the Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (Cameron, 1984, AK 274350). Other Northland records include Kai Iwi Lakes, Kerikeri and Kawau Island.

***Christella dentata* (Nationally Critical CD, HI, OL, SO)**

Christella dentata is a fern with tufts of pale green, velvety textured fronds arising from a very shortly creeping rhizome. Recorded by Bartlett in 1977 from three wetlands by Spirits Bay Road (this population has been burnt out, the wetlands were drained in connection with pine planting, DOC Bioweb 2007). There are several records in 1990's from Unuwahao Bush and Shrublands (N02/004) (including de Lange, 1991, WELT P017616), with a 'very large population, both in numbers and in size' recorded in 1999 (Syddall and Trafford 1999, DOC Bioweb 2007). There is also a 1999 record from Te Paki Remnants and Shrublands (N02/003) (Syddall and Renwick, 1999, AK 245593).

***Cololejeunea falcidentata* (Nationally Critical)**

Cololejeunea falcidentata is a rare liverwort recorded at Unuwahao Bush and Shrubland (N02/004) on a nikau trunk in damp forest (Braggins, 1985, AK 284269). It is also known from southeast of Kaitaia in Mangamuka Gorge Scenic Reserve (DOC unpublished data 2007).

***Coprosma spathulata* subsp. *bikuruana* (Nationally Critical ^{CD, HI, OL})**

Coprosma spathulata subsp. *bikuruana* is a prostrate, trailing shrub endemic to 120 ha of exposed ultramafic rock in Surville Cliffs, North Cape Scientific Reserve and Surrounds (N02/005(c)). There are very few plants and they are at risk from weed competition, browsing mammals, and fire (de Lange and Heenan 2001).

***Erpodium glaucum* (Nationally Critical ^{so})**

Erpodium glaucum is a moss which was recorded at Unuwahao (N02/004) as a super-epiphyte on the liverwort *Frullania* sp., which in turn was growing on the bark of tawa (collected by John Bartlett in the period 1974-1983, WELT M008353; Barlett 1985). Formerly known as *Aulacopilum glaucum*, the only other known localities are the Raukokore River mouth (Bay of Plenty) (collected by O'Malley, 1943) and the Bay of Islands (Colenso, WELT M31113).

***Frullania wairua* (Nationally Critical ^{ol})**

Frullania wairua is a liverwort which has only been recorded from two trees of Bartlett's rata (Nationally Critical) in Radar Bush (N02/003) (von Konrat and Braggins 2005). It is considered to be nationally critical because it appears to be endemic to its host species, which is also acutely threatened, and known only from this site (von Konrat and Braggins 2005).

Dwarf greenhood *Linguella puberula* (Nationally Critical ^{EF, HI})

Dwarf greenhood is a small orchid with compact and tightly appressed rosette leaves found on gumland and clay soils. In Te Pahi ED it has been recorded once at North Cape (N02/005(c)) in 1990, in the catchment of the serpentine quarry amongst sedges on the edge of manuka thickets (Forester, AK 205017). In Northland it is also known from the Three Kings Islands (P. de Lange pers. comm.), near Kaitaia (K. Matthews pers. comm.), Bay of Islands (CHR 289629) and Purua (CHR 289665). In the past this species has been referred to as *Pterostylis puberula* and *P. nana* in New Zealand.

***Mazus novaezeelandiae* subsp. *impolitus* f. *hirtus* (Nationally Critical ^{CD, HI})**

Mazus novaezeelandiae subsp. *impolitus* f. *hirtus* is an endemic herb formerly recorded from 9 sites from western Northland (Te Pahi, Kaitaia south to the Hokianga Harbour), the Waikato (near Mercer) and in scattered sites near East Cape (NZPCN 2007). It is now only known with certainty from three sites: one at Awanui near Kaitaia, at Hautai Beach, and Waipapa Stream near East Cape (ibid). The most recent Te Pahi ED record is from Te Werahi Wetland (N02/010), with the comment 'on margin of swamp, in amongst raupo, fairly common in some areas'

(Braggins, 1985, AK 283910), and there is an historic record by Carse in 1928 from Scott Point Shrubland and Coastal Associations (M02/008) (CHR 328095).

Bartlett's rata, Rata Moehau *Metrosideros bartlettii* (Nationally Critical CD, HI)

Bartlett's rata was first discovered in 1975; this white-flowering endemic tree rata is known only from three forest remnants in both free-standing and epiphytic forms at Te Paki Shrublands and Forest Remnants (N02/003) at Kohuronaki and Radar Bush and at Unuwaho (part of N02/004). It has distinctive pale grey to whitish, soft and flaking bark (Wilson and Given 1989). It occurs in mixed broadleaf forest remnants in gully bottoms (Dopson *et al.* 1999) which have escaped fire. Currently the population stands at 31 individuals and is actively being managed including the planting of 200 trees in 2007 (J. Collings pers. comm.).

***Sicyos australis sens. str.* (Nationally Critical CD, TO)**

Sicyos australis grows as a sprawling, cucumber-like vine and produces prickly fruit. At least two distinct species appear to exist in this taxon; one species which occurs on mainland New Zealand from Northland to the Bay of Plenty, while the other (*S. aff. australis*) is present on islands from the Three Kings, Motuopao and the Poor Knights to Mayor Island (Forester and Townsend 2004). Close relatives occur in eastern Australia and formerly Lord Howe and Norfolk Islands. Present in Te Paki ED at Motuopao Island (M02/071) (Forester, 2001, AK 297346). There is also a 1944 record (Beddie), a few hundred metres south of North Cape N02/005(c) (DOC Bioweb 2007). Most recently recorded on rocks at the base of Maungapiko Hill (part of N02/004) in 2006 (Holland and Bridson, AK 297549) which had been previously record by Ogle in 1986 (DOC Bioweb 2007).

***Thelymitra* (a) (WELT 79140; Ahipara) (Nationally Critical CD, DP, EF, HI)**

Thelymitra (a) is a very rare orchid which was recorded in small populations of between 4 and 7 plants scattered in two sites at North Cape Scientific Reserve and Surrounds (N02/005(c)) in 1990 (de Lange, DOC Bioweb 2007). Also occurs in the Aupouri and Ahipara EDs in Northland.

***Thelymitra sanscilia* (Nationally Critical DP, EF)**

Thelymitra sanscilia is an endemic North Island orchid which is apparently confined to Northland, and known from 'a handful of sites from Te Paki to Pipiwai near Whangarei' (NZPCN 2007). It is generally similar to *Thelymitra pauciflora*, but the column arms have few or no hairs, and the midlobe is often very deeply cleft and sometimes greenish (Saint George 1999). It occurs in open gumland shrub and in open ground in association with *Kunzea ericoides* var. *linearis* woodland (NZPCN 2007). It was noted on the way to North Cape Scientific Reserve and Surrounds (N02/005(c)) in 1996 (Scanlen 1997), though the exact locality is unclear. There are apparently no herbarium specimens from Te Paki ED.

***Uncinia perplexa* (Nationally Critical CD, HI, OL)**

Uncinia perplexa is a sedge endemic to the Surville Cliffs, North Cape Scientific Reserve and Surrounds (N02/005(c)); where past fires have restricted it to a single 0.1 ha pohutukawa forest remnant on ultramafic rock. Within this remaining habitat it is locally abundant with a population of 50–100 plants, its main threats being future habitat loss through fire, weeds or grazing animals. (Heenan and de Lange 2001)

***Cololejeunea* sp. 1 (Nationally Endangered)**

Cololejeunea sp. 1 is a liverwort which has been recorded at Radar Bush in Te Paki Shrublands and Forest Remnants (N02/003) in forest of taraire, puriri, and houhere as an epiphyte on kanono, closely appressed to bark (Braggins, 1995, AK 254998), and at Unuwahao Bush and Shrubland (N02/004) on nodes and stems of supplejack in well lit, dense, moist forest (Braggins, 1985, AK 283952). It has also been recorded at Kiwani Reserve in the Herekino Forest and is probably present in Australia (DOC unpublished data 2007).

***Goebelobryum unguiculatum* (Nationally Endangered HI, SO)**

Goebelobryum unguiculatum is a liverwort which is in moderate decline through loss of gumland habitat. There is an old record from a clay bank in the general locality of Kapowairua (Bartlett, 1978, AK 189923) (probably within N02/003), and the species is also known from Lake Ohia and Ahipara (DOC unpublished data 2007).

***Hibiscus richardsonii* (Nationally Endangered)**

Hibiscus richardsonii was formally named *Hibiscus* aff. *trionum* (AK 218967; North Island) in de Lange *et al.* 2004 and its threat classification has been changed to Nationally Critical. *Hibiscus richardsonii* is a coastal native herbaceous annual to short-lived hibiscus which requires open ground and is highly palatable to stock. There is a naturalised form of *H. trionum* which hybridises freely with the native form. (NZPCN 2007). In this ED it has been recorded from Tapotupotu Beach (M02/063) (Smith, 2002, AK 256598), Unuwahao Bush and Shrublands (N02/004) (Ogle, 1986, CHR 438278), Kapowairua (N02/027) (Gardner, 1979, DOC Bioweb 2007), Tom Bowling Bay (N02/029) (Syddall and Trafford, 1998, DOC Bioweb 2007), Te Werahi Beach and Cape Maria van Diemen (M02/012) (Bartlett, 1980, CHR 403503) and a historical record by Kelly in 1967 (CHR 178034) from Kohuronaki (part of N02/003).

Cook's scurvy grass, nau *Lepidium oleraceum* (Nationally Endangered CD, EF, HI)

Cook's scurvy grass or nau is an endemic sprawling, upright, fleshy-leaved herb in the Brassicaceae family, which was once common on the coast and islands throughout New Zealand. It played a critical role in preventing scurvy in ship crews visiting New Zealand during the late 1700s and early 1800s. Similar plants are used as a food source throughout the Pacific so it is possible that Maori also used this and allied plants in the same way (NZPCN 2007). It was recorded on Motupao Island (M02/071) in 1994 (Forester, AK 294641) however rats were removed from the island in the

mid 1990's, resulting in a population explosion of the common garden snail which possibly decimated the *Lepidium*. It has also been recorded on a rock stack near Motuopao Island (Parrish, 1990, AK 196229) however it was not recorded in a follow-up check (L. Forester pers. comm.).

***Ophioglossum petiolatum* (Nationally Endangered CD, HI, SO)**

Ophioglossum petiolatum is an unusual fern, up to 30 cm tall, with one or sometimes two leaves, is widespread in the tropics and subtropics. It has been recorded from moist talus and grassy areas, sandy margins of coastal lagoons, herbfields near lake margins, swamps and streams, and rarely from podocarp forest. Records in Te Pahi ED come from Tawakewake Wetland (N02/036) (Crowcroft and de Lange, WELT P016365). Early records are from Scott Point (Matthews, 1924, WELT P004601) and Cape Maria van Diemen (Baylis, 1934, OTA 001238). *O. petiolatum* also occurs on the Three Kings Islands and in the neighbouring Aupouri ED.

***Phylloglossum drummondii* (Nationally Endangered)**

Phylloglossum drummondii is New Zealand's smallest fern ally (up to 40 mm long). It has a short growing season, appearing above the ground in winter and early spring; the rest of the year it dies down to an underground tuber (Forester and Townsend 2004). It is common in Australia (NZPCN 2007). It has been recorded at several sites in Te Pahi ED in the past including N02/003 (Chinnock 1971) and N02/005(b) (Hynes, 1959, AK 50342)), however the only recent records are from the Surville Cliffs in N02/005(c) (de Lange, 1990, CHR 473022) and a 1988 record from Scott Point Shrubland and Coastal Associations (M02/008) by Forester (SSBI M02/N02/H026).

***Picris burbidgeae* (Nationally Endangered SO)**

Picris burbidgeae is a herb in the daisy family. It has been recorded at Unuwahao Bush and Shrublands (N02/004) (Gardner, 1979, AK 151727), Murimotu Island (N02/072) (Wright and Cameron 1996) and at North Cape Scientific Reserve and Surrounds (N02/005(c)) on the ultramafic rock of the Surville Cliffs (de Lange, 1996, AK 225852). It is also known from the Three Kings Islands and Waipoua (Tutamoe ED) in Northland.

***Pittosporum serpentinum* (Nationally Endangered CD, RF, OL)**

Pittosporum serpentinum is a low-growing shrub with prostrate branches and distinctive dark orange-brown tomentum on branchlets when young (de Lange 1998). It is endemic to ultramafic rock on the Surville Cliffs at North Cape Scientific Reserve and Surrounds (N02/005(c)). Formerly named *Pittosporum ellipticum* subsp. *serpentinum*.

***Pomaderris phyllicifolia* (Nationally Endangered HO, SO)**

Pomaderris phyllicifolia is a low bushy shrub which grows amongst stunted manuka on infertile gumland soils and it also favours disturbed road edges (L. Forester pers. comm.). Historically known from Northland to the northern Waikato and currently known from Spirit's Bay to near Orewa. It also occurs in Australia at Victoria and southern New South Wales. *P. phyllicifolia* has been recorded many times in the Te Pahi ED including within Te Pahi Shrublands and Forest Remnants (N02/003)

(Walsh, 1997, WELT SPO81374/A), Unuwahao Bush and Shrublands (N02/004) (Riddell, 1995, AK 225655), the Surville Cliffs (part of N02/005(c)) (de Lange, 1996, AK 229545), on the edge of Te Werahi Wetland (M02/010) (Syddall, 2000, DOC Bioweb 2007) and at Scott Point Shrubland and Coastal Associations (M02/008) (Forester, 1988, SSBI M02/N02/H026). Formerly known as *Pomaderris polifolia*, or *P. phyllicifolia* var. *polifolia*.

***Senecio scaberulus* (Nationally Endangered^{EF, HI})**

Senecio scaberulus is an endemic fireweed which is now mainly found at some coastal sites in Northland and on some of the Hauraki Gulf Islands (NZPCN 2007). Its only record from Te Paki ED is from Unuwahao Bush and Shrublands (N02/004) (Gardner, 1979, AK 151536).

***Stenolejeunea acuminata* (Nationally Endangered)**

Stenolejeunea acuminata is a liverwort which has recently been recorded from three localities in Northland: Maunganui Bluff, Karikari Peninsula and Radar Bush in Te Paki Shrublands and Forest Remnants (N02/003) (Braggins, 1995, AK 254990). It was found growing on basalt under pohutukawa at Maunganui Bluff and Karikari Peninsula. At Radar Bush, it grew as an epiphyte on kanono under taraire-puriri-houhere forest. (DOC unpublished data 2007 and Braggins, 1995, AK 254990)

***Todea barbara* (Nationally Endangered^{so})**

Todea barbara is a large, indigenous erect fern with leathery fronds growing up to 1 m tall, occurring in gumland vegetation, coastal shrublands and streamside margins in open forest. This fern grows from Te Paki south to the Bay of Islands and around Dargaville as well as on the Poor Knights Islands, and is common in Australia and South Africa. (NZPCN 2007)

It is found at numerous sites throughout Te Paki ED including Unuwahao Bush and Shrublands (N02/004) (Wright, 1979, AK 151264), Shenstone Block (N02/009) (Wright, 2003, AK 280720), Te Paki Shrublands and Forest Remnants (N02/003) (Syddall, 1999, DOC Bioweb 2007), Mokaikai Scenic Reserve and Surrounds (N02/005(a)) (Avis, 1991, DOC Bioweb 2007) and North Cape Scientific Reserve and Surrounds (N02/005(c)) (Winch, 1997, AK 230738) and The Big Lake (N02/067) (Bartlett, 1977, CHR 312507).

***Utricularia australis* (Nationally Endangered^{HI, SO, CD})**

Utricularia australis is a submerged yellow-flowering bladderwort found in peat lakes, peaty pools and slow-moving streams which drain peat bogs water (Forester and Townsend 2004). It is seriously at risk by competition from introduced aquatic weeds especially *Utricularia gibba* which is now widespread in most of the lakes in the Far North (L. Forester pers. comm.). In Te Paki ED, this species has been recorded in wetlands at Shenstone Block (Te Paki Dune Lake within N02/009) (Wells *et al.* 2007), Te Werahi Wetland (M02/010) (Cameron, 1985 AK 274648), a stream at Whareana Bay (N02/031) (Forester, 1988, AK 180261) and Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex

(N02/016) (Cameron, 1984, AK 171314). There is a historic record from the Kapowairua area, probably at Paranoa (Kelly, 1966, CHR 177916). Formerly known as *Utricularia protusa*.

***Hibiscus diversifolius* (Nationally Vulnerable_{so})**

Hibiscus diversifolius is an indigenous prickly stemmed shrub mostly restricted to the Far North of Northland. It is also known from Africa, Australia, New Guinea, the Philipines, Central and South America and many Pacific Islands (NZPCN 2007). In Te Paki ED it is found at several sites from Kapowairua to Waikuku, including Unuwahao Bush and Shrublands (N02/004) (de Lange, 1990, CHR 472746), Mokaikai Scenic Reserve and Surrounds (N02/005(a)), North Cape Scientific Reserve and Surrounds (N02/005(c)) (prostrate form, sighted in Cameron and Jones 1996), Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (Trafford and Syddall, 1999, DOC Bioweb 2007), Kapowairua (N02/027) (Trafford and Syddall, 1999, DOC Bioweb; 2007 record from Whangakea Beach (western end of Kapowairua) W. Holland pers. comm.), Tom Bowling Bay (N02/029) (possibly plantings, sighted in Cameron and Jones 1996), Waikuku Beach (N02/030) (Crowcroft and de Lange, 1990, DOC Bioweb), Whareana Bay (N02/031) (N. Syddall, 1999, DOC Bioweb 2007), Waikuku Wetlands (N02/033) (Riddell and McManus, 1995, DOC Bioweb 2007), Waitangi Stream Wetland and Riparian Strip (N02/034) (Riddell, 1995, DOC Bioweb 2007), and Haupatoto/Whareana Bay Wetland (N02/038) (Clunie and Wittebrock, 1985, DOC Bioweb 2007).

Swamp leek orchid *Prasophyllum hectorii* (Nationally Vulnerable)

Swamp leek orchid is a large (up to 1 m tall) orchid with a sharply folded back labellum, is found in pools of water in swampy habitats (Hollard and Clements 1993). Its former range was from Te Paki through to Waiouru, and it was also known from one locality on the main Chatham Island (NZPCN 2007). Current records exist for the Waikato, the Central Volcanic Plateau, and Te Paki ED (NZPCN 2007), where it has been recorded from Te Werahi Wetland (M02/010) (Cameron, 1984, AK 274299). Formerly referred to as *Prasophyllum* aff. *patens*.

***Leptinella rotundata* (Nationally Vulnerable_{RF})**

Leptinella rotundata is a creeping perennial herb found on cliffsides and is endemic to the North Island. Up until very recently it had only been known from Maunganui Bluff to Mitimiti in Northland (3 populations) (occurring in Tutamoe and Hokianga Ecological Districts), however in 2007 it was found growing in the Te Paki Ecological District on the west coast (part of N02/008) (by A. Townsend, specimen to be lodged with Auckland Museum Herbarium). This is an extremely important find as just previously its ranking was reviewed to Nationally Critical due to decline in one of the populations (P. de Lange pers. comm. 2007). This plant's threats include coastal erosion and weed invasion (NZPCN 2007).

CHRONICALLY THREATENED

***Daucus glochidiatus* (Serious Decline_{so, DP})**

Daucus glochidiatus is a native carrot-type plant that has been recorded

at a few sites in the eastern half of Te Paki ED including North Cape (part of N02/005(c)) (Wright, 1995, AK 224986) and Unuwahao Bush and Shrublands (N02/004) (Wright, 1989, AK 189999). This species has undergone a rapid decline in the last 30 years, probably through competition with taller weeds such as ratstail (NZPCN 2007). Can be confused with the introduced carrot weed *Daucus carota*.

Shore spurge *Euphorbia glauca* (Serious Decline _{ET})

Shore spurge is a soft herb which is endemic to New Zealand. It has a sporadic distribution found around the coast on sand dunes and coastal seeps (Wilson and Given 1989). It has been recorded at Twilight Beach (M02/011) (Carlin, 1984, DOC Bioweb 2007) and Waikuku Beach (N02/030) (Cameron, 1995, AK 224162), and historically by Carse (1928) (DOC Bioweb 2007) from Scott Point Shrubland and Coastal Associations (M02/008) and Whareana Bay (N02/031) by Hynes in 1959 (AK 227878).

***Kunzea ericoides* var. *linearis* (Serious Decline _{HI})**

Kunzea ericoides var. *linearis* is a variety of kanuka which is endemic to the northern North Island where it is most abundant from Kaitaia north, preferring sandy coastal soils (NZPCN 2007). It is widespread in Te Paki ED, from Te Rerenga Wairua to North Cape and south to Te Hapua, occurring in a number of sites. Records include Unuwahao Bush and Shrublands (N02/004) where it is recorded in the notes for *Pittosporum ellipticum* (de Lange, 1996, AK 252126), Mokaikai Scenic Reserve and Surrounds (N02/005(a)) (de Lange, 2000, AK 287953), the Surville Cliffs (part of N02/005(c)) (de Lange and Ritchie, 2000, AK 287874), Te Paki Shrublands and Forest Remnants (N02/003) (de Lange, 2000, AK 287951), and Murimotu Island (N02/072) (Wright and Cameron 1996). Past surveys may have recorded it simply as the more common kanuka variety, *Kunzea ericoides* var. *ericoides*. Its main threat is loss of habitat though coastal development (NZPCN 2007), however this is less of an issue in Te Paki ED, which has large areas of protected coastal land.

***Pimelea tomentosa* (Serious Decline _{EF})**

Pimelea tomentosa is an endemic slender, finely hairy shrub found in open shrubland from Three Kings to Nelson/Marlborough (Poole and Adams 1990). There are very few records from Northland, with a small number of plants recorded from around Pandora in open shrubland within Te Paki Shrublands and Forest Remnants (N02/003) (L. Forester pers. comm. 2007).

***Plumatictilos tasmanicum* (Serious Decline _{EF, HI, SO})**

Plumatictilos tasmanicum is a distinctive orchid, with rosette leaves and long yellow hairs on the labellum, indigenous to New Zealand and Victoria and Tasmania in Australia (St George 1999). This species requires an open habitat and is threatened by competition from weeds and collecting by orchid enthusiasts (NZPCN 2007). Found at North Cape on both cliffs and plateau in open, exposed sites, North Cape Scientific Reserve and Surrounds (N02/005(c)) (Cameron, 1995, AK 224161) and near Cape Reinga Road, Te Paki Shrublands and Forest Remnants (N02/003) (Young,

1995, DOC Bioweb 2007). The most recent record is from North Cape Scientific Reserve and Surrounds (Young 2006).

***Arthropodium bifurcatum* (Gradual Decline)**

Arthropodium bifurcatum is a newly described species of rengarenga lily, which can be differentiated from the sympatric, more common rengarenga lily (*A. cirratum*), by its bifurcate flower bracts, upright and fleshy leaves with a prominent white and fleshy midrib. It occurs on the Northland mainland and on the Three Kings, Poor Knights, Cavalli, and Hen and Chickens Islands. (Heenan *et al.* 2004)

In Te Pahi ED it has been recorded at Motuopao Island (M02/071) (Shaw, 1990, AK 204998), North Cape Scientific Reserve and Surrounds (N02/005(c)) (Wright, 1978, AK 148989), Te Pahi Shrublands and Forest Remnants (N02/003) (Holland and Townsend, 2007, AK 301844), and Kapowairua (N02/027) (Owen, 1978, CHR 354030).

Its preferred habitat is above the spray zone, on exposed rock stacks, wave-cut platforms, and cliff faces, and it is extremely drought-resistant. The species is threatened by browsers (slugs, snails, and pigs) and competition from weeds, and it has been classed as 'Gradual Decline' mainly because of the mainland populations, which are not 'secure'. (Heenan *et al.* 2004)

Sand tussock *Austrofestuca littoralis* (Gradual Decline CD, HI, SO)

Sand tussock is a tufted grass with incurled and pointed leaves which is found on sandy and rocky places near the shore throughout the North and South Islands, temperate Australia, and formerly on the Chatham Islands (NZPCN 2007). Scattered populations occur on shifting and consolidated dunes along most of Te Pahi ED's coastline, however browsing, competition with marram grass, and vehicle disturbance has reduced its abundance. The problem of mis-identification by people managing the dunes (i.e. confusing it with marram grass and spraying or hand-pulling it) has also been identified as a threat (DOC Bioweb 2007). It has been recorded at the following sites: Te Werahi Beach and Cape Maria van Diemen (M02/012) (de Lange, 1990, CHR 472753), Tapotupotu Beach (M02/063) (de Lange, 1990, AK 200905), Unuwahao Bush and Shrublands (N02/004) (Syddall and Trafford, 1999, DOC Bioweb), Kapowairua (N02/027) (de Lange, 1990, CHR 472885), Tom Bowling Bay (N02/029) (de Lange, 1990, AK 200861), Waikuku Beach (N02/030) (de Lange, 1990, AK 200864), and Whareana Bay (N02/031) (Syddall, 1999, DOC Bioweb 2007). An unusual absence from the record is Twilight Beach (M02/011), and there is only an historic record from Scott Point (M02/008) (Matthews, pre-1934, AK 158407). In Northland it is also known from Aupouri, Ahipara and Whangaruru EDs.

***Colensoa physaloides* (Gradual Decline)**

Colensoa physaloides is a distinctive blue-flowered, shrub in the lobelia family with hydrangea-like foliage. It is a monotypic genus, found in Northland and some of Northland's offshore islands such as the Three Kings where it is common (L. Forester pers. comm.). There is an outlier population on Rakitu Island, east of Great Barrier Island, which suggests

it used to be more widespread than its present range (NZPCN 2007). It is a highly palatable herb and as a result has vanished from most of its former habitat on the mainland (ibid).

This species has been recorded in Te Paki ED at Te Paki Shrublands and Forest Remnants (N02/003) (Syddall, 2000, DOC Bioweb; also many times at Radar Bush), Unuwahao Bush and Shrublands (N02/004) (de Lange, 1991, AK 200932), Mokaikai Scenic Reserve and Surrounds (N02/005(a)) (Ogle, 1985, DOC Bioweb 2007) and North Cape Scientific Reserve and Surrounds (N02/005(c)) (Crowcroft and de Lange, 1990, CHR 472759).

***Cyclosorus interruptus* (Gradual Decline so)**

Cyclosorus interruptus is an indigenous glabrous, leathery fern which grows in warm, frost-free wetlands, such as geothermal areas around Rotorua and Taupo, and coastal wetlands in the northern North Island (Brownsey and Smith-Dodsworth 2000). It is found throughout the tropical and warm-temperate Pacific where it is not threatened (NZPCN 2007). In Te Paki ED it has been recorded at Shenstone Block (N02/009) (Young, 1999, DOC Bioweb 2007) and Te Werahi Wetland (M02/010) (Braggins, 1985, AK 283909), with an old record from Cape Maria van Diemen (part of M02/012) (Baylis, 1934, OTA 001101). Until 1977 there were three small populations within the Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (collected by J. Bartlett), however these were destroyed by drainage associated with radiata pine plantations and fire (DOC Bioweb 2007).

***Cyperus insularis* (Gradual Decline)**

Cyperus insularis is a robust sedge, which grows up to 2 m tall, and is found mainly on the northern offshore islands, including the Kermadec Island and Three Kings Islands, and it also has a sparse and disjunct mainland distribution from Te Paki south to the Waikato and Bay of Plenty (Heenan and de Lange 2005). The only record of it in Te Paki ED is from Motuopao Island (M02/071) (Shaw, 1990, AK 204994), however it is likely to be more common than this suggests, as members of this newly described species were formerly included within the circumscription of the common giant umbrella sedge (*Cyperus ustulatus*).

***Pingao Desmoschoenus spiralis* (Gradual Decline CD, EF)**

Pingao is an endemic sand-binding sedge, which has declined in abundance throughout New Zealand's coastal dunes through weed competition (especially marram grass), dune stabilisation and compaction, harvesting, trampling, vehicle traffic, and browsing animals (NZPCN 2007). It has been recorded at several sites in Te Paki ED: Twilight Beach (M02/011) (recorded during this survey), Te Werahi Beach and Cape Maria van Diemen (M02/012) (de Lange, 1990, DOC Bioweb), Tom Bowling Bay (N02/029) (de Lange, 1990, DOC Bioweb), Waikuku Beach (N02/030) (de Lange, 1990, DOC Bioweb), Kapowairua (N02/027) (Crowcroft and de Lange, 1990, DOC Bioweb), Ngakengo Beach (N02/062) (recorded during this survey) and Motuopao Island (M02/071) (Parrish, 1994, AK 294626).

***Drosera pygmaea* pygmy sundew (Gradual Decline _{so})**

Drosera pygmaea is found in limited locations in the North and South Island in places such as gumland and peat bogs however it is common in Australia. It is threatened by wetland drainage and the spread of taller and faster growing weeds (NZPCN 2007). In November 2007, Andrew Townsend recorded this plant from a raised acid bog near Kapowairua (part of N02/003), specimen to be lodged with the Auckland Museum Herbarium (W. Holland pers. comm.). Te Pahi records are scarce with records previously by Mitchell 1984 and then T. F. Cheesman back in 1896 (AK 4521).

***Eleocharis neozelandica* (Gradual Decline _{EF})**

Eleocharis neozelandica is a small, endemic, naturally ephemeral sedge which occurs on the sandy margins of dune lakes, damp sandy flats, dune hollows and coastal stream flats (Wilson and Given 1989). It is scarce in the South Island and is now only known from Farewell Spit (NZPCN 2007). Its stronghold is at Te Pahi (de Lange, pers. comm. 1996) where it has been recorded at Ngakengo Beach (N02/062) (de Lange, 1996, AK 226101), Waikuku Beach (N02/030) (Cameron, 1995, AK 227028), Waihakari Wetland (N02/035) (Ogle, 1985, CHR 418268) and Te Werahi Beach and Cape Maria van Diemen (M02/012) (Fitzpatrick, 1996, DOC Bioweb 2007).

***Myriophyllum robustum* (Gradual Decline _{CD})**

Myriophyllum robustum is an aquatic water plant endemic to the North and South Islands. It is threatened by habitat modification and the spread of naturalised wetland weeds. (NZPCN 2007)

This plant has been recorded from numerous dune lakes in the Aupouri ED where it is found around shallow lake margins. In Te Pahi ED, there is a 1985 record from Te Werahi Wetland (M02/010) where it was noted as locally common in open areas with *Eleocharis sphacelata* (Cameron, AK 274647). There is also one historic record from an unspecified 'small lagoon' on the west coast of the North Cape Peninsula (Matthews, 1921, CHR 291257).

***Pimelea arenaria* (Gradual Decline _{III})**

Pimelea arenaria, also known as sand daphne, is a low, spreading, silky-haired shrub that grows on coastal sand dunes. It is endemic to the North Island and has two distinct forms, of which one is further restricted to Northland. Its major threats are habitat loss (e.g. through development of dunes and plantings to stabilise moving sand) and disturbance of habitat by vehicles (Forester and Townsend 2004). It is also threatened by browsing and grazing mammals, seed destruction by rodents, and competition from marram grass (NZPCN 2007). In Te Pahi ED it occurs at Te Werahi Beach and Cape Maria van Diemen (M02/012) (including Mt. Herangi) (de Lange, 1990, AK 200862), Kapowairua (N02/027) (de Lange, 1990, AK 200906), Tom Bowling Bay (N02/029) (de Lange, 1990, DOC Bioweb 2007), and Waikuku Beach (N02/030) (de Lange, 1990, WELT SPO78998). There is an historic record from Twilight Beach (M02/011) 'near Miss Walker's Cove' (Carse, 1928, CHR 330403).

***Thelypteris confluens* (Gradual Decline)**

Thelypteris confluens is a frost-tender wetland fern which occurs in the North Island, from Te Paki to the Waitakere Ranges in the west and Bay of Plenty in the east, mainly near the coast but extending inland within wetlands associated with geothermally active systems (NZPCN 2007). The major populations in Northland are at Pouto (Forester and Townsend 2004). In Te Paki ED it has been recorded at Te Werahi Wetland (M02/010) (Syddall, 1999, DOC Bioweb), Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (Bartlett, 1976, DOC Bioweb 2007) and Ponaki Wetland (N02/032) (Bartlett, 1976, DOC Bioweb 2007).

Willow-leaved maire *Mida salicifolia* (Gradual Decline ^{RF})

Willow-leaved maire is a small, shiny-leaved, hemiparasitic tree endemic to the North Island (NZPCN 2007). It is extremely palatable to possums, goats and deer (ibid). In Te Paki ED it has been recorded in Te Paki Shrublands and Forest Remnants (N02/003) (Radar Bush, Gardner and Bartlett 1980) and North Cape Scientific Reserve and Surrounds (N02/005(c)) (Beever, 1986, AK 176613).

AT RISK

***Baumea complanata* (Range Restricted ^{HI})**

Baumea complanata is a shiny, flat-leaved *Baumea* sedge which is endemic to the North Island, where it now only occurs in scattered locations between Te Paki and the Kaipara Harbour (NZPCN 2007). The only record of it in Te Paki ED comes from Shenstone Block (N02/009) where it was discovered covering an area of 300m² in a stream bed (McCluggage 2000).

***Carex ophiolithica* (Range Restricted ^{CD, OL, ST})**

Carex ophiolithica is an ultramafic endemic sedge of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)). It occurs abundantly in a wide range of habitats on this specific substrate (de Lange and Heenan 1997).

***Cassinia amoena* (Range Restricted)**

Cassinia amoena is an ultramafic endemic shrub of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)). It is abundant on the plateau and cliff margins (de Lange, 1996, AK 229533).

***Coprosma distantia* (Range Restricted ^{CD, OL})**

Coprosma distantia is an ultramafic endemic of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)). *Coprosma distantia* is a tightly interlaced divaricating shrub common on open and windswept sites on the Surville Cliffs and the North Cape plateau (de Lange and Gardner 2002).

***Coprosma neglecta* (Range Restricted)**

Coprosma neglecta is a shrub restricted to Northland, found in scattered

populations including the Three Kings Islands, Maunganui Bluff (Tutamoe ED), and in Te Paki ED, including the following sites: North Cape Scientific Reserve and Surrounds N02/005(c) (Wichman, 1999, AK 236642) (where it was abundant in the serpentine area (Druce *et al.* 1979), Unuwahao Bush and Shrublands (N02/004) (de Lange and Crowcroft, 1992, AK 207135) and Murimotu Island (N02/072) (Wright, 1995, AK 224990).

Three Kings cabbage tree *Cordyline obtecta* (Range Restricted)

Three Kings cabbage tree is very closely allied to ti kouka (*Cordyline australis*), but with shorter and broader leaves and bracts, wider leaf vein angles and longer flowers. Until recently this species was known as *Cordyline kaspar* and considered a New Zealand endemic (occurring at the Three Kings, Poor Knights, and Hen and Chickens Islands, as well as at Te Paki on the mainland), but it has now been found to be the same species as *C. obtecta* from the Norfolk Islands (de Lange *et al.* 2005). It has been recorded from Te Paki ED on Murimotu Island (N02/072) (Wright and Cameron 1996) and at North Cape Scientific Reserve and Surrounds (N02/005(c)) (de Lange, 1995, AK 222936). It is possible that this species could have been transported to Murimotu Island by Ngati Kuri and planted as a source of food (Wright and Cameron 1996).

***Ectropothecium sandwichense* (Range Restricted so)**

Ectropothecium sandwichense is a tropical moss found on soil or rotting logs in damp sites including streambanks (sometimes submerged) (NZPCN 2007). In New Zealand it is known from the Kermadec Islands, North Cape Scientific Reserve and Surrounds (N02/005(c)) (Beever, 1986, CHR 568391) and Radar Bush in Te Paki Shrublands and Forest Remnants (N02/003) (Bartlett, 1976, AK 187680) where it is thought to be at its southern limit (J. Beever pers. comm. 1996).

***Geniostoma ligustrifolium* var. *crassum* (Range Restricted CD, OL, ST)**

Geniostoma ligustrifolium var. *crassum* is an ultramafic endemic of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)) (de Lange, 1996, AK 226111) where it is locally abundant. *Geniostoma ligustrifolium* var. *ligustrifolium* (hangehange) is the more widespread variety which also occurs in the same site.

***Haloragis erecta* subsp. *cartilaginea* (Range Restricted CD, OL, ST)**

An ultramafic endemic of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)) (de Lange, 1990, CHR 472771). This species occurs on dry sites on bare rock or regolith on the Surville Cliffs and the North Cape plateau (P. de Lange, pers. comm. 1996).

***Harpalejeunea filicuspis* (Range Restricted)**

Harpalejeunea filicuspis is a non-endemic liverwort which has been recorded at 'Te Paki Bush'¹⁰ (part of N02/003) (Bartlett, 1979, WELT H008235) and Mangamuka Gorge, south of Kaitaia (DOC unpublished data 2007).

10. Probably Radar Bush.

***Hebe adamsii* (Range Restricted _{OL})**

Hebe adamsii is a shrub, which is endemic to Te Paki ED. It is currently only known from rock pinnacles and vertical cliffs at Unuwahao Bush and Shrublands (N02/004) in association with kowharawhara (NZPCN 2007) (de Lange, 1991, CHR 473297).

***Hebe* aff. *ligustrifolia* (AK 207101; Surville Cliffs) (Range Restricted)**

Hebe aff. *ligustrifolia* is common on the North Cape plateau, with scattered plants found on Surville cliffs, North Cape Scientific Reserve and Surrounds (N02/005(c)) (Powell, 1996, AK 44749).

***Hebe brevifolia* (Range Restricted _{CD, OL, ST})**

Hebe brevifolia is an ultramafic endemic of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)). *Hebe brevifolia* is an attractive shrub with a large magenta flower spikes, and is sometimes mistaken for *H. speciosa* (de Lange and Cameron 1992). It has a large population within the confines of the ultramafic rock (de Lange 1997).

***Helicbrysum* aff. *aggregatum* (AK 54473; Surville Cliffs) (Range Restricted _{CD, OL, ST})**

Helicbrysum aff. *aggregatum* is an ultramafic endemic of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)). This shrub forms a distinct belt of vegetation along the first tier of Surville Cliffs amongst shrubland and talus. It often grows amongst *Corokia cotoneaster* (with which it is often confused), *Phyllocladus* aff. *trichomanoides* (AK 138439; Surville Cliffs) and *Pseudopanax* aff. *lessonii* (AK 46066, Surville Cliffs). It is also located near a series of eroded gullies on loose talus slopes beneath weathered ultramafic stacks. (P. de Lange, pers. comm. 1996)

Beach morning glory *Ipomoea pes-caprae* subsp. *brasiliensis* (Range Restricted)

Beach morning glory is a tropical creeper with heart-shaped leaves has been recorded at Twilight Beach (M02/011) (Forester and McCluggage, 1996, AK 239470) and Whareana Bay (N02/031) where Lisa Forester recorded a seedling amongst *Atriplex hollowayi* in 2002 (L. Forester pers. comm.). New Zealand is its southernmost world distribution limit and it is only known from Te Paki ED and the Kermadec Islands where it is common on some of the islands (NZPCN 2007).

***Leucopogon xerampelinus* (Range Restricted _{CD, OL, ST})**

Leucopogon xerampelinus is an ultramafic endemic of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)) where it is very common shrub on the plateau, gully heads, and cliff faces (de Lange *et al.* 2003). This species was previously grouped with *Leucopogon parviflorus*, which occurs on the Chatham Islands, Tasmania and the Australian mainland (de Lange *et al.* 2003).

***Macromitrium brevicaule* (Range Restricted)**

Macromitrium brevicaule is an indigenous moss which is found in northern North Island, adjacent offshore islands and Australia (NZPCN 2007). It is confined to a very specific habitat and substrate, usually on the inner face of coastal rock stacks (DOC unpublished data 2007). It has also been found ti kouka trunks (J. Beever pers. comm. 1996). North Cape Scientific Reserve and Surrounds (N02/005(c)) is the type locality for this species, which was previously known as *M. subfragile*. Also recorded from Te Huka, (part of N02/004) (Bartlett, 1978, AK 188249), Twilight Beach (M02/011) (Bartlett, between 1975-1985, AK 190399) and Te Werahi Beach (part of M02/012) (Bartlett, between 1975-1985, AK 197986).

***Parsonsia praeruptis* (Range Restricted CD, OL)**

Parsonsia praeruptis is an ultramafic endemic climber of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)). *Parsonsia praeruptis* grows abundantly in rock joints, ledges, and rock rubble associated with the cliffs and ultramafic scree. This species differs from other *Parsonsia* species in that it is neither twining nor climbing, is sometimes decumbent and is not heterophyllous. Unlike many of the Surville Cliff ultramafic endemics, *Parsonsia praeruptis*, although abundant, is also highly palatable. (Heads and de Lange 1999)

***Petalochilus alatus* (Range Restricted DP, TO)**

Petalochilus alatus is an orchid (previously known as *Caladenia alata* and *Caladenia catenata* var. *exigua*) which has a naturally sparse distribution from Te Paki to approximately Rotorua, thence disjunct to the Horowhenua, however it was only recently recognised from New Zealand and its full distribution is not clear (NZPCN 2007). It also occurs in Australia. In Te Paki ED it has been recorded from Te Paki Shrublands and Forest Remnants (N02/003) (Forester, 1988, AK 185559), Mokakai (N02/005(a)), and the Shenstone Block (N02/009) (McCrae 1990). There is an unconfirmed record from Murimotu Island (Wright and Cameron 1996).

***Phyllocladus* aff. *trichomanoides* (AK 138439; Surville Cliffs) (Range Restricted CD, OL, ST)**

Phyllocladus aff. *trichomanoides* is a stunted form of tanekaha, with longer phylloclades, forming large spreading thickets and is abundant on Surville Cliffs and the plateau within North Cape Scientific Reserve and Surrounds (N02/005(c)). It is confined to ultramafic soils (P. de Lange pers. comm. 1996).

***Pimelea* aff. *tomentosa* (b) (AK 130893; Surville Cliffs) (Range Restricted CD, OL, ST)**

Pimelea aff. *tomentosa* (b) is an ultramafic endemic of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)). This is a taxonomically indeterminate shrub with a closely related taxon on the Three Kings Islands (AK 228145). There is little information about its abundance within this site.

***Pittosporum pimeleoides* subsp. *majus* (Range Restricted CD, OL, ST)**

Pittosporum pimeleoides subsp. *majus* is an ultramafic endemic of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)) (Crowcroft and de Lange, 1990, CHR 472767). *Pittosporum pimeleoides* subsp. *majus* is a sprawling, prostrate shrub which is very common in low scrub and at the bases of talus slopes on the cliffs (NZPCN 2007).

***Pomaderris paniculosa* subsp. *novae-zelandiae* (Range Restricted)**

Pomaderris paniculosa subsp. *novae-zelandiae* is a low-growing plant which is only known from Northland at North Cape in this Ecological District and Mt Manaia and Mt Aubrey in the Manaia ED. It is common on the plateau/cliff edge at the Surville Cliffs in North Cape Scientific Reserve and Surrounds (N02/005(c)) (NZPCN 2007) (de Lange, 1990, AK 200893).

***Pseudopanax* aff. *lessonii* (AK 46066, Surville Cliffs) (Range Restricted CD)**

Pseudopanax aff. *lessonii* is an ultramafic endemic of the Surville Cliffs serpentinite formation at North Cape Scientific Reserve and Surrounds (N02/005(c)). This variety of houpara is very abundant on the cliffs, forming patches of dense scrub or low forest in association with pohutukawa (Druce *et al.* 1979). It has also been recorded at Hooper Point (part of N02/004) (de Lange, 1996, AK 229532).

***Thelymitra* (b) (CHR 518036; “darkie”) (Range Restricted)**

Thelymitra (b) is a Northland endemic sun orchid of uncommon distribution, the largest populations are found on the North Cape Scientific Reserve and Surrounds (N02/005(c)) and Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex Wetland Complex (N02/016) (McCrae 1990). Also recorded from Scott Point Shrubland and Coastal Associations (M02/008) in 1988 by Forester (SSBI M02/N02/H026).

***Thelymitra* (c) (CHR 518036; “rough leaf”) (Range Restricted)**

Thelymitra (c) is a robust rough-leaved Northland endemic sun orchid with an uncommon and local distribution in the Te Paki ED (McCrae 1990). It has been recorded from North Cape Scientific Reserve and Surrounds (N02/005(c)) (de Lange, 1996, AK 229531) and Scott Point Shrubland and Coastal Associations (M02/008) and Mokaikai Scenic Reserve and Surrounds (N02/005(a)) (McCrae 1990).

***Trisetum serpentinum* (Range Restricted)**

Trisetum serpentinum is an endemic grass species limited to ultramafic soil or rock (Edgar and Connor 2002). In the North Island is only known from the Surville Cliffs in North Cape Scientific Reserve and Surrounds (N02/005(c)) (de Lange, 1996, CHR 513773) and in the South Island it occurs at several sites on the ultramafic Mineral Belt (e.g. Mt Dun, D’Urville Island and Red Hills) (NZPCN 2007).

***Anzybas rotundifolius* (Sparse)**

Anzybas rotundifolius is a tiny ground orchid usually found growing on leaf litter under regenerating forest or gumland scrub. It is a North Island endemic, occurring from Te Paki ED to near the Manawatu Gorge (NZPCN 2007). In Te Paki ED it has only been recorded twice: at Waikuku Flat (N02/005(b)) (Forester and Clunie, 1992, DOC Bioweb 2007), in the Kapowairua catchment of Te Paki Shrublands and Forest Remnants (N02/003) (McCrae 1990) and in the Shenstone Block (N02/009) (L. Forester pers. comm.).

Parsley fern *Botrychium australe* (Sparse DP, SO, EF)

Parsley fern is a distinctive fern with parsley-like leaves. It is widespread but uncommon from North Cape to Dunedin and it used to occur in the Chatham Islands (NZPCN 2007). Parsley fern also occurs in Australia, Papua New Guinea, and South America (Brownsey and Smith Dodsworth 2000). In Te Paki ED it is known from Unuwahao Bush and Shrublands (N02/004) (Forester, 1989, SSBI M02/N02/H011) and North Cape Scientific Reserve and Surrounds (N02/005(c)) (de Lange and Crowcroft, 1992, CHR 475147), and is one of the earliest plants to have been collected and lodged in a herbarium from Te Paki ED, by Thomas Kirk in 1868 (WELT P004512).

***Calystegia marginata* (Sparse SO, EF)**

Calystegia marginata is an indigenous slender climber which has narrowly triangular leaves, found mainly growing in coastal open habitats (NZPCN 2007). Sparse populations occur in Te Paki ED on Motuopao Island (M02/071) (McKenzie, 1990, AK 195823), at Unuwahao Bush and Shrublands (N02/004) (Gardner and Bartlett, 1980, CHR 312576) and M. Young observed *C. marginata* near Waitangi Stream in 1990 (part of N02/034) (DOC Bioweb 2007).

***Corunastylis pumila* (Sparse SO, EF)**

Corunastylis pumila is an endemic orchid typical of open sites on gumland or infertile soils and is found from Te Paki south to about Kawhia, East Cape and the Bay of Plenty (NZPCN 2007). Records from Te Paki ED are from Te Paki Shrublands and Forest Remnants (N02/003) (Townsend and Cameron, 2007, DOC Bioweb), Scott Point Shrubland and Coastal Associations (M02/008), 1988, (SSBI M02/N02/H026), North Cape (part of N02/005(c)) (Druce *et al.* 1979) and an historic herbarium record by Thomas Kirk collected from Kapowairua (AK 11231). This species was formerly known as *Prasophyllum pumilum*.

Monoao *Halocarpus kirkii* (Sparse RF)

Monoao is an endemic northern tree associated with kauri. It has been recorded from forest remnants in Te Paki Shrublands and Forest Remnants (N02/003) (de Lange and Crowcroft, 1992, AK 207107) where it can be locally common, often associated with kauri.

***Korthalsella salicornioides* (Sparse)**

Korthalsella salicornioides is a dwarf mistletoe which is mainly parasitic on manuka and kanuka. In Te Paki ED it is currently known from Unuwahao

Bush and Shrublands (N02/004) (de Lange and Crowcroft, 1992, AK 207172) and North Cape Scientific Reserve and Surrounds (N02/005(c)) (Wright, 1995, AK 224977). There are historic records from the Shenstone Block (N02/009) (Cooper, 1966, CHR 213774) and from near a waterfall at Kapowairua Wetland and Lagoon (N02/019) (Cooper, 1949, AK 24435).

***Kawaka Libocedrus plumosa* (Sparse EF)**

Kawaka is an endemic podocarp tree to the North and South Islands where it is found in localised patches within coastal to lowland forest, often in association with kauri in the north (NZPCN 2007). Within Te Paki ED it is only known from forest remnants in the Te Paki Shrublands and Forest Remnants (N02/003) (Radar Bush (Davidson, 1970, AK 128382) and Kohuronaki Hill (Forester, 1988, SSBI M02/N02/H007).

***Macrothelypteris torresiana* (Sparse SO, EF)**

Macrothelypteris torresiana is a tropical, terrestrial fern with the only NZ mainland record occurring at North Cape Scientific Reserve and Surrounds (N02/005(c)) (de Lange and Crowcroft 1997). Otherwise it is known to occur on the Kermadec Islands, and in the Old World tropics from Madagascar to Hawaii (Brownsey and Smith-Dodsworth 2000).

***Mimulus repens* (Sparse DP, SO)**

Mimulus repens is a strictly coastal mat-forming succulent herb known from North and South Islands and Australia, occurring in saltmarshes and estuaries (NZPCN 2007). It is very rare in Northland recorded in this Ecological District from Waitahora Lagoon (part of N02/016) (Young, 1997, AK 234405) where it is the largest of only three known populations in Northland (Wells *et al.* 2007) and a small population at Kapowairua Wetland and Lagoon (N02/019) (Cameron, 1989, AK 296816).

***Petalochilus bartlettii* (Sparse DP, EF)**

Petalochilus bartlettii is an endemic orchid (formerly known as *Caladenia bartlettii*) occurring in the North Island from Te Paki to about the northern Waikato and Kaimai Ranges (exact southern limits as yet unclear) (NZPCN 2007). Its preferred habitats are kauri forest (especially on kauri leaf litter) or gumland scrub (NZPCN 2007). Exact localities within Te Paki ED are not recorded.

***Parapara Pisonia brunoniana* (Sparse SO, HI)**

Parapara is an indigenous coastal tree found on the Kermadecs, Three Kings and the North Island. Parapara is now mainly found on rodent-free offshore islands, on the mainland it is very rare and is now only known from Te Paki to Mangawhai in Northland. There are historical records from the East Cape, Coromandel Peninsula and around Auckland. It is very palatable and is browsed by possums, goats and other feral livestock. There is one record of parapara in the Te Paki ED; a mature tree sighted on cliffs near Te Rerenga Wairua (part of N02/003) (T. Conaghan pers. comm.).

***Pittosporum ellipticum* (Sparse)**

Pittosporum ellipticum is an endemic North Island tree which occurs from Te Paki south to Mt Pirongia in the west, and to the Karangahake

and Waioeka Gorges in the east (NZPCN 2007). Within this range it is very uncommon, most often being found associated with kauri forest, and always in relatively open vegetation (ibid). There is one record from Te Paki ED, from Unuwahao Bush and Shrublands (N02/004) 'in *Kunzea ericoides* var. *linearis* scrubland on bluffs' (de Lange, 1996, AK 252126). This species was formerly referred to as *Pittosporum ellipticum* subsp. *ellipticum*.

***Sticherus flabellatus* (Sparse)**

Sticherus flabellatus is a hairless fern which is common in Australia but New Zealand populations are widely scattered through the northern North Island and northern South Islands, and it is never common (NZPCN 2007). Records in Te Paki ED include Te Paki Shrublands and Forest Remnants (N02/003) (most recent collection within this site is Cameron, 1984, AK 274343), Shenstone Block (N02/009) (Wright, 1995, AK 234852), North Cape Scientific Reserve and Surrounds (N02/005(c)) (Druce *et al*, 1979), and Upper Kapowairua Wetland (N02/017) (Ogle, 1985, CHR 418289).

***Thelymitra* aff. *ixioides* (AK 251348; New Zealand) (Sparse)**

This is a taxonomically indeterminate orchid, similar to the common spotted sun orchid *Thelymitra ixioides*, which has a sporadic distribution in Northland. It has been recorded from Te Paki Shrublands and Forest Remnants (N02/003) and Mokaikai Scenic Reserve and Surrounds (N02/005(a)) (McCrae 1990).

***Thelymitra tholiformis* (Sparse)**

Thelymitra tholiformis is endemic to the North Island (Te Paki south to north Waikato) and is similar to the blue sun orchid *T. aemula*, but is smaller (0.4-0.6 m), with narrow-linear, green leaves that have reddish margins and ridges (NZPCN 2007). In this Ecological District occasional plants are found on the plateau at North Cape Scientific Reserve and Surrounds (N02/005(c)) (Crowcroft and de Lange, 1990, DOC Bioweb 2007).

***Thismia rodwayi* (Sparse)**

Thismia rodwayi is a small, easily overlooked, saprophytic plant which occurs in the North Island and is also present in Australia (NZPCN 2007). In Te Paki ED it has been recorded on the southern slopes of Kohuronaki (part of N02/003) (Stringer, 1994, AK 221444).

***Tmesipteris sigmatifolia* (Sparse)**

Tmesipteris sigmatifolia is a non-endemic fern ally which usually grows epiphytically on tree trunks, occasionally growing terrestrially amongst leaf litter (NZPCN 2007). It is found in both the North and South Islands, most commonly in the north and west of each, though it is never common at any particular site (ibid). In Te Paki ED there has been only one collection, from Te Paki Shrublands and Forest Remnants (N02/003) (Cameron, 1984, AK 273149), where it was growing on the trunk of ponga in a coastal forest remnant. It probably also occurs at other localities within Te Paki ED but has simply not been recorded.

Data Deficient plant species

Drepanolejeunea aff. *ternatensis* (Data Deficient)

Drepanolejeunea aff. *ternatensis* is a liverwort which has only been recorded on Great Barrier Island (2004) and at Radar Bush in Te Paki Shrublands and Forest Remnants (N02/033) (1990s) (DOC unpublished data 2007). *Drepanolejeunea ternatensis* s.s. has an Indomalayan-Oceanic distribution (Chuah-Petiot and Pócs 2005).

Cephalocystis furcellata (Data Deficient)

Cephalocystis furcellata is a red alga collected once in Te Paki ED from between Pandora Bank and Cape Maria van Diemen (Tangaroa, 1981, WELT A011736) (specific locality not known). It also occurs on the coasts of South Australia, Tasmania and Victoria (Millar *et al.* 1996).

Fissidens oblongifolius var. *oblongifolius* (Data Deficient)

Fissidens oblongifolius var. *oblongifolius* is a moss which is possibly overlooked because it is difficult to distinguish from the very common *F. asplenioides* (DOC unpublished data 2007). Modern confirmed records are only from the North Cape Scientific Reserve and Surrounds (N02/005(c)), where it is found soil or rock on stream banks. (DOC unpublished data 2007). It is also present in Australia (J. Beever pers. comm. 1996).

Nematoceras rivulare (Data Deficient)

Nematoceras rivulare is a spider orchid which occurs in the North Island probably from Taranaki north, on mossy rock banks close to water level or in year-round seepage on mud-flow in native forest (NZPCN 2007). In the Te Paki ED it has been recorded from Radar Bush (part of N02/003) (Gardner and Bartlett 1980). Formerly known as *Corybas rivularis*.

Olearia angulata (Data Deficient)

Olearia angulata is an endemic coastal shrub which is somewhat cryptic, being very similar to *Olearia albida* (regionally significant). It can be distinguished by its much smaller stature, typically oblong leaves with strongly wavy margins (in shade or sun), usually resinous yellow-green foliage (though dark green colour variants occur throughout the species range), smaller, compact inflorescences and different chromosome number (NZPCN 2007). It is known with certainty from Te Paki ED, and in scattered sites along the western North Island coastline to near Mokau, but not from the North Island's east coast (*ibid*). Te Paki ED records are from several points along the northern coastline, within Unuwahao Bush and Shrublands (N02/004) (de Lange, 1991, CHR 473284), North Cape Scientific Reserve and Surrounds (N02/005(c)) (de Lange, 1996, AK 232715) and from the Kapowairua area-probably part of (N02/003) (Bartlett, 1978, AK 353500).

Spiranthes aff. *novae-zelandiae* (CHR 518297; Motutangi) (Data Deficient HI, EF)

Spiranthes aff. *novae-zelandiae* is an orchid known mainly from the damp, boggy areas of Kaimaumau-Motutangi (Aupouri ED). In Te Paki ED, it has been recorded at Ponaki Wetland (N02/032) and Te Werahi Wetland

(M02/010) (McCrae 1990) and Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (McLean *et al.* 1985).

Non-resident native

Prickly rasp fern *Doodia aspera* (Vagrant)

Doodia aspera is a common Australian species which has apparently reached New Zealand several times but has rarely become established. It is similar to *D. australis*, but usually lacks hairs on the laminae and has adnate pinnae (Brownsey and Smith-Dodsworth 2000). It has been recorded many times from coastal hillsides under stunted manuka near Tom Bowling Bay in Unuwahao Bush and Shrublands (N02/004) (including de Lange and Forester, 1990, CHR 472744) however these are thought to be hybrids (NZPCN 2007).

***Thelymitra malvina* (Coloniser)**

Thelymitra malvina is a mauve-flowered sun orchid which is common in eastern Australia in New South Wales, Victoria, Tasmania and South Australia (NZPCN 2007). In the North Island of New Zealand it has been recorded at scattered locations in the North Cape area, Ahipara gumfields, Kaimaumu, Lake Ohia and Ngawha where it likes open ground within peat bogs and wetlands, nearly always found in association with rotting kauri logs (*ibid.*). It was recently observed on the edge of a vehicle track in gumland scrub within Te Paki Shrublands and Forest Remnants (N02/003) (AK 297981) (Young 2006).

***Thelymitra matthewsii* (Coloniser to)**

Thelymitra matthewsii is a sun orchid which has a leaf that spirals around the stem. It is native to Australia (South Australia and Victoria), and in New Zealand it is known only from the northern North Island where it is locally present around Te Paki ED (NZPCN 2007). It appears to be extinct at its original New Zealand location on sandhills between Ahipara and Kaitaia (*ibid.*). Te Paki ED records include Shenstone Block (N02/009) (Fraser, 2004, AK 289544), exposed sites at North Cape Scientific Reserve and Surrounds (N02/005(c)) (Cameron, 1995, AK 225967) and Maungatiketike Point Shrubland (M02/007) (A. Townsend pers. comm.).

Doubtful threatened plants records

***Juncus holoschoenus* var. *holoschoenus* (Nationally Critical)**

There is only one historic record of the rush *Juncus holoschoenus* from Te Paki ED (from Kerr Point by Dumbleton in 1967, CHR 174857). This species is common in Australia, however it is considered to be a species complex, with taxonomy not fully resolved (NZPCN 2007). It is not clear whether this specimen (CHR 174857) is the acutely threatened variety. Currently *Juncus holoschoenus* var. *holoschoenus* is only known with certainty from relatively weed free sub-alpine mires and frost flats (NZPCN 2007), so it would seem that this specimen may not be the Nationally Critical taxon.

Regionally significant plant species

The following species are included in a draft list of regionally significant species in Northland which is being prepared by DOC Northland Conservancy considered to be uncommon or of a very local distribution in Northland. There are 69 regionally significant plant taxa recorded in Te Paki Ecological District.

TABLE 4: REGIONALLY SIGNIFICANT PLANT TAXA (DOC 2007 IN PREP.) RECORDED IN TE PAKI ECOLOGICAL DISTRICT.

*=pre-1975 records, refer to Section 3.3.4

PLANT GROUP	TAXON	COMMON NAME
Fern	<i>Adiantum aethiopicum</i>	Maidenhair fern
Dicot tree	<i>Ascarina lucida</i>	Hutu
Fern	<i>Asplenium flabellifolium</i>	
Fern	<i>Asplenium gracillimum</i>	
Fern	<i>Asplenium obtusatum</i> subsp. <i>nortblandicum</i>	
Monocot herb	<i>Astelia grandis</i>	
Fern	<i>Azolla filiculoides</i>	
Fern	* <i>Blechnum fluviatile</i>	
Dicot tree	<i>Brachyglottis kirkii</i> var. <i>angustior</i>	Kirk's tree daisy
Fern	<i>Cbeilanthes sieberi</i>	
Dicot shrub	<i>Coprosma acerosa</i>	
Dicot tree	<i>Coprosma crassifolia</i>	
Dicot tree	<i>Coprosma parviflora</i>	
Dicot tree	<i>Coprosma rigida</i>	
Dicot shrub	<i>Corokia cotoneaster</i>	
Orchid	<i>Corybas cheesemanii</i>	
Fern	<i>Cyathea cunninghamii</i>	
Fern	<i>Dicksonia lanata</i>	
Dicot shrub	<i>Dracophyllum sinclairii</i>	
Dicot herb	<i>Drosera binata</i>	Sundew
Dicot herb	<i>Drosera peltata</i>	Sundew
Restiad	<i>Empodisma minus</i>	Wirerush
Moss	<i>Entosthodon productus</i>	
Dicot tree	<i>Epacris pauciflora</i>	
Dicot herb	* <i>Epilobium cinereum</i>	
Dicot herb	<i>Epilobium pallidiflorum</i>	Swamp willowherb
Orchid	<i>Gastrodia sesamoides</i>	
Dicot herb	<i>Glossostigma elatinooides</i>	
Dicot herb	<i>Gratiola sexdentata</i>	
Dicot herb	* <i>Gunnera dentata</i>	
Dicot shrub	<i>Hebe diosmifolia</i>	

PLANT GROUP	TAXON	COMMON NAME
Dicot shrub	<i>Hebe macrocarpa</i> var. <i>macrocarpa</i>	
Dicot shrub	<i>Helicbrysum lanceolatum</i>	
Rush	<i>Juncus pauciflorus</i>	
Dicot herb	<i>Lagenifera lanata</i>	
Gymnosperm	<i>Lepidothamnus intermedius</i> ²	
Dicot tree	<i>Lophomyrtus obcordata</i>	Rohutu
Rush	<i>Luzula picta</i> var. <i>picta</i>	Painted woodrush
Gymnosperm	<i>Manoao colensoi</i>	Manoao
Dicot tree	<i>Melicytus novae-zelandiae</i>	Coastal mahoe
Dicot vine	<i>Metrosideros carminea</i>	Carmine rata
Dicot tree	<i>Metrosideros robusta</i>	Northern rata
Dicot tree	<i>Metrosideros umbellata</i>	Southern rata
Orchid	<i>Molloybas cryptanthus</i>	
Dicot tree	<i>Myoporum laetum</i>	Ngaio
Dicot herb	<i>Myriophyllum votschii</i>	
Dicot tree	* <i>Neomyrtus pedunculata</i>	Rohutu
Dicot tree	<i>Olearia albida</i>	
Fern	<i>Ophioglossum coriaceum</i>	
Dicot herb	<i>Pelargonium inodorum</i>	
Fern	<i>Pellaea calidirupium</i>	
Gymnosperm	<i>Phyllocladus toatoa</i>	Toatoa
Dicot tree	* <i>Plagianthus regius</i>	Manatu, ribbonwood
Dicot herb	<i>Plantago raoulii</i>	
Dicot shrub	<i>Pomaderris edgerleyi</i>	
Dicot tree	<i>Pouteria costata</i>	Tawapou
Dicot herb	<i>Pratia angulata</i>	
Dicot tree	<i>Pseudowintera axillaris</i>	Horopito
Dicot tree	* <i>Pseudowintera colorata</i>	Mountain horopito
Fern ally	<i>Psilotum nudum</i>	
Dicot herb	<i>Ranunculus urvilleanus</i>	
Dicot tree	<i>Raukaua anomalus</i>	
Fern	<i>Schizaea bifida</i>	
Dicot herb	<i>Scleranthus biflorus</i>	
Monocot herb	<i>Sparganium subglobosum</i>	Burr reed
Orchid	<i>Spiranthes novaezelandiae</i>	
Dicot herb	* <i>Suaeda novae-zelandiae</i>	
Orchid	<i>Tbelymitra</i> aff. <i>longifolia</i>	Sun orchid
Monocot herb	<i>Triglochin striata</i>	Arrow grass
Total		69

Adiantum aethiopicum

Adiantum aethiopicum is a non-endemic maidenhair fern which becomes uncommon south of Waikato (Brownsey and Smith-Dodsworth 2000). In Te Paki ED it has been collected from several localities with pre-1975 records from North Cape Scientific Reserve and Surrounds (N02/005(c)) (Wheeler 1963) and Scott Point Shrubland and Coastal Associations (M02/008) (Matthews, 1926, AK 115463) and post-1975 records from Te Paki Shrublands and Forest Remnants (N02/003) (Ogle, 1985 CHR 418288), Unuwahao Bush and Shrublands (N02/004) (Sykes, 1989, CHR 465005) and Scott Point Shrubland and Coastal Associations (M02/008) in 2007 (A. Townsend pers. comm.).

Hutu *Ascarina lucida*

Hutu is an uncommon tree in Northland mostly occurring at high altitudes on the western side of Northland. Hutu is common in the west of the South Island, but generally uncommon in the North Island (NZPCN 2007). It was recorded as present at Radar Bush and elsewhere in Te Paki Shrublands and Forest Remnants (N02/003) (Mitchell 1984, Gardner and Bartlett 1980), although no herbarium collections appear to have been made from Te Paki ED.

Asplenium flabellifolium

Asplenium flabellifolium is small fern which is widely distributed throughout New Zealand, although usually confined to the east coast of both major islands, where it grows on dry, rocky ground (Brownsey and Smith-Dodsworth 2000). In Northland its stronghold appears to be the Kaikohe ED, where it occurs around volcanic rocks and it is threatened by being overwhelmed by weeds such as kikuyu (L. Forester pers. comm.). In Te Paki ED it has only been recorded near the Unuwahao Trig (part of N02/004) under rocky ledges (Bartlett, 1978, WELT P010270), however it is possibly more common than collections suggest.

Asplenium gracillimum

Asplenium gracillimum is a fern, which has also been known as *Asplenium bulbiferum* subsp. *gracillimum*. During the 1980's several collections were made in the Te Paki ED. It has been recorded in the Te Paki Shrublands and Forest Remnants (N02/003) including Kohuronaki (Gardner, 1980, AK 151920), at Unuwahao Bush and Shrublands (N02/004) (Ogle, 1982, CHR 404667), and in the Mokaikai Scenic Reserve and Surrounds (N02/005(a)) (Forester, 1988, AK 180262).

Asplenium obtusatum* subsp. *northlandicum

Asplenium obtusatum subsp. *northlandicum* is a fern which is confined to coastal cliffs and rocks in the northern North Island (Brownsey and Smith Dodsworth 2000). It has been recorded from numerous coastal locations around Te Paki ED, including Motuopao Island (M02/071) (Forester, 1990, AK 134821), Murimotu Island (N02/072) (Parrish, 1993 (Wright and Cameron 1996), Te Paki Shrublands and Forest Remnants (N02/003) (de Lange and Crowcroft, 1990, CHR 473073), North Cape Scientific Reserve and Surrounds (N02/005(c)) (Cameron, 1995, AK

227115) and Pananehe Island (part of N02/027) (Parrish, 1993, SSBI N02/H048). Historic records include Twilight Beach (M02/011) (Matthews and Bedggood, 1926, AK 134821) and Te Werahi Beach and Cape Maria van Diemen (M02/012) (Cheeseman, 1896, AK 134792).

Astelia grandis

Astelia grandis (sometimes called swamp astelia) is a robust, endemic astelia found in both the North and South Islands. It has been recorded in the North Cape Scientific Reserve and Surrounds (N02/005(c)), growing in coastal forest and on the Surville Cliffs (Hambley, 1996, AK 227100).

Azolla filiculoides

Azolla filiculoides is a floating non-endemic water fern which is also found in Australia (Brownsey and Smith-Dodsworth 2000). It has previously been known in New Zealand as *A. filiculoides* var. *rubra*, or *A. rubra*. Though widespread in some parts of the country (in particular the east of the South Island), it has been largely replaced by the exotic *A. pinnata* in warmer areas such as Northland (ibid). In Te Paki ED it has been recorded at Te Werahi Wetland (M02/010) (Cameron, 1984, AK 274330).

Brachyglottis kirkii* var. *angustior

Brachyglottis kirkii var. *angustior* is an endemic tree daisy which is restricted to the north of the North Island, typically found from Te Puke and Ngaruawahia northwards (NZPCN 2007). The only records from Te Paki ED are from a collection made near Whiriwhiri stream, North Cape Scientific Reserve (N02/005(c)), (Beever, 1986, AK176614) and Radar Bush (part of N02/003) (Gardner and Bartlett 1980).

Cheilanthes sieberi

Cheilanthes sieberi is a small, non-endemic fern which has been the subject of some debate, and it is also recognised as *Cheilanthes sieberi* subsp. *sieberi*. It is found in dry coastal to montane areas of the North and South Islands, usually along the east coasts (Brownsey and Smith-Dodsworth 2000). Collections in Te Paki ED include Te Paki Shrublands and Forest Remnants (N02/003) (Mitchell 1984), Unuwahao Bush and Shrublands (N02/004) (Cameron, 1989, AK 296820), and a historical record from North Cape Scientific Reserve and Surrounds (N02/005(c)) (Parris, 1969, AK 128360).

Coprosma acerosa

Coprosma acerosa is a low-growing spreading endemic shrub which occurs on coastal sands throughout New Zealand (Allan 1961), but is rapidly becoming scarce in large parts of its range as a result of dune reclamation and competition by marram grass (NZPCN 2007). In Te Paki ED it is known from numerous coastal sites, in particular Te Werahi Beach and Cape Maria van Diemen (M02/012) (2006, SSBI M02/N02/H050), Waikuku Beach (N02/030) (Cameron, 1995, AK 227108), Kapowairua (N02/027) (Cameron, 1999, AK 239560) and Twilight Beach (M02/011) (during this survey. It has also been recorded at Motuopao Island (M02/071) (Forester, 1990, AK 195769), Maungatiketike Point Shrubland (M02/007)

(SSBI M02/N02/H050), Te Paki Shrublands and Forest Remnants (N02/003) at Te Rerenga Wairua (W. Holland pers. comm.) and recorded during this survey from Scott Point Shrubland and Coastal Associations (M02/008) and Ngakengo Beach (N02/062).

Coprosma crassifolia

Coprosma crassifolia is an endemic shrub which occurs throughout New Zealand, usually in rocky places east of the main ranges (Wilson and Galloway 1993). Druce *et al.* (1979) recorded it at North Cape Scientific Reserve (N02/005(c)).

Coprosma parviflora

Coprosma parviflora is an endemic shrub which has undergone recent revision, and it is now considered to include plants distributed from Te Paki south to the Kaipara Heads (Jane 2005). Plants from the North Cape ultramafic area tend to be stunted, with smaller leaves (*ibid*). In Te Paki ED it has been recorded at widespread locations, often under a canopy of manuka or kanuka. Records include Unuwahao Bush and Shrublands (N02/004) (Wright, 1989, AK 190012), Te Paki Shrublands and Forest Remnants (N02/003) including Radar Bush (Brown, 1992, AK 273797), on the margin of Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (Cameron, 1984, AK 274344), Mokaikai Scenic Reserve and Surrounds (N02/005(a)) (Ogle, 1985, CHR 418276) and North Cape Scientific Reserve (N02/005(c)) (Cameron, 1995, AK 227018).

Coprosma rigida

Coprosma rigida is a divaricating shrub with small leaves and reddish bark found throughout the North and South Islands (Poole and Adams 1994) although it is relatively uncommon in Northland. In this ED it has been recorded from Te Paki Shrublands and Forest Remnants (N02/003) (Clunie 1985).

Corokia cotoneaster

Corokia cotoneaster is a shrub found in shrublands from the Three Kings to Foveaux Strait (Poole and Adams 1994). It has an uncommon plant in Northland with a local distribution, recorded in this Ecological District from Te Paki Shrublands and Forest Remnants (N02/003) including Radar Bush (Gardner and Bartlett 1980).

Corybas cheesemanii

Corybas cheesemanii is a tiny orchid which has been recorded in a few locations in Te Paki ED, including and Te Paki Shrublands and Forest Remnants (N02/003) at Kohuronaki (Wright, 1989, AK 191232). It has also been noted in association with *Gastrodia sesamoides* in the Shenstone Block (N02/009), (McCrae, 1989, AK 188385).

Gully tree fern *Cyathea cunninghamii*

Gully tree fern is a non-endemic tree fern with a local distribution in both the North and South Islands, occurring usually in damp gullies or near river banks (Brownsey and Smith-Dodsworth 2000). In Te Paki region it has been recorded at Shenstone Block (N02/009) (Clunie 1985(a)), and

in a shaded gully in Te Paki Shrublands and Forest Remnants (N02/003) (Cameron, 1984, AK 274337).

Dicksonia lanata

Dicksonia lanata is a short-trunked tree found in the North and South Islands. It has an uncommon distribution in Northland recorded in this ED from Te Paki Shrublands and Forest Remnants (N02/003) including Radar Bush (CHR 356977-Gardner and Bartlett 1980).

Dracophyllum sinclairii

Dracophyllum sinclairii (previously known as *D. viride* (W. R. B. Oliver) is a stout and much-branched species reaching 5 m in height (Allan 1961), it is endemic to the North Island (NZPCN 2007). There is an historical record from Unuwahao Bush and Shrublands (N02/004) (Cooper, 1949, AK 24479) with current records from Te Paki Shrublands and Forest Remnants (N02/003) including Radar Bush (Crowcroft and de Lange, 1992, AK 207108) and Kohuronaki (Syddall, 1999, Bioweb 2007).

Drosera binata

Drosera binata is a small, forked sundew found throughout New Zealand inhabiting wet and boggy ground, and is also found in Australia (NZPCN 2007). In Te Paki it has been collected in North Cape Scientific Reserve and Surrounds (N02/005(c)), (Beever, 1986, AK 176611), the Shenstone Block (N02/009) (Clunie 1985(a)) and Ponaki Wetland (N02/032), recorded in this survey.

Drosera peltata

Drosera peltata is a small, non-endemic sundew found in New Zealand from Te Paki as far south as Auckland (NZPCN 2007). It grows on consolidated sand dunes, clay pans or peat (ibid). It is known to be present in North Cape Scientific Reserve and Surrounds (N02/005(c)), the Shenstone Block (N02/009) (Young 2006), and Te Paki Shrublands and Forest Remnants (N02/003) at Waitiki Landing, where it was found growing on clay (Salmon, 1991, AK298879).

Wirerush *Empodisma minus*

Wirerush is an indigenous, peat-forming restiad which is found throughout New Zealand, although uncommon in some localities, including areas north of Auckland (NZPCN 2007). It is remarkable for its tolerance of extremely acidic conditions, which are present in the raised bogs which it forms (ibid). It is present in several habitats in Te Paki ED recorded from Te Paki Shrublands and Forest Remnants (N02/003) (Clunie 1985), Shenstone Block (N02/009) and Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016), both recorded during this survey.

Entosthodon productus

Entosthodon productus is a non-endemic moss, which is uncommon in New Zealand (Beever *et al.* 1992). It has been collected once in Te Paki ED, at North Cape Scientific Reserve and Surrounds (N02/005(c)) on bare soil in a canopy gap in manuka shrubland (Beever, 1986, CHR 106658).

Epacris pauciflora

Epacris pauciflora is an endemic, flowering shrub found in the North and South Islands from Te Paki as far south as Charleston (NZPCN 2007). Collections in Te Paki ED are mostly old (e.g. 1940s–1970s) and with somewhat vague localities, however it is known to occur at Shenstone Block (N02/009), Mokaikai Scenic Reserve and Surrounds (N02/005(a)) and Te Paki Shrublands and Forest Remnants (N02/003) (also Cameron 1984, AK 274340) all recorded during this survey.

Swamp willowherb *Epilobium pallidiflorum*

Swamp willowherb, as the name suggests, likes to inhabit swamps, marshes and river banks (Allan 1961). It is a non-endemic species, found through the South and North Islands, the Chatham Islands, and Australia (NZPCN 2007). Records in Te Paki ED include Te Werahi Wetland (M02/010) (Cameron, 1984, AK 274294) and Mokaikai Scenic Reserve and Surrounds (N02/005(a)) at Waiparariki Stream (Ogle, 1986, CHR 438280).

Gastrodia sesamoides

Gastrodia sesamoides is a non-endemic orchid with the New Zealand plants differing somewhat from those found in Australia (NZPCN 2007). It has been recorded at North Cape Scientific Reserve and Surrounds (N02/005(c)) (Beever, 1986, AK 176612), Te Werahi Wetland (M02/010) (Braggins, 1985, AK 283908), Shenstone Block (N02/009) (McCrae, 1989, AK 188385) and most recently at Maungatiketike Point Shrubland (M02/007) (Young, 1997, AK 234404).

Glossostigma elatinoides

Glossostigma elatinoides is a low growing, mat-forming herb which is present in coastal to lowland sites throughout New Zealand, often growing submerged in shallow waters (Allan 1961). It is also found in Australia (ibid). There is one collection from Te Paki ED, where it was found growing on sand at the margin of a stream on Waikuku Beach (N02/030) (Wright, 1995, AK 225000).

Gratiola sexdentata

Gratiola sexdentata is a creeping, endemic herb which is widespread throughout New Zealand, although often absent from large areas of the country, and typically grows beside lakes and rivers on marginal turf or exposed mud and silt (NZPCN 2007). There are two collections from Te Paki ED. The first is a historic record from Scott Point Shrubland and Coastal Associations (M02/008) (Matthews, 1924, AK 107362), and the second a more recent record from a tributary of the Paranoa Swamp within the Te Paki Shrublands and Forest Remnants (N02/003) (Ogle, 1985, CHR 418283). Here it was found to be locally common, and growing along a muddy stream bank.

Hebe diosmifolia

Hebe diosmifolia, an endemic shrub, occurs as scattered populations in Northland, and has been recorded at Te Paki Shrublands and Forest Remnants (N02/003) near Te Rerenga Wairua (Winch, 1997, CHR 548313) and Waitiki Landing (L. Forester pers. comm.) and at Radar Bush (Bartlett,

1977, CHR 314511) (all part of N02/003) and at Shenstone Block (N02/009) (Forester, 1993, AK 229719).

Hebe macrocarpa* var. *macrocarpa

Hebe macrocarpa var. *macrocarpa* is northern North Island endemic hebe with thick leaves. The stronghold for this species in Northland is the Brynderwyn Hills in the Waipu ED (L. Forester, pers. comm.). In this ED it has been recorded from Unuwaho Bush (part of N02/004) (Young, Benham and Hambley 1998).

Helichrysum lanceolatum

Helichrysum lanceolatum is an endemic shrub typically found in coastal and lowland shrublands throughout the North and South Islands (Allan 1961). In Te Paki ED it has been recorded within North Cape Scientific Reserve and Surrounds (N02/005(c)) (de Lange and Ritchie, 2000, AK 246822), and at Unuwaho (part of N02/004) (Gardner, 1979, AK 151733).

Juncus pauciflorus

Juncus pauciflorus is a non-endemic rush which inhabits damp ground and hollows through both the North and South Islands, often in scrub, pasture, or within coastal forest (NZPCN 2007). Although present in Australia too, it is rather uncommon in New Zealand (ibid). It has been collected once in Te Paki ED, from Pandora in Te Paki Shrublands and Forest Remnants (N02/003), where it was found growing on a damp river flat under tall manuka (Gardner, 1979, AK 151734).

Lagenifera lanata

Lagenifera lanata is an endemic herb restricted to the north of the North Island, where it is of local occurrence, often present in rough pasture reverting to shrubland (NZPCN 2007). It has been collected twice from Te Paki ED: on Waikuku Flat (N02/005(b)) it was found growing underneath 1 m tall manuka (Cameron, 1995, AK 227023), and another earlier record was described from North Cape (hinterland shrubland) (part of N02/005(c)) (Parris, 1969, AK 127980, also refer to Parris 1997).

Rohutu *Lophomyrtus obcordata*

Rohutu is an endemic shrub which occurs locally in coastal to lowland forests throughout New Zealand, usually south of approximately Kaitaia (35°) (Allan 1961). In Te Paki ED it has been recorded at Waitiki Stream, Shenstone Block (N02/009) (Forester, 1993, AK 233171), where it was growing in riparian forest on an alluvial terrace.

Luzula picta* var. *picta

Luzula picta var. *picta* is a small, endemic rush is found through the North and South Islands, usually on dry ground (Moore and Edgar 1970). In Te Paki ED it has been collected from Unuwaho Bush and Shrublands (N02/004), where it was found growing on a rock outcrop, among lichens (Ogle, 1986, CHR 440038).

Manoao *Manoao colensoi*

Manoao or silver pine is an endemic, monotypic species found in the South Island and in the North Island mainly around the mountains of the Central Volcanic Plateau (NZPCN 2007). In Northland it is very scarce with its only recent record in the Te Paki ED from Radar Bush (part of N02/003) (Young and Newport, 2006, AK 297569), where it is uncommon. There is an historic record from the Kapowairua catchment, also within N02/003 (Michie, 1955, AK 42585).

Coastal mahoe *Melicytus novae-zelandiae*

Coastal mahoe is a stout, endemic shrub found mainly on coastal islands in the north of the North Island (Allan 1961). It seems to be limited to the western side of Te Paki ED, including Te Werahi Beach and Cape Maria van Diemen (M02/012) near Cape Maria van Diemen (Kilgour and Renner, 2003, AK 281148), Taupiri Island (M02/074) (de Lange, 1990, CHR 472892), Scott Point Shrubland and Coastal Associations (M02/008) (Bartlett, 1977, CHR 312523) and Maungatiketike Point Shrubland (M02/007) (Holland, 2006, SSBI M02/N02/H050), however there is also an historic record from 'North Cape' (Adams, 1896, AK 15038).

Carmine rata *Metrosideros carminea*

This endemic climbing rata with carmine-coloured flowers is distributed from Te Paki south to Taranaki in the west, and Mahia Peninsula in the east (NZPCN 2007). It has been collected from Te Paki Shrublands and Forest Remnants (N02/003) including Radar Bush (Bellingham, 1985, AK 174928), and also from Unuwaho Bush and Shrublands (N02/004) (de Lange, 1991, CHR 473302).

Northern rata *Metrosideros robusta*

Northern rata is a distinctive tall tree, which can begin life as an epiphyte or as a terrestrial plant, was once widespread from Te Paki south to Wellington, though it is now uncommon over large parts of this area mainly due to possum browse. It has been recorded at Te Paki Shrublands and Forest Remnants (N02/003) at Radar Bush (most recent collection de Lange, 1992, CHR 475175), and at Unuwaho Bush and Shrublands (N02/004) (Gardner and Bartlett 1980).

Southern rata *Metrosideros umbellata*

Southern rata is a tree rata (like northern rata), however it generally establishes on the ground, and is a smaller than northern rata (Salmon 1980). It is uncommon in Northland and is generally a tree of higher altitude. Radar Bush in Te Paki Shrublands and Forest Remnants (N02/003) is its northernmost limit of distribution (most recent collection: P. de Lange, 2002, AK 283576).

Molloybas cryptanthus

Molloybas cryptanthus is endemic to the North and South Islands and the Three Kings and is unusual in that it lacks chlorophyll and often grows and flowers entirely under leaf litter (NZPCN 2007). Although widely distributed, it is of sparse occurrence, and in Te Paki ED has only been recorded in Shenstone Block (N02/009) (McCrae, 1990, AK

198039) where it was found growing under manuka. Formerly known as *Corybas cryptanthus*.

Ngaio Myoporum laetum

Ngaio is an endemic tree generally found on the coast in the North and South Islands, the Three Kings and the Chatham Islands where it is rare and probably naturalised (NZPCN 2007). It is an uncommon tree in Northland. It has been recorded at several coastal sites in Te Paki ED, including Te Paki Shrublands and Forest Remnants (N02/003) (Wright, 1975, AK 138431), North Cape Scientific Reserve and Surrounds (N02/005(c)) (Wright, 1983, AK 165540) Motuopao Island (M02/071 (Forester, 1989, AK 186059), and Kapowairua (N02/027) (Cameron, 1984, AK 274371).

Myriophyllum votschii

Myriophyllum votschii is a semi-aquatic to aquatic herb found in dune wetlands. It has been recorded in Te Paki ED at Waihakari Wetland (N02/035) (Ogle, 1985, CHR 418267) and at Waikuku Beach (N02/030) in damp sand around a stream (de Lange and Crowcroft, 1992, CHR 475127) and at Te Paki Dune Lake (part of N02/009) (Wells *et al.* 2007).

Olearia albida

Olearia albida is a small coastal tree which occurs locally from Te Paki ED to Tokomaru Bay, East Cape (Salmon 1980). It is generally larger and more common than *O. angulata* (Data Deficient), which occurs in similar habitats. It has been recorded from the coastal margin in Te Paki Shrublands and Forest Remnants (N02/003) (Brown, 1982, AK 273843), Unuwahao Bush and Shrublands (N02/004) (Holland, 2006, AK 297556) and an historic record from Kerr Point in North Cape Scientific Reserve and Surrounds (N02/005(c)) (Winchester, 1968, AK 264087).

Ophioglossum coriaceum

Ophioglossum coriaceum is a small fern which was historically recorded at Unuwahao Bush and Shrubland (N02/004) (Hynes, 1959, AK 234121), and more recently at Pukekarea, Scott Point Shrubland and Coastal Associations (M02/008) (de Lange and Crowcroft, 1990, CHR 472756) and in 2007 in the Kapowairua area (part of N02/003) (A. Townsend pers. comm., herbarium sample sent to Auckland Museum Herbarium).

It can be confused with the threatened fern *Ophioglossum petiolatum*.

Pelargonium inodorum

Pelargonium inodorum is a low growing herb found throughout New Zealand in lowland to lower montane grassland (Allan 1961). Often occurring in modified communities, and also present in Australia, its status as indigenous is considered doubtful by some (Webb *et al.* 1988). In Te Paki ED it has been collected from Unuwahao Bush and Shrublands (N02/004), where it was found growing on rocky slopes or cliffs (de Lange, 1991, CHR 473285).

Pellaea calidirupium

Pellaea calidirupium is a non-endemic fern found in both the North and South Islands, especially along the east coasts, where it grows in open,

dry, rocky places (Brownsey and Smith-Dodsworth 2000). In Te Paki ED it is known from several collections made from the same locality, on cliffs above Waikuku Beach, within Mokaikai Scenic Reserve and Surrounds (N02/005(a)) (de Lange and Crowcroft, 1992, AK 207094).

Toatoa *Phyllocladus toatoa*

Toatoa is an endemic conifer commonly found in the North Island from Mangonui south to Rotorua (Salmon 1980). The only collection from Te Paki ED is from North Cape Scientific Reserve and Surrounds (N02/005(c)), from the Surville Cliffs (de Lange and Crowcroft, 1990, WELT SP079005).

Native plantain *Plantago raoulii*

Native plantain is a hairy-leaved endemic herb found throughout the North and South Islands in damp areas from the coast to inland valleys (Allan 1961). It has scattered populations in Northland. In Te Paki ED it has been recorded Te Paki Shrublands and Forest Remnants (N02/003) at Radar Bush (Bellingham, 1985, AK 174934), and near Pandora (Gardner, 1979, AK 151740) and a historic record from North Cape (part of N02/005(c)) (Wheeler 1963).

Pomaderris edgerleyi

Pomaderris edgerleyi is a low-growing Northland endemic shrub occurring from Te Paki to around the Dargaville area. It has been recorded at four locations in Te Paki Ecological District: Te Paki Shrublands and Forest Remnants (N02/003) (Radar Bush, Gardner and Bartlett 1980), North Cape Scientific Reserve and Surrounds (N02/005(c)) (Cameron and Jones 1996), Mokaikai Scenic Reserve and Surrounds (N02/005(a)) (W. Holland pers. comm.) and Shenstone Block (N02/009) (Clunie 1985). Formerly referred to as *Pomaderris prunifolia* var. *edgerleyi*.

Tawapou *Pouteria costata*

Tawapou is a coastal, shiny-leaved tree (up to 15 m tall) found from the Three Kings to East Cape in New Zealand and also found at Norfolk Island (Poole and Adams 1994). It is now uncommon on the mainland however the Te Paki ED is one of the mainland stronghold for this species. Tawapou has been recorded in this ED at Taupiri Island (M02/074) (de Lange, 1990, AK 200862), Te Paki Shrublands and Forest Remnants (N02/003) (Ogle, 1986, AK 440035), Unuwahao Bush and Shrublands (N02/004) (Gardner and Bartlett 1980; Holland, 2006, SSBI M02/N02/H013) and North Cape Scientific Reserve and Surrounds (N02/005(c)) (Wright, 1983, AK 165533).

Pratia angulata

Pratia angulata is a small, creeping herb with white flowers and purplish-red berries that commonly grows in lowland to subalpine damp places throughout New Zealand (Allan 1961), but is uncommon in Northland. In Te Paki ED it was recorded in 1988 record from Scott Point Shrubland and Coastal Associations (M02/008) (Forester, SSBI M02/N02/H026) and there is an historical record from Waikuku Flat (N02/005(b)) (Wheeler 1963).

Horopito *Pseudowintera axillaris*

Horopito is an endemic shrub or small tree (to 8m) found from Te Pahi ED to the northern South Island (Poole and Adams 1994). It mainly occurs at higher altitudes in Northland. In Te Pahi ED, which is north of its common distribution, it has been recorded from several forest remnants in Te Pahi Shrublands and Forest Remnants (N02/003) (Cameron, 1984, AK 273150) and from Unuwahao Bush and Shrublands (N02/004) (Gardner and Bartlett 1980).

Psilotum nudum

Psilotum nudum is a distinctive fern ally common in the tropics and subtropics, but restricted to the Poor Knights Islands and northern North Island in New Zealand, where it occurs mainly in thermal regions or under dry coastal forest (Brownsey and Smith-Dodsworth, 2000). In Te Pahi ED it was recorded in 2007 from Te Rerenga Wairua (part of N02/003) (by P. Whaley and W. Holland, specimen recently lodged with Auckland Museum Herbarium), North Cape Scientific Reserve and Surrounds (N02/005(c)) (AK 224996, Cameron and Jones 1996), and Murimotu Island (N02/072) (Forester, 1997, AK 294505).

Ranunculus urvilleanus

Ranunculus urvilleanus is an endemic, flowering herb, found in areas of Northland, Auckland and Waikato on swamp margins, stream banks and other wet ground (Webb *et al.* 1988). It seems to be frequent and widespread in Te Pahi ED, but uncommon elsewhere in Northland. It has been recorded at numerous locations throughout Te Pahi ED within 11 different sites in wetlands, shrubland, fernland, and rank pasture under light pohutukawa: (N02/002), Skyes, 1989, CHR 465 376; (N02/003), Trafford and Syddall, 1999, DOC Bioweb; (N02/004), de Lange, 1991, CHR 473290; (N02/005(b)), Wright, 1995, AK 225004; (M02/010), Cameron, 1984, AK 017828; (N02/016) recorded in this survey; (N02/017), unsubstantiated SSBI M02/N02/H018; (N02/018), Wright, 1989, AK 191230; (N02/032), Trafford, 1999, DOC Bioweb; (N02/033), de Lange, 1990, CHR 473026 and a historical record from (N02/005(c)), Croxall, 1969, AK 128014.

Raukaua anomalus

Raukaua anomalus is an endemic shrub (around 3m tall) with interlacing zig-zag branchlets (Wilson and Galloway 1993). In Te Pahi ED it only occurs at higher altitudes within Unuwahao Bush and Shrublands (N02/004) (Gardner and Bartlett 1980; Forester, 1992, SSBI M02/N02/H011) and may be present in other high forest remnants.

Forked comb fern *Schizaea bifida*

Forked comb fern is small and wiry with inconspicuous fronds and is typical of poor soils. It occurs from Te Pahi to Lake Taupo and East Cape in the North Island, and in north-west Nelson and the Westport area of the South Island but is often local; also occurs in Australia and New Caledonia (Brownsey and Smith-Dodsworth 2000). In Te Pahi ED it has been recorded from open sites and under manuka at Shenstone Block (N02/009) (Wright, 1995, AK 234855), Te Pahi Shrublands and

Forest Remnants (N02/003) (Cameron, 1984, AK 273134), and Waikuku Flat (N02/005(b)) (Beever, 1986, WELT P017868).

Scleranthus biflorus

Scleranthus biflorus is an indigenous perennial herb closely branched, usually yellowish often forming a dense and mossy mat (Allan 1961). Also found in Tasmania, Australia and South America (ibid). In Te Paki ED there is a recent record from inland on loose conglomerate in Unuwahao Bush and Shrublands (N02/004) (de Lange and Crowcroft, 1992, CHR 475165), but no recent records from the coast. Historic records are from North Cape Scientific Reserve and Surrounds (N02/005(c)) including from Surville Cliffs (Druce *et al.* 1979—listed but not seen) and Kerr Point (Powell, 1950, AK 44761), and from Te Paki Shrublands and Forest Remnants (N02/003) behind Tom Bowling Bay (Turbott, 1934, AK 100165) and in the Kapowairua area (Hynes, 1957, AK 94172).

Burr reed *Sparganium subglobosum*

Burr reed is a monocotyledon which occurs locally in wetlands throughout the North Island and upper South Island. It is known as burr reed, for its rounded, white burrs (flower heads) appearing in late spring. In Te Paki ED it has been recorded at Te Paki Dune Lake (part of N02/009) (Wells *et al.* 2007), Te Werahi Wetland (M02/010) (Cameron, 1984, AK 274292), Waitangi Stream Wetland and Riparian Strip (N02/034) (Wright, 1983, AK 165556), Waiwhero Stream Wetland (N02/025) (recorded during this survey), Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (Cameron, 1984, AK 274352) and Ponaki Wetland (N02/032) (de Lange, 1996, AK 226103).

Spiranthes novae-zelandiae

Spiranthes novae-zelandiae is a perennial wetland orchid endemic to the North, South and Chatham Islands. It occurs in open sites within a wide range of wetland types, from coastal to montane areas (NZPCN 2007). In Te Paki ED there are herbarium records for it from Ponaki Wetland (N02/032) (Cameron, 1985, AK 274666) and Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (Cameron, 1985, AK 274652), however differences between this species and *Spiranthes* aff. *novae-zelandiae* (CHR 518297; Motutangi) (Data Deficient) are yet to be resolved, as they both occur in the same sites.

Thelymitra* aff. *longifolia

Thelymitra longifolia sensu stricto has not been found north of a line between Matauri Bay on the east coast and Tauroa Peninsula on the west (McCrae 1990). This is a closely related entity endemic to northern Northland which is common to abundant throughout Te Paki ED with records including Te Paki Shrublands and Forest Remnants (N02/003), Mokaikai Scenic Reserve and Surrounds (N02/005(a)), North Cape Scientific Reserve and Surrounds (N02/005(c)), Scott Point Shrubland and Coastal Associations (M02/008), and the Shenstone Block (N02/009) (McCrae 1990). It differs from the very common, unscented, white-flowered, self-pollinating *T. longifolia* by being scented, often insect-pollinated, with white but sometimes pink flowers.

Arrow grass *Triglochin striata*

Arrow grass is an indigenous small salt meadow monocotyledon, which is generally found coastally in saltmarsh, estuaries and damp seepages (NZPCN 2007). In Te Paki ED it has been recorded from saltmarsh at the northern end of Kapowairua (N02/027) (Sykes, 1989, CHR 466483) and from freshwater at Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016), (Cameron, 1984, AK 274360). It has also been noted at North Cape Scientific Reserve and Surrounds (N02/005(c)) (Parris 1997) and Motuopao Island (M02/071) (Forester 1993).

Doubtful regionally significant plant records

Lepidothamnus intermedius

This endemic podocarp is found in lowland to subalpine forest throughout New Zealand (Allan 1961). It has been recorded once in Te Paki ED, (Adams, date unknown, AK 14270), although the locality ('North Cape District') is somewhat vague, and has been described as 'suspect' by R.O. Gardner (see notes in herbarium record).

Threatened and regionally significant plant species recorded pre-1975 in Te Paki Ecological District

ACUTELY THREATENED

***Epilobium birtigerum* (Nationally Endangered)**

Epilobium birtigerum was once widespread in the North Island (except Taranaki) but was only considered common north of Hamilton (NZPCN 2007). There is a historic collection (late 1800s) of this herb by T.F. Cheeseman from Tom Bowling Bay (AK 5648), but it has not been recorded in Te Paki ED since then. This species seems to have declined as a result of increasing competition from other introduced weeds and grasses (NZPCN 2007).

Titirangi *Hebe speciosa* (Nationally Endangered)

Titirangi is a coastal hebe with large magenta-coloured flower spikes and broad leaves with purplish edges and midrib. It grows on cliffs and steep slopes by the sea. It is endemic to the northwest coast of the North Island and now also grows wild in the southern North Island and Marlborough Sounds whence it was probably translocated by pre-European Māori (Armstrong and de Lange 2005). In Te Paki ED there are historic records of *Hebe speciosa* from Scott Point (Forester and Townsend 2004) and North Cape (collected by Cheeseman in 1899 and grown on at Maungatapere; AK 107326). The Surville Cliffs endemic, *Hebe brevifolia*, has a similar flower colour but its leaves are lance-shaped, lighter green, and lack the purplish edges and midrib (Forester and Townsend 2004).

***Lycopodiella serpentina* (Nationally Vulnerable)**

Lycopodiella serpentina is a non-endemic creeping clubmoss which generally grows in very wet, swampy areas growing on small hummocks; a habitat which is becoming eroded as wetlands are drained and stock

trample the ground (Brownsey and Smith-Dodsworth 2000). Also found in Australia and New Caledonia (although it is possibly extinct from the latter) (NZPCN 2007). There is an historic record of this species by Colenso from the Te Paki ED (AK 1016; specific locality not provided). This species used to be known as *Lycopodium serpentinum*.

CHRONICALLY THREATENED

Puha *Sonchus kirkii* (Gradual Decline)

Puha is an endemic coastal sow thistle (true puha) which used to occur throughout New Zealand, including the Chatham Islands, however it is now in decline due to habitat loss through coastal development and competition with weeds (NZPCN 2007). It usually occurs in open, wet coastal cliffs and talus, rarely on sand or in saltmarshes (Forester and Townsend 2004). Historic records from Te Paki are by Cheeseman in 1896 from Te Rerenga Wairua (part of N02/003) (AK 10801), and by Carse in 1927 from Kapowairua (N02/027). It has been recorded recently on the west coast of adjoining Aupouri ED.

AT RISK

***Fuchsia procumbens* (Sparse)**

Fuchsia procumbens is a prostrate, sprawling plant found in open coastal habitats on the mainland from North Cape to Maunganui Bluff on the west coast, Coromandel on the east coast, and on Great Barrier Island (Godley and Berry 1995). In the late 1800s and early 1900s this species was recorded at Kapowairua (N02/027) (Carse, 1928, CHR 330301), Scott Point (M02/008) (Carse, 1928, CHR 330304) and North Cape (probably within N02/005(c)) (Adams, 1896, AK 15114), however there appear to be no modern herbarium records from Te Paki ED.

***Pseudopanax ferox* (Sparse)**

Pseudopanax ferox is a distinctive tree differing from its more common relative *Pseudopanax crassifolius* by having brown leaves with large, 'fierce' serrations, being smaller and preferring drier habitats. It is endemic to the North Island (with a very patchy distribution) and South Island, where it is more widespread (NZPCN 2007). Within Te Paki ED, it has been recorded at North Cape Scientific Reserve and Surrounds (N02/005(c)) (Rawlings, 1971, AK 220982). In addition to being naturally sparse, it is threatened by possum, deer and goat browse, and over-collection for horticulture (NZPCN 2007).

REGIONALLY SIGNIFICANT

Blechnum fluviatile

Blechnum fluviatile is a fern which generally occurs at higher altitudes in Northland. Wheeler (1963) recorded it from coastal forest in North Cape (N02/005(c)).

Epilobium cinereum

Epilobium cinereum is an endemic herb which inhabits open grassland and gravelly places from North Cape area south to approximately 45°

(near Oamaru) (Allan 1961). The only collection from Te Paki ED is historic (Cheeseman, probably 1890s), and was taken from Kapowairua.

Gunnera dentata

Gunnera dentata is a creeping, endemic herb which grows on wet ground by streams or bogs, or in grassland, in both the North and South Islands (Allan 1961). In Te Paki ED there are three historic records of *G. dentata*; undated collection made from North Cape (N02/005(c)) by Adams (AK 15124); Cape Maria van Diemen, (part of M02/012) (Cheeseman, 1896, AK 6027) and from salt swamp and damp sandflats on Waikuku Flat (N02/005(b)) (Wheeler 1963). The only other place where this plant occurs in Northland is on the Pouto Peninsula.

Manatu Plagianthus regius

Manatu, also known as ribbonwood, is a tall flowering tree found locally from Mangonui southwards, typically along riverbanks and alluvial terraces (Salmon 1980). Records in Te Paki ED, which is north of its typical range, are scarce, with only one record found; an unspecific locality in the 'North Cape Area' (Kelly 1967).

Mountain horopito Pseudowintera colorata

Mountain horopito, also known as peppertree, is a small tree or shrub which is common in some parts of New Zealand forests but is very rare in Northland where it is only found in higher altitude places like the Tutamoe Range in the Tutamoe ED. Te Paki is thus considerably north of its common distribution. The only collection in Te Paki ED is an historic one, from Unuwahao Bush and Shrublands (N02/004) (Cooper, 1949, AK 24475), where it was present near the summit of Unuwahao peak.

Rohutu Neomyrtus pedunculata

Rohutu is a small-leaved, white-flowered shrub or small tree which can be identified by its square branchlets in cross section (Wilson and Galloway 1983). It has a scattered distribution throughout New Zealand (Salmon 1980), with Te Paki ED being its northernmost limit. The only collection of this species from Te Paki ED is historic, from Pandora in Te Paki Shrublands and Forest Remnants (N02/003) (Michie, 1947, AK 23282).

Suaeda novae-zelandiae

Suaeda novae-zelandiae is an uncommon coastal and estuarine herb found close to the high tide with its Northland stronghold in the Whangaruru ED (L. Forester pers. comm.). It was recorded by Wheeler (1963) from the salt swamp and sandflat zone of Waikuku Flat (N02/005(b)).

3.4 FAUNA

Information on fauna in this report has been compiled from SSWI (Special Site of Wildlife Interest) and SSBI databases, published reports, and from field observations during this survey. Many of these records date from 1978 (SSWI, NZ Wildlife Service) however due to the relatively unmodified state of the Te Paki ED since 1978 these records have been

included. Categories of threat and rarity are based on the classification scheme of Molloy *et al.* (2002), as followed by Hitchmough *et al.* (comp.) (2007) (See Appendix 3). Nomenclature follows Hitchmough *et al.* (2007) except for some records in *Threatened landsnail species* where the most updated nomenclature is used with reference back to Hitchmough *et al.* (comp.) 2007. Status of bird species or subspecies (i.e. endemic—found only in New Zealand; indigenous—also breeds outside New Zealand) is taken from Heather and Robertson (2005).

The individual site descriptions detail known significant fauna and common species if the information is available. Most of the common bird species of Northland, both indigenous and introduced, are to be found in Te Paki Ecological District. A checklist of fauna recorded is included in Appendix 7.

3.4.1 Threatened bird species

Three key features of Te Paki ED make the area an important one for birds, including many threatened species:

- Northern extremity of New Zealand therefore important for national and international latitudinal migrants
- Coastal and island breeding sites for seabirds
- Nearby presence of an internationally important harbour, Parengarenga (Aupouri ED) from which birds may disperse to visit sites in the Te Paki ED

ACUTELY THREATENED

White heron, kotuku *Egretta alba modesta* (Nationally Critical^{st, so, ol})
Indigenous

Recorded in Parengarenga Harbour. In New Zealand, only breeds near Okarito.

Australasian bittern, matuku *Botaurus poiciloptilus* (Nationally Endangered^{ro, ni})
Indigenous

Found in the larger wetlands, including Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) (1978, SSBI M02/N02/H010), Kapowairua Wetland and Lagoon (N02/019) (1978, SSBI M02/N02/H009), Lake Ngakeketa (part of N02/001) (1992, SSBI M02/N02/H024), Cape Road Wetlands and Shrubland (N02/002) (R. Pierce pers. comm.), Waiwhero Stream Wetland (1999, SSBI M02/N02/H016), Te Werahi Wetland (M02/010) (1983, SSBI M02/N02/H001), Tawakewake Wetland (N02/036) (1999, SSBI M02/N02/H016) and margins of the Parengarenga Harbour.

Grey duck, parera *Anas superciliosa superciliosa* (Nationally Endangered^{so})
Endemic subspecies

Northland is one of the strongholds for this species in New Zealand, with records throughout the Te Paki ED (Robertson *et al.* 2007). Preferred habitat includes small lakes, slow-flowing rivers, and tidal

water surrounded by forest (Heather and Robertson 2005). In Te Pahi ED records include Lake Ngakeketa, Te Pahi Lake and Surrounds (N02/001) (1996, SSBI M02/N02/H023 and 1992, SSBI M02/N02/H024), Te Werahi Wetland (N02/010) (OSNZ, 2000, SSBI M02/N02/H001), Waitahora Lagoon (part of N02/016) (1992, SSBI M02/N02/H010) and Kapowairua Wetland and Lagoon (N02/019) (1978, SSBI M02/N02/H009).

Caspian tern, taranui *Sterna caspia* (Nationally Vulnerable so)

Indigenous

Fishes along the coastline and roosts on beaches throughout including Kapowairua Wetland and Lagoon (N02/019) (1978, SSBI M02/N02/H009), Tom Bowling Bay (N02/029) (R. J. Pierce pers. comm. 2007), Waikuku Beach (N02/030) (R. J. Pierce pers. comm. 2007) and Ngakengo Beach (N02/062) (1997, SSBI M02/N02/H020). A small breeding colony occurs at Parengarenga (R. J. Pierce pers. comm.).

Reef heron, matuku-moana *Egretta sacra sacra* (Nationally Vulnerable DP, so)

Indigenous

Widely distributed along coasts of the ED (Robertson *et al.* 2007), including Motuopao Island (M02/071) (1992, SSBI M02/N02/H042).

Wrybill, ngutu-parore *Anarhynchus frontalis* (Nationally Vulnerable)

Endemic

Recorded in Parengarenga Harbour, where small flocks of birds overwinter. Threats to this species include predation and modification to habitat (Heather and Robertson 2005).

Northern New Zealand dotterel *Charadrius obscurus aquilonius* (Nationally Vulnerable CD, ST)

Endemic

Found in small numbers along sandy beaches at Ngakengo Beach (N02/062) (1997, SSBI M02/N02/H020), Tapotupotu Beach M02/063 (1978, SSBI M02/N02/H002), Kapowairua (N02/027), Kapowairua Wetland and Lagoon (N02/019) (1991, SSBI M02/N02/H009) and Whareana Bay (N02/031) (1978, SSBI M02/N02/H017). Also found at Tom Bowling Bay (N02/029), Waikuku Beach (N02/030), Twilight Beach (M02/011), and Te Werahi Beach and Cape Maria van Diemen (M02/012) (P. Anderson pers. comm.). Breeds on most beaches (R. Pierce pers. comm.).

Bush falcon, karearea *Falco novaeseelandiae* “bush” (Nationally Vulnerable DP, HI)

Endemic

Recorded once in this ED (unconfirmed) (Bull *et al.* 1985).

CHRONICALLY THREATENED

Banded dotterel, tuturiwhatu *Charadrius bicinctus bicinctus* (Gradual Decline)

Endemic

Found along the coastline at Kapowairua (N02/027) and Kapowairua Wetland and Lagoon (N02/019) (1991, SSBI M02/N02/H009), Whareana

Bay (N02/031) (1978, SSBI M02/N02/H017), Ngakengo Beach (N02/062) (1978, SSBI M02/N02/H020), Waitahora Lagoon (part of N02/016) (1992, SSBI M02/N02/H010) and Tom Bowling Bay (N02/029) (R. J. Pierce pers. comm.). Pairs breed at most of the above beaches, but the local “wintering” population in January–July comprises migrants mainly from central and southern New Zealand (Pierce 1999).

There are unofficial records from Te Werahi Beach and Cape Maria van Diemen (M02/012) and Waikuku Beach (N02/030).

**Kukupa, NZ pigeon *Hemiphaga novaeseelandiae* (Gradual Decline_{RF})
*Endemic***

Found in forest remnants. Recorded from Te Paki Shrublands and Forest Remnants (N02/003) (recorded during this survey, SSBI M02/N02/H026 and P. Whaley pers. comm.), Unuwahao Bush and Shrublands (N02/004) (2006, SSBI M02/N02/H013) and and Mokaikai Scenic Reserve and Surrounds (N02/005(a) (P. Whaley pers. comm.) in the Te Paki Ecological District.

**Long-tailed cuckoo, koekoea *Eudynamys taitensis* (Gradual Decline_{DP, HI})
*Endemic***

Birds pass through Te Paki ED on their migration north to the tropical Pacific. A few birds have been known to overwinter in the far north of New Zealand, but breeding does not occur here presumably because the area is beyond the range of whitehead (*Moboua albicilla*), its principal host species in the North Island (Heather and Robertson 2005).

**Northern little blue penguin, karora *Eudyptula minor iredalei* (Gradual Decline_{HI, EF})
*Endemic***

Recorded at many sites in the ED (Robertson *et al.* 2007) including Motuopao Island (breeding) (M02/071) (Pierce and Parrish 1993), Twilight Beach (M02/011) (R. Pierce pers. comm.), and Cape Maria van Diemen (part of M02/012) (R. Pierce pers. comm.).

**Red-billed gull, tarapunga *Larus novaehollandiae scopulinus* (Gradual Decline)
*Endemic subspecies***

Coastal areas of Te Paki ED and also found in inland areas (R. J. Pierce pers. comm.), including Tapotupotu Beach (M02/063) (1978, SSBI M02/N02/H002), Waitahora Lagoon (part of N02/016) (1992, SSBI M02/N02/H010), Kapowairua Wetland and Lagoon (N02/019) and Kapowairua (N02/027) (1991, SSBI M02/N02/H020) and Ngakengo Beach (N02/062) (1997, SSBI M02/N02/H020).

**Sooty shearwater, titi *Puffinus griseus* (Gradual Decline_{SO, HI})
*Indigenous***

Breeds on Motuopao Island (M02/071) (Pierce and Parrish 1993).

**White-fronted tern, tara *Sterna striata striata* (Gradual Decline)
*Endemic***

Found along the coastline including Ngakengo Beach (N02/062) (1997, SSBI M02/N02/H020), Waitahora Lagoon (part of N02/016) (1992,

SSBI M02/N02/H010), Kapowairua Wetland and Lagoon (N02/019) and Kapowairua (N02/027) (1991, SSBI M02/N02/H009) and Motuopao Island (M02/071) (1992, SSBI M02/N02/H042). Numbers of this species have greatly declined; the exact reasons are unknown however predation is severe from cats, mustelids and rats (Heather and Robertson 2005).

AT RISK

Little black shag *Phalacrocorax sulcirostris* (Range Restricted so) *Indigenous*

Recorded at dunelakes and wetlands (Robertson *et al.* 2007) including Te Werahi Wetland (M02/010) (OSNZ, 1981, SSBI M02/N02/H001).

White-capped noddy *Anous tenuirostris minutus* (Range Restricted so) *Indigenous*

Historical record at Kapowairua (N02/027) in 1965 (MacDonald 1965).

Banded rail, moho-pereru *Gallirallus philippensis assimilis* (Sparse DP, HI) *Endemic subspecies*

Formerly widespread, this species now has its national stronghold in Northland. It has been recorded from many sites in the Te Paki ED (Robertson *et al.* 2007) including Waitahora Lagoon (part of N02/016) (OSNZ, 1996, SSBI M02/N02/H010), also recorded at the Parengarenga Harbour.

Marsh crake, koitareke *Porzana pusilla affinis* (Sparse) *Endemic subspecies*

An uncommon, although widely distributed species with few records Northland. It has been reported from Waitahora Lagoon (part of N02/016) (1992, SSBI M02/N02/H010).

New Zealand dabchick, weweia *Poliocephalus rufpectus* (Sparse) *Endemic*

Found on dune lakes, this species was recorded by Kelly (1967) in Te Paki Ecological District at Lake Ngakeketa, Te Paki Lake and Surrounds (N02/001) and recorded at one site (possibly Te Werahi Wetland M02/010) in the ED in Robertson *et al.* 2007.

North Island fernbird, matata *Bowdleria punctata vealeae* (Sparse HI) *Endemic*

Te Paki is a stronghold for this species, which is found throughout most of the shrublands (recorded from at least 14 sites) with a dense population occurring in the Kapowairua area (Anderson 1984).

Sites include N02/001 (1999, SSBI M02/N02/H024); N02/003 (Anderson 1984); N02/004 (P. Whaley pers. comm.), N02/005(a), N02/005(b) (1978, SSBI M02/N02/H016); N02/005(c) (2007, SSBI M02/N02/H049); N02/009 (1995, SSBI M02/N02/H049); N02/010 (1978, SSBI M02/N02/H001); N02/016 (1978, SSBI M02/N02/H010); N02/017 and N02/018 (1978, SSBI M02/N02/H018/H019); N02/019 (2007, SSBI M02/N02/H009); N02/032 (1978, SSBI M02/M02/H020); N02/033 (1978, M02/N02/H016); N02/034

(1978, SSBI M02/N02/H016); N02/036 (1978, SSBI M02/N02/H016) and N02/038 (1978, SSBI M02/N02/H017).

Spotless crane puweto *Porzana tabuensis plumbea* (Sparse so)
Indigenous

A species with restricted distribution and, on the mainland, largely confined to dense reed beds. Found at a variety of wetland sites throughout Te Paki ED: Upper Kapowairua Wetland (N02/017) and Broughton's Gully Wetland (N02/018) (1978, SSBI M02/N02H018/H019), Kapowairua Wetland and Lagoon (N02/019) (1978, SSBI M02/N02H009), Ponaki Wetland (N02/032) (1978, SSBI M02/N02H020), Waikuku Wetlands (N02/033), Waitangi Stream Wetland and Riparian Strip (N02/034), and Tawakewake Wetland (N02/036) all in 1978, SSBI M02/N02/H016.

Black shag kawau *Phalacrocorax carbo novaehollandiae* (Sparse so)
Indigenous

This species has been recorded at several coastal sites (Robertson *et al.* 2007) and at Te Werahi Wetland (M02/010) (OSNZ, 2000, SSBI M02/N02/H001), Lake Ngakeketa, Te Paki Lake and Surrounds (N02/001) (1992, M02/N02/H024), and Tapotupotu Stream Wetland and Estuary (M02/015) (1978, SSBI M02/N02/H002).

Regionally significant bird species

The following species are included in a draft list of regionally significant species prepared by the Northland Conservancy (DOC, in prep.).

Variable oystercatcher, torea *Haematopus unicolor*
Endemic

Found in small numbers along the coastline from North Cape Scientific Reserve (N02/005(c) (P. Anderson pers. comm.), Kapowairua (N02/027) and Kapowairua Wetland and Lagoon (N02/019) (1991, SSBI M02/N02/H009), Tapotupotu Beach (M02/063) (SSBI 1978, M02/N02/H002), Tom Bowling Bay (N02/029) (R. Pierce pers. comm.), Whareana Bay (N02/031) (1978, SSBI N02/N02/H017), Ngakengo Beach (N02/062) (1997, SSBI M02/N02/H020), Motuopao Island (M02/071) (1992, SSBI M02/N02/H042) and Taupiri Island (1990, M02/N02/H044). Also recorded at Twilight Beach (M02/011), Te Werahi Beach and Cape Maria van Diemen (M02/012) and Waikuku Beach (N02/030) (P. Anderson pers. comm.). Breeds at most of these beaches (R. Pierce pers. comm.).

New Zealand scaup, papango *Aythya novaeseelandiae*
Endemic

In Northland New Zealand scaup are mostly found on dunelakes (Heather and Robertson 2005) but are also recorded from freshwater wetlands. Recorded from Lake Ngakeketa, Te Paki Lake and Surrounds (N02/001) and Cape Road Wetlands and Shrubland (N02/002) in this ED. (R. Pierce pers. comm.).

NZ shoveler, *Anas rhynchosotis variegata*
Endemic subspecies

Anas rhynchosotis has two subspecies, one of which breeds in Australia (A.

rhynchotis rhynchotis) and this subspecies the NZ shoveler which breeds in New Zealand. NZ shoveler occurs throughout New Zealand including Te Pahi ED with a probable increase in Northland since the 1985 atlas (Robertson *et al.* 2007). Records include Te Werahi Wetland (M02/010) (OSNZ, 1999, SSBI M02/N02/H001).

White-faced storm petrel *Pelagodroma marina*

Indigenous

This species has been recorded at Cape Maria van Diemen (part of M02/012), Tapotupotu Beach (part of M02/063) (R. Pierce pers. comm.) and breeding at Motuopao Island (M02/071) (Pierce and Parrish 1993).

Northern diving petrel, kuaka *Pelecanoides urinatrix urinatrix*

Indigenous

A circumpolar species, which has been recorded breeding at Motuopao Island (M02/071) (Pierce and Parrish 1993).

Grey-faced petrel oi *Pterodroma macroptera gouldi*

Endemic

Grey-faced petrel breed at Te Rerenga Wairua (part of N02/003) (observed in April 2008, A. Booth pers. comm.), Cape Maria van Diemen (part of M02/012) (R. Pierce pers. comm.) and Motuopao Island (M02/071) (Pierce and Parrish 1993).

Black-winged petrel *Pterodroma nigripennis*

Indigenous

This species has been recorded prospecting at Cape Maria van Diemen (part of M02/012) (R. Pierce pers. comm.) and breeding at Motuopao Island (M02/071) (Pierce and Parrish 1993).

Grey teal, tete *Anas gracilis*

Indigenous

Grey teal inhabit lowland lakes and lagoons, as well as estuaries. Recorded at Cape Road Wetlands and Shrubland (N02/002) (R. Pierce pers. comm.), Te Werahi Wetland (N02/010) (OSNZ, 1999, SSBI M02/N02/H001) and Waitahora Lagoon (part of N02/016) (OSNZ, 1996, M02/N02/H010).

NI tomtit, miromiro *Petroica macrocephala toitoi*

Endemic

North Island tomtit declined throughout New Zealand after lowland forest clearance and the introduction of predatory mammals, however NI tomtit have been able to adapt with populations probably stabilised (Heather and Robertson 2005). In the Te Pahi ED they have been recorded recently from Radar Bush (part of N02/003) (2006, SSBI M02/N02/H006) and towards North Cape (O. Ball pers. comm.).

Red-tailed tropicbird *Phaeton rubricauda*

Northland is the southern extremity of this tropical species. It is a visitor to Te Pahi coastal waters and Parengarenga Harbour especially after tropical storms reach New Zealand (R. Pierce pers. comm.).

Threatened landsnail species

Information on landsnails was provided by Dr Fred Brook. Information on the distribution of native landsnail species in Te Paki Ecological District is listed in Powell (1938, 1947, 1951), Gardner (1967, 1968), Ogle *et al.* (1985), Goulstone *et al.* (1993), Goulstone (1997), Brook (1999a, 1999b, 2002), and Marshall and Barker (2007, 2008). A total of 101 native species is known including at least 39 local endemics, and three species (*Climocella reinga*, *Egestula pandora*, *Serpho matthewsi*) that are restricted to Te Paki and Aupouri Ecological Districts. This is by far the greatest concentration of endemic landsnail species in New Zealand. Many of these species have not yet been formally described—informal names in this report follow the numbering system used in the taxonomic list of Spencer *et al.* (in press), and the numbers preceded by 'NMNZ M.' refer to voucher specimens in the Museum of New Zealand Te Papa Tongarewa. Seven adventive European landsnail species have been recorded from Te Paki Ecological District: *Candidula intersecta*, *Cochlicopa lubrica*, *Cornus aspersum*, *Lauria cylindracea*, *Oxychilus cellarius*, *Prietocella barbara*, *Vallonia excentrica*. (Goulstone *et al.* 1993; Barker 1999).

The richest assemblages of native landsnails in Te Paki Ecological District are in remnant patches of broadleaf-dominated forest. For example, 49 species are recorded from Radar Bush, 47 from Unuwahao, 41 from Kohuronaki, 32 from Haupatoto Bush, and 31 from Whareana forest remnants (Goulstone *et al.* 1993). Mature kanuka forest and coastal harakeke-broadleaf shrublands also contain locally rich landsnail assemblages, but manuka heathlands generally contain very few species (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a).

Forty-three native landsnail taxa present in Te Paki Ecological District are considered to be uncommon or threatened, with some known only from single sites (Brook 2002; Hitchmough *et al.* (comp.) 2007). Many of these species are known only from forest remnants, and some are recorded from forest and harakeke-broadleaf shrublands. Two unnamed species are known only from coastal shrubland habitats (i.e., Punctidae sp. 156 NMNZ M. 79798, Punctidae sp. 223 NMNZ M.151458), and *Succinea archbeyi* is restricted to *Spinifex* grassland and prostrate shrubland vegetation on sand dunes (Brook 1999b, 2002). Most of the threatened landsnails are small (maximum shell dimensions <10 mm), but two are giant: *Paryphanta wattii* and *Placostylus ambagiosus*. The latter taxon comprises a genetically and morphologically diverse complex of at least 27 small, disjunct natural populations, many of which are highly threatened (Triggs and Sherley 1993; Brook 2002).

The main existing threats to native landsnail species in Te Paki Ecological District are: predation by introduced mammals, especially by pigs and rodents; modification of habitats as a result of browsing and trampling by cattle and horses, browsing by rabbits and possums, and rooting by pigs; and loss of habitat through fires and vegetation clearance. Coastal shrubland and dune habitats are also locally under threat from invasive exotic plants, including kikuyu grass (*Pennisetum clandestinum*) and pampas grass (*Cortaderia selloana*). The northwards spread of the

Argentine ant (*Linepithema humile*) on Aupouri Peninsula is an extremely serious threat, and could potentially lead to extinction of many endemic snails and other invertebrates in the Te Paki ED (see section 3.5).

Threatened native landsnail taxa in Te Paki Ecological District are listed below from information compiled by Dr. Fred Brook and information described in 'DOC unpublished data 2007'. The categories of threat follow the New Zealand classification system of Molloy *et al.* (2002) as listed in Hitchmough *et al.* (comp.) (2007)¹¹. Subspecies of *Placostylus ambagiosus* and distribution follows Brook (2002). (See Appendix 7 Checklist of fauna species in Te Paki Ecological District for a full list of snails compiled by Dr. Fred Brook.)

ACUTELY THREATENED

Charopidae sp. 46 (NMNZ M.87828) (Nationally Critical DP)

This species is endemic to northern Aupouri Peninsula (Te Paki ED), known from Ngaruariki Stream and Te Huka (Brook 2002) in N02/004.

***Cytora gardneri* (NMNZ M.87893) (Marshall and Barker 2007) (Nationally Critical HI, OL I) (*Cytora* sp. 11 in Hitchmough *et al.* (comp.) 2007)**

Cytora gardneri is endemic to northern Aupouri Peninsula; recorded from Radar Bush, Kohuronaki and Taumatarao Flat (Marshall and Barker 2007), N02/003 and N02/005(a) in this ED.

Distribution of *Placostylus ambagiosus*

Placostylus ambagiosus are endemic to northern Aupouri Peninsula; sporadically distributed between Motuopao and North Cape (Powell 1979; Brook 2002).

***Placostylus ambagiosus* (Suter, 1906) *ambagiosus* Suter (Nationally Critical)**

Placostylus ambagiosus ambagiosus is endemic to Motuopao Island (M02/071) where observations have shown evidence of recruitment since kiore were eradicated (H. Taylor and A. Booth pers. comm.).

***Placostylus ambagiosus consobrinus* Powell (Nationally Critical CD, RF OL)**

This subspecies is endemic to Cape Maria van Diemen headland (part of M02/012).

***Placostylus ambagiosus* "Haupatoto" (Nationally Critical CD, HI, RF, OL)**

This subspecies is found in two populations in forest remnants in N02/005(a) near Haupatoto.

***Placostylus ambagiosus* "Kauaetewhakapeke Stream" (Nationally Critical DP, OL)**

This subspecies is found in broadleaved and broadleaved-kanuka forest in (N02/003).

11. With the exception of *Allodiscus wairua* which is not listed at all in Hitchmough *et al.* 2007. The status for this species comes from Marshall and Barker 2008.

***Placostylus ambagiosus keenorum* Powell (Nationally Critical_{CD, ST, RF, OL})**

This subspecies occurs as a single population in forest and shrubland at Maungapiko Hill within Unuwahao Bush and Forest Remnants (N02/004).

***Placostylus ambagiosus pandora* Powell (Nationally Critical_{CD, ST, RF, OL})**

This population occurs at Pandora and Whangakea Stream (part of N02/003).

***Placostylus ambagiosus* “Poroiki” (Nationally Critical_{CD, ST, RF, OL})**

This subspecies occurs as a single population in a forest remnant at Poroiki Hill (part of N02/005(a)).

***Placostylus ambagiosus* “Rangiora” (Nationally Critical_{DP, HI, OL})**

Occurs as a single population at the north end of Rangiora Bay (part of N02/005(a)).

***Placostylus ambagiosus* “Tapotupotu” (Nationally Critical_{OL})**

This subspecies occurs in the Tapotupotu area (part of N02/003).

***Placostylus ambagiosus* “Te Paki” (Nationally Critical_{CD, ST, OL})**

This subspecies is found in one population near Te Paki Trig (N02/003).

***Placostylus ambagiosus* “Tirikawa Coast” (Nationally Critical_{HI, OL})**

This subspecies occurs on the Tirikawa coast (part of N02/003) as two populations.

***Placostylus ambagiosus* “Tirikawa Trig” (Nationally Critical_{DP, HI, OL})**

This subspecies occurs as a single population at Tirikawa Trig (part of N02/003).

***Placostylus ambagiosus watti* Powell (Nationally Critical_{CD, ST, RF, OL})**

This subspecies is found within the North Cape Scientific Reserve (N02/005(c)) at the eastern end of North Cape Headland.

***Placostylus ambagiosus whareana* Powell (Nationally Critical_{CD, ST, RF, OL})**

This subspecies occurs at Whareana (N02/031) as a single population.

Punctidae sp. 156 (NMNZ M.79798) (Nationally Critical_{DP}) (Listed as Punctidae sp. 27 in Hitchmough *et al.* (comp.) 2007)

Punctidae sp. 156 is endemic to Motuopao (M02/071) and Cape Maria van Diemen (part of M02/012) (Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002).

Punctidae sp. 223 (NMNZ M.151458) (Nationally Critical) (Listed as Punctidae sp. 6 in Hitchmough *et al.* (comp.) 2007)

Punctidae sp. 223 was formerly widely distributed on dunefields in northern and eastern Northland; two extant populations known, including one at Kurahoupo Rocks (part of N02/004) in Te Paki Ecological District and the other at Whangarei Heads in the Manaia Ecological District (DOC unpublished data 2007).

Charopidae sp. 27 (NMNZ M.58110) (Nationally Endangered_{DP, OL})

Endemic to northwestern Aupouri Peninsula; known from Tapotupotu Bay only (part of N02/003) (Brook 2002).

Charopidae sp. 166 (NMNZ M.79360) (Nationally Endangered_{DP, OL})

Endemic to northwestern Aupouri Peninsula, known from Radar Bush (part of N02/003) (Brook 2002).

***Costalodiscus parrishi* (Nationally Endangered) (Marshall and Barker 2008) (Charopidae sp. 165 (NMNZ M.99147) in Hitchmough *et al.* (comp.) 2007)**

Costalodiscus parrishi is endemic to northern Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and Tom Bowling Bay (Goulstone *et al.* 1993; Brook 1999a, 2002; Marshall and Barker 2008) within the sites N02/003 and N02/004.

***Flammulina tepakiensis* Gardner (Nationally Endangered_{DP})**

Flammulina tepakiensis is endemic to northern Aupouri Peninsula, known from Radar Bush (part of N02/003), Kohuronaki (part of N02/003) and Unuwahao (part of N02/004) (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).

***Placostylus ambagiosus annectens* Powell (Nationally Endangered_{CD, RF})**

This subspecies occurs in several populations within N02/004.

***Placostylus ambagiosus michiei* Powell (Nationally Endangered_{CD, RF, OL})**

This subspecies is endemic to North Cape Scientific Reserve (N02/005(c)), with a single population at the Surville Cliffs.

***Placostylus ambagiosus* “Ngaupoko” (Nationally Endangered_{HI, RF, OL})**

This subspecies is found near Ngaupoko in N02/003.

***Placostylus ambagiosus paraspiritus* Powell (Nationally Endangered_{CD, HI, RF})**

This subspecies occurs as one natural population on a small coastal headland east of Cape Maria van Diemen (part of M02/012) and a translocated population on coastal slopes northwest of Maungatiketike Point (M02/007) (Brook 2002).

CHRONICALLY THREATENED

***Succinea archeyi* Powell (Serious Decline)**

Succinea archeyi is found at dunefields in northern and eastern Northland, and eastern Coromandel Peninsula; in Te Paki ED it is known from Motuopao Island (M02/071), Cape Maria van Diemen (part of M02/012), Maungatiketike Point Shrubland (M02/007), Kapowairua (N02/027) and Tom Bowling Bay (N02/029) (Brook 1999b; 2002).

***Arthoracophorus* sp. 4 “northern NZ” (Gradual Decline_{HI})**

This species is endemic to the northwestern Aupouri Peninsula (G. M. Barker pers. comm.), recorded from N02/003.

***Amborbytida duplicata* Suter (Gradual Decline)**

Amborbytida duplicata is endemic to northern Aupouri Peninsula, sporadically distributed between Te Werahi and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a). Recorded from sites M02/012, N02/003, N02/004, N02/005(a), N02/005(c) and N02/034.

***Paryphanta watti* Powell 1946 (Gradual Decline _{CD, HI})**

Paryphanta watti (a kauri snail) is endemic to northern Aupouri Peninsula with extant populations at Radar Bush, Kohuronaki (both part of N02/003) and Unuwahao (N02/004) (Goulstone *et al.* 1993; Stringer and Montefiore 2001; Brook 2002; Stringer *et al.* 2003). Extinct from Te Werahi Beach and Cape Maria Van Diemen (M02/012) and Tom Bowling Bay (N02/029).

AT RISK

***Allodiscus basiliratus* Gardner (Range Restricted)**

Allodiscus basiliratus is endemic to northern Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and North Cape (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a; Marshall and Barker 2008) recorded from N02/003, N02/004, N02/005(a) and N02/005(c).

***Allodiscus pumilus* Marshall and Barker 2008 (Range Restricted _{DP})
(Listed as *Charopidae* sp. 177 in Hitchmough *et al.* (comp.) 2007)**

Allodiscus pumilus is endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and North Cape (Goulstone *et al.* 1993; Marshall and Barker 2008) recorded from N02/003, N02/004, N02/005(a) and N02/005(c).

***Allodiscus spiritus* Powell (Range Restricted)**

Allodiscus spiritus is endemic to Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and Mokaikai (Ogle *et al.* 1985; Goulstone *et al.* 1993; Marshall and Barker 2008) recorded from N02/003, N02/004, N02/005(a) and N02/034.

***Allodiscus wairua* Marshall and Barker 2008 (Range Restricted)**

Allodiscus wairua is endemic to northern Aupouri Peninsula, sporadically distributed between Motuopao and North Cape (Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a; Marshall and Barker 2008). (Not listed in Hitchmough *et al.* (comp.) 2007, threat category from Marshall and Barker 2008). Recorded from M02/007, M02/012, M02/071, M02/074, N02/003, N02/004 and N02/005(c).

***Charopidae* sp. 73 (NMNZ M.77056) (Range Restricted)**

Charopidae sp. 73 is endemic to northern Aupouri Peninsula; sporadically distributed between Te Rerenga Wairua and North Cape, recorded from N02/003, N02/004, N02/005(a), N02/005(c) and N02/034.

Charopidae sp. 105 (NMNZ M.77007) (Range Restricted)

Charopidae sp. 105 is endemic to northern Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002) recorded from N02/003, N02/004 and N02/005(a).

**Charopidae sp. 169 (NMNZ M.160257) (Range Restricted)
(Listed as *Therasiella* sp. “Unuwahao” in Hitchmough *et al.* (comp.) 2007)**

This species has been recorded from N02/004 however its distribution has not been determined.

Charopidae sp. 170 (NMNS M.160258) (Range Restricted DP)

Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and Mokaikai (Ogle *et al.* 1985; Goulstone *et al.* 1993) recorded from N02/003, N02/004, N02/005(a).

***Climocella reinga* Goulstone (Range Restricted)**

Climocella reinga is endemic to Aupouri Peninsula, sporadically distributed between Motuopao and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002), recorded from N02/003, N02/004, N02/005(a), N02/005(c), M02/007, M02/012, N02/031, N02/034, M02/071 and M02/074.

***Cytora brooki* Marshall and Barker, 2007 (Range Restricted DP)
(Listed as *Cytora* sp. 16 in Hitchmough *et al.* (comp.) 2007)**

Cytora brooki is endemic to northwestern Aupouri Peninsula (Brook 2002; Marshall and Barker 2007). Marshall and Barker 2007 have classified this snail as Nationally Vulnerable. Recorded from N02/003.

***Cytora hispida* Gardner (Range Restricted)**

Cytora hispida is endemic to northern Aupouri Peninsula, sporadically distributed between Motuopao and North Cape (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002; Marshall and Barker 2007).

Classified as Nationally Vulnerable by Marshall and Barker 2007. Recorded from M02/071, N02/003, N02/004, N02/005(a) and N02/005(c).

***Cytora kerrana* Gardner (Range Restricted)**

Cytora kerrana is endemic to northern Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and North Cape (Gardner 1968; Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 2002; Marshall and Barker 2007). Recorded from N02/003, N02/004, N02/005(a), N02/005(c), N02/031 and N02/034.

***Cytora lignaria* Marshall and Barker 2007 (Range Restricted)
(Listed as *Cytora ampla* in Hitchmough *et al.* (comp.) 2007)**

Cytora lignaria is endemic to northern Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and Mokaikai (Powell 1941; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002; Marshall and Barker 2007). Recorded from N02/003, N02/004 and N02/005(a).

***Cytora tepakiensis* Gardner (Range Restricted)**

Cytpra tepakiensis is endemic to northern Aupouri Peninsula, sporadically distributed between Motuopao and North Cape (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002; Marshall and Barker 2007). Recorded from M02/071, M02/012, M02/007, N02/003, N02/004, N02/005(a), N02/005(c), N02/072 and N02/029.

***Delos* sp. 2 (NMNZ M.38250) (Range Restricted)**

Delos sp. 2 is endemic to northern Aupouri Peninsula, sporadically distributed between Cape Maria van Diemen and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a, 2002). Recorded from M02/012, M02/007, N02/003, N02/004, N02/005(a), N02/005(c), N02/029 and N02/031.

***Egestula pandora* Gardner (Range Restricted)**

Egestula pandora is endemic to Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and North Cape (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a, 2002). Recorded from N02/003, N02/004 and N02/005(a).

***Laomarex minuta* Gardner (Range Restricted)**

Laomarex minuta is endemic to northern Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and Mokaikai (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002). Recorded from N02/003, N02/004 and N02/005(a).

***Liarea aupouria* Powell (Range Restricted)**

(*L. a. aupouria* in Hitchmough *et al.* (comp.) 2007)

Endemic to northern Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and North Cape (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a, 2002). Recorded from N02/003, N02/004, N02/005(a), N02/005(c) and N02/034.

***Phrixgnathus aupouria* Cumber (Range Restricted)**

(Listed as *Laoma mariae aupouria* in Hitchmough *et al.* (comp.) 2007)

Phrixgnathus aupouria is endemic to northern Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and Mokaikai (Goulstone *et al.* 1993; Brook 2002). Recorded from N02/003 and N02/004.

Punctidae sp. 30 (NMNZ M.87982) (Range Restricted DP)

(Punctidae sp.17 in Hitchmough *et al.* (comp.) 2007)

Punctidae sp. 30 is endemic to northern Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and Tom Bowling Bay (Goulstone *et al.* 1993; Brook 2002). Recorded from N02/003 and N02/004. This threat ranking should be revised to a higher category (F. Brook pers. comm.).

Punctidae sp. 33 (NMNZ M.87987) (Range Restricted DP)

(Listed as Punctidae sp.16 in Hitchmough *et al.* (comp.) 2007)

Punctidae sp. 33 is endemic to northern Aupouri Peninsula, sporadically

distributed between Te Paki and Mokaikai (Goulstone *et al.* 1993; Brook 2002). Recorded from N02/003, N02/004 and N02/005(a). This threat ranking should be revised to a higher category (F. Brook pers. comm.).

Punctidae sp. 63 (NMNZ M.68881) (Range Restricted_{DP})

Punctidae sp. 63 is endemic to northern Aupouri Peninsula, sporadically distributed between Te Rerenga Wairua and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002). Recorded from N02/003, N02/005(a) and N02/005(c).

This threat ranking should be revised to a high category (F. Brook pers. comm.).

**Punctidae sp. 99 (NMNZ M.83503) (Range Restricted_{DP})
(Listed as Punctidae sp. 23 in Hitchmough *et al.* (comp.) 2007)**

Punctidae sp. 99 is endemic to northern Aupouri Peninsula, known from Radar Bush and Kapowairua (N02/003 and N02/004) (Goulstone *et al.* 1993; Brook 2002).

This threat ranking should be revised to a high category (F. Brook pers. comm.).

**Punctidae sp. 104 (NMNZ M.54260) (Range Restricted)
(Listed as Punctidae sp. 25 in Hitchmough *et al.* (comp.) 2007)**

Punctidae sp. 104 is endemic to North Cape headland (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002). Recorded from N02/005(c).

**Punctidae sp. 130 (NMNZ M.62132) (Range Restricted)
(Listed as Punctidae sp. 10 in Hitchmough *et al.* (comp.) 2007)**

Punctidae sp. 130 is endemic to northern Aupouri Peninsula, sporadically distributed between Te Paki and Mokaikai (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).

Recorded from N02/003 and N02/005(a).

**Punctidae sp. 153 (NMNZ M.87994) (Range Restricted_{OL, DP})
(Listed as Punctidae sp. 9 in Hitchmough *et al.* (comp.) 2007)**

Punctidae sp. 153 is endemic to North Cape headland (N02/005(c)) (Goulstone *et al.* 1993; Brook 2002). This threat classification should be revised to higher category (F. Brook pers. comm.).

**Punctidae sp. 229 (NMNZ M.79639) (Range Restricted)
(Listed as Punctidae sp. 11 in Hitchmough *et al.* (comp.) 2007)**

Punctidae sp. 229 is endemic to northern Aupouri Peninsula, sporadically distributed between Te Paki and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002). Recorded from N02/003, N02/005(a) and N02/005(c).

**Punctidae sp. 250 (NMNZ M.55454) (Range Restricted)
(Listed as Punctidae sp. 22 in Hitchmough *et al.* (comp.) 2007)**

Punctidae sp. 250 is endemic to northern Aupouri Peninsula, sporadically distributed between Te Paki and Mokaikai (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).

Recorded from N02/003, N02/004 and N02/005(a).

This threat classification should be revised to higher category (F. Brook pers. comm.).

***Serpho matthewsi* Suter (Range Restricted)**

Serpho matthewsi is endemic to Aupouri Peninsula, sporadically distributed between Reinga and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a, 2002). Recorded from N02/003, N02/004, N02/005(a).

***Delouagapia cordelia* (Hutton, 1883) (Sparse)**

Delouagapia cordelia is endemic to northern and eastern Northland (Powell 1979), recorded from M02/071, M02/012, M02/074, M02/007, N02/003, N02/004, N02/005(a) and N02/005(c).

Data Deficient landsnail species

***Placostylus ambagiosus bancoxi* Powell (Data Deficient ^{RE,OL})**

Endemic to northern Aupouri Peninsula; single population at Rangiora Bay; no live animals reported since 1950, but there have been no searches over the last 15-20 years (DOC unpublished data 2007).

***Placostylus ambagiosus* “Reinga” (Data Deficient ^{HI,OL})**

Endemic to northern Aupouri Peninsula; a few specimens recorded from Te Rerenga Wairua (N02/003), but no recent records.

***Therasiella* “narrow umbilicus” (NMNZ M.79608) (Data Deficient ^{OL})**

Only one specimen has been found from one location; Tom Bowling Bay (N02/029) in this ED (DOC unpublished data 2007).

Extinct landsnails

Five populations of *Placostylus ambagiosus* are now extinct in the Te Paki ED from sites M02/063, N02/027, N02/029, N02/030 and N02/031 (F. Brook pers. comm.). These consist of two sub-species:

***Placostylus ambagiosus* “Herangi Hill”**

Last recorded in early 1960s (M02/012) (DOC unpublished data 2007).

***Placostylus ambagiosus* “Kohuronaki”**

Not seen alive for several decades, but fresh shell fragments early 1990s; endemic to northern Aupouri Peninsula (N02/003) (DOC unpublished data 2007).

Other threatened terrestrial invertebrates

This is not an exhaustive list of important invertebrates for Te Paki ED, because a search of all national collections was not undertaken. AMNZ numbers refer to specimens housed in the Auckland Museum. Stephen Thorpe (beetles), Mike Fitzgerald (spiders) and Dr Olivier Ball (beetles and spiders) provided incredibly useful invertebrate information. (See Appendix 7 Checklist of fauna species in Te Paki Ecological District for more information on invertebrates.)

Beetles

Te Paki is known to be an area of high endemism for landsnails (Goulstone *et al.* 1993), and the same is probably true for beetles (and possibly other terrestrial invertebrates), though few comparative taxonomic studies have been conducted, and most of the likely endemics are as yet undescribed and undocumented (most of the snails are also still undescribed, but have at least been provisionally documented).

One stag beetle (*Paralissotes oconnori*), once thought to be a Te Paki endemic is probably also found at Herekino and Mangamuka, though more collecting is needed to confirm this. This scenario may be similar to that of the Hokianga tusked weta (*Anisoura nicobarica*) which was first discovered in Te Paki. Four species of carabid beetles are Te Paki endemics (*Mecodema* sp. "Te Paki", and 3 harpalines ("*Parabaris boarei*", *Tuiharpalus moorei*, and *Kupeharpalus embersoni*). The *Mecodema* sp. "Te Paki", although rare, is taxonomically not very distinctive, being just one among many species of the genus. However, the harpalines are more distinctive, particularly the rarest of the three, *Tuiharpalus moorei*.

A large and spectacular click beetle (*Metablax* sp.) is known only from a single confirmed specimen. A species of large green chafer beetle (*Stethaspis* n.sp.) with a four-segmented male antennal club (unique in the genus) also appears to be a Te Paki endemic. There are many small and undescribed weevils which are almost certainly Te Paki endemics, sometimes more than one species in the same genus, perhaps indicating some evolutionary radiation within Te Paki itself. Many potential Te Paki endemics are only known from very few specimens, so more collecting is required, and more taxonomic work is needed to document this interesting and possibly threatened fauna. (S. Thorpe and O. Ball pers. comm.)

Spiders

Spiders of the Far North (North Cape - Cape Reinga - Te Paki) are not well known. Historically, several species have been described from just a few specimens of one sex. Recent collecting by Olivier Ball, Patrick Whaley and Andrea Booth (2006-7) and identifications by Mike Fitzgerald has provided more material and in some cases, specimens of the missing sex have been found. Not surprisingly, material is very limited for a number of species in the area and therefore the distributions of many of these species are poorly understood. Many species appear to be limited to this area and replaced by other representatives of their genus further south in Northland (e.g. *Paramamoea pandora*, *Reinga apica*, *Hapona reinga*, *Hypodrassodes apicus*, *Cambridgea reinga*, *Nanocambridgea grandis* and *Pahoroides* sp.). This pattern of endemism is similar to that seen for other invertebrate groups and plants. Several undescribed species from the area have also recently been found including a *Huttonia* species, a mysmenid species, a *Pahoroides* species, and a *Sidymella* species. (M. Fitzgerald and O. Ball pers. comm.).

ACUTELY THREATENED

***Mecodema* sp. “Te Paki” (Nationally Critical^{DP,OL})**

This carabid beetle has been recorded at Unuwaho (part of N02/004) and Whareana and Taumatara Bush (both part of N02/005(a)), but not recorded at other specifically surveyed sites (i.e. 13 sites with suitable habitat surveyed in 2006/07) (Olly Ball pers. comm. 2007). This species is predominantly found in broadleaf forest with some kanuka and this beetle appears to be absent from western Te Paki. The threats to this species are unknown but are thought to be pigs and rats (A. Booth pers. comm.).

***Ericodesma aerodana* (Meyrick, 1881) (Nationally Endangered^{DP})**

This moth has been recorded from Kaitorete Spit to Te Rerenga Wairua, although North Island and South Island populations are distinguishable and may be different taxa. Habitat is in decline, although some good patches remain. There is low confidence in estimates of population numbers. Host plants are coastal and frost flat species of *Pimelea*. (DOC unpublished data 2007)

***Notoreas* sp. “northern” (Nationally Endangered)**

This moth is known from West Auckland north. In Te Paki ED it has been collected from North Cape (part of N02/005(c)) and Scott Point (M02/008). The host plant is *Pimelea prostrata* and it is likely to occur at other sites with suitable habitat. It is threatened by habitat modification and stock. Larvae are potentially predated by paper wasps *Polistes* spp. (A. Booth pers. comm.)

CHRONICALLY THREATENED

Black katipo spider *Latrodectus atritus* Urquhart, 1889 (Serious Decline^{III})

The black katipo spider has been recorded in Te Paki ED at Tapotupotu Bay (M02/063) (AMNZ6110) and the northern end of Kapowairua (N02/027) (AMNZ6103, AMNZ6104, AMNZ6105, AMNZ6106) in 1996. This species inhabits dune systems north of New Plymouth and East Cape. Threats include habitat modification from introduced plants and disturbance from vehicles and people (A. Booth pers. comm.).

***Athoracophorus* sp. 4 (NMNZ M.151430) (Gradual Decline^{III})**

This slug is a northern Northland endemic which has been recorded in the Te Paki ED (DOC unpublished data 2007).

AT RISK

***Menimus borealis* Watt, 1992 (Range Restricted)**

Menimus borealis is a darkling beetle whose type locality is described as Te Paki Coastal Park (part of N02/003), “Pandora Road” (DOC unpublished data 2007).

***Menimus brouni* Watt, 1992 (Range Restricted^{DP})**

This species of darkling beetle also has its type locality described as

“Te Paki Coastal Park” (part of N02/003) (DOC unpublished data 2007). The Auckland Museum has records in Te Paki ED for Kohuronaki (AMNZ20604) and “Kauri Bush” (AMNZ29271) (both part of N02/003).

Northland tusked weta *Anisoura nicobarica* Ander, 1938 (Sparse)

Only known from north of a line between Waipoua and Whananaki. Within Te Paki ED, known from Te Rerenga Wairua (part of N02/003), Maungapika Hill (part of N02/004) and Whareana (R. Parrish pers. comm.). This species is mostly arboreal, with most specimens having been located in holes in manuka and kanuka (McGuinness 2001). Synonym of *Hemiandrus monstrosus*.

***Brullea antarctica* (Castelnau, 1867) (Sparse)**

Specimens of this carabid beetle that are in the Auckland Museum have been collected from Te Paki Stream (Aupouri ED), Te Werahi Beach and Cape Maria van Diemen (M02/012) (exact locations not listed) in this ED. This sand burrowing species is believed to be present virtually everywhere along the seashore above the high-water mark. It is most often found under driftwood or stones. Threats to this species include habitat modification through removal of driftwood. (McGuinness 2001)

***Syrphetodes* sp. “Te Paki” (Sparse DP)**

The taxonomy of this beetle is uncertain, and specimens may actually be *S. decoratus*; synonymy or voucher pending (DOC unpublished data 2007).

***Paralissotes oconnori* (Sparse DP)**

Records for this species of stag beetle in the Te Paki ED are from Pandora Track, Kapowairua (both part of N02/003) (DOC unpublished data 2007), Kohuronaki (AMNZ20383, AMNZ29260) (part of N02/003) and Unuwahao (O. Ball pers. comm.).

***Megascolex animae* (Data Deficient OL)**

The holotype for this earthworm species is in Auckland Museum. It was collected by A.W.B. Powell in February 1946 at Unuwahao (N02/004), near Kapowairua (J. Early pers. comm. 2007).

***Izatha* sp. “small grey” (Data Deficient)**

A moth that has been collected in Te Paki ED.

***Metablax* sp. (Data Deficient OL)**

This undescribed click beetle has been recorded at Kapowairua (location unknown) (Guinness 2001).

***Wairua reinga* Forster, 1990 (Data Deficient OL)**

The spider *Wairua reinga* is known from the type locality, in a web on a tree trunk in a small patch of forest at Te Rerenga Wairua (part of N02/003) (coll. RR Forster, Jan 7, 1967). That and the damaged female specimen collected with it, are all that is known of this species (Phil Sirvid pers. comm. 2007).

***Stanwellia hollowayi* (Forster and Wilton, 1973) (Data Deficient)**

The holotype of this species of spider was collected by B. A. Holloway, 1 Dec 1960 on the slopes of “Mt Te Paki” (part of N02/003). Its previous name was *Aparua hollowayi*.

***Nanocambridgea grandis* Blest and Vink, 2000 (Data Deficient OL)**

The holotype and paratype for this species of spider were collected at Te Rerenga Wairua (part of N02/003) in 1995 found in a gully of regenerating shrubland and are the only two specimens known.

Threatened herpetofauna

CHRONICALLY THREATENED

***Matapia gecko* *Hoplodactylus* “Matapia Island” (Gradual Decline III)
*Endemic***

A smaller form of this gecko is also known from Matapia Island (Aupouri Ecological District), from where it was translocated to Motuopao Island (M02/071) in this Ecological District in 1997 (Parrish and Anderson 1999) and N02/003 (2007 record by Peter Anderson). A larger form is now known on the mainland from Te Paki-North Cape southwards to the Karikari Peninsula. This nocturnal species is found in native shrubland, harakeke, possibly native forest and in peripheral modified areas of suitable habitat. It is threatened by predators, fire and land development. (P. Anderson pers. comm.)

***Ornate skink* *Cyclodina ornata* (Gradual Decline DP)
*Endemic***

Ornate skink is endemic to the North Island (Gill and Whitaker 1996) found in shrubland, forest and in some coastal sites. It is a crepuscular species (active in mornings and evenings) and is threatened by predators and habitat development (P. Anderson pers. comm.). It has become increasingly uncommon on the mainland, although its decline there may be partly offset by increases on islands (DOC unpublished data 2007). The Herpetofauna Database (DOC Bioweb 2007) has records from Te Paki Shrublands and Forest Remnants (N02/003), Unuwahao Bush and Shrublands (N02/004), North Cape (N02/005(c)), Kapowairua (N02/027) and Tapotupotu Beach (M02/063).

***North Cape Pacific gecko* *Hoplodactylus* “North Cape Pacific gecko”
(Gradual Decline III)**

Endemic

North Cape Pacific gecko is found from Te Paki-North Cape southwards to Karikari Peninsula. Its habitat is native shrubland, harakeke, possibly native forest and on peripheral modified areas where there is suitable habitat. It is threatened by the common threats to lizards including predators, fire and land development (P. Anderson pers. comm.). The Herpetofauna Database (DOC Bioweb 2007) has records from Te Paki Shrublands and Forest Remnants (N02/003), Mokaikai Scenic Reserve and Surrounds (N02/005(a)), Tapotupotu Beach (M02/063), Taupiri Island (M02/074) and Motuopao Island and Rockstack (M02/071) and there is also a record from North Cape Scientific Reserve (N02/005(c)).

AT RISK

Suter's skink *Oligosoma suteri* (Range Restricted III)

Endemic

Suter's skink is a large lizard and is New Zealand's only native egg-laying lizard. This skink is confined to north-eastern North Island and where it is secure on the offshore islands. There are however very few mainland populations. Suter's skink is nocturnal and found around boulders or shingle beaches or rocky platforms. (P. Anderson pers. comm.)

The Herptofauna Database (DOC Bioweb 2007) has records from North Cape Scientific Reserve and Surrounds (N02/005(c)), Tapotupotu Beach (M02/063) and Motuopao Island and Rockstack (M02/071). Suter's skink is also known as the egg-laying skink.

Robust skink *Cyclodina alani* (Range Restricted ST,III)

Endemic

Robust skink is one of the three biggest New Zealand skinks and is only found in the North Island offshore islands (Gill and Whitaker 1996). This species was translocated to Motuopao Island (M02/071) from Matapia Island (Aupouri Ecological District) in 1997 (Parrish and Anderson 1999) and monitoring has shown this species is now successfully breeding on Motuopao Island (P. Anderson pers. comm.). The total area occupied by this species is c.30 ha (DOC unpublished data 2007).

Moko skink *Oligosoma moco* (Sparse III)

Endemic

Moko skink is endemic to the North Island occurring on offshore islands and a few mainland localities from from Bay of Plenty north. (Gill and Whitaker 1996). In Te Paki ED it is known only from Motuopao Island (M02/071) (DOC Bioweb 2007). There have been serious declines on the mainland (DOC unpublished data 2007). Further searching could confirm its presence on the mainland in this Ecological District (P. Anderson pers. comm.).

North Cape green gecko *Naultinus* "North Cape green gecko" (Sparse DP)

Endemic

North Cape green gecko is confined to Te Paki and Aupouri ED's occurring as far south as Kaimaumu wetlands. It is a diurnal species living in the canopy of native shrubland, particularly in kanuka and manuka. It is threatened by stoats, rats, cats, fire and land clearance. (P. Anderson pers. comm. 2007)

The Herptofauna Database (DOC Bioweb 2007) has records from Te Paki Shrublands and Forest Remnants (N02/003), Unuwahao Bush and Shrublands (N02/004), Kapowairua (N02/027), Tapotupotu Beach (N02/063), Tom Bowling Bay (N02/029) and Te Werahi Beach and Cape Maria van Diemen (M02/012). A green gecko was recorded in the Shenstone Block (N02/009) by the NZ Native Orchid Group in 1998 (SSBI M02/N02/H049).

This species has a qualifier of 'data poor' in Hitchmough *et al.* (comp.) (2007).

Regionally significant herpetofauna

Cyclodina levidensa

Endemic

Cyclodina levidensa is a newly described copper skink which is morphologically and genetically distinct from the common copper skink *Cyclodina aenea* and is currently only known from the Te Pahi ED. Very little is known about its distribution, biology, ecology and life history (Chapple *et al.* 2008) and it is not currently listed in the New Zealand Threat Classification Lists (Hitchmough *et al.* (comp.) 2007), although this may change as more information becomes available. Its current distribution is known from sites within N02/003 and N02/004.

Leatherback turtle *Dermochelys coriacea*

Migrant

The leather back turtle has been recorded in Parengarenga Harbour (1882), 10.5 km east of North Cape (1997) (DOC Bioweb 2007), and at various locations in Northland outside Te Pahi ED (Gill 1997).

Green turtle *Chelonia mydas*

Migrant

Recorded from east coast beaches and Parengarenga Harbour with a recent record from Waikuku Beach in this Ecological District (P. Whaley pers. comm.). There is a resident non-breeding population in the Kermadecs (DOC unpublished data 2007).

OTHER

Yellow-bellied sea snake *Pelamis platurus* (Vagrant DP)

The yellow-bellied sea snake is found in the Indian and Pacific Oceans and is a relatively regular visitor to northern New Zealand (Gill and Whitaker 1996). In this Ecological District it has been recorded from Kapowairua in 2005 (P. Whaley pers. comm.).

Threatened fish and freshwater invertebrates

CHRONICALLY THREATENED

Black mudfish *Neochanna diversus* (Gradual Decline_{HI})

Endemic

There is an unconfirmed record from Waikuku Flat N02/005(b) in 1993. However, over ten subsequent surveys in the vicinity of Waikuku Flat have not found black mudfish (NIWA 2007). Three evolutionarily significant units have been described, with northern Northland populations being separate from those in southern Northland and Waikato. Threats on a national scale include gambusia impact, habitat fragmentation, drainage, weeds, and eutrophication. Parengarenga Harbour has been identified as a key black mudfish population because it is a geographic outlier (Department of Conservation 2003).

***Hyridella menziesii* (Gradual Decline)**

Hyridella menziesii is a freshwater mussel and is currently the only native species recognised in New Zealand. It is threatened by water quality and declining numbers of native fish which disperse its larvae (DOC unpublished data 2007). Recorded in this ED from Te Paki Lake (part of N02/001) (Wells *et al.* 2007).

Koura *Paranephrops planifrons* White, 1842 (Gradual Decline)

Koura are a freshwater crayfish found on in the North Island and on the northern and western South Island. In this ED koura have been recorded from a tributary of Waitiki Stream in 2005 (part of N02/003) (NIWA 2007).

Longfin eel *Anguilla dieffenbachii* (Gradual Decline _{HD})

Endemic

Longfin eels are found throughout New Zealand, but are threatened by over-harvesting (especially of large females) and habitat modification. Within Te Paki ED, this species was recorded (NIWA 2007) in a tributary of Tapotupotu Stream and Waitiki Stream (part of N02/003), in Te Werahi Stream (part of N02/010), Te Kanakana Stream (part of N02/005(c)), in an unnamed stream flowing to Waikuku Beach (part of N02/033), in Waitanoni Stream and Waitapu Stream (part of N02/004) which both flow into Kapowairua and in an unnamed wetland east of Tom Bowling Bay.

AT RISK

***Tepakia caligata* Towns and Peters, 1996 (Sparse)**

This species of mayfly has been recorded in five locations, all in the North Island: Te Paki, Waikoha Stream, Kapiti Island, Waitakere Ranges, and Kauaeranga River (DOC unpublished data 2007).

Regionally significant fish species

Banded kokopu *Galaxias fasciatus*

Endemic

Banded kokopu occur in shaded streams throughout New Zealand. It has been recorded from the Shenstone Block (N02/009) (SSBI M02/N02/H049) with NZFFD (NIWA 2007) records from Te Paki Shrublands and Forest Remnants (N02/003), Waitanoni Stream (part of N02/004), unnamed wetlands in the Ngakengo Stream catchment (part of N02/005(a), Waikuku Flat (N02/005(b)), Te Kanakana Stream (two records) (part of N02/005(c)) and in an unnamed stream that flows to Waikuku Beach (part of N02/033) (NIWA 2007). Although this species is currently not threatened, it is listed with a Data Poor qualifier in Hitchmough *et al.* (comp.) (2007). There is a historic decline in this species nationally, due to habitat modification and loss (Department of Conservation 2005).

Giant bully *Gobiomorphus gobioides*

Endemic

NZFFD (NIWA 2007) records for Te Paki ED come from a tributary of Ngakengo Stream (part of N02/005(a), Waitangi Stream at Tom Bowling

Bay (part of N02/034), an unnamed stream at Waikuku Beach (part of N02/033), and Te Kanakana Stream (N02/005(c)) (NIWA 2007). There is also an SSBI record which probably occurs within Ponaki Wetland (N02/032) (SSBI M02/N02/H020).

Threatened and regionally significant fauna species not recorded recently in Te Paki Ecological District

Pateke, brown teal *Anas chlorotis* “North Island” (Nationally Endangered)

Endemic

Formerly widespread throughout lowland and montane New Zealand, remnant populations (total of c. 1500) of pateke are now only present in eastern Northland (Whangaruru ED), on Great Barrier Island, Coromandel Peninsula and in small numbers at several other localities (R. Pierce pers. comm.). There was a possible sighting of this species in Te Paki ED by R. Dobbs in 1976 (Anderson 1984).

Duvaucel’s gecko *Hoplodactylus duvaucelii* (Sparse)

Endemic

Duvaucel’s gecko is now restricted to islands; historically it was recorded at Cape Maria van Diemen in 1965 (part of M02/012) (DOC Bioweb 2007) in this ED.

3.5 THREATS

Te Paki Ecological District contains many threatened endemic and indigenous species, particularly land snails, insects and plants. Historically, clearance of native forest and shrubland vegetation, and predation by introduced animals, especially rodents and pigs, have been key factors contributing to declines of many of the endemic invertebrates.

Forty-three species of land snails in the Te Paki ED, including thirty nine locally endemic species, are uncommon or threatened, and some are known from single sites only (Brook 2002; Hitchmough *et al.* (comp.) 2007). Most of these species had highly restricted and/or fragmented distributions as a result of anthropic vegetation clearance over the last several hundred years, and continued modification and loss of native forest, shrubland and dunefield habitats is one of the main existing threats. Snail habitats face a variety of threats including: vegetation browse by cattle, horses and possums; disturbance of the ground-layer from trampling by cattle and horses, and rooting by feral pigs; and the replacement of native plant associations by invasive exotic weed species. In addition, predation by pigs and rats is known to be a significant threat to the larger species of land snail in the Te Paki ED (i.e., *Amborhytida duplicata*, *Paryphanta watti*, *Placostylus ambagiosus*), and the last-named species is locally preyed on by thrushes. Predation by mice, possums and hedgehogs may also be contributing to declines of some land snail species.

Wild fires are a serious potential risk to land snails and other invertebrate species in Te Paki ED. However, the northwards spread of the Argentine

ant (*Linepithema humile*) poses an even more serious threat to the Te Pahi endemic invertebrate fauna. This ant species was first recorded in Auckland in 1990 (Harris 2001, 2002), but widely scattered populations, presumably spread by human activities, have since been found as far north as Kaitaia in 2002 and Pukenui - Houhora Transfer Station in 2005 (A. Booth pers. comm.). In Northland the Argentine ant presently has a synanthropic distribution restricted to highly modified habitats, but unless populations are eradicated or controlled, the species is predicted to spread throughout much of the region. According to Harris (2002), the native habitats at greatest risk of invasion by Argentine ants are shrublands and other low-stature vegetation types. If this assumption is correct, then the invertebrate fauna across much of Te Pahi ED is at serious risk. Within New Zealand, the area with the highest risk of establishment by Argentine Ants is northern New Zealand (Harris 2002).

Vehicles, people and weeds are the main threats to the katipo spider (A. Booth pers. comm.).

The exotic yellow flower wasp, *Radumeris tasmaniensis* (Scoliidae), was first collected at Twilight Beach in October 1999, with subsequent surveys in 2003 finding established populations in Te Pahi ED at Kapowairua and Tom Bowling Bay and in 2008 on Motuopao Island (A. Booth pers. comm.). This wasp parasitises larvae of native sand scarabs (Scarabidae: *Pericoptus* spp.) (Rawnsley 2006). Population surveys suggest large drops in scarab numbers have occurred where the wasp is established. The future spread of this wasp is unpredictable, although it has currently only been recorded on sand dunes (T. Beauchamp, Coastal Dune Vegetation Network Newsletter No 15, June 2005).

Threats to indigenous lizards include modification and loss of habitat (e.g. Matapia gecko appears to be threatened by coastal development), small and/or highly fragmented populations (e.g. robust skink), the continuing decline of mainland populations (e.g. ornate skink, shore skink), introduced predators and lack of knowledge regarding species' taxonomy, ecology, and distribution (e.g. North Cape green gecko and *Cyclodina levidensa*).

It is not known what impact the fish dart goby (*Parioglossus marginalis*) will have on indigenous ecosystems, as little is known about its ecology. Currently, Waitangi Stream in this Ecological District is the only known site for this Australian species on mainland New Zealand. Although it generally inhabits marine and estuarine waters, dart goby can tolerate fresh water for at least two weeks (McDowall 2002).

Shore nesting birds such as banded dotterel, northern NZ dotterel, variable oystercatcher are threatened by cattle and horses, habitat degradation, lack of habitat protection, predators, and disturbance from people and other animals. Kukupa are threatened by poaching (Department of Conservation 1999) and introduced predators particularly possums and ship rats.

Stoats and weasles are predators of native birds, their eggs and chicks, and of invertebrates and lizards. While ferrets have not been recorded in Te Pahi ED they are spreading progressively northwards and are very close (P. Whaley pers. comm.). As mentioned above, pigs are predators

of landsnails, but they also inhibit natural regeneration by browsing and uprooting seedlings and disturbing soil, encouraging the spread of invasive weeds. Rats are omnivorous feeding on native fruit and seed-falls, insects, birds, eggs, snails and lizards. Feral cats are predators of lizards, birds and many insects. Rabbits damage native orchids and modify native sand-binding vegetation in fragile coastal environments through soil disturbance and direct browsing (Department of Conservation 1999).

Cattle, horses and possums all browse threatened plants. Possums have only recently arrived in Te Pahi Ecological District. In 1980, they had spread to Mangamuka Bridge, and by 1983 had reached Awanui. Despite pleas to the Forest Service for action to prevent their spread onto the Aupouri Peninsula by many concerned individuals in the late 1970s and early 1980s, no efforts were made to create a buffer zone and possums reached as far as North Cape only recently. As elsewhere, possums are a threat to many plant species, particularly ground orchids and *Metrosideros* spp. A recent assessment of the acutely threatened Bartlett's rata within the main population at Unuwaho found them to be in extremely poor condition due to possum browse (Whaley *et al.* 2005 in SSBI M02/N02/H011). Possums also prey on insects and bird life, including kukupa eggs and chicks.

Introduced plant species are a major threat to the many open habitats at Te Pahi, especially dunefields and the low, open shrubland on infertile soils. Established species such as pampas, dally pine, prickly hakea, downy hakea, orange cestrum, *Arundo donax*, mistflower, lantana, madeira vine (e.g. on Motuopao Island), and Sydney golden wattle are particular threats. The Northland Conservation Management Strategy (Department of Conservation 1999) also identifies kangaroo acacia, spartina, and oxycobium as threats to the Te Pahi/Parengarenga area.

In the mid-1990s an aquatic pest plant, hornwort was recorded present in Lake Ngakeketa (it is also present in Te Werahi Wetland). Recent studies by NIWA have described the lake as being completely dominated by this submerged pest plant (Wells *et al.* 2007). This weed does not set seed in New Zealand and is transported within catchments by water flow or into new catchment via mechanical dispersal, e.g. on boats and trailers (NZPCN 2007) and fishing nets (Wells *et al.* 2007). Further spread of this species into other open water habitats is a threat to indigenous aquatic flora and fauna of Te Pahi ED.

The introduced submerged bladderwort, *Utricularia gibba*, is widespread in most of the lakes in the Far North and has the potential to invade wetlands throughout New Zealand. It is a huge threat to our native bladderworts by dominating their habitat particularly, the Nationally Endangered *Utricularia australis* which is found in this ED.

Past deforestation and burning has contributed to sheet and gully erosion at North Cape.

Fire is a major threat to the entire ecosystem, especially the extensive shrubland areas. The presence of fire-adapted exotic species such as prickly and downy hakea and gorse intensifies the potential degradation as a result of fire, as these species compete with the regeneration of

manuka, kanuka and other indigenous shrubland species, whose growth rate is extremely slow on infertile soils. Although the area has been burnt intermittently since its occupation, intentional fires no longer occur. If future fires are managed quickly, a tall forest community will evolve eventually over much of the shrubland area.

Wetlands are special features of Te Pahi Ecological District, including those bounding Parengarenga Harbour. Many of the high natural values of these habitats arise from their relative lack of modification, although surrounding land uses can degrade these values and in many cases fencing is required (Te Werahi Wetland is currently being fenced by DoC). Sensitive management of exotic plantations and farmland in these catchments is needed to prevent nutrient run-off and siltation into the many wetlands and internationally significant Parengarenga Harbour.

A summary of the threats to the ultramafic vegetation of the Surville Cliffs is provided by de Lange (1997). Between 1968 and 1984, the major threat was quarrying of the serpentinite, but this ceased in 1984 and subsequently fire and animal browse and trampling became the major concerns. In April 1995, these threats were significantly reduced by the erection of a fence across the North Cape isthmus by the Department of Conservation, to exclude stock, pigs and horses. A remaining threat to this flora was the spread of woolly hakea, prickly hakea, and pampas, which have the potential to replace ultramafic vegetation.

4. Site descriptions

The 45 natural areas identified in the survey are described and mapped below.

Midpoint grid references (New Zealand Map Grid (NZMG)) are given for all sites.

Vegetation types within ecological units describe abundant/dominant (species which form 50-100% of the canopy) and common (species which form 20-50% of the canopy) canopy species (refer to Section 2.3). If there is more than one canopy species, and the species are all common they are listed alphabetically.

Records of threatened flora and fauna have been sourced from herbaria and other databases and information systems 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 with their references (ie herbarium accession number; SSBI number etc.) given in Sections 3.3.5-3.4.9. All records included were from the mid 1970s or more recent, unless otherwise stated.

The fauna section of each site description lists incidental indigenous fauna observations and identifies significant fauna with their current New Zealand conservation status in capitals (e.g. Gradual Decline) which is derived from Hitchmough *et al.* (comp.) (2007). 'Not surveyed' is stated in the fauna section of the site description if, at the time of publication, the Department of Conservation, Northland Conservancy, did not have any information on indigenous fauna species from that natural area.

Recent aerial photography from 2003 was used to produce the site maps as a check against the original 1995/97 survey. Generally sites changed very little or not at all, whilst the site boundary of some sites was improved upon with the benefit of an aerial view compared to the predominantly topographical interpretation used for the original survey. It was not possible to re-survey and so the ecological units in the site descriptions apply to the date of survey, although where available updated information was added and referenced accordingly.

See Appendix 5 for a list of vascular plants species and Appendix 7 for a list of fauna species present in Te Paki ED.

4.1 LEVEL 1 SITES

SITE	SURVEY NO.	GRID REF.
Lake Ngakeketa, Te Paki Lake and Surrounds	N02/001	N02 900 434
Cape Road Wetlands and Shrubland	N02/002	N02 909 455
Te Paki Shrublands and Forest Remnants	N02/003	N02 900 475
Unuwahao Bush and Shrublands	N02/004	N02 014 526
Mokaikai Scenic Reserve and Surrounds	N02/005(a)	N02 087 484
Waikuku Flat	N02/005(b)	N02 110 530
North Cape Scientific Reserve and Surrounds	N02/005(c)	N02 120 550
Maungatiketike Point Shrubland	M02/007	M02 810 468
Scott Point Shrubland and Coastal Associations	M02/008	M02 855 420
Shenstone Block	N02/009	N02 928 423
Te Werahi Wetland	M02/010	M02 830 480
Twilight Beach	M02/011	M02 830 460
Te Werahi Beach and Cape Maria van Diemen	M02/012	M02 815 495
Tapotupotu Stream, Wetland and Estuary	M02/015	M02 850 300
Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex	N02/016	N02 951 498
Upper Kapowairua Wetland	N02/017	M02 985 458
Broughton's Gully Wetland	N02/018	N02 973 443
Kapowairua Wetland and Lagoon	N02/019	N02 990 573
Te Huruwai Stream Wetland	N02/020	N02 010 452
Te Hapua Wetland	N02/021	N02 027 435
Te Hapua Settlement Wetland	N02/022	N02 020 433
Paingatai Channel Wetlands	N02/023	N02 056 485 and 059 476
Te Hapua Road Wetland	N02/024	N02 007 439
Waiwhero Stream Wetland	N02/025	N02 095 530
Kapowairua	N02/027	N02 955 504
Tom Bowling Bay	N02/029	N02 092 532
Waikuku Beach	N02/030	N02 115 522
Whareana Bay	N02/031	N02 111 494
Ponaki Wetland	N02/032	N02 048 461
Waikuku Wetlands	N02/033	N02 108 526
Waitangi Stream Wetland and Riparian Strip	N02/034	N02 083 524
Waihakari Wetland	N02/035	N02 106 447
Tawakewake Wetland	N02/036	N02 104 538
Waiheuheu Catchment Wetlands	N02/037	N02 036 484
Haupatoto/Whareana Bay Wetlands	N02/038	N02 080 491 and 110 491
Tahuna Channel Wetlands	N02/039	N02 065 461
Wainatepua Channel Wetland	N02/040	N02 018 484
Te Hurewai Stream Wetland	N02/041	N02 002 443
Ngakengo Beach	N02/062	N02 110 460
Tapotupotu Beach	M02/063	M02 857 517
The Big Lake	N02/067	N02 952 398
Motuopao Island and Rockstack	M02/071	M02/N02 778 480
Murimotu Island	N02/072	N02 157 541
Taupiri Island	M02/074	N02 792 469

LAKE NGAKEKETA, TE PAKI LAKE AND SURROUNDS

Survey no.	N02/001
Survey date	23 August 1995, 14 February 1997
Grid reference	N02 900 434
Area	317.6 ha (3.9 ha forest, 284.9 ha shrubland, 28.8 ha wetland)
Altitude	60–120 m asl

Ecological units

- (a) Kanuka-puriri forest on hillslope
- (b) Kanuka shrubland on hillslope
- (c) Open water in dune lake
- (d) Raupo reedland on dune lake fringe

Landform/geology

Hill country of weathered Tangihua Complex igneous rocks and Pleistocene consolidated dunes, with lakes ponded by Holocene dunes.

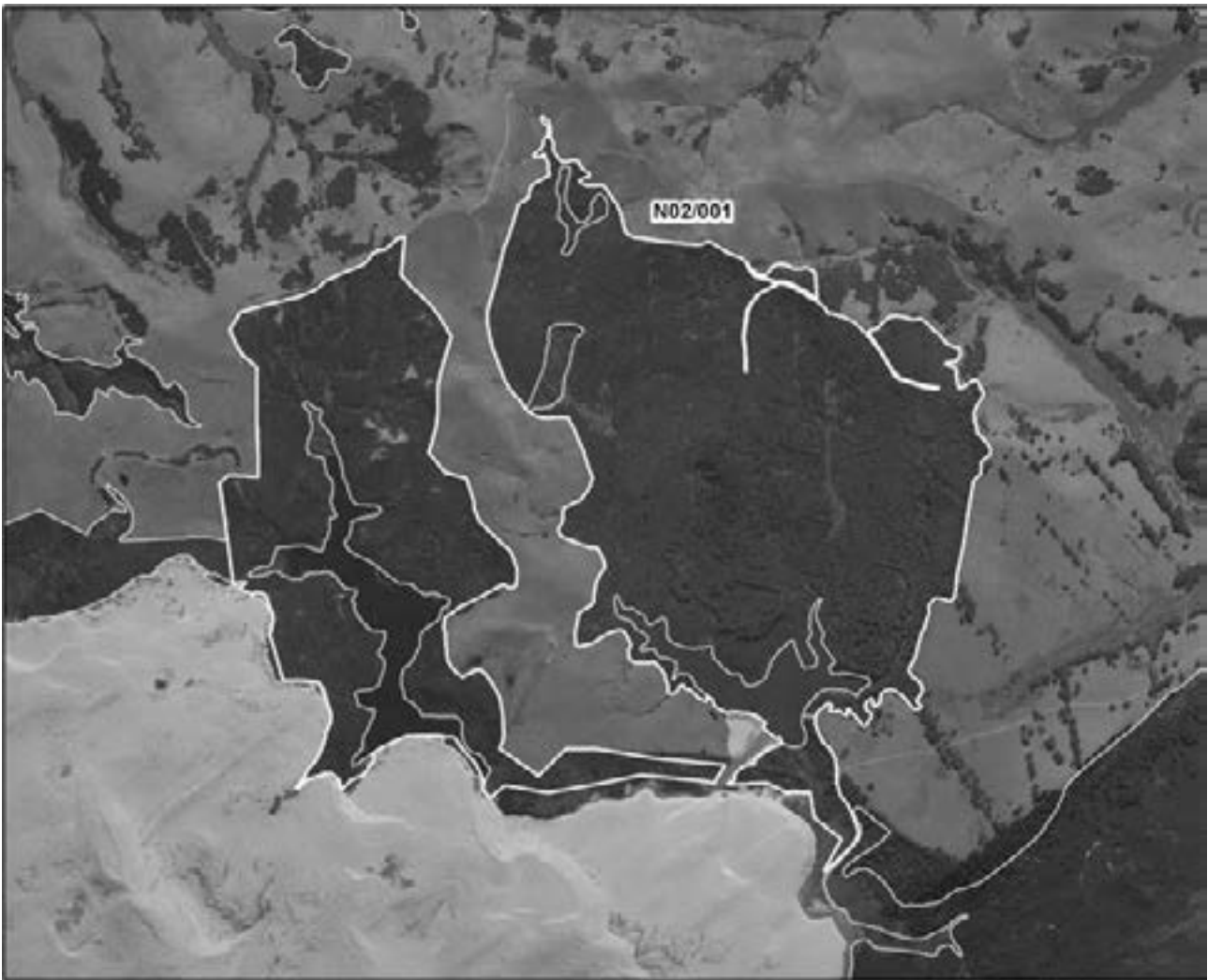
Vegetation

- (a) At the northern end of the shrubland, is an area of secondary forest in which kanuka is abundant, and puriri is common. Nikau, mamaku, kohekohe, rewarewa and brush wattle occur occasionally.
- (b) The kanuka-dominated shrublands make up the rest of the terrestrial habitat apart from a small area of radiata pines. Manuka is frequent with ti kouka and mamaku occasional.
- (c) Lake Ngakeketa (12.5 ha) is a deep dune lake with a narrow, intermittent fringe of raupo, type (d), in association with *Baumea articulata* and kuta, and occasional *Eleocharis sphacelata* and harakeke. The invasive aquatic weed hornwort dominates the submerged vegetation (Wells *et al.* 2007). The western lake, Te Paki Lake (12.7 ha) is also fairly deep, and ponded by a large Holocene dune. The water level appears to be rising as the outlet is being blocked by a mobile dune with some marginal plants, ti kouka, manuka and harakeke partially submerged and dying (Wells *et al.* 2007). It has an intermittent fringe of raupo, type (d), *Eleocharis sphacelata*, *Baumea articulata* and *Juncus pallidus* and is surrounded by tall kanuka shrublands which also contain hangehange, ti kouka, bracken, coastal toetoe and occasional shining karamu, harakeke and wattle.

Fauna

Birds

Australasian bittern (Nationally Endangered), grey duck (Nationally Endangered), NI fernbird (Sparse), NZ dabchick (Sparse) (old record), black shag (Sparse), pied shag, little shag, black swan, paradise shelduck,

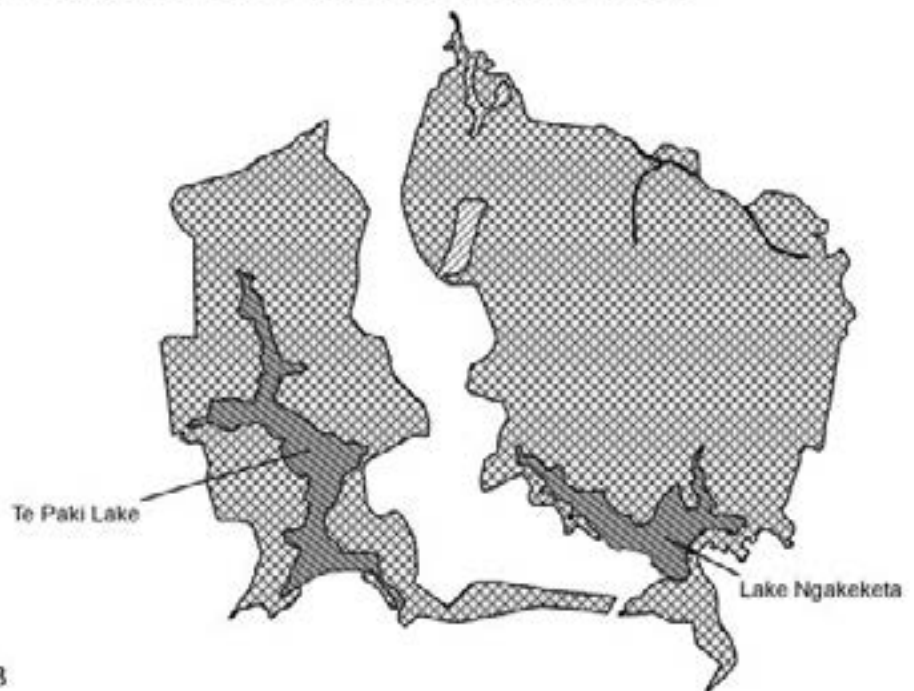


N02/001 Lake Ngakeketa, Te Paki Lake and Surrounds

0 125 250 500
Metres

Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

mallard, pukeko, kahu, white-faced heron, pheasant, spur-winged plover, eastern rosella, welcome swallow, blackbird, grey warbler, NI fantail, silvereve, yellowhammer, chaffinch, myna and magpie.

In the NIWA study (Wells *et al.* 2007) it was noted that marginal trees provided a nesting and roosting site for pied shag at Te Paki Lake.

Aquatic fauna

Common bullies, the snail *Potamopyrgus antipodarum* and empty shells of the freshwater mussel (*Hyridella menziesi*) (Gradual Decline) were recorded in 2006 at Te Paki Lake with schools of juvenile and adult mullet and common bullies abundant in Lake Ngakeketa (Wells *et al.* 2007).

Significance

Two of the northernmost dune lakes in New Zealand with a riparian buffer, not present at most dune lakes. Dune lakes are a rare wetland type in Northland. A study of Lake Ngakeketa by NIWA in 2007 (Wells *et al.* 2007) ranked the lake as 'low' due to the dominance of the exotic submerged wetland plant, hornwort. In the same study, Te Paki Lake is ranked as being 'high' as it retains mainly indigenous aquatic vegetation and is surrounded by native shrubland/forest. Five threatened birds and a threatened freshwater mussel have been recorded from the site and the kanuka-puriri forest type (a) is an under-represented vegetation type in the ecological region. Representative site also for type (c) open water. This site is almost entirely within the Te Paki Recreation Reserve (DOC-administered) (317.25 ha or 99.9%). Approximately 61.3 ha of this site is within an 'At Risk' land environment (G1.1a), 0.8 ha is within an 'Underprotected' land environment (A2.1a) and 234.5 ha is within 'Less Reduced and Better Protected' (A1.1b) (Walker *et al.* 2007).

CAPE ROAD WETLANDS AND SHRUBLAND

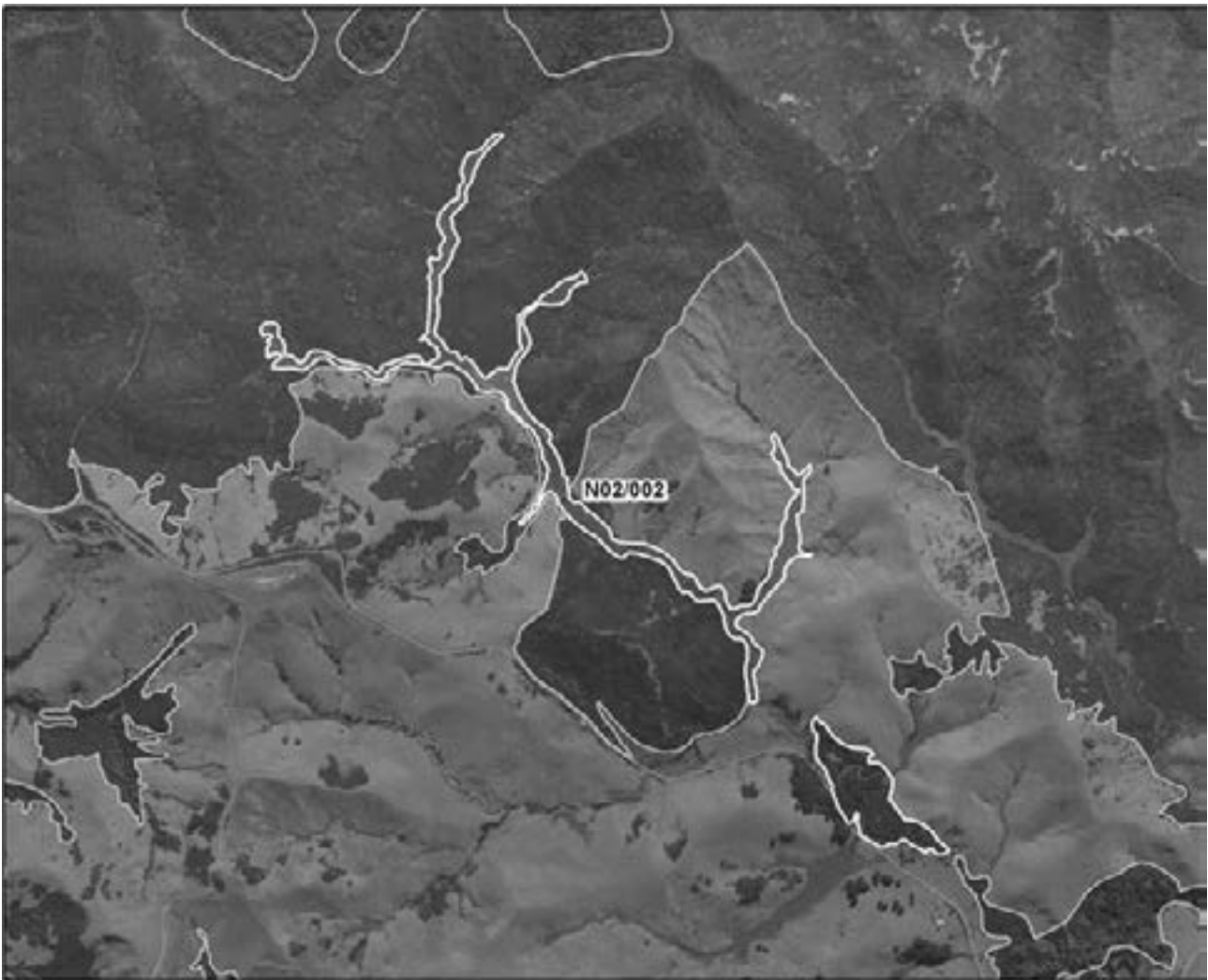
Survey no. N02/002
Survey date 24 August 1995, 16 February 1997
Grid reference N02 909 455
Area 16.7 ha
Altitude 40-100 m asl

Ecological units

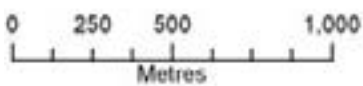
- (a) Raupo reedland in gully
- (b) Kanuka/manuka shrubland on hillslope

Landform/geology

Hill country of weathered Tangihua Complex igneous rocks, with freshwater wetlands on alluvium along stream valleys.

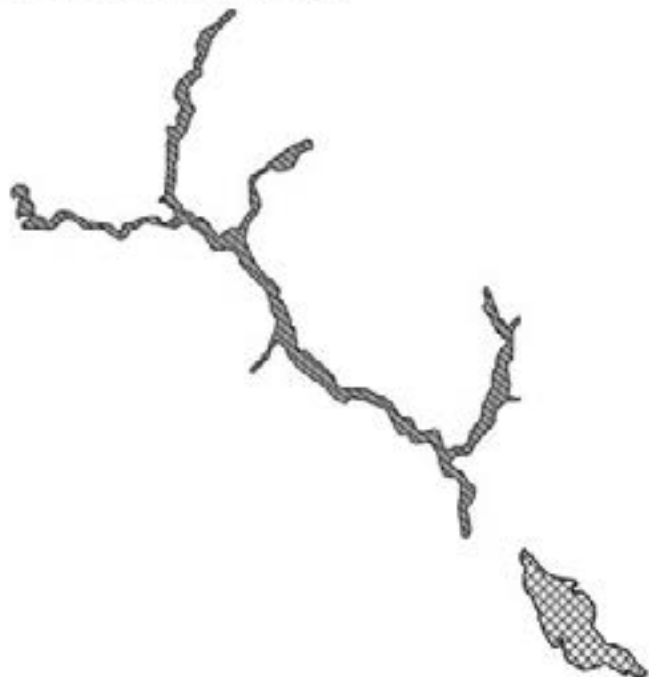


N02/002 Cape Road Wetlands and Shrubland



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Vegetation

- (a) Raupo is dominant with *Juncus* sp., kuta, *Eleocharis sphacelata* and other sedges present. Ti kouka, harakeke, and mamaku are occasional.
- (b) Kanuka/manuka shrubland (not mapped) occurs on the northern side in the upper catchment. Prickly hakea, mamaku, kohuhu, hangehange, rewarewa, akeake, radiata pine and gorse are also present. Macrocarpa, eucalypts and radiata pines are emergent in a small area of kanuka at the lower end of the catchment.

Significant flora

Ranunculus urvilleanus (regionally significant).

Fauna

Australasian bittern (Nationally Endangered), grey teal (regionally significant), NZ scaup (regionally significant) and paradise shelduck (R. Pierce pers. comm). In addition grey warbler, skylark and spur-winged plover were recorded during this survey.

Significance

Although relatively common in Te Paki Ecological District, fertile wetlands of this size and which are relatively unmodified, are a nationally uncommon habitat type. Both wetland and shrubland function as buffer to the upper catchment of the Waitiki Stream and contribute to the high water quality of the internationally important Parengarenga Harbour. Threatened and regionally significant species present. This site is entirely within Te Paki Recreation Reserve (DOC-administered). Approximately 3.0 ha and 21 ha is within 'Less Reduced and Better Protected' land environment (A1.1a and A1.1b) (Walker *et al.* 2007).

TE PAKI SHRUBLANDS AND FOREST REMNANTS

Survey no.	N02/003
Survey date	24 August 1995, December 1996, February 1997
Grid reference	N02 900 475
Area	10,629.8 ha (431 ha forest, 10,189.2 ha shrubland, 2.3 ha wetland, duneland 7.3 ha)
Altitude	<2 to 310 m asl

Ecological units

- (a) Manuka-harakeke shrubland on exposed hillslopes
- (b) Manuka shrubland on infertile slopes and ridges
- (c) Manuka-kanuka shrubland on volcanic hillslopes and ridges
- (d) Manuka shrubland on valley alluvium
- (e) Manuka shrubland and manuka-*Lepidosperma filiforme* shrub-sedgeland on gumland slopes and ridges

- (f) Umbrella fern fernland in valley bottoms
- (g) Manuka shrubland on low gumland slopes and depressions
- (h) Manuka shrubland on podzolised valley bottoms
- (i) Manuka-prickly hakea shrubland on hillslope
- (j) Kohekohe-puriri forest on hillslope
- (k) Kohekohe-puriri-taraire forest on hillslope
- (l) Kanuka-tree fern forest on hillslope
- (m) Kanuka forest on hillslope and along stream gullies
- (n) Taraire forest on hillslope
- (o) Kauri-monoao forest on spur
- (p) Kanuka-nikau-taraire forest on hillslope
- (q) Ponga-taraire forest on hillslope
- (r) Kanuka-kauri forest on hillslope
- (s) Kohekohe-taraire forest on hillslope
- (t) Puriri-taraire forest on hillslope
- (u) Puriri-taraire forest in gully
- (v) Puriri-tree fern forest on hillslope
- (w) Pohutukawa treeland on cliff
- (x) Kanuka-taraire forest in gully bottoms
- (y) Raupo reedland in valley bottom

Landform/geology

Predominantly hill country of Tangihua Complex igneous rock units, but with an area of lower relief hill country of deeply weathered and podzolised Parengarenga Group sandstone and mudstone south-east of Kapowairua and north-west of Waitiki Landing and Pleistocene consolidated dune sands north of Te Werahi Stream. Also Pleistocene consolidated intertidal and estuarine sands in low terrain bordering Parengarenga Harbour.

Vegetation

Around 95% of the vegetation at this site, which extends from Te Werahi Beach in the west to Te Hapua Settlement and Spirits Bay Road in the east, is shrubland.

Sbrubland

(a) *Manuka-harakeke shrubland on exposed hillslopes*

This type occurs between Te Rerenga Wairua and Hiriki Pa.

The vegetation is mostly stunted (<1m). In places the vegetation cover is dense and in other places the cover is relatively open. Harakeke is common or frequent. Associated species are hangehange, mingimingi, bracken, rasp fern, tauhinu, karamu, *Coprosma rhamnoides*, *Corokia cotoneaster*, *Hebe diosmifolia*, *H. ligustrifolia*, *Pimelea urvilleana* agg., *Pomaderris amoena*, knobby clubbrush, *Isolepis reticularis*, *Lepidosperma australe*, *L. laterale*, *Morelotia affinis*, *Schoenus tendo*, *Baumea juncea*,

Astelia sp., mawhai, pohuehue and occasional *Carmichaelia australis*, pampas and woolly hakea. Ti kouka and pohutukawa are scattered and the orchids *Thelymitra pauciflora* and *T. aff. longifolia* are common (McCrae 1990). Dense manuka and harakeke also occur on the upper margin of Te Paki Trig south east remnant.

(b) Manuka shrubland on infertile slopes and ridges

Associated species in this type are hangehange, ti kouka, hakea, pampas, kumarahou, harakeke, gorse, tutu, and *Dracophyllum lessonianum*. South of Te Rerenga Wairua Type (a) grades into Type (b).

(i) Below Hiriki Pa, ti kouka, coastal toetoe, tree fern and pampas are scattered in the canopy.

(ii) Towards Tapotupotu, stunted manuka with prickly hakea is locally dominant. *Thelymitra aff. longifolia* is common on top slopes. Other orchid species are present including various *Thelymitra*, *Microtis*, *Orthoceras*, *Prasophyllum* and *Petalochilus* species (including *P. minor*).

(iii) At Pandora manuka is dominant with both prickly and woolly hakea frequent. *Lycopodiella cernua*, *Dracophyllum lessonianum* and *Thelymitra* orchids also occur.

(iv) Around Radar Bush, manuka is dominant and varies in height up to 3 m. In the lower vegetation *Dracophyllum lessonianum* is a frequent emergent with occasional kumarahou, kohuhu, akeake and ti kouka. Umbrella fern is common, with frequent *Schoenus* sp. and scattered *Pomaderris edgerleyi* and woolly hakea. *Thelymitra* orchids are common.

On the margins of the bush gullies manuka is 1-3 m tall, with kanuka, sapling kawaka, kauri, monoao, lancewood, rewarewa and tanekaha. *Dracophyllum lessonianum*, kohuhu and shining karamu are frequent, with occasional toro, toru, and kumarahou. In the understorey *Gleichenia dicarpa* is abundant along with hangehange, *Schoenus tendo*, *S. brevifolius*, bracken, turutu, *Cordyline pumilo*, and *Lycopodium deuterodensum*. As the vegetation becomes taller, the understorey is more open, with *Blechnum fraseri* and lichen at ground level.

(c) Manuka-kanuka shrubland on volcanic hillslopes and ridges

(i) Between Tapotupotu and Kapowairua and north of Te Hapua, shrubland of 2-3 m in height occurs. Kanuka may be dominant with scattered ti kouka, kohuhu, hangehange, mamangi, rangiora, prickly hakea and the occasional emergent rewarewa and radiata pine. The twining vine mawhai is present throughout.

(ii) Kanuka 3-5 m tall is predominant on spur crests and upper slopes. Manuka is common and locally dominant, especially around sheet-erosion scars. Gorse is scattered throughout, with prickly hakea locally common on higher areas. Mawhai, ti kouka, rewarewa, *Dracophyllum lessonianum*, kumarahou, tutu and mamaku are scattered. The understorey is open, with rasp fern common and in less dense areas *Microlaena* grasses and small herbs are locally common (Clunie 1984). On higher land between Te Rerenga Wairua and Kohuronaki, ridges and knolls within the manuka and

kanuka shrubland are open and support *Rytidosperma* grasses, pasture herbs, *Centella uniflora* and *Leucopogon fraseri* (Clunie 1984). Around Te Paki Trig and associated ridge slopes the lower manuka shrubland at Radar Bush grades into taller manuka and kanuka shrubland, with frequent kohuhu and emergent akeake, rewarewa and puriri. This in turn grades into taller kanuka with occasional puriri and emergent kauri, puriri, kawaka and tanekaha merging into a very mixed canopy between Te Paki Trig and Kohuronaki.

(iii) South of Te Hapua Road (in the western sector of the area referred to as the “Te Marua Block” in Clunie 1985), manuka and kanuka shrubland occurs on spur crests, slopes and flats on volcanic soils. The vegetation is mostly 1.5–3 m tall, with kanuka up to 4 m on the upper flanks of high ridges. Prickly hakea, kumarahou, mingimingi and bracken are widely scattered. Occasional ti kouka, mamaku and harakeke occur on valley bottoms.

The understorey is generally open, and sparse under dense manuka. Seedlings of forest species occur locally near gully remnants. The main understorey species are *Coprosma rhamnoides*, shining karamu, hangehange, kumarahou, rangiora, rasp fern, kiokio, *Adiantum hispidulum*, native grasses, and occasional bracken, ponga, harakeke, *Microlaena* sp., *Schoenus tendo*, *Carex flagellifera*, *Baumea juncea*, *Nertera setulosa*, Mercury Bay weed, *Centella uniflora*, and turutu (Clunie 1985). Tutu occurs on the margins.

At Ngakapua Point south of Te Hapua, kanuka is dominant with frequent dally pine.

(iv) Manuka-kanuka from 3–15 m occurs on the coastal margin of the Waitiki Stream and Channel on the Parengarenga Harbour (part of the “Te Marua Block” in Clunie 1985). Akeake, karamu, mingimingi and mapou are scattered along with *Gabnia lacera*, harakeke, grasses (*Rytidosperma* (including *R. gracile*), *Lachnagrostis filiformis*, *Austrostipa stipoides*), sedges (knobby clubrush, *Lepidosperma laterale*) and ferns (*Adiantum* spp. and rasp fern) (Clunie 1985).

(d) Manuka shrubland on valley alluvium

Tall (5–8 m) spindly manuka with scattered ti kouka.

Ti kouka, *Coprosma areolata*, and *C. tenuicaulis* (damper sites) occur in the understorey. Bush lawyer is common. *Baumea juncea* is dominant in the ground layer with native grass, *Schoenus maschalinus*, ring fern, kiokio, rasp fern, wheki, bracken, shaking brake, gully fern, scattered *Juncus* sp. and dicot weeds. Harakeke is scattered but locally dense near stream banks, with *Carex flagellifera* (Clunie 1984).

(e) Manuka shrubland and Manuka-Lepidosperma filiforme shrub-sedgeland form a mosaic on gumland slopes and ridges in the Kapowairua catchment.

Low manuka (0.5–1 m) with 50% open canopy is widespread on spur crests and upper slopes. It is taller and denser on lower slopes. *Lepidosperma filiforme* is common on upper and mid slopes where it may be locally dominant. *Schoenus brevifolius* occurs throughout. Sedges

are less common in dense manuka stands on the lower slopes.

Kanuka to 3 m occurs locally on higher ground, sometimes associated with prickly and woolly hakea, both of which may be common or locally dominant.

Scattered throughout but more frequent in areas of higher soil fertility are turutu, *Pimelea prostrata*, mingimingi, bracken, kumarahou, *Epacris pauciflora* and *Thelymitra* orchids. Also present in more fertile areas are *Pomaderris amoena*, *P. edgerleyi*, mawhai, *Lepidosperma laterale*, *L. australe*, *Lycopodium deuterodensum*, *Lycopodiella cernua*, and *Dracophyllum lessonianum* (Clunie 1984). Orchids present include *Thelymitra*, *Microtis*, *Petalochilus*, *Orthoceras* and the threatened *Calochilus* aff. *herbaceus* (McCrae 1990).

This type also occurs in the north eastern sector of the “Te Marua Block” and the head of the Waiwheo Stream catchment. In the “Te Marua Block” the vegetation is taller (>1m) and more dense. The area is underlain by a fault zone between volcanic and sedimentary rocks. *Todea barbara* and *Sticherus flabellatus* occur here (Clunie 1985).

Umbrella fern, type (f), is common in shallow side-gully bottoms in the “Te Marua Block” with *Baumea teretifolia* and sometimes *Schoenus brevifolius*. *Lepidosperma laterale* is local with occasional *Tetraria capillaris*. Wirerush is locally abundant on the main gully bottom with *Baumea teretifolia* and sometimes *B. juncea*, among tall manuka. (Clunie 1985) *Gleichenia dicarpa* fernland also occurs in shallow valley bottoms in the vicinity of Pandora Gate.

(g) Manuka shrubland on low gumland slopes and depressions
Kapowairua catchment

Manuka to 1.5 m of varying density is dominant with kanuka locally common on well-drained sites. Other species scattered throughout are mingimingi, bracken, gorse, mawhai, prickly hakea, *Epacris pauciflora*, *Pimelea prostrata* and turutu. *Baumea juncea* and *B. teretifolia* occur on moist sites with local *Dracophyllum lessonianum*, and *Baumea rubiginosa* and *B. arthrophylla* in the wettest parts.

Open areas contain scattered sedges (*Baumea juncea*, *B. teretifolia*, knobby clubrush, *Schoenus brevifolius*, *Lepidosperma filiforme*), sparse grasses, *Thelymitra* orchids and occasional *Schizaea fistulosa* (Clunie 1984).

(h) Manuka shrubland on podzolised valley bottoms

Manuka to 3 m forms a dense canopy with scattered ti kouka in the Kapowairua catchment. *Baumea teretifolia* and *B. juncea* dominate a sparse understorey with occasional *Coprosma areolata*, *C. tenuicaulis*, mingimingi, bracken and kiokio (Clunie 1984).

(i) Co-dominant manuka and prickly hakea occurs with frequent to common gorse and occasional sedges and bracken. This type occurs north of Te Hapua and on some ridge tops around Te Paki Trig and Pandora. Woolly hakea is frequent around the Kapowairua/Te Hapua intersection.

Forest (Mitchell 1984)

The first of the broadleaf forest types (j) is kohekohe-puriri found adjacent to Tapotupotu Bay. Taraire, houhere, mahoe, mapou and karaka occur frequently with occasional nikau, ponga, manuka and kohuhu. Kanuka and ti kouka are common in the canopy. There is occasional kowhai, tawapou, and pohutukawa reflecting the coastal influence. Mitchell (1984) reported vigorous regeneration of kohekohe. *Hebe diosmifolia* is present (Kelly 1967).

The kohekohe-puriri-taraire remnants (k) are situated at the head of Broughton's Gully (Kohuronaki) and at Tirikawa Trig on steep and rocky substrate.

At Tirikawa the canopy is tall, to 25 m. Ponga is common and there is a dense understorey of *Rhabdothermus solandri* and kiekie in the damper western portion. Rangiora, rewarewa, mangeao, hinau, nikau, mapou, houhere and kanono are frequent with occasional karaka.

At Broughton's Gully, karaka and kanuka are common in the canopy with manuka, rewarewa, maire tawake and Bartlett's rata being occasional.

East of Darkies Track, the kanuka-tree fern-dominated forest type (l) is up to 15 m tall and contains common puriri and frequent taraire, rewarewa, mamangi, hinau, kauri, and nikau. Smaller amounts of houhere, putaputaweta, lancewood, mamaku, toro, rimu, monoao, white maire, willow-leaved maire and ti kouka are also part of the type.

Tall kanuka (to 15 m), type (m) is also dominant on spurs and around broadleaf remnants south east of Kohuronaki and in the "Te Marua Block" (Clunie 1985) with kohuhu, mapou, houhere, lancewood and mamangi. *Coprosma rhamnoides*, mapou and hangehange are common in the understorey.

Tall kanuka also occurs in some gully heads, e.g. below Hiriki Pa with occasional ti kouka and tree fern. Pohutukawa is present here along with occasional taraire and titoki. Hangehange, rangiora, and houhere are present in the understorey.

The taraire-dominant broadleaf remnant (n), at Pandora's Gate has ponga, hinau and rewarewa being common in the canopy. Nikau, houhere, kohekohe, kohuhu, kanuka, mahoe, five-finger, puriri and northern rata also occur here. Miro, totara, tanekaha, and kauri occur on spurs and upper slopes. *Colensoa physaloides* occurs in the understorey.

Taraire forest also occurs at Te Paki Trig East. Ponga and mamaku are common, with frequent nikau and kohekohe, and scattered puriri, rewarewa, and pukatea. A stand of kauri with monoao occurs on a spur (Type (o)). The understorey contains kohekohe and houhere seedlings. *Rhabdothermus solandri* and hangehange are common; kanono, mahoe, mapou, pigeonwood, houhere and pate are occasional. Tall manuka occurs on the margins.

On a damp, steep slope adjacent to Cape Reinga Road, type (p) a mosaic of kanuka-nikau-taraire comprises a complete catchment. Puriri, ponga and kohuhu occur in association. Kohekohe, houhere and rewarewa

are scattered and mapou, mahoe, mamaku, kanono and kanuka are also present. There are no podocarps apart from a single monoao. This remnant has a good understorey with all size classes of puriri and taraire. Supplejack is dense, *Rhabdothamnus solandri* and hangehange common.

At Whangakea Stream (Pandora), Type (q) taraire and ponga are co-dominant with frequent nikau, mamangi, houhere and mahoe. Kanuka is locally common on ridges. Puriri, kohekohe rewarewa, lancewood, kohuhu and mamaku are occasional. A dense understorey occurs in the gullies, with strong taraire regeneration. *Rhabdothamnus solandri* and *Colensoa physaloides* are plentiful. Some ricker kauri occur on the ridges and there is strong kauri regeneration under a tall kanuka canopy. To the west of Kohuronaki Trig, type (q) also occurs with frequent nikau, kohekohe, and rewarewa. Mamaku, houhere, totara, mamangi, hinau, kanuka, wheki, tutu, putaputaweta, lancewood, kohuhu, toro, puriri and kauri are present. The understorey is open with taraire represented in the full range of size classes.

In type (r) at Radar Bush, kauri is emergent over kanuka with abundant ponga. Kawaka, monoao are frequent and rimu is an occasional emergent in association with kauri. Taraire is common in gullies. Bartlett's rata, tanekaha and manao are also present, making a very rare canopy association. Other species present are houhere, toru, rewarewa, mamangi, miro, totara, matai, hinau, northern rata, white maire, willow-leaved maire, nikau and kohuhu. Regeneration of kawaka, kauri, podocarps and kohekohe is strong. Other common species in the understorey are ponga, hangehange, Kirk's tree daisy, *Alseuosmia* sp., *Gabnia lacera*, mingimingi, kanono, shining karamu and *Blechnum fraseri*. *Dracophyllum latifolium* and mairehau are present, and kiekie and supplejack are locally common in gullies and *Coprosma spathulata* and *Leptocophylla juniperina* are frequent on dry ridges.

Type (s) kohekohe-taraire-nikau is found south east of the Te Paki Trig track, towards Kohuronaki Trig. It is a large, south-facing remnant on a steep slope from ridge to valley bottom. Kanuka and ponga are frequent, with scattered rewarewa, mapou, puriri, toru, miro, mamaku, and pukatea. Kauri occurs on spurs, with some large specimens and tanekaha and rimu in association. *Dracophyllum sinclairii* is a common sub-canopy species under tall kauri on some spurs (Kelly 1967). Hangehange, *Rhabdothamnus solandri* and heketara are common in the understorey with rangiora, houhere, kohuhu, mamangi, mahoe, kanono and *Coprosma rhamnoides*. Kiekie is dense.

North and east of Kohuronaki Trig, is type (t) puriri-taraire forest, including some large trees, with ponga, rewarewa, kohekohe and houhere locally common or frequent. Other species present are karaka, lancewood, mahoe, mapou, pate, horopito, mamangi, ti kouka, wheki, hinau, miro, mangeao, tawa and maire tawake. Hangehange is prevalent in the dry open understorey.

In the gully south of Tapotupotu, Type (u), puriri-taraire forest occurs on alluvium with maire tawake, karaka and other broadleaved species. Maire tawake is rare in Te Paki Ecological District (Kelly 1967).

South of Kohuronaki Trig, type (v), puriri and sometimes hinau, are emergent over a canopy of tree ferns, both ponga and mamaku. Rewarewa, nikau, kohekohe, houhere, mangeao, mamangi, mapou, tawa, lancewood, mahoe and kanuka are present. In the understorey, hangehange, *Coprosma rhamnoides*, ponga, supplejack, *Carex dissita*, *Blechnum filiforme*, *Adiantum*, hound's tongue, gully fern, *Pteris macilenta*, shining spleenwort, *Microsorium scandens* are common with nikau, rangiora, pate, kawakawa, *Coprosma macrocarpa* subsp. *minor*, bush rice grass, native grass, hook sedge and clumps of *Gabnia lacera* are scattered.

Type (w), pohutukawa treeland, occurs on coastal cliffs. At Pandora, pohutukawa are scattered, and karaka and tawapou also occur here. The understorey consists of harakeke, kowharawhara and hangehange. South of Te Rerenga Wairua, tawapou and a persist on steep cliffs inaccessible to livestock and possums.

Kanuka-taraire forest, Type (x), occurs in narrow bands in gully bottoms in the "Te Marua Block". Other species present include houhere, mahoe, mapou, scattered large puriri, emergent rewarewa, ponga, mamaku, titoki, pigeonwood, tawa, and pohutukawa. The understorey is open with mapou, *Coprosma rhamnoides*, shining karamu, hangehange, rangiora, ponga, kohekohe saplings and occasional nikau and *Coprosma rigida*. Ferns and sedges are scattered to locally common. (Clunie 1985)

Type (y) Raupo swamp in valley bottom

Several valley bottoms, including those running into the Parengarenga Harbour, contain raupo-dominant swamps with kuta being locally common on the margins. Swamp millet and *Calystegia sepium* also occur with occasional harakeke and ti kouka.

Significant flora

Nationally Critical

Bartlett's rata, *Calochilus* aff. *herbaceus*, *Christella dentata* sens str, and *Frullaria wairua*.

Nationally Endangered

Cololejeunea sp. 1, *Goebelobryum unguiculatum* (presumably within this site; general locality of Kapowairua (clay bank)), *Pomaderris phyllicifolia*, *Stenolejeunea acuminata* and *Todea barbara*.

Serious Decline

Kunzea ericoides var. *linearis*, *Plumatichilos tasmanicum* and *Pimelea tomentosa*.

Gradual Decline

Arthropodium bifurcatum, *Colensoa physaloides*, *Drosera pygmaea* and willow-leaved maire.

Range Restricted

Ectropothecium sandwichense, *Harpalejeunea filicuspis* and *Petalochilus alatus*.

Sparse

Kawaka, *Anzybas rotundifolius*, *Corunastylis pumila*, parapara, *Tmesipteris sigmatifolia*, *Sticherus flabellatus*, monoao, *Tbelymitra* aff. *ixioides* (AK 251348; New Zealand) and *Thismia rodwayi*.

Other

Drepanolejeunea aff. *ternatensis* (Data Deficient), *Nematoceras rivulare* (Data Deficient), *Olearia angulata* (Data Deficient) (general location recorded as Kapowairua area—assumed to occur within this site) and *Tbelymitra malvina* (Coloniser).

Regionally significant species

Adiantum aethiopicum, *Asplenium gracillimum*, *Asplenium obtusatum* subsp. *nortblandicum*, *Brachglottis kirkii* var. *angustior*, carmine rata, *Cbeilanthus sieberi*, *Coprosma acerosa*, *Coprosma parviflora*, *Coprosma rigida*, *Corybas cheesemanii*, *Corokia cotoneaster*, gully tree fern, *Dracophyllum sinclairii*, *Drosera peltata*, *Epacris pauciflora*, *Gratiola sexdentata*, *Hebe diosmifolia*, horopito, hutu, *Juncus pauciflorus*, native plantain, northern rata, *Ophioglossum petiolatum*, southern rata, ngaio, *Olearia albida*, manoao, *Pomaderris edgerleyi*, *Psilotum nudum*, *Ranunculus urvilleanus*, *Schizaea bifida*, tawapou, *Tbelymitra* aff. *longifolia* and wirerush.

Historic records

Hibiscus richardsonii (Nationally Endangered) (1967), *Ophioglossum petiolatum* (Nationally Endangered) (1934), *Phylloglossum drummondii* (Nationally Endangered) (1971), *Sonchus kirkii* (Gradual Decline) (1896), rohutu (regionally significant) (1947) and *Scleranthus biflorus* (regionally significant) (1957).

Fauna

Birds

Kukupa (Gradual Decline), North Island fernbird (Sparse), North Island tomtit and grey-faced petrel (breeding, Te Rerenga Wairua) (both regionally significant). These common species were also recorded during this survey; grey warbler, NZ kingfisher, kahu, welcome swallow and skylark.

Fish and freshwater invertebrates

Banded kokopu (regionally significant), common bully, inanga, longfin eel (Gradual Decline) and koura (Gradual Decline). Historic record of shortfin eel (1960).

Lizards

Ornate skink (Gradual Decline), North Cape Pacific gecko (Gradual Decline), Matapia gecko (Gradual Decline), North Cape green gecko (Sparse), *Cyclodina levidensa* (regionally significant), shore skink¹², and common gecko.

12. In 2007 Peter Anderson recorded a shore skink on a high ridge 1.5 km from the coast, well outside of its normal habitat.

Landsnails

Nationally Critical

Cytora gardneri (Marshall and Barker 2007) (#*Cytora* sp. 11), *Placostylus ambagiosus pandora*, *Placostylus ambagiosus* “Tirikawa Trig”, *Placostylus ambagiosus* “Tirikawa Coast”, *Placostylus ambagiosus* “Tapotupotu”, *Placostylus ambagiosus* “Kauaetewhakapeke” and *Placostylus* “Te Paki”.

Nationally Endangered

Costallogiscus parrishi (Marshall and Barker 2008) (#Charopidae sp. 165), Charopidae sp. 27, Charopidae sp. 166, *Flammulina tepakiensis* and *Placostylus ambagiosus* “Ngaupoko”.

Gradual Decline

Amborhytida duplicata, *Athoracophorus* sp. 4 and *Paryphanta busbyi watti*.

Range Restricted

Allodiscus basiliratus, *Allodiscus pumilus* (Marshall and Barker 2008) (#Charopidae sp. 177), *Allodiscus spiritus*, *Allodiscus wairua* (status from Marshall and Barker 2008), Charopidae sp. 73, Charopidae sp. 105, Charopidae sp. 170, *Climocella reinga*, *Cytora lignaria* (#*Cytora ampla*), *Cytora brooki* (Marshall and Barker 2007) (#*Cytora* sp. 16), *Cytora hispida*, *Cytora kerrana*, *Cytora tepakiensis*, *Delos* sp. 2, *Egestula pandora*, *Laomarex minuta*, *Phrixgnathus aupouria* (#*Laoma mariae aupouria*), *Liarea aupouria* (#*L. a. aupouria*), Punctidae sp. 130 (#P. sp. 10), Punctidae sp. 229 (#P. sp. 11), Punctidae sp. 33 (#P. sp. 16), Punctidae sp. 30 (#P. sp. 17), Punctidae sp. 250 (#P. sp. 22), Punctidae sp. 99 (#P. sp. 23), Punctidae sp. 63 and *Serpho matthewsii*.

name used in Hitchmough *et al.* (comp.) 2007

Sparse

Delouagapia cordelia.

Data Deficient

Placostylus ambagiosus “Reinga” (no recent records).

Extinct

Placostylus ambagiosus “Kohuronaki”.

Non-threatened landsnails

Cavellia buccinella, *Charopa coma*, Charopidae sp. 1, *Cavellia* sp. cf. *C. irregularis*, *Climocella runga*, *Cantareus aspersus*, *Cytora cytora*, *Cytora fasciata*, *Cytora tokerau*, *Fectola charopiformis*, *Flammulina cornea*, *Flammulina perdita*, *Georissa purchasi*, *Huonodon hectori*, *Kokikora angulata*, *Mocella eta*, *Papulaoma monticola*, *Paralalaoma caputspinulae*, *Paracharopa chrysaugia*, *Paracharopa delicatula*, *Paracharopa fuscata*, *Phenacohelix tholoides*, *Phenacharopa pseudanguicula*, *Phrixgnathus glabriusculus*, *Phrixgnathus sciadum*, *Phrixgnathus viridulus*, Punctidae sp. 56, Punctidae sp. 62, Punctidae

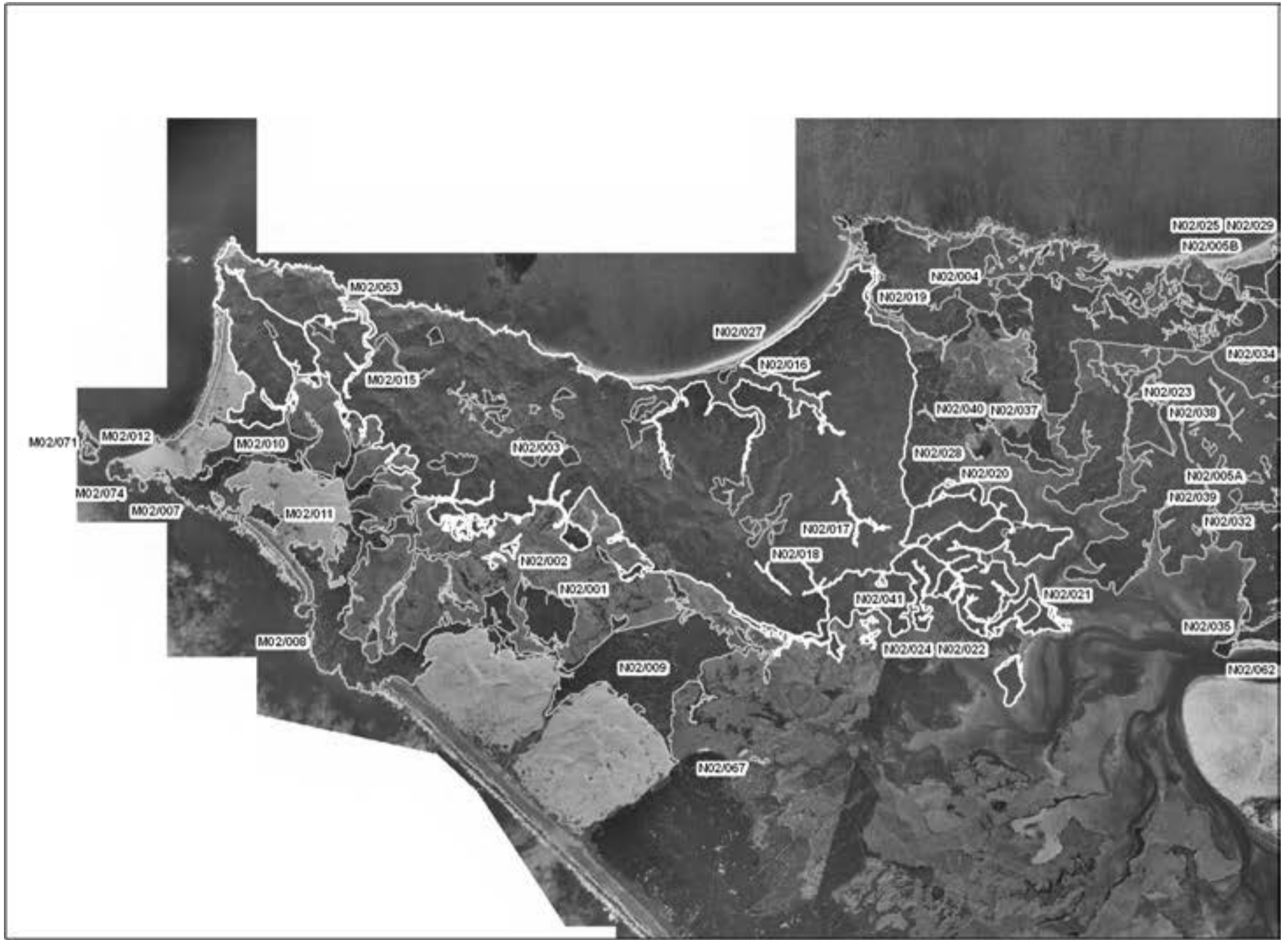
sp. 824, Punctidae sp. 96, Punctidae sp. 100, Punctidae sp. 133, Punctidae sp. A, Punctidae sp. C, Punctidae sp. D, *Serpbo kivi*, *Suterilla neozelandica*, *Taguabelix crispata*, *Tbalassobelix zelandiae*, *Therasia sp.*, *Therasiella celinde*, *Therasiella elevata*, *Therasiella serrata*, *Tornatellides novoseelandica* and *Tornatellides subperforata*.

Other terrestrial invertebrates

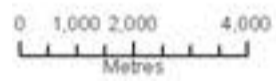
The darkling beetles *Menimus borealis* and *Menimus brouni* (both Range Restricted), Northland tusked weta (Sparse), the stag beetle *Paralissotes oconnori* (Sparse) and the spiders *Wairua reinga*, *Stanwellia hollowayi* and *Nanocambridgea grandis* (all Data Deficient).

Significance

A large and extensive area of vegetation in an ecologically diverse and distinctive part of New Zealand. This site is of national conservation significance. The extensive shrublands perform an important function in linking the various wetlands, sand dunes, gumlands, and forest remnants that stretch from Cape Maria van Diemen to North Cape, forming an extensive (over 18,000 ha) and important habitat for the many invertebrates, lizards, birds and flora that occur in the region. These shrublands are also an integral part of the natural landscape. The area includes entire vegetated catchments, including Kapowairua. It includes the boundary between volcanic and sedimentary lithology which has considerable scientific value. The gumland vegetation is now much reduced from its former extent (Clunie 1984). This is one of the last large remaining contiguous habitats in Northland for a distinct form of the endemic North Cape green gecko and one of the largest populations in Northland of North Island fernbird (P. Anderson pers. comm.). At least 23 Northland endemic species of landsnail occur here, including some endemic to Te Paki such as *Cytora tepakiensis* and *Placostylus ambagiosus*. The forest remnants are a diverse and important source and reservoir of genetic diversity, as well as vestiges of former extensive forests, including some nationally uncommon vegetation associations. Only remnant patches of these forests now survive. Among the many threatened plants found within this habitat, Bartlett's rata stands out because it is a large tree up to 25 m tall, 1 m or more in diameter, and was only found in 1975; it is present however only in low numbers. It occurs within two remnants in this site and in one other site (N02/004). Representative site for all vegetation types except type (i) manuka-prickly hakea shrubland. The eastern end of Kapowairua is a nationally important geopreservation site for one of the largest and best preserved prehistoric adze working sites in New Zealand (Kenny and Hayward 1996). Approximately 9,221.3 ha (86.7%) of N02/003 is within Te Paki Recreation Reserve (DOC-administered). Approximately 1.7 ha of this site is within an 'Acutely Threatened' land environment (A5.1a), 2.7 ha is within a 'Chronically Threatened' land environment (A1.1c), 165.7 ha is within 'At Risk' land environments (A4.1a, G1.1a), 791 ha is within an 'Underprotected' land environment (A2.1a) and 9638.4 is within a 'Less Reduced and Better Protected' land environments (A1.1a, A1.1b, A3.1a) (Walker *et al.* 2007).

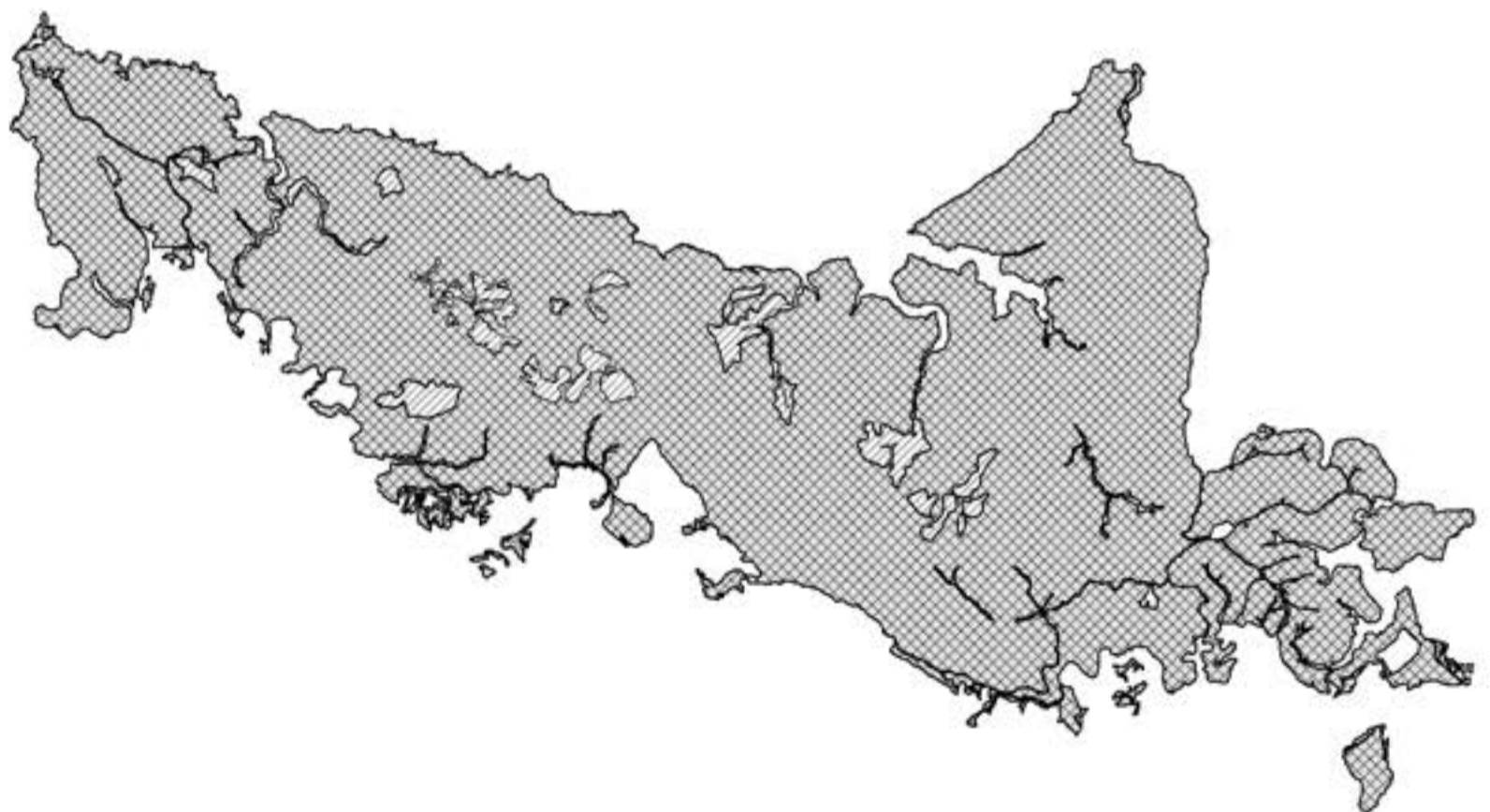


N02/003 Te Paki Shrublands and Forest Remnants



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



UNUWHAO BUSH AND SHRUBLANDS

Survey no.	N02/004
Survey date	24 August 1995
Grid reference	N02 014 526
Area	1,484.6 ha (359.8 ha forest, 1,126.5 ha shrubland, 0.5 ha wetland (part of Te Huka Stream))
Altitude	0–309 m asl

Ecological units

- (a) Mixed cliff shrubland on coastal cliffs
- (b) Kanuka forest on coastal hillslope
- (c) Manuka shrubland on coastal hillslope
- (d) Kanuka forest on hillslope
- (e) Kohekohe-puriri-taraire forest on hillslope and in gully
- (f) Mixed shrubland on inland cliffs

Landform/geology

Coastal hill country of Tangihua Complex igneous rocks forming an anticlinal core below unconformably overlying Parengarenga Group stratigraphic sequence of mudstone bluff-forming igneous conglomerate and minor deeply weathered and podzolised sandstone.

Vegetation

- (a) On the coastal cliffs, scattered pohutukawa are emergent over taupata, harakeke, knobby clubrush and the native morning glory vine, *Ipomoea cairica*, with occasional prostrate houpara. Some of the coastal faces between Hooper Point and Tom Bowling Bay are heavily modified with up to 50% in exotic grass. At Maungapiko Hill the vegetation cover is mostly kikuyu with frequent pohutukawa and harakeke, with occasional taupata, mahoe and karaka. Many coastal flats and hillslopes are covered with kikuyu and are grazed.
- (b) Kanuka shrubland containing frequent manuka occurs on hillslopes between the radiata pine forest and the coast.
- (c) East of Kapowairua, low manuka is dominant.
- (d) Secondary kanuka forest to 14 m at Unuwaho contains frequent mahoe and pohutukawa. Nikau, mamaku and kowhai are also present. In the understory sapling broadleaf species occur with mamangi, *Coprosma spathulata* and *Hebe ligustrifolia*.
- (e) The broadleaf forest comprises puriri-taraire-kohekohe. Ti kouka is locally common and pohutukawa is common near the coast and a common emergent north east of the Unuwaho Trig (Kelly 1967). Other species in this association include karaka, kowhai (widespread, especially along streams), hinau, houhere, lancewood, titoki, nikau, mamaku, mamangi, and occasional rewarewa, karaka and northern rata, with only a few examples

of the podocarps totara, rimu, miro, and kahikatea. The highest 30 m around the trig is moist because of 'lingering mist' (Kelly 1967) with supplejack, kiekie, filmy ferns, ramarama, wharangi, *Raukaua anomalus* and horopito present. Kohekohe, karaka, nikau, *Rhabdotohamnus solandri* and tree ferns are common in the understorey, with kiekie abundant on steep slopes.

West of Te Huka, pohutukawa to 20 m tall is a common emergent over puriri, kohekohe, taraire, karaka. Broadleaf forest occurs in gullies from Matirarau Bay to Akiwa Stream. Kowhai is common or frequent. Tawapou is scattered along the coast including a stand on the east bank of the Waihi Stream (Kelly 1967).

On inland cliff faces, an association of perching lilies (*Astelia* sp., *Collospermum bastatum* and rengarenga lily), climbing rata vines, harakeke, ferns and *Hebe adamsii* occurs.

A recent survey of habitat condition found extensive pig and possum impacts in this site, including severe canopy die-back on many emergent pohutukawa and high levels of browse on mahoe, kohekohe, and titoki. In particular, around the main Bartlett's rata population, very high levels of pig damage were noted, with almost no understorey vegetation present. The Bartlett's rata themselves displayed severe possum damage. Authors of the survey report noted that possums have been in Unuwahao for around 20 years¹³, so their long-term impacts probably remain to be seen (Whaley *et al.* 2005 in SSBI M02/N02/H011).

Significant flora

Nationally Critical

Bartlett's rata, *Christella dentata*, *Cololejeunea falcidentata*, *Erpodium glaucum* and *Sicyos australis* sens. str.

Nationally Endangered

Hibiscus richardsonii, *Cololejeunea* sp. 1, *Picris burbridgeae*, *Pomaderris phyllicifolia*, *Senecio scaberulus* and *Todea barbara*.

Nationally Vulnerable

Hibiscus diversifolius.

Serious Decline

Daucus glochidiatus and *Kunzea ericoides* var. *linearis*.

Gradual Decline

Austrofestuca littoralis and *Colensoa physaloides*.

Range Restricted

Coprosma neglecta, *Hebe adamsii*, *Macromitrium brevicaulis* and *Pseudopanax* aff. *lessonii*.

Sparse

13. In 1984 possum pellets were collected from Unuwahao and kiekie flowers were recorded as being browsed by the Wildlife Service (P. Anderson pers. comm.).

Botrychium australe, *Calystegia marginata*, *Korthalsella salicornioides* and *Pittosporum ellipticum*.

Other

Doodia aspera (Vagrant) and *Olearia angulata* (Data Deficient).

Regionally significant species

Adiantum aethiopicum, *Asplenium flabellifolium*, *Asplenium gracillimum*, *Cheilanthes sieberi*, *Coprosma parviflora*, *Hebe macrocarpa* var. *macrocarpa*, *Helichrysum lanceolatum*, horopito, *Luzula picta* var. *picta*, carmine rata, northern rata, *Olearia albida*, *Pelargonium inodorum*, *Ranunculus urvilleanus*, *Raukaua anomalus*, *Scleranthus biflorus* and tawapou.

Historic records of *Dracophyllum sinclairii* (regionally significant) (1949), *Ophioglossum coriaceum* (regionally significant) (1959) and mountain horopito (1949).

Fauna

Birds

Kukupa (Gradual Decline), NI fernbird (Sparse), kahu, kingfisher, grey warbler, North Island fantail, tui, myna, and eastern rosella.

Lizards

Ornate skink (Gradual Decline), North Cape green gecko (Sparse), *Cyclodina levidensa* (regionally significant) and shore skink.

Fish

Longfin eel (Gradual Decline) and *Galaxias* sp.

Landsnails

Nationally Critical

Charopidae sp. 46, *Placostylus ambagiosus keenorum* and *Punctidae* sp. 223 (#*Punctidae* sp. 6).

Nationally Endangered

Costaliodiscus parrishi (Marshall and Barker 2008) (#*Charopidae* sp. 165), *Flammulina tepakiensis* and *Placostylus ambagiosus annectens*.

Gradual Decline

Amborhytida duplicata, and *Paryphanta busbyi watti*.

Range Restricted

Allodiscus basiliratus, *Allodiscus pumilus* (Marshall and Barker 2008) (#*Charopidae* sp. 177), *Allodiscus spiritus*, *Allodiscus wairua* (status from Marshall and Barker 2008), *Charopidae* sp. 73, *Charopidae* sp. 105, *Charopidae* sp. 170, *Climocella reinga*, *Cytora lignaria* (#*Cytora ampla*), *Cytora hispida*, *Cytora kerrana*, *Cytora tepakiensis*, *Delos* sp. 2, *Egestula pandora*, *Laomarex minuta*, *Liarea aupouria* (#*L. a. aupouria*), *Phrixgnathus aupouria* (#*Laoma mariae aupouria*),

Punctidae sp. 33 (#P. sp. 16), Punctidae sp. 30 (#P. sp. 17), Punctidae sp. 250 (#P. sp. 22), Punctidae sp. 99 (#P. sp. 23), *Serpheo matthewsii* and Charopidae sp. 169 (#*Therasiella* sp. “Unuwhao”).

#= name used in Hitchmough *et al.* (comp.) 2007

Sparse

Delouagapia cordelia.

Non-threatened landsnails

Arthoracophorus sp.(p), *Cavellia buccinella*, *Charopa coma*, Charopidae sp. 1, *Cavellia* sp. cf. *C. irregularis*, *Caureopa hazelwoodi*, *Caureopa titirangiensis*, *Climocella runga*, *Cantareus aspersus*, *Cytora tokerau*, *Georissa purchasi*, *Huonodon bectori*, *Mocella eta*, *Oxychilus cellarius*, *Papulaoma monticola*, *Paralalaoma caputspinulae*, *Paracharopa chrysaengeia*, *Paracharopa delicatula*, *Phenocobelix tholoides*, *Phenacharopa pseudanguicula*, *Phrixgnathus glabriusculus*, *Phrixgnathus sciadum*, *Phrixgnathus viridulus*, Punctid sp. 84, Punctidae sp. 25, Punctidae sp. 71, Punctidae sp. 72, Punctidae sp. 100, Punctidae sp. B, Punctidae sp. D, Punctidae sp. E, *Serpheo kivi*, *Taguabelix crispata*, *Therasia* sp., *Therasiella celinde*, *Therasiella* sp. “North Cape”, *Tornatellides novoseelandica* and *Tornatellides subperforata*.

Other terrestrial invertebrates

Mecodema sp. “Te Paki” (Nationally Critical), Northland tusked weta (Sparse), the stag beetle *Paralissotes oconnori* (Sparse), the earthworm *Megascolex animae* (Data Deficient), the click beetle *Metablax* sp. (Data Deficient).

Three species of landhopper have been recorded only in the Unuwhao area. Two of these species are thought to be extinct; *Waematau muriwhenua* and *W. unuwhao*, the third is *W. reinga*. (Information sighted in SSBI M02/N02/H011 with the reference Duncan 1994). Survey is required at Unuwhao and other sites in the Te Paki Ecological District to determine the status of these three species (A. Booth pers. comm.).

Significance

This forest and shrubland complex plays a vital linking role between the wetlands and various bush remnants in Te Paki Ecological District. This acts as a corridor for the recruitment and dispersal of the less mobile native species. This site contains landsnails such as *Placostylus ambagiosus annectens* and *Paryphanta wattii* that are threatened endemics in Te Paki Ecological District, supports one of only three sites for the threatened Te Paki endemic ground beetle *Mecodema* sp. “Te Paki”, and contains many threatened plant species. Representative site for all vegetation types. Part of the site is classed as a regionally important geological site (Kenny and Hayward 1996); land behind Te Huka Beach and the Kurahaupo Rocks just offshore are considered the best exposed sequence through most of the Parengarenga Group. Approximately 1.4 ha of this site is within Kapowairua Marginal Strip, and 68.5 ha within Te Paki Recreation Reserve (DOC-administered). Recently 1372 ha of this site has been protected by






Kawenata through Nga Whenua Rahui. Approximately 10.3 ha of this site is within an 'At Risk' land environment (G1.1a), 6.9 ha is within an 'Underprotected' land environment (A2.1a) and 1390.9 ha within a 'Less Reduced and Better Protected' land environments (A1.1a, A1.1b) (Walker *et al.* 2007).

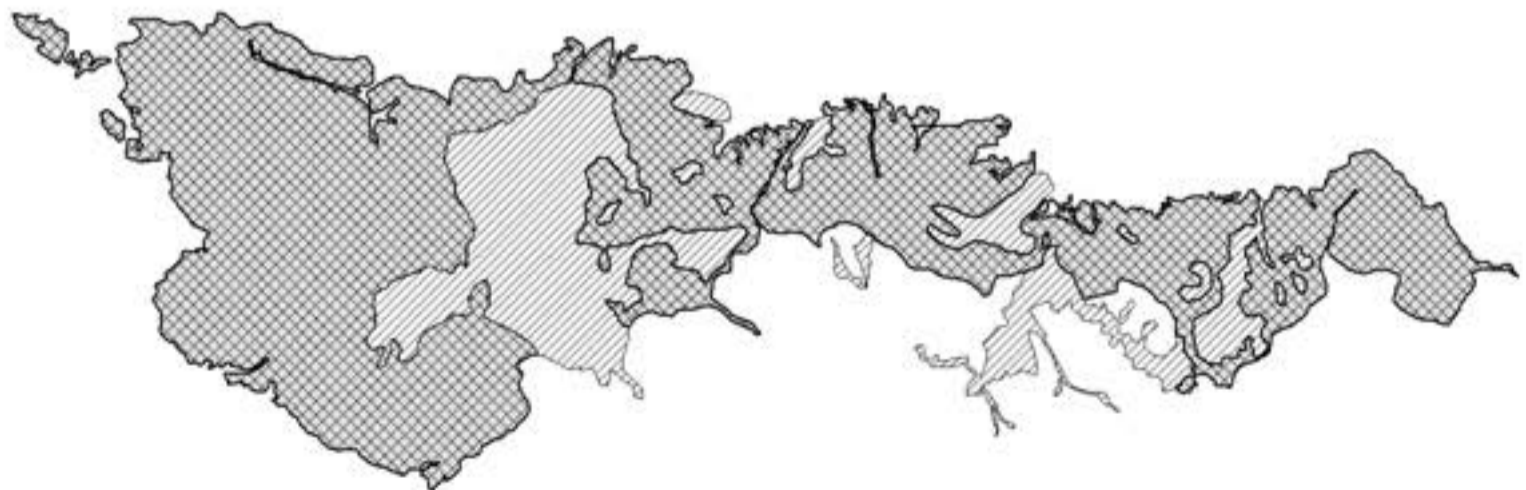


N02/004 Unuwaho Bush and Shrublands



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



MOKAIKAI SCENIC RESERVE AND SURROUNDS

Survey no.	N02/005(a)
Survey date	27 August 1995, 9 January 1997, 15 February 1997
Grid reference	N02 087 484
Area	4,720.7 ha (155.1 ha forest, 4,563.7 ha shrubland, 1.9 duneland)
Altitude	0-191 m asl

Ecological units

- (a) Harakeke-kanuka-ti kouka shrubland on coastal cliffs
- (b) Manuka shrubland on raised sandflats
- (c) Manuka shrubland on hillslope
- (d) Kanuka/manuka shrubland on hillslope
- (e) Kanuka shrubland on hillslope
- (f) Kanuka forest on hillslope
- (g) Kanuka-puriri forest on hillslope and along stream gullies
- (h) Kanuka-karaka forest on hillslope
- (i) Puriri-taraire forest on hillslope
- (j) Kohekohe-taraire forest on hillslope
- (k) Puriri-rewarewa-taraire forest on hillslope
- (l) Pohutukawa-puriri forest on hillslope
- (m) Kohekohe-pohutukawa forest on hillslope
- (n) Raupo reedland in swamp

Landform/geology

Hill country of Parengarenga Group sandstone, mudstone and bluff-forming igneous conglomerate, Mangakahia Complex sandstone, mudstone and limestone, with Pleistocene consolidated sand forming a veneer on Taumataroa Flat and adjacent ridge-tops, and Pleistocene intertidal and estuarine sands forming low terraces bordering Parengarenga Harbour.

Vegetation

SHRUBLAND

- (a) The coastal shrubland at the north end of Whareana Beach is defined by harakeke, ti kouka and kanuka. *Hibiscus diversifolius* is found at the southern end and *Ipomoea cairica* is common.

(b) On Taumataroa Flat, dense manuka 0.5–3 m occurs with *Dracophyllum lessonianum*, mingimingi and *Baumea teretifolia* common. Bracken, *Epacris pauciflora*, *Lycopodiella lateralis* and *L. cernua* are present, as are *Thelymitra* orchids including *Thelymitra* (c) (CHR 518036, “rough leaf”) (McCrae 1990), *Todea barbara* and *Phylloglossum drummondii* are also present. There are a few emergent pohutukawa.

(c) On the plateau between the Parengarenga Harbour and Great Exhibition Bay, the vegetation is similar to that at Taumataroa Flat, being manuka dominant shrubland < 2 m with frequent kanuka and occasional prickly and woolly hakea, bracken, *Dracophyllum lessonianum*, *Pomaderris edgerleyi*, *Baumea juncea*, mawhai, *Leptecophylla juniperina*, *Lepidosperma laterale* and *Schoenus brevifolius*. Dense harakeke occurs on the cliffs by the Kohau Trig (Kelly 1967).

(d) In the east is an area of kanuka/manuka shrubland occurs. Prickly hakea is locally common from Whareana south. Mingimingi is frequent and *Lycopodiella cernua* scattered.

(e) Around Kaiwhetu Pa, kanuka is dominant with emergent rewarewa, pohutukawa, lancewood, ti kouka and shining karamu.

Most of the catchment west of Kaiwhetu Pa consists of lower kanuka with frequent emergent rewarewa.

East of Poroiki Hill, manuka is dominant, type (c), with frequent prickly hakea and scattered to frequent emergent rewarewa.

West of Poroiki Hill, kanuka/manuka shrubland, type (d), occurs with rewarewa and ti kouka as occasional to frequent emergents. Prickly hakea is also scattered to frequent. Hangehange, mamaku, karamu, lancewood, akeake and mawhai all occur here.

Kanuka shrubland, type (e), 2–3 m tall covers about 20% of the area, being somewhat taller in the Waitangi Stream catchment.

FOREST REMNANTS

Type (f) Kanuka forest

- i. Very tall mature kanuka occurs with occasional puriri, ti kouka and pohutukawa in one of the gully heads of the upper Waitangi Stream and the catchment above Ponaki Swamp, where pohutukawa is not present.
- ii. Pockets of secondary kanuka forest with karaka, rewarewa, taraire and kohekohe occur to the southern end at Te Topito.
- iii. Haupatoto Bush is kanuka-dominant with rewarewa, pohutukawa, puriri, taraire, kohekohe and nikau. Lancewood, akeake, kohuhu are also present in the canopy with tree ferns, supplejack and kiekie in the understorey.
- iv. The other forest remnants in the central portion of the area (including gullies between Poroiki Hill and Kaiwhetu Pa and in the catchment of the Waipakarihi Stream) have abundant kanuka, with puriri and nikau being common. Associated species are pohutukawa, kowhai, mamaku, mahoe, rewarewa, ti kouka, kohekohe, lancewood, supplejack, kiekie,

akeake, taraire and kohuhu, with nikau, ti kouka, mamaku and kohuhu in the sub-canopy.

Type (g) Kanuka-puriri forest

- i. In the gullies between the Money Tree and Poroiki Hill and in the southernmost gully heads of the upper Waitangi Stream, bush remnants are mainly kanuka and puriri with pohutukawa. Kohuhu, mamaku, mahoe, rewarewa and ti kouka also occur.
- ii. Kanuka-puriri dominates the bush remnant in the upper valley in the catchment above Ponaki Swamp with frequent pohutukawa and rewarewa, and occasional taraire and kohuhu.

Type (h) Kanuka-karaka forest

This type occurs at Te Topito Head with rewarewa, taraire, and kohekohe, and an understorey of rangiora and kohekohe.

Type (i) Puriri-taraire forest

- i. In a gully above Ngakengo Swamp (Grid Ref M02/N02 096 475) there is puriri and taraire with occasional kohuhu, lancewood, houhere, rewarewa and ponga, surrounded by tall kanuka.
- ii. West of Kaiwhetu Pa, puriri and taraire are dominant with frequent rewarewa, kohuhu and kanuka.
- iii. East of Kaiwhetu Pa puriri and taraire are dominant with frequent kanuka, rewarewa and emergent pohutukawa.

Type (j) Kohekohe-taraire forest

In the gully adjacent to the radiata pines west of Poroiki Hill, kohekohe and taraire are common with karaka, puriri, kohuhu, lancewood, nikau and rewarewa present.

Type (k) Puriri-rewarewa-taraire forest

One remnant of puriri, rewarewa and taraire occurs east of the Money Tree. Mamaku and akeake are present with the occasional kauri.

Type (l) Pohutukawa-puriri forest

The largest remnant in the upper Waitangi Stream comprises pohutukawa and puriri with kanuka, taraire, rewarewa and kohekohe.

Type (m) Pohutukawa-kohekohe forest

Dry coastal remnants with karaka and ti kouka occur near Whareana Bay.

Type (n) Raupo occurs in the valley bottoms.

Significant flora

Todea barbara (Nationally Endangered), *Hibiscus diversifolius* (Nationally Vulnerable), *Kunzea ericoides* var. *linearis* (Serious Decline), *Colensoa physaloides* (Gradual Decline), *Thelymitra* (c) (CHR 518036, "rough leaf") (Range Restricted), *Petalochilus alatus* (Range Restricted) and *Thelymitra* aff. *ixioides* (AK 251348; New Zealand) (Sparse).

Regionally significant species

Asplenium gracillimum, *Coprosma parviflora*, *Epilobium pallidiflorum*, *Pellaea calidirupium*, *Pomaderris edgerleyi* and *Thelymitra* aff. *longifolia*.

Fauna

Birds

Kukupa (Gradual Decline), NI fernbird (Sparse), NZ kingfisher, song thrush, grey warbler, NI fantail silvereye, and chaffinch.

Landsnails

Nationally Critical

Cytora gardneri (Marshall and Barker 2007) (#*Cytora* sp. 11), *Placostylus ambagiosus* “Poroiki”, *Placostylus ambagiosus* “Haupatoto”, *Placostylus ambagiosus* “Rangiora”, Punctidae sp. 223 (#Punctidae sp. 6).

Gradual Decline

Amborhytida duplicata.

Range Restricted

Allodiscus basilratus, *Allodiscus pumilus* (Marshall and Barker 2008) (#Charopidae sp. 177), *Allodiscus spiritus*, Charopidae sp. 73, Charopidae sp. 105, Charopidae sp. 170, *Climocella reinga*, *Cytora lignaria* (#*Cytora ampla*), *Cytora hispida*, *Cytora kerrana*, *Cytora tepakiensis*, *Delos* sp. 2, *Egestula pandora*, *Liarea aupouria* (#*L. a. aupouria*), *Laomarex minuta*, Punctidae sp. 33 (#P. sp. 16), Punctidae sp. 130 (#P. sp. 10), Punctidae sp. 229 (#P. sp. 11), Punctidae sp. 250 (#P. sp. 22), Punctidae sp. 63 and *Serpbo matthewsi*.

#=name used in Hitchmough *et al.* (comp.) 2007

Sparse

Delouagapia cordelia.

Non-threatened landsnails

Athoracophorus sp., *Charopa parva*, Charopidae sp. 1, *Cavellia* sp. cf. *C. irregularis*, *Chaureopa titrangiensis*, *Cavellia buccinella*, *Climocella runga*, *Cantareus aspersus*, *Cytora tokerau*, *Fectola charopiformis*, *Fectola infecta*, *Georissa purchasi*, *Huonodon hectori*, *Kokikora angulata*, *Mocella eta*, *Papulaoma monticola*, *Paralaoma lateumbilicata*, *Paracharopa chrysaugiea*, *Paracharopa delicatula*, *Paracharopa fuscata*, *Paralaoma caputspinulae*, *Phenacobelix tholoides*, *Phenacharopa pseudanguicula*, *Pbrixgnathus glabriusculus*, *Pbrixgnathus sciadium*, Punctidae sp. A, Punctidae sp. D, Punctidae sp. 25, Punctidae sp. 84, Punctidae sp. 100, *Serpbo kivi*, *Taguabelix crispata*, *Therastia* sp., *Therasiella celinde*, *Therasiella elevata*, *Therasiella tamora*, *Therasiella* sp. “North Cape” and *Tornatellides novoseelandica*.

Lizards

North Cape Pacific gecko (Gradual Decline), copper skink and shore skink.

Other

The ground beetle *Mecodema* sp. “Te Paki” (Nationally Critical).

Fish

Banded kokopu (regionally significant).

Significance






These shrublands and forest remnants form the only fully vegetated catchments within the Parengarenga Harbour catchment and support many threatened and regionally significant species. The Parengarenga Harbour maintains outstanding water quality and is an important nursery for many marine fishes and internationally important bird habitat. The buffering and linkages to the wetlands that the shrublands provide is another important function, including corridors between forest remnants. Presence of many threatened species including two of the three known sites with the Nationally Critical ground beetle *Mecodema* sp. “Te Paki”. Representative site for all ecological units. Approximately 4,026.1 ha (85.3%) of this site is within Mokaikai Scenic Reserve (DOC-administered) and 3.5 ha has been recently protected by Kawenata through Nga Whenua Rahui. Approximately 203.4 ha of this site is within a ‘Chronically Threatened’ land environment (A1.1c), 89.8 ha of this site is within an ‘At Risk’ land environment (G1.1a), 1,158.9 ha is within an ‘Underprotected’ land environment (A2.1a) and 3216.9 ha within ‘Less Reduced and Better Protected’ land environments (A1.1a and A1.1b) (Walker *et al.* 2007).

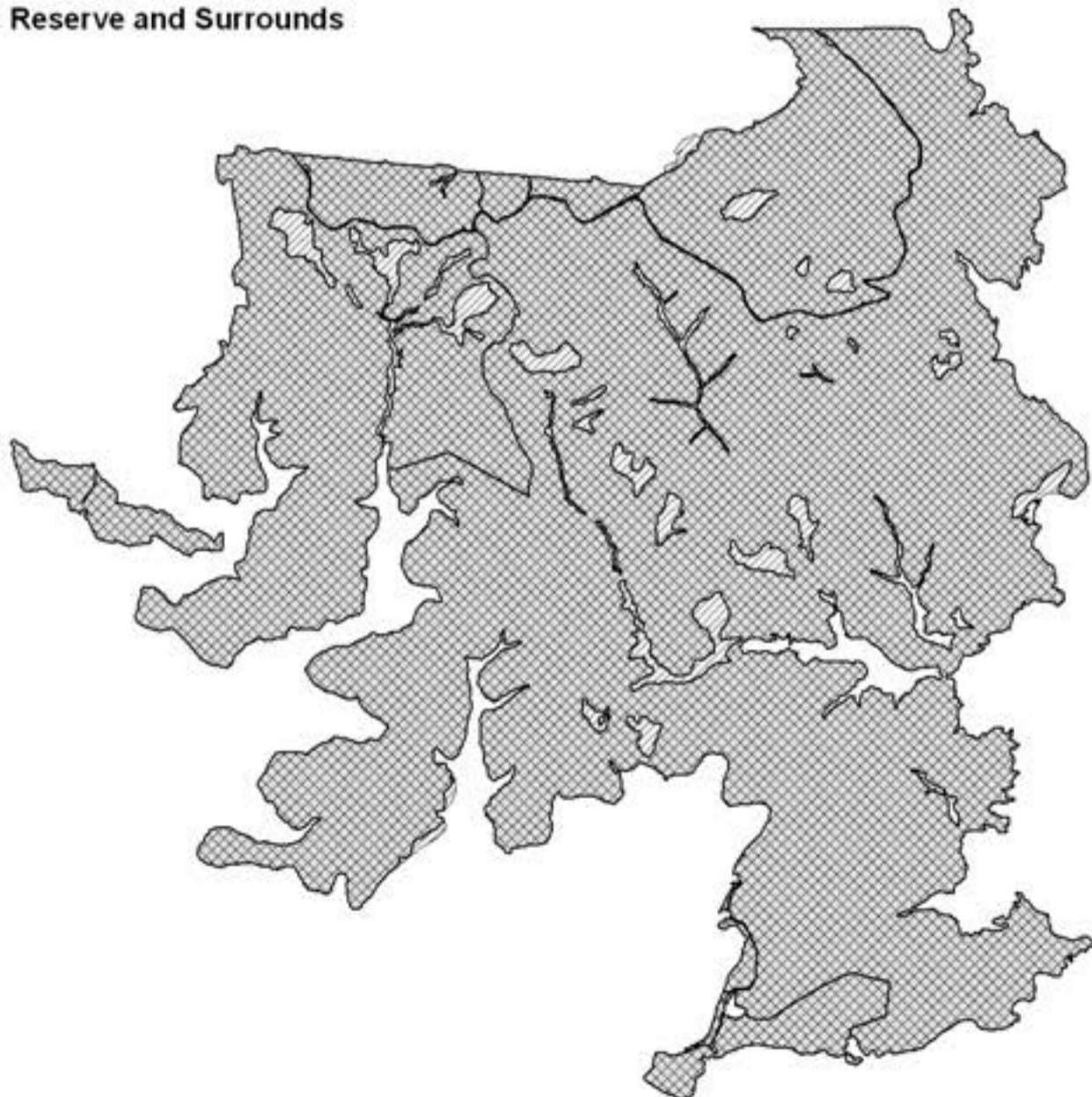


N02/005 (a) Mokaikai Scenic Reserve and Surrounds



Habitat Type

-  Dune/land/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



WAIKUKU FLAT

Survey no. N02/005(b)
Survey date 27 August 1995, 9 January 1997
Grid reference N02 110 530
Area 348.3 ha
Altitude <20 m asl

Ecological units

- (a) Manuka shrubland on tombolo
- (b) *Baumea arthrophylla*-*B. juncea* sedgeland in peaty depressions
- (c) *Eleocharis sphacelata*-*Baumea arthrophylla* sedgeland in peaty depressions
- (d) *Eleocharis sphacelata* sedgeland in peaty depressions
- (e) Mixed wetland vegetation in peaty depressions

Landform/geology

Pleistocene to Holocene muddy and sandy interdune deposits on tombolo flanked by Pleistocene-Holocene foredune belts with ponded freshwater wetlands in muddy and sandy interdune deposits.

Vegetation

(a) Peaty freshwater swamps and depressions are scattered throughout the tombolo within the manuka dominant gumland vegetation on Waikuku Flat. Much of the area is seasonally wet. Manuka 1–4 m tall is dominant over most of the area.

In drier areas, *Coprosma rhamnoides* and bracken are common to abundant in the understorey, with hangehange frequent. Turutu, *Leptecophylla juniperina*, *Gonocarpus incanus*, *Lepidosperma laterale*, kumarahou, mingimingi, water fern, rasp fern and mamaku are scattered. The twining parasite mawhai, *Nertera dichondrifolia* and *Centella uniflora* are locally common. *Tbelymitra* and *Microtis* ground orchids are common. *Oxylobium* is a locally common to abundant emergent in the central and southern area.

In the wetter areas, *Baumea juncea* and *Gleichenia dicarpa* are common to abundant in the understorey. Ti kouka is scattered but frequent near the margins of the wetlands behind Tom Bowling Bay.

Numerous small wetlands up to 0.5 ha, but mostly much smaller, occur in depressions amongst the shrubland. These comprise a variety of forms including:

(b) *Baumea arthrophylla* and *B. juncea* are common with occasional *Juncus microcephalus*, *J. prismatocarpus* and *Myriophyllum propinquum* on the margins. *Baumea arthrophylla* with occasional *Eleocharis sphacelata* also occurs.

(c) *Eleocharis sphacelata* and *Baumea arthrophylla* with *B. juncea* abundant on the margins.

(d) *Eleocharis sphacelata* with *Baumea articulata* and *B. arthrophylla*.

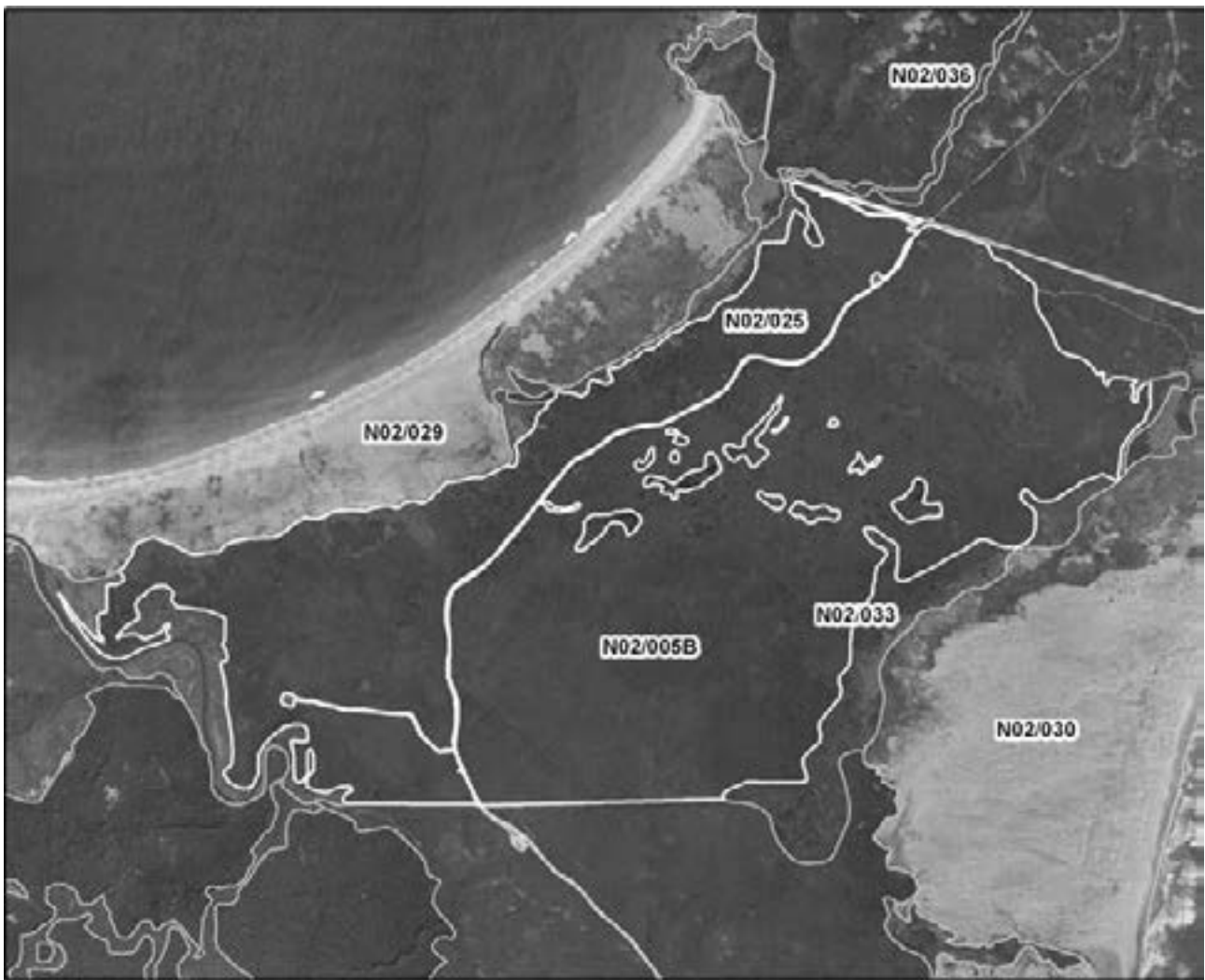
All of these sites had 100 mm or more depth of water in January 1997.

(e) The mixed wetland vegetation occurs in mostly open, damp, sometimes wet, ground with scattered clumps of *Baumea arthrophylla*, *B. articulata*, *Juncus microcephalus* and, rarely, raupo with visible kauri peg roots above ground.

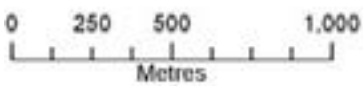
Sphagnum sp. occurs in damp depressions and old gum holes.

Significant flora

Anzybas rotundifolius (Sparse), *Schizaea bifida* (regionally significant), *Lagenifera lanata* (regionally significant) and *Ranunculus urvilleanus* (regionally significant).



N02/005(b) Waikuku Flat



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Historical records of *Centipeda minima* subsp. *minima* (Nationally Critical) (1970), *Phylloglossum drummondii* (Nationally Endangered) (1959) and the regionally significant species *Pratia angulata*, *Gunnera dentata* and *Suaedia novae-zelandiae* (all 1963).

Fauna

Birds

Australasian bittern (Nationally Endangered) and prime habitat for North Island fernbird (Sparse).

Fish

1993 unconfirmed record of black mudfish (Gradual Decline), banded kokopu (regionally significant), inanga, and red-finned bully.

Significance

This site forms a vital role in linking the North Cape area with the rest of Te Pahi, creating a land-bridge corridor which will aid the dispersal and reintroduction of many species. It is a unique feature in itself, as a sand tombolo in a natural (albeit semi-modified) state, including an extensive wetland system containing threatened species and prime habitat for North Island fernbird. A representative site for all vegetation types. Horses and cattle are present (P. Whaley pers. comm.). A dune-dammed swamp of regionally geological importance is located in the middle area of the site (Kenny and Hayward 1996). Approximately 286.9 ha of this site (82.3%) is within Mokaikai Scenic Reserve (DOC-administered) and recently 51.7 ha has been protected by Kawenata through Nga Whenua Rahui. Approximately 2.9 ha of this site is within a 'Chronically Threatened' land environment (A1.1c), 1.1 ha is within an 'At Risk' land environment (G1.1a), 329.3 ha is within an 'Underprotected' land environment (A2.1a) and 16.6 ha within 'Less Reduced and Better Protected' land environments (A1.1a and A1.1b) (Walker *et al.* 2007).

NORTH CAPE SCIENTIFIC RESERVE AND SURROUNDS

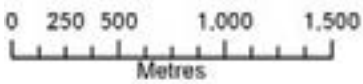
Survey no.	N02/005(c)
Survey date	27 August 1995, 19 December 1996, 9 January 1997
Grid reference	N02 120 550
Area	1,032.9 ha (11.7 ha forest, 1,019 ha shrubland, 2.2 ha wetland)
Altitude	0-234 m asl

Ecological units

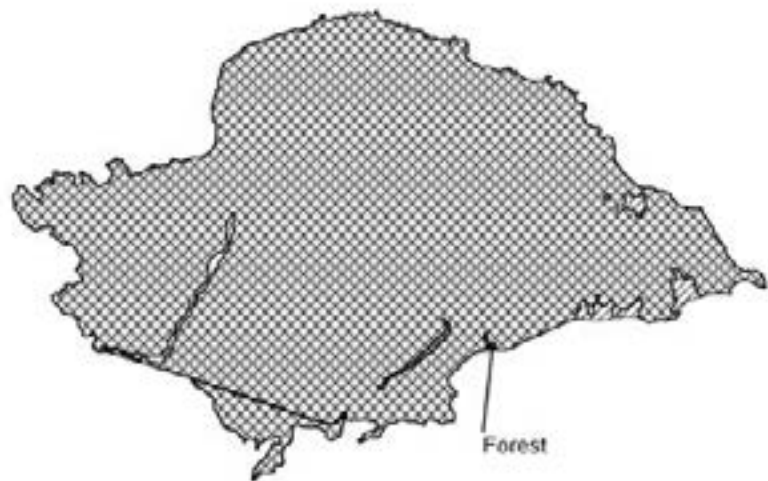
- (a) Pohutukawa forest on coastal serpentine cliffs
- (b) Shrubland on coastal serpentine cliffs
- (c) Shrubland on lower coastal cliffs



N02/005(c) North Cape Scientific Reserve and Surrounds



Habitat Type



Aerial photography flown 2003

- (d) Pohutukawa forest in coastal gullies
- (e) Manuka-*Cassinia amoena* shrubland on plateau
- (f) *Schoenus brevifolius*-*Lepidosperma filiforme* sedgeland on upper slopes and plateau
- (g) Manuka-*Schoenus brevifolius* shrub sedgeland on hillslope
- (h) Manuka shrubland on hillslopes
- (i) *Baumea juncea*-*Schoenus brevifolius* sedgeland on upper slopes and plateau

Landform/geology

Rock promontory of Tangihua Complex serpentine gabbro and basalt, bounded by mudstone and intruding microdiorite-andesite between Mahurangi Point and Tokatoka Point. Laterite overlies on erosional terrace at 200–230 m elevation on the northern side of North Cape headland.

Soils

Brown granular clay (Rangiuru Mangonui Huia Bream).

Vegetation

Surville Cliffs

The serpentine cliffs are steep with an average slope of 45° and consist of a loose rocky surface and steep vertical faces. Vegetation is open and discontinuous, except at the western end of the ultramafics, where it is much more dense.

- (a) Pohutukawa forest

Small pockets of forest dominated by pohutukawa (2–4–10 m tall) also contain houpara, kawakawa, ngaio, mahoe, and karaka. Rewarewa, manuka and stunted tanekaha, and mangeao also occur here.

- (b) Open coastal shrubland

Scattered on open faces, up to 2 m are *Corokia cotoneaster*, *Leucopogon xerampelinus*, kanuka (*Kunzea ericoides* var. *linearis*), *Helichrysum* aff. *aggregatum*, *Cassinia amoena*, houpara, tanekaha, karo, mapou, poataniwha, small-leaved mahoe, *Hebe ligustrifolia*, *H. brevifolia*, *Coprosma rhamnoides*, *C. macrocarpa*, *C. distantia*, *Pomaderris paniculosa* subsp. *novae-zelandiae*, *P. prunifolia*, *Pimelea prostrata* var. *erecta*, *Parsonsia praeruptis*, hangehange, coastal toetoe, harakeke and kowharawhara together with other scattered ferns, grasses and herbs and the twining parasite mawhai. Druce *et al.* (1979) record the ‘semi-lianoid’ or sprawling habit of a number of species (updated nomenclature), such as *Coprosma spathulata* subsp. *bikuruana*, *Pittosporum pimeleoides* subsp. *majus*, *Coprosma neglecta*, *Geniostoma ligustrifolium* var. *crassum*, *Parsonsia praeruptis*, *Phyllocladus* aff. *trichomanoides*, *Pseudopanax* aff. *lessonii*, and *Pittosporum serpentinum*. A further eight species are simply low-growing or stunted in form, such as kanuka, *Cassinia amoena*, *Corokia cotoneaster*, *Leucopogon xerampelinus*, *Coprosma distantia*, *Hebe* sp., *Pomaderris paniculosa* subsp. *novae-zelandiae*, and *Pomaderris edgerleyi*. Many of the species found here are serpentine

endemics. Druce *et al.* (1979) suggest convergence to a common growth form within several different families as an evolutionary adaptation to the unique environment of rock type and dry conditions.

(c) Lower cliffs

Near the sea, manuka, harakeke, rengarenga lily, coastal toetoe, pohuehue, houpara and taupata are the dominant species with scattered pohutukawa on rocky cliffs. *Cassinia amoena* and *Leptecophylla juniperina* are also present.

(d) Coastal forest

Elsewhere, coastal forest remnants occur in gullies. Pohutukawa is dominant with karaka, houhere, whau, ti kouka, tawapou and puriri. On the steep cliffs west of Ngawhenua Stream (edge of ultramafics), pohutukawa is common, manuka frequent and houpara occasional with about 70% coverage.

At Ngaroku Stream there is a diverse assemblage of coastal species including taraire, kohekohe, mangeao, puriri, rewarewa, willow-leaved maire and *Astelia grandis*.

At Whiriwhiri houhere and tutu are common with pohutukawa near the coast, and kanuka inland. *Colensoa physaloides* and *Todea barbara* occur on the stream margin and "*Gastrodia* aff. *sesamoides*" under the kanuka.

(e) Plateau shrubland

Shrubland to 0.5 m of manuka with common *Cassinia amoena* and frequent *Hebe ligustrifolia* over much of the North Cape plateau. Bare ground, *Lepidosperma filiforme* and umbrella fern are locally frequent. Other species present are kanuka, *Pittosporum pimeleoides* subsp. *majus*, *Coprosma neglecta*, *Leucopogon xerampelinus*, *Leptecophylla juniperina*, *Geniostoma ligustrifolium* var. *crassum*, *Pomaderris edgerleyi*, *Pimelea urvilleana* agg., *Morelotia affinis*, *Lepidosperma laterale*, *Schoenus brevifolius*, *Baumea tenax*, harakeke, prickly and downy hakea, with occasional pohutukawa, bracken, *Corokia cotoneaster* and kowharawhara. *Thelymitra* aff. *longifolia* is scattered throughout. Other ground orchids present are *Thelymitra carnea*, *T.* "b", *T. tholiformis*, *T. matthewsii* and *Plumatichilos tasmanicum*.

This type occurs along the ridge top towards Titirangi Point from the eastern end of the Surville Cliffs, where it grades into the *Schoenus brevifolius* and *Lepidosperma filiforme* sedgeland back towards the trig, type (f).

Quarry

(g) Much of the southern and eastern flanks of the quarry are covered in low (0.5-1 m), open vegetation dominated by manuka and *Schoenus brevifolius*. *Gleichenia dicarpa* is locally common. In the gullies, the manuka is taller (to 2-3m) with bracken and sedges. *Todea barbara* is local and rare.

Towards the trig *Schoenus brevifolius* is dominant with frequent *Lepidosperma filiforme* and manuka. *Lepidosperma filiforme* becomes

more common closer to the trig. Umbrella fern is locally common. Also present are kumarahou, kanuka, mingimingi, *Pimelea urvilleana* agg., turutu, *Leptecophylla juniperina*, mawhai, *Pomaderris prunifolia*, *Lepidosperma laterale* and *Cassinia amoena*. Stunted houpara, rewarewa, and mamaku are present in sheltered sites. In some areas the vegetative cover is only 50%, with sparsely scattered *Schoenus brevifolius* and *Gleichenia dicarpa*. The remaining area is bare ground.

(h) Inland hillslope shrubland (Wheeler's (1963) "hinterland scrub")

Manuka is dominant with occasional kumarahou, ti kouka and harakeke. In the understorey hangehange is common, with locally abundant *Schoenus tendo* and *Gleichenia dicarpa*. Also present are turutu, *Lepidosperma laterale*, and *Schoenus brevifolius*. On eroded slopes, manuka shrubland to 1 metre occurs with locally frequent umbrella fern. Also present are bracken, kumarahou, prickly hakea, ti kouka, harakeke, turutu, and *Dracophyllum lessonianum*. There are a few examples of *Todea barbara*. Clumps of kanuka to 3 m occur in small side gullies with houpara, mapou, mingimingi, *Leptecophylla juniperina* and kowharawhara in the understorey.

(i) West of the North Cape road this grades into *Baumea juncea*-*Schoenus brevifolius* sedgeland. On some slopes pohutukawa and mamaku are occasional.

Close to Tom Bowling Bay, harakeke is frequent to common and ti kouka is frequent.

Significant flora

(*=endemic to North Cape)

Nationally Critical

**Coprosma spathulata* subsp. *bikuruana*, *Linguella puberula*, *Thelymitra* (a) (WELT 79140; Ahipara), *Thelymitra sanscilia*¹⁴ and **Uncinia perplexa*.

Nationally Endangered

Phylloglossum drummondii, *Picris burbridgeae*, **Pittosporum serpentinum*, *Pomaderris phyllicifolia* and *Todea barbara*.

Nationally Vulnerable

Hibiscus diversifolius.

Serious Decline

Daucus glochidiatus, *Kunzea ericoides* var. *linearis* and *Plumaticbilos tasmanicum*.

Gradual Decline

Arthropodium bifurcatum, *Colensoa physaloides* and willow-leaved maire.

14. Locality not clear, but probably within this site.

Range Restricted

**Carex opbiolithica*, **Cassinia amoena*, **Coprosma distantia*, *Coprosma neglecta*, *Cordyline obtecta*, *Ectropothecium sandwichense*, **Geniostoma ligustrifolium* var. *crassum*, **Haloragis erecta* subsp. *cartilaginea*, **Hebe brevifolia*, **Hebe* aff. *ligustrifolia* (AK 207101; Surville Cliffs), **Helicbrysum* aff. *aggregatum* (AK 54473; Surville Cliffs), **Leucopogon xerampelinus*, *Macromitrium brevicaule*, **Parsonsia praeruptis*, **Pittosporum pimeleoides* subsp. *majus*, *Pomaderris paniculosa* subsp. *novae-zelandiae*, *Trisetum serpentinum*, * *Phyllocladus* aff. *trichomanoides* (AK 138439; Surville Cliffs), **Pimelea* aff. *tomentosa* (b) (AK 130893; Surville Cliffs), * *Pseudopanax* aff. *lessonii* (AK 46066, Surville Cliffs), *Thelymitra* (b) (CHR 518036; “Darkie”) and *Thelymitra* (c) (CHR 518036 “rough leaf”).

Sparse

Botrychium australe, *Corunastylis pumila*, *Korthalsella salicornioides*, *Macrothelypteris torresiana*, *Sticherus flabellatus* and *Thelymitra tholiformis*.

Other

Olearia angulata (Data Deficient), *Fissidens oblongifolius* var. *oblongifolius* (Data Deficient) and *Thelymitra matthewsii* (Coloniser).

Regionally significant species

Arrow grass, *Asplenium obtusatum* subsp. *northlandicum*, *Astelia grandis*, *Brachyglottis kirkii* var. *angustior*, *Coprosma crassifolia*, *Coprosma parviflora*, *Drosera binata*, *Drosera peltata*, *Entosthodon productus*, *Gastrodia sesamoides*, *Helicbrysum lanceolatum*, *Lagenifera lanata*, ngaio, *Pomaderris edgerleyi*, *Psilotum nudum*, tawapou, *Thelymitra* aff. *longifolia* and toatoa.

Historic records of *Fuchsia procumbens* (Sparse) (1896), *Pseudopanax ferox* (Sparse) (1971) and the regionally significant plants: *Adiantum aethiopicum* (1963), *Blechnum fluviatile* (1963), *Cheilanthes sieberi* (1969), *Gunnera dentata* (undated), *Olearia albida* (1968), *Plantago raoulii* (1963), *Ranunculus urvilleanus* (1969) and *Scleranthus biflorus*.

Fauna

(*=endemic to North Cape)

Birds

North Island fernbird (Sparse), variable oystercatcher (regionally significant) and pied shag.

Fish

Longfin eel (Gradual Decline) recorded in 1999.

Banded kokopu (regionally significant), giant bully (regionally significant), red-finned bully, inanga and common bully.

Lizards

Matapia gecko (Gradual Decline), ornate skink (Gradual Decline), North Cape Pacific gecko (Gradual Decline), Suters skink (Range Restricted), copper skink, shore skink and common gecko.

Landsnails

Nationally Critical

Placostylus ambagiosus watti.

Nationally Endangered

Placostylus ambagiosus michiei.

Gradual Decline

Amborhytida duplicata.

Range Restricted

Allodiscus basiliratus, *Allodiscus pumilus* (Marshall and Barker 2008) (#Charopidae sp. 177), *Allodiscus wairua* (status from Marshall and Barker 2008), Charopidae sp. 73, *Climocella reinga*, *Cytora hispida*, *Cytora kerrana*, *Cytora tepakiensis*, *Delos* sp. 2, *Liarea aupouria* (#*L. a. aupouria*), Punctidae sp. 153 (#P.sp. 9), Punctidae sp. 229 (#P. sp. 11), *Punctidae* sp. 25 (#P. sp. 25), Punctidae sp. 63, Punctidae sp. 84 and Punctidae sp. 96.

#=name used in Hitchmough *et al.* (comp.) 2007

Sparse

Delouagapia cordelia.

Non-threatened landsnails

Cavellia buccinella, *Kokikora angulata*, *Mocella eta*, *Papulaoma monticola*, *Papulaoma serratocostata*, *Papulaoma caputspinulae*, *Phenacobelix tholoides*, *Pbrixgnathus sciadium*, *Pbrixgnathus viridulus*, Punctidae sp. 84, *Suterilla neozelanica*, *Therasiella celinde*, *Therasiella* sp. "North Cape" and *Tornatellinops novoseelandica*.

Other terrestrial invertebrates

Notoreas sp. "northern" (Nationally Endangered).

Significance

The North Cape Scientific Reserve and Surrounds is an exceptionally important habitat with a high number of threatened and locally endemic plant and animal species. This site is of international ecological significance. The serpentine soils and harsh climate give rise to low-growing vegetation with many peculiarities. In fact there are 17 endemic plant species known only from this area. A fence across the Waikuku tombolo has enhanced this area by excluding large browsing animals from the reserve such as cattle, horses and pigs; possums and other small animals however are not excluded. A representative site for all vegetation types. A nationally important geological site: the only ultramafic/gabbro ophiolite complex

in northern New Zealand (Kenny and Hayward 1996). The large area of brown granular clay soils under native vegetation and good examples of uncommon Rangiuru soils are of regional significance (Arand *et al.* 1993). Approximately 12.1 ha of this site is within Mokaikai Scenic Reserve, and 688.2 ha is within North Cape Scientific Reserve (both DOC-administered). Approximately 0.6 ha of this site is within a 'Chronically Threatened' land environment (A1.1c), 1.6 ha of this site is within an 'At Risk' land environment (G1.1a), 7.4 ha is within an 'Underprotected' land environment (A2.1a) and 1016.9 ha within a 'Less Reduced and Better Protected' land environments (A1.1a and A1.1b) (Walker *et al.* 2007).

MAUNGATIKETIKE POINT SHRUBLAND

Survey no.	M02/007
Survey date	19 September 1995, 14 February 1997
Grid reference	M02 810 468
Area	284.8 ha (277.6 ha shrubland, 7.2 ha duneland)
Altitude	0–60 m asl

Ecological units

- (a) Kanuka shrubland on hillslope
- (b) Manuka shrubland on hillslope
- (c) Oioi rushland on hillslope
- (d) Kikuyu grassland on hillslope

Landform/geology

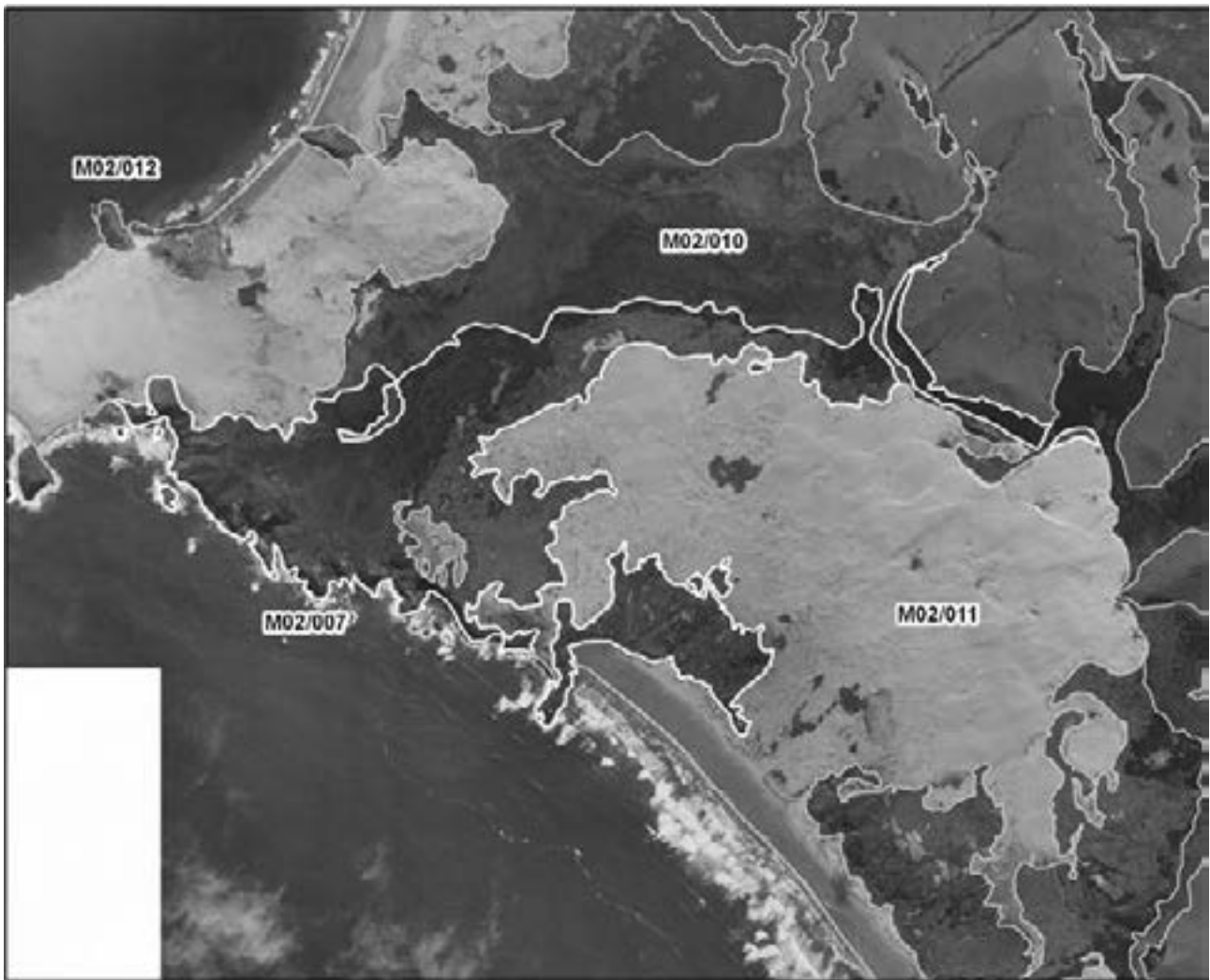
Pleistocene consolidated dunes with underlying Tangihua Complex igneous rocks exposed in coastal cliffs.

Vegetation

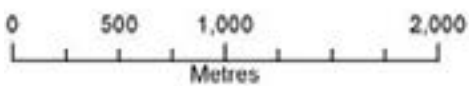
- (a) More than 70% of the area is dominated by kanuka with manuka, and occasional ti kouka and harakeke.
- (b) Manuka is dominant in association with tauhinu, harakeke, hangehange, mingimingi, and sedges, and occasional *Thelymitra longifolia* and kikuyu.
- (c) Near Pitokuku Point, oioi is common with frequent coastal toetoe, and occasional harakeke and pohutukawa.
- (d) Between Te Werahi wetland and dunes, kikuyu is abundant with locally common pampas, coastal toetoe and pohuehue.

Significant flora

Coprosma acerosa (regionally significant), coastal mahoe (regionally significant), and *Gastrodia sesamoides* (regionally significant). *Thelymitra matthewsii* (Coloniser).

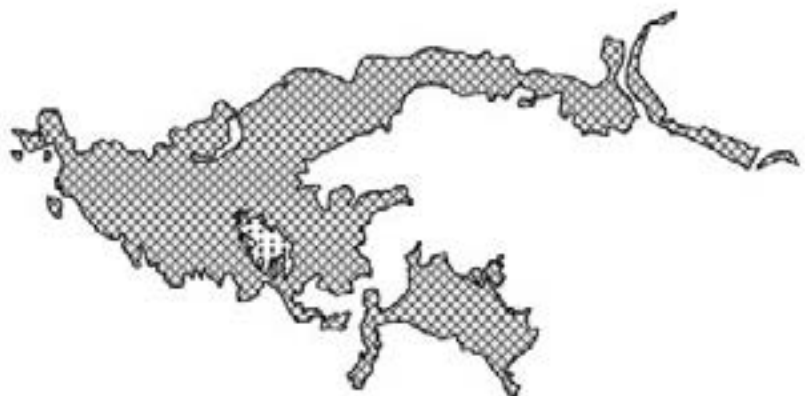


M02/007 Maungatiketike Point Shrubland



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Fauna

Landsnails

Placostylus ambagiosus paraspiritus (Nationally Endangered) (translocated population from the natural population at the “Pa site” (part of M02/012), *Succinea archeyi* (Serious Decline), *Cytora tepakiensis* (Range Restricted), *Climocella reinga* (Range Restricted), *Delos* sp. 2 (Range Restricted), *Allodiscus wairua* (Range Restricted) (status from Marshall and Barker 2008) and *Delouagapia cordelia* (Sparse).

Non-threatened landsnails

Cavellia buccinella, *Paracharopa delicatula*, *Phenacohelix tholoides*, Punctidae sp. 84, *Paralaoma caputspinulae*, *Cochlicopa lubrica* and *Centareus aspersus*.

Significance

This habitat is an integral part of the Te Rerenga Wairua-Scott Point ecosystem, and uninterrupted sequences of dunes, wetlands and shrublands. It is also habitat for several threatened endemic landsnails and regionally significant plants. Representative site for type (a) kanuka shrubland and type (c) oioi rushland. Approximately 281.6 ha of this site is within Te Pahi Recreation Reserve (DOC-administered). Approximately 119.6 ha of this site is within an ‘At Risk’ land environment (G1.1a), 7.8 ha is within an ‘Underprotected’ land environment (A2.1a) and 153.2 ha is within a ‘Less Reduced and Better Protected’ land environments (A1.1a, A1.1b and A3.1a) (Walker *et al.* 2007).

SCOTT POINT SHRUBLAND AND COASTAL ASSOCIATIONS

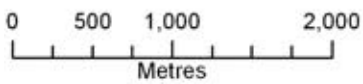
Survey no. M02/008
Survey date 24 August 1995, 14 February 1997
Grid reference M02 855 420
Area 623.5 ha (617.5 ha shrubland, 6.0 ha duneland)
Altitude 0-120 m asl

Ecological units

- (a) Manuka-kanuka shrubland on consolidated dunes
- (b) Bracken fernland on consolidated dunes
- (c) Coastal toetoe tussockland on consolidated dunes
- (d) Kikuyu grassland on consolidated dunes
- (e) Oioi rushland on consolidated dunes
- (f) Manuka-kanuka-harakeke shrubland on coastal cliffs
- (g) Oioi-harakeke sedgeland on coastal cliffs
- (h) Coastal shrubland on coastal cliffs
- (i) Harakeke-kikuyu-manuka flaxland on coastal cliff
- (j) Pohuehue-kikuyu-*Coprosma acerosa* shrubland on dunes



M02/008 Scott Point Shrubland and Coastal Associations



Habitat Type



Aerial photography flown 2003

Landform/geology

Pleistocene consolidated dunes with underlying Tangihua Complex igneous rocks exposed in coastal cliffs.

Vegetation

(a) The inland vegetation is manuka-dominant with frequent to common kanuka. Prickly and woolly hakea are locally frequent or common. Mingimingi is frequent to occasional. Other species present are *Leptecophylla juniperina*, *Leucopogon fraseri*, *Morelotia affinis*, *Coprosma rhamnoides*, *Lepidosperma laterale*, and mawhai. Harakeke is rare, and patches of bare ground occur. Sun orchids (*Thelymitra* spp.) are common and *Phylloglossum drummondii* is locally common.

(b) In the north eastern sector adjoining the dunes there are small patches of bracken and the shrubland grades into type (c) coastal toetoe tussockland with frequent clumps of *Isolepis* sp., and occasional harakeke and pohutukawa. This in turn grades into type (d) kikuyu grassland with frequent to common coastal toetoe and patches of *Isolepis* sp.

(e) In small hollows oioi is abundant with occasional harakeke and raupo, with *Baumea juncea* on the margins. *B. juncea* also occurs on damp flats.

(f) Near the coast the shrubland is stunted manuka and kanuka (to c.0.5 m tall) with frequent to common harakeke. Tauhinu, *Pomaderris amoena*, kumarahou, knobby clubrush, *Baumea juncea*, *Morelotia affinis*, bracken and hangehange are present. There are a few examples of *Pimelea urvilleana* agg., coastal toetoe, lupin, pampas, Sydney golden wattle, prickly and woolly hakea. In sheltered coastal gullies, pohutukawa, hangehange, and *Coprosma rhamnoides* are present with scattered *Isolepis* sp. and oioi.

(g) Near the cliff edge oioi is dominant with frequent to locally common harakeke. Kikuyu is locally dominant. Tauhinu is scattered and taupata is uncommon, as is kowharawhara on scarp faces. There are scattered coastal toetoe and tauhinu in eroded coastal gullies.

(h) On exposed coastal faces, such as at Tehepouto Point, a mosaic of manuka, coastal toetoe, harakeke, bracken and oioi occurs with frequent hangehange and scattered pohutukawa.

(i) Harakeke, kikuyu, and manuka are dominant on some cliffs.

(j) Above Twilight Beach, pohuehue, kikuyu, and *Coprosma acerosa* are dominant. Near the beach *Tetragonia* sp., *Lobelia anceps*, *Calystegia sepium*, and occasionally houpara, occur. *Apium* sp. and remuremu occur at the base of the cliffs.

Significant flora

Phylloglossum drummondii (Nationally Endangered), *Pomaderris polifolia* (Nationally Endangered), *Leptinella rotundata* (Nationally Vulnerable), *Thelymitra* (c) (CHR 518036; "rough leaf") (Range Restricted), *Thelymitra* (b) (CHR 518036; "Darkie") (Range Restricted), *Corunastylis pumila* (Sparse).

Regionally significant: coastal mahoe, *Coprosma acerosa*, *Ophioglossum coriaceum*, *Pratia angulata* and *Thelymitra* aff. *longifolia*.

Historic records of *Mazus novaezeelandiae* subsp. *impolitus* f. *birtus* (Nationally Critical) (1928), *Hebe speciosa* (Nationally Endangered) (1899), *Ophioglossum petiolatum* (Nationally Endangered) (1924), *Austrofestuca littoralis* (Gradual Decline) (pre-1934), *Euphorbia glauca* (Serious Decline) (1928), *Gratiola sexdentata* (regionally significant) (1924) and *Adiantum aethiopicum* (regionally significant) (1926).

Fauna

Not surveyed.

Notoreas sp. “northern” (Nationally Endangered).

Non-threatened landsnails: *Phenacobelix tholoides*.

Significance

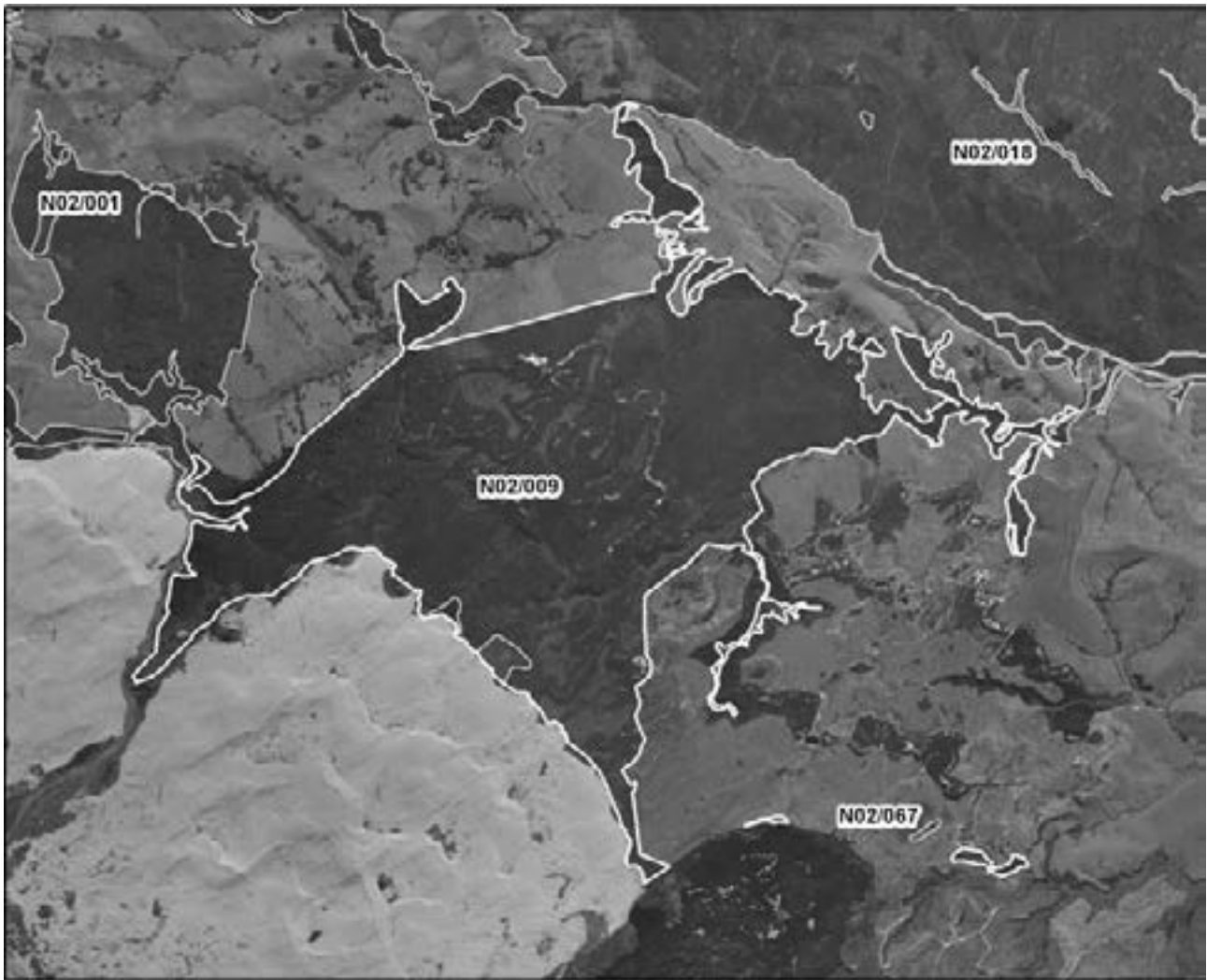
A diverse example of coastal shrubland habitat, with several threatened and regionally significant plant species present, further fauna survey, however is required. The shrubland forms a buffer between farmland and coastal shrubland, and between wetlands, farmland and mobile dunelands. Representative site for type (b), (c), (f), (g), (h), (i), and (j). Only record of type (b) in Te Paki ED. Regionally important preserved examples of Cretaceous pillow lavas occur in rocks at the southern end of Twilight Beach at Tehepouto Point (Kenny and Hayward 1996). Approximately 615 ha of this site is within Te Paki Recreation Reserve (DOC-administered). Approximately 164.9 ha of this site is within an ‘At Risk’ land environment (G1.1a), 103.6 ha is within an ‘Underprotected’ land environment (A2.1a) and 353.1 ha is within a ‘Less Reduced and Better Protected’ land environments (A1.1a, A1.1b and A3.1a) (Walker *et al.* 2007).

SHENSTONE BLOCK

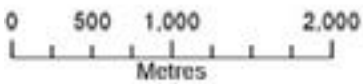
Survey no.	N02/009
Survey date	24 August 1995
Grid reference	N02 928 423
Area	829.7 ha (forest, 821.9 ha shrubland, 7.7 ha wetland)
Altitude	0-113 m asl

Ecological units

- (a) Manuka-kanuka shrubland on ridges, spurs and hillslopes
- (b) Kanuka-kohekohe-puriri-rewarewa forest on steep hillslope
- (c) *Baumea teretifolia* sedgeland in bog
- (d) *Baumea teretifolia*-manuka shrub-sedgeland on infertile flats
- (e) Wirerush rushland in swampy basin



N02/009 Shenstone Block



Habitat Type



Aerial photography flown 2003

- (f) *Eleocharis sphacelata* reedland in dune lake
- (g) *Eleocharis acuta*-*Baumea* spp. reedland on dune lake bed
- (h) Open water in dune lake

Landform/geology

Pleistocene consolidated dunes bounded to the north east by hills of Parengarenga Group conglomerate, with small lakes ponded by Holocene dunes in the west.

Vegetation

In type (a) manuka is dominant in an even, closed canopy to 3 m tall. Kanuka is locally common, co-dominant or dominant mostly on higher ground. Kumarahou, *Pomaderris phyllicifolia*, mingimingi and *Schoenus brevifolius* are scattered throughout. *Baumea juncea* is locally common and *B. teretifolia* present on damper lower slopes. Gorse is present on track edges and on the southern periphery, and prickly hakea is widespread and locally dominant, along with downy hakea, around erosion scars. The understorey is open with occasional bracken, *Coprosma rhamnoides*, *Gonocarpus montanus*, turutu, rasp fern and numerous orchid species including the saprophytes *Gastrodia sesamoides* and *Molloybas cryptanthus*. Ferns, including *Sticherus flabellatus* and *Todea barbara*, are dense in the gullies. Open canopy shrubland occurs around erosion scars and on upper spurs where the small shrubs *Pomaderris phyllicifolia* and *P. edgerleyi* are common to abundant. *Leptecophylla juniperina*, *Leucopogon fraseri*, *Schoenus brevifolius* and *Morelotia affinis* are locally common and *Gaultheria antipoda*, *Dracophyllum lessonianum*, *Epacris pauciflora*, *Lepidosperma laterale*, *Lycopodium deuterodensum* and *Pimelea urvilleana* agg. occasional.

Type (b) is a tiny remnant on a steep streamside scarp comprising kanuka, kohekohe, puriri and rewarewa with mahoe and pate with an understorey of hangehange and gully tree fern, *Leptopteris hymenophylloides* and rasp fern. Hook sedge, *Lepidosperma laterale*, *Coprosma* sp. and kiekie are locally common. Gully fern, shining and hanging spleenwort and hound's tongue are also present.

Type (c) *Baumea teretifolia* to 1.5 m is dominant on infertile acidic bogs and swampy flats in the upper catchment. *B. juncea* and *Schoenus brevifolius* are locally common on raised sites, and *B. rubiginosa* and *B. juncea* in depressions.

Type (d) occurs on raised flats, manuka and *Baumea* forming an open sedge-shrubland with locally common *Gleichenia dicarpa*.

In the mid to lower catchment is type (e), wirerush is dominant forming tangled masses and up to 2 m high in a more fertile swamp with swamp millet, *Baumea rubiginosa*, *B. juncea* and locally abundant raupo. Umbrella fern, manuka, kiokio, bracken, harakeke, mawhai and occasional ti kouka, *Hebe* sp. and shining karamu are scattered throughout, with local *Carex* spp.

Dense beds of *Eleocharis sphacelata*, type (f), cover most of the shallow northern lake called 'Te Paki Dune Lake' in Wells *et al.* 2007 and 'New Lake' in SSBI M02/N02/H027; with small clumps of *Baumea articulata*. *Eleocharis acuta*, *Baumea teretifolia*, *B. rubiginosa* and *B. juncea*, type (g), occur on the margins, merging into manuka shrub-sedgeland with occasional harakeke and mamaku over two thirds of the area, with dunes on the remaining margin. Less than 10% is open water (h).

The southern lake (named as 'Heart Lake' in SSBI M02/N02/H028) is about 50% open water with a fringe of *Eleocharis sphacelata* with patches of *Baumea articulata* and raupo. Around the lake margins *B. articulata*, *B. rubiginosa*, and *B. juncea* sedgeland occur with scattered manuka, harakeke, and mamaku. This lake was not surveyed as part of the NIWA (Wells *et al.* 2007) Northland lakes status report.

Significant flora

Calochilus aff. *herbaceus* (Nationally Critical), *Todea barbara* (Nationally Endangered), *Utricularia australis* (Nationally Endangered), *Cyclosorus interruptus* (Gradual Decline), *Petalochilus alatus* (Range Restricted), *Baumea complanata* (Range Restricted), *Sticherus flabellatus* (Sparse), *Anzybas rotundifolius* (Sparse) and *Thelymitra matthewsii* (Coloniser).

Regionally significant species: *Adiantum aethiopicum*, *Corybas cheesemanii*, *Drosera binata*, *Drosera peltata*, gully tree fern, *Pomaderris edgerleyi*, *Molloybas cryptanthus*, *Myriophyllum votschii*, *Thelymitra* aff. *longifolia*, *Gastrodia sesamoides*, *Hebe diosmifolia*, *Lophomyrtus obcordata*, *Schizaea bifida*, *Sparganium subglobosum* and wirerush.

Historic record of *Korthalsella salicornioides* (Sparse) (1966).

Fauna

Birds

North Island fernbird (Sparse), pied shag, Californian quail, pheasant, pukeko, spur-winged plover, NZ kingfisher, skylark, welcome swallow, blackbird, song thrush, grey warbler, NI fantail, yellowhammer, chaffinch, goldfinch and mynah.

Possible habitat for Australasian bittern (Nationally Endangered).

Fish

Banded kokopu (regionally significant), red-finned bully and common bully.

Shortfin eels were noted in Te Paki Dune Lake (Wells *et al.* 2007).

Lizards

North Cape green gecko (Sparse).

Significance

Acid bogs and peat swamps are very rare in this Ecological District and throughout Northland, with this site also supporting nationally and regionally threatened plants and animals. The two lakes in the south-west

of the site are the headwaters for the Waitiki Stream, the catchment of which is mostly vegetated, and the site is the only one of its type, contiguous with open mobile dunes, forming a sequence from the open coast in the Ecological District. The northern lake, Te Paki Dune Lake (also known as New Lake) is almost entirely represented by indigenous vegetation with up to 50% of the lake dominated by the Nationally Endangered submerged aquatic plant *Utricularia australis*; for these reasons this lake receives a ranking of Outstanding by NIWA (Wells *et al.* 2007). Small infestations of the exotic aquatic weeds, *Ottelia ovalifolia* and *Utricularia gibba* and were found for the first time at this lake with the latter unfortunately predicted to become abundant (Wells *et al.* 2007). Representative site for all ecological units. Only location for type (e) in Te Paki ED. Approximately 801.8 ha of this site is within Te Paki Recreation Reserve (DOC-administered). Approximately 31 ha of this site is within an 'At Risk' land environment (G1.1a), 43.2 ha is within an 'Underprotected' land environment (A2.1a) and 755.3 ha is within 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).

TE WERAHI WETLAND

Survey no.	M02/010
Survey date	19 September 1995, 16 February 1997
Grid reference	M02 830 480
Area	567.6 ha (72.2 ha shrubland, 495.4 ha wetland)
Altitude	<40 m asl

Ecological units

- (a) Open water
- (b) Raupo reedland in swamp
- (c) *Eleocharis sphacelata* sedgeland in swamp
- (d) *Baumea articulata* sedgeland in swamp
- (e) Manuka shrubland on low hillslope

Landform/geology

Wetland ponded by Holocene dunes.

Vegetation

- (a) A large wetland system comprising three swamps linked by narrow sandy stream channels. Up to 10% of the site may be open water.
- (b) Raupo is dominant throughout most of the wetland, including most of the narrow arms, but some sections, particularly the main southern swamp, form a mosaic with *Eleocharis sphacelata*, *Baumea articulata* and scattered manuka. Both of these sedges are locally dominant.
- (c) Kuta, swamp millet, and *Baumea arthropphylla* are present throughout. *Baumea juncea*, *Myriophyllum propinquum*, *Azolla* sp., *Persicaria*

decipiens, ti kouka and soft rush occur frequently on the margins. Harakeke, *Calystegia sepium*, *Blechnum* sp., *Coprosma tenuifolia*, *Sparganium subglobosum*, *Baumea teretifolia*, *B. rubiginosa*, *Juncus pallidus* and mamaku are occasional.

(d) In the more stagnant areas, *Eleocharis sphacelata* is dominant, with *Myriophyllum propinquum*, willow weed, and occasional *Baumea* spp.

(e) *Baumea articulata* is dominant in drier areas.

Baumea arthropphylla is locally common within both types (c) and (d).

Along the flowing stream edges, *Eleocharis acuta*, bachelor's button, *Baumea articulata*, *Cyperus* sp., shaking brake, and willow weed are scattered.

(e) A manuka buffer occurs on some margins, sometimes low and open. Ti kouka is frequent on some margins, and harakeke occasional to locally frequent. Cattle are impacting on some of the upper arms of the wetland.

Significant flora

Mazus novaezeelandiae subsp. *impolitus* f. *birtus* (Nationally Critical), *Pomaderris phyllicifolia* (Nationally Endangered) (recorded on the edge of the wetland), *Utricularia australis* (Nationally Endangered), *Prasophyllum hectorii* (Nationally Vulnerable), *Tbelypteris confluens* (Gradual Decline), *Cyclosorus interruptus* (Gradual Decline), *Myriophyllum robustum* (Gradual Decline) and *Spiranthes* aff. *novae-zelandiae* (CHR 518297; Motutangi) (Data Deficient).

Regionally significant species: *Azolla filiculoides*, *Epilobium pallidiflorum*, *Gastrodia sesamoides*, *Ranunculus urvilleanus* and *Sparganium subglobosum*.

Fauna

Birds

Australasian bittern (Nationally Endangered), grey duck (Nationally Endangered), North Island fernbird (Sparse). NZ dabchick (Sparse), black shag (Sparse), little black shag (Range Restricted), NZ shoveler (regionally significant), grey teal (regionally significant), little shag, pied shag, pukeko, white-faced heron, pied stilt, NZ kingfisher, black swan, paradise shelduck, mallard duck, kahu and spur-winged plover. Paradise shelduck moulting site. A chestnut-breasted shelduck was recorded from this site in the 1990's (R. Pierce pers. comm.).

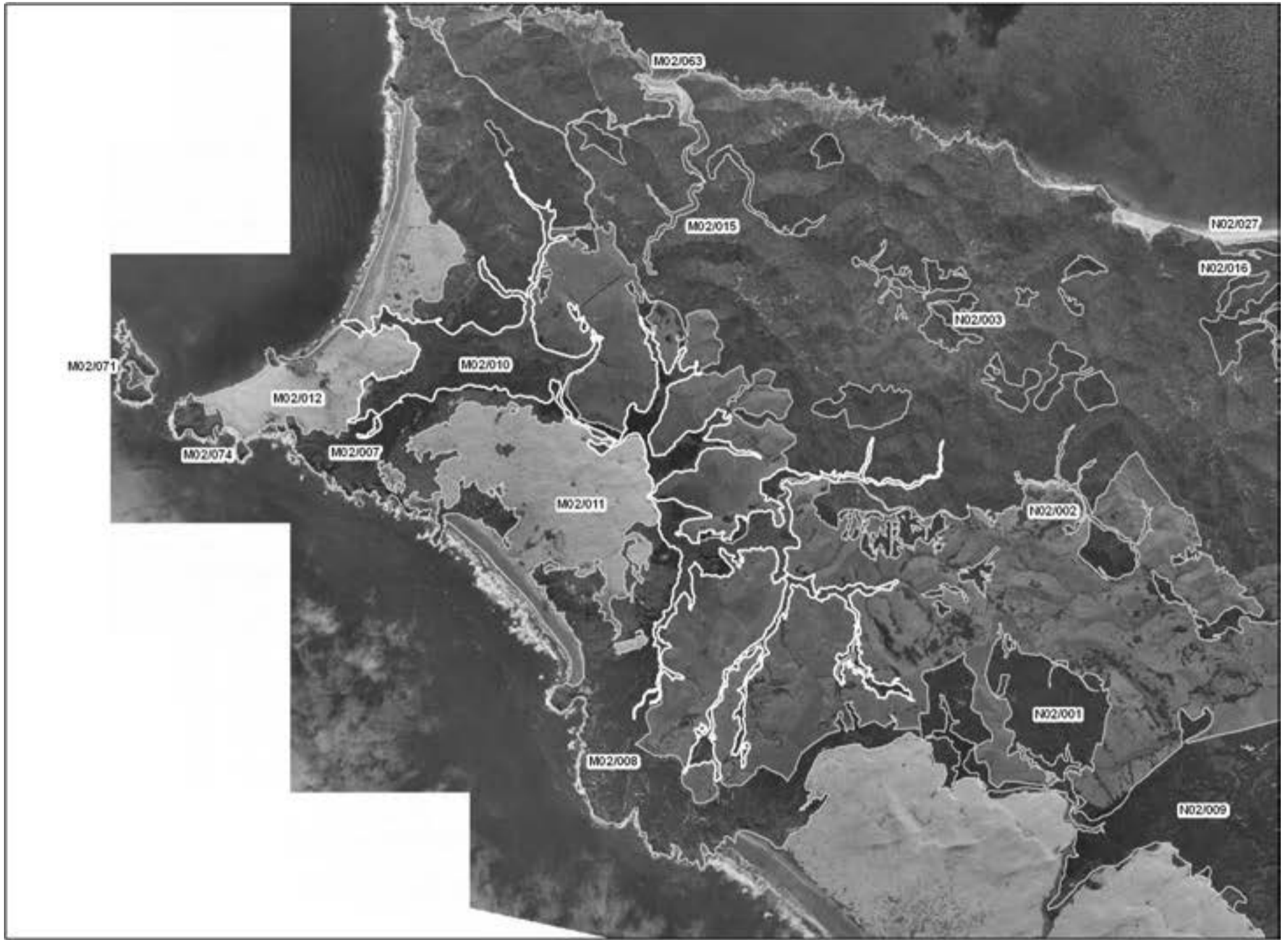
Fish

Longfin eel (Gradual Decline), common bully, inanga and grey mullet.

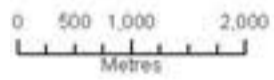
Significance

Te Werahi wetland is the largest wetland system in Te Paki Ecological District and is one of the largest mineralised freshwater wetlands in Northland (the others being the Motatau Wetland Complex in the Tangihua ED and Kaipeha Swamp in the Kaikohe ED) and thus a very important site for wetland birds. This wetland supports many nationally threatened

and several regionally significant plants and animals and is currently being fenced by the Department of Conservation. Representative site for type (a), (b), (c) and (d). NIWA has recorded the invasive submerged wetland plants, hornwort and *Egeria densa* (Wells *et al.* 2007). Te Werahi Wetland is protected with 563.7 ha of this site within Te Pahi Recreation Reserve (DOC-administered). Approximately 13.1 ha of this site is within an 'At Risk' land environment (G1.1a), 11.3 ha is within an 'Underprotected' land environment (A2.1a) and 518 ha is within a 'Less Reduced and Better Protected' land environments (A1.1a, A1.1b and A3.1a) (Walker *et al.* 2007).



M02/010 Te Werahi Wetland



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



TWILIGHT BEACH

Survey no.	M02/011
Survey date	19 September 1995, 14 February 1997
Grid reference	M02 830 460
Area	551.5 ha
Altitude	0-45 m asl

Ecological units

- (a) Spinifex grassland on dunes
- (b) Oioi rushland on dunes
- (c) Pohutukawa forest on dunes
- (d) Coastal toetoe tussockland on dunes
- (e) Pohuehue-kikuyu grass-vineland on dunes
- (f) Dunefield
- (g) Kikuyu grassland on dunes
- (h) Sand sedge sedgeland on sandflats

Landform/geology

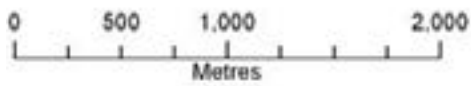
Holocene dunefield with mobile transverse dunes and a coastal deflation zone.

Vegetation

- (a) On the foredune spinifex is common with occasional to frequent shore bindweed and occasional pingao, tauhinu and *Coprosma acerosa*. Behind the foredune, lupin and kikuyu are locally common with bracken and knobby clubrush.
- (b) On the backdune oioi is locally dominant with scattered pohutukawa, scattered to common coastal toetoe and a few scattered houpara.
- (c) Pohutukawa is dominant on the higher slopes of the dune with occasional NZ spinach and taupata in the understorey.
- (d) In the central area of the beach, coastal toetoe is common amongst the pohuehue-kikuyu grass-vineland, type (e). There are scattered clumps of knobby clubrush and pohutukawa.



M02/011 Twilight Beach



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Giant umbrella sedge, harakeke and shining spleenwort are present in small sheltered gullies.

(f) Over 50% of the sandfield is unvegetated with outcrops of consolidated sands. Sparsely scattered pingao, coastal toetoe and tauhinu occur over about a third of the area.

(g) Clumps of coastal toetoe and knobby clubrush are present amongst patches of kikuyu, with frequent lupin and a few examples of harakeke. Manuka is absent.

(h) Sand sedge occurs on sandflats at the south end of Twilight Beach.

Significant flora

Euphorbia glauca (Serious Decline), pingao (Gradual Decline), *Ipomoea pes-caprae* subsp. *brasiliensis* (Range Restricted), *Macromitrium brevicaule* (Range Restricted) and *Coprosma acerosa* (regionally significant).

Historic records of *Pimelea arenaria* (Gradual Decline) (1928) and *Asplenium obtusatum* subsp. *northlandicum* (regionally significant) (1926).

Fauna

Northern NZ dotterel (Nationally Vulnerable), northern little blue penguin (Gradual Decline), and variable oystercatcher (regionally significant).

Significance

One of several dune systems in Te Paki Ecological Region, it is an example of a nationally rare habitat type, despite the presence of kikuyu. The rare example of pohutukawa forest on sand is of particular note. Representative site for type (a), (b), (c), (d), (e), (f) and (h). Approximately 521.6 ha of this site is within Te Paki Recreation Reserve (DOC-administered). Approximately 498.5 ha of this site is within an 'At Risk' land environment (G1.1a), 3.9 ha is within an 'Underprotected' land environment (A2.1a) and 13.4 ha is within a 'Less Reduced and Better Protected' land environments (A1.1a, A1.1b and A3.1 a) (Walker *et al.* 2007).

TE WERAHI BEACH AND CAPE MARIA VAN DIEMEN

Survey no.	M02/012
Survey date	19 September 1995, 16 February 1997
Grid reference	M02 815 495
Area	423.7 ha (28.7 ha shrubland, 395 ha duneland)
Altitude	0-159 m asl

Ecological units

- (a) Spinifex grassland on dunes
- (b) Sandfield
- (c) Sedge-tussocklands in damp sand flats
- (d) Oioi rushland on sand
- (e) *Coprosma acerosa*-knobby clubrush shrubland on dunes
- (f) Kanuka-pampas shrubland on consolidated dunes
- (g) Coastal toetoe tussockland on dunes
- (h) Harakeke flaxland on coastal cliffs
- (i) Kanuka shrubland on hillslope

Landform/geology

Predominantly Holocene dune and slopewash sands mantling coastal hills of Tangihua Complex igneous rocks and erosional remnants of late Pleistocene calcareous dune sands.

Vegetation

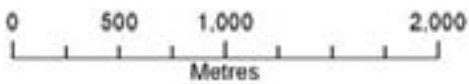
- (a) The seaward dunes have abundant spinifex and frequent tauhinu, *Coprosma acerosa*, coastal toetoe and pingao, and occasional *Pimelea arenaria*.
- (b) Behind the beach is a sparsely vegetated sandfield with scattered spinifex, tauhinu and pingao.
- (c) Damp depressions are more densely vegetated in a variety of associations:
 - i. Pampas-*Coprosma acerosa*-knobby clubrush-lupin with various exotic herb species and occasional coastal toetoe.
 - ii. Sand sedge with scattered marram grass, spinifex, pingao and oioi.
 - iii. Pampas-knobby clubrush and oioi.
- (d) Oioi is common near the wetland margins, with frequent pampas on the lagoon edge.

On unconsolidated backdunes sand constitutes 50% of the area with scattered spinifex, *Coprosma acerosa* and tauhinu.

- (e) Further inland *Coprosma acerosa* and knobby clubrush are common with scattered tauhinu and spinifex. Pampas is frequent and coastal toetoe locally frequent.



M02/012 Te Werahi Beach and Cape Maria van Diemen



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

(f) On consolidated dunes open vegetation to 2 m consists of kanuka and pampas with open ground and occasional manuka, knobby clubbrush, tauhinu, *Morelotia affinis*, *Coprosma acerosa*, lupin and hare's-tail. Fleabane is common throughout most of the vegetated backdunes.

(g) Coastal toetoe is locally common in the vicinity of Herangi Hill.

(h) The coastal harakeke communities (Te Kohatu Point and Cape Maria van Diemen) have frequent kikuyu, coastal toetoe, tauhinu, knobby clubbrush, *Coprosma acerosa* and manuka with occasional *Pimelea* sp., kawakawa, taupata, hangehange, bracken and pohutukawa.

(i) Kanuka dominates the shrubland area with manuka, some ti kouka and harakeke.

Significant flora

Hibiscus richardsonii (Nationally Endangered), *Austrofestuca littoralis* (Gradual Decline), *Pimelea arenaria* (Gradual Decline), pingao (Gradual Decline), *Eleocharis neozelandica* (Gradual Decline), *Macromitrium brevicaule* (Range Restricted), *Coprosma acerosa* (regionally significant), and coastal mahoe (regionally significant).

Historic records of *Asplenium obtusatum* subsp. *northlandicum* (regionally significant) (1896), *Cyclosorus interruptus* (Gradual Decline) (1934) and *Gunnera dentata* (regionally significant) (1896) on Cape Maria van Diemen.

Fauna

Birds

Breeding Northern NZ dotterel (Nationally Vulnerable), banded dotterel (Gradual Decline) (unofficial record) and variable oystercatcher (regionally significant). Northern little blue penguin (Gradual Decline) and grey-faced petrel (regionally significant) breed at Cape Maria van Diemen; black-winged petrels (regionally significant) and white-faced storm petrels (regionally significant) prospect there.

Lizards

Historical record of Duvaucel's gecko (Sparse) in 1965.

Landsnails

Punctidae sp. 156 (Punctidae sp. 27 in Hitchmough *et al.* (comp.) 2007) (Nationally Critical), *Placostylus ambagiosus consobrinus* (Nationally Critical), *Placostylus ambagiosus paraspirtus* (Nationally Endangered), *Succinea archeyi* (Serious Decline), *Amborhytida duplicata* (Gradual Decline), *Delos* sp. 2 (Range Restricted), *Climocella reinga* (Range Restricted), *Allodiscus wairua* (Range Restricted) (status from Marshall and Barker 2008), *Cytora tepakiensis* and *Delouagapia cordelia* (both Sparse).

Placostylus ambagiosus "Herangi Hill" (Extinct).

Paryphanta busbyi wattii (Gradual Decline) is extinct from this site (F. Brook pers. comm.).

Non-threatened landsnails

Cavellia buccinella, *Paracharopa delicatula*, *Phenacohelix tholoides*, *Kokikora angulata*, Punctidae sp. 84, *Cochlicopa lubrica*, *Cantareus aspersus* and *Paralaoma caputspinulae*.

Other threatened terrestrial invertebrates

The carabid beetle *Brullea antarctica* (Sparse).

Significance

Part of a huge sand dune complex containing gradients from beaches, headlands and wetland supporting rare habitat types and many threatened and regionally significant plants and animals. Representative site for all ecological units except type (f). Approximately 333.2 ha of this site is within Te Paki Recreation Reserve (DOC-administered). Approximately 317 ha of this site is within an 'At Risk' land environment (G1.1a) and 68.8 ha is within a 'Less Reduced and Better Protected' land environments (A1.1a, A1.1b and A3.1a) (Walker *et al.* 2007).

TAPOTUPOTU STREAM WETLAND AND ESTUARY

Survey no.	M02/015
Survey date	25 August 1995, 16 February 1997
Grid reference	M02 850 300
Area	25.1 ha (12.1 ha wetland, 13.0 ha estuary)
Altitude	0-5 m asl

Ecological units

- (a) Raupo reedland in swamp
- (b) Mangrove forest in estuary
- (c) Oioi-sea rush saltmarsh in estuary

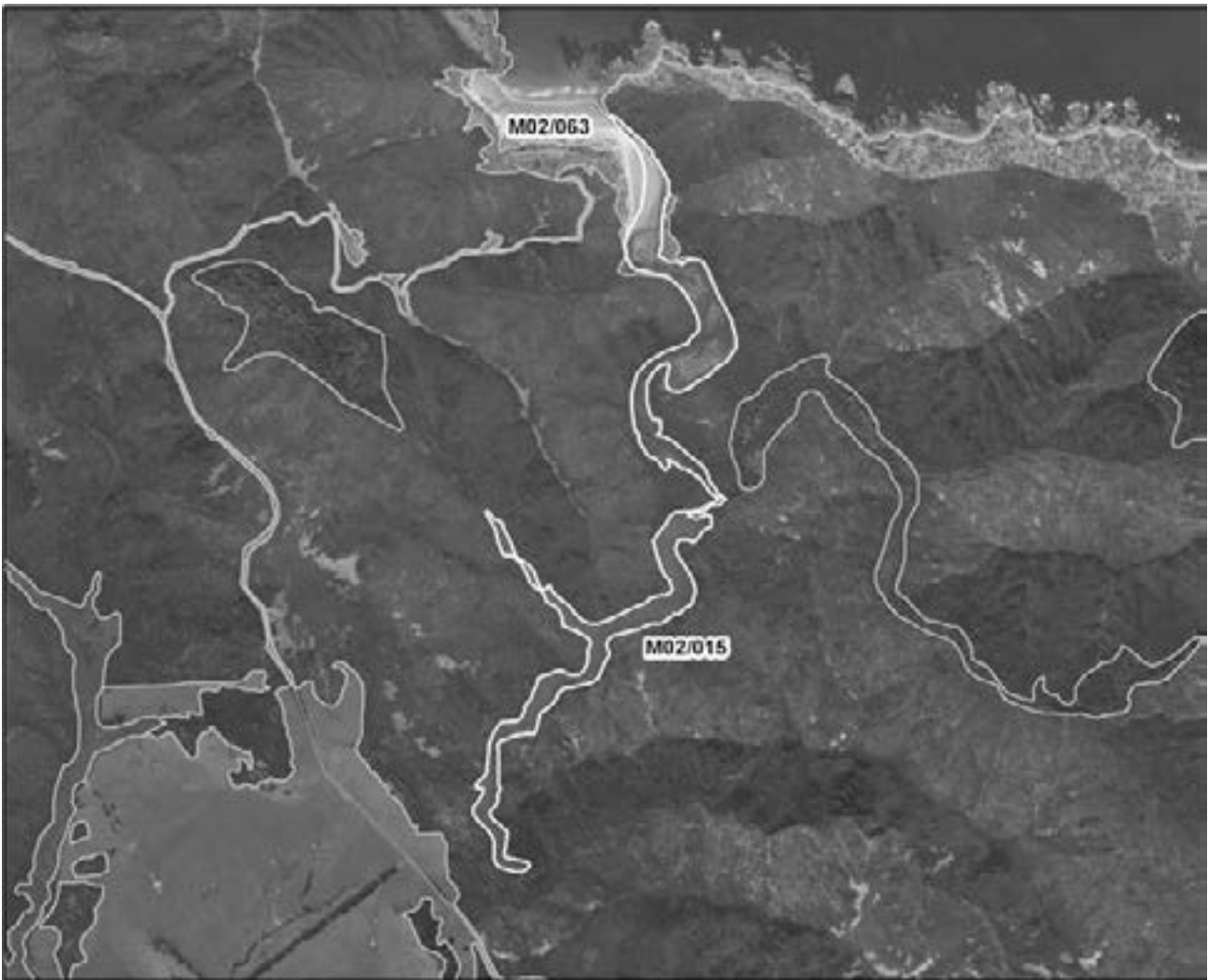
Landform/geology

Stream-mouth estuary ponded by Holocene foredunes, passing landwards into freshwater valley wetland.

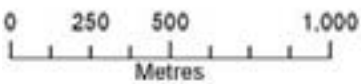
Vegetation

- (a) The freshwater wetlands are dominated by raupo.
- (b) A mangrove-lined channel grades into type (c) saltmarsh, which is defined by a narrow fringe of oioi and sea rush¹⁵. Glasswort is locally abundant, with scattered sea primrose and remuremu. *Austrostipa stipoides* occurs on higher ground. Coastal ribbonwood is scattered throughout the saltmarsh.

15. The original draft report recorded this as *Juncus australis* (the survey sheet has been lost and therefore could not be checked for this report); this was presumed to be a mistake and hence changed to sea rush.



M02/015 Tapotupotu Stream Wetland and Estuary



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Fauna

Black shag (Sparse), white-faced heron, black-backed gull, NZ kingfisher, paradise shelduck and other common birds.

Significance

A complete vegetated sequence from freshwater wetland to an estuarine environment. The entire catchment is under native vegetation cover. Habitat for a threatened species. Updated fauna survey required. Representative site for type (a) raupo reedland and type (c) oioi-*Juncus australis* saltmarsh, which is the only record of this vegetation type in Te Paki Ecological District. This site is entirely within Te Paki Recreation Reserve (DOC-administered). Approximately 1.3 ha of this site is within a 'Chronically Threatened' land environment (A1.1c) and 17.6 ha is within a 'Less Reduced and Better Protected' land environments (A1.1a, A1.1b and A3.1) (Walker *et al.* 2007).

PARANOA SWAMP, WAITAHORA LAGOON AND WAITAHORA LAKES WETLAND COMPLEX

Survey no.	N02/016
Survey date	26 August 1995
Grid reference	N02 951 498
Area	269.6 ha
Altitude	<20 m asl

Ecological units

- (a) Raupo-*Baumea articulata*-*B. arthropbylla* reedland on alluvium
- (b) *Baumea rubiginosa*-*Eleocharis acuta*-*E. gracilis* sedgeland on swamp margins
- (c) Manuka-*Baumea juncea*-*B. teretifolia* shrubland on swamp margins
Eleocharis sphacelata sedgeland in swamp
- (d) *Baumea articulata* sedgeland in swamp
- (e) *Baumea juncea* sedgeland in swamp
- (f) Oioi-sea rush rushland in swamp
- (g) Open water
- (h) Shrubland

Geology

Wetland ponded by Holocene foredunes.

Vegetation

The Kapowairua dunes impound the Waitahora Lagoon at the western end of the beach and the Paranoa swamp on peat-alluvial flats of the lower arms and mouth of the main valleys in the catchment. Swamps

also occur on the narrow alluvial valley bottoms inland (Clunie 1984). Most of Waitahora Lagoon is saline with no submerged vegetation (Wells *et al.* 2007).

The western-most valley drains directly into the Waitahora Lagoon, while the lower reaches of two central valleys merge together near a central 'island' of higher ground. The Waitahora Stream meanders through the middle and upper reaches in a steep-sided, deep and narrow channel (4–6 m). The channel disappears near the 'island' and reappears as a shallow and wider channel linked to the brackish Waitahora Lagoon (McLean).

(a) Raupo is dominant over most of the area with *Baumea articulata* and *B. arthrophylla* common and locally dominant. Kuta and *Eleocharis sphacelata* also occur locally. Swamp millet, *Centella unifolia*, willow weed (especially *Persicaria decipiens*), and *Baumea juncea* are widespread but only locally dense. Amongst this community *Myriophyllum propinquum* may be abundant with *Juncus articulatus* common and water purslane locally abundant. *Juncus prismatocarpus* and *Isolepis reticularis* are also locally present.

In the inland valley bottoms raupo is dominant with *Baumea articulata* and *B. juncea* locally common. Harakeke and ti kouka are scattered on the margins with *Carex virgata*, willow weed, swamp millet, kiokio and rushes (*Juncus* sp.). *Ranunculus urvilleanus* may be locally common. On the margins, type (b) *Baumea rubiginosa*, *Eleocharis acuta*, *E. gracilis* with wirerush are locally present.

Type (c) occurs on slightly raised margins. Scattered manuka over *Baumea juncea*, *B. teretifolia*, swamp millet, with scattered harakeke, kiokio, *Adiantum aethiopicum*, *Carex virgata*, giant umbrella sedge, *Juncus* sp. and herbs.

Type (d) *Eleocharis sphacelata* is dominant in the wettest areas.

(e) In the Waitahora arm, *Baumea articulata* is the dominant species.

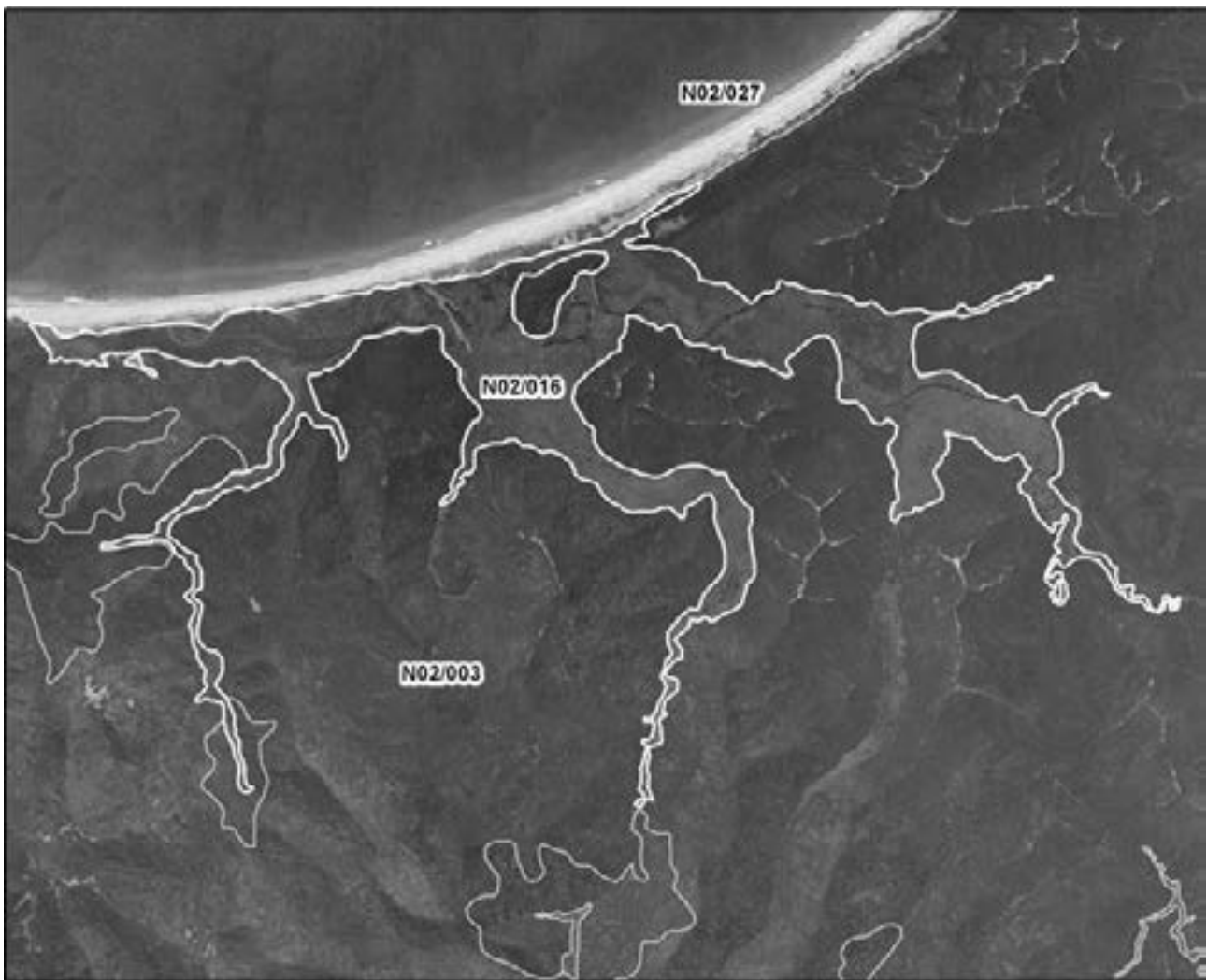
(f) At the confluence of the wetland with the Waitahora Lagoon, *Baumea juncea* is abundant.

(g) The eastern half of the Waitahora Lagoon is surrounded by oioi and sea rush with marginal areas containing *Baumea juncea*, giant umbrella sedge and the nationally threatened *Hibiscus diversifolius*.

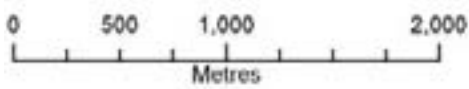
On the edge of the Lagoon there are areas of turf dominated by the threatened herb *Mimulus repens* (NIWA 2007).

(h) Open water occupies around 18 ha of this site (calculated from 2003 aerial photography). There are several small freshwater lakes (Waitahora Lakes) just east of Waitahora Lagoon. The largest is around 2.3 ha with these water bodies mostly covered by emergent *Eleocharis sphacelata* and *Baumea articulata* (NIWA 2007).

(i) The shrubland type represented in the 'island' near the coast was not identified during survey.



N02/016 Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Significant flora

Calochilus aff. *herbaceus* (Nationally Critical) (unsubstantiated record), *Centipeda minima* subsp. *minima* (Nationally Critical), *Utricularia australis* (Nationally Endangered), *Hibiscus diversifolius* (Nationally Vulnerable), *Thelypteris confluens* (Gradual Decline), *Thelymitra* (b) (CHR 518036; “Darkie”) (Range Restricted), *Mimulus repens* (Sparse) and *Spiranthes* aff. *novae-zelandiae* (CHR 518297; Motutangi) (Data Deficient).

Regionally significant: *Coprosma parviflora*, *Ranunculus urvilleanus*, *Sparganium subglobosum*, *Spiranthes novae-zelandiae*, arrow grass and wirerush.

Historic record of *Cyclosorus interruptus* (Gradual Decline), destroyed by drainage and fire after 1977.

Of interest a charophyte in the genus *Lamprothamium* was found in Waitahora Lagoon by NIWA in 2007. In New Zealand this genus is represented by one species *L. macropogon*. *Lamprothamium* has never previously been found in the upper half of the North Island and it appears that the species found here is different. (Wells *et al.* 2007)

Fauna

Birds

Australasian bittern (Nationally Endangered), grey duck (Nationally Endangered), red-billed gull (Gradual Decline), white-fronted tern (Gradual Decline), banded dotterel (Gradual Decline), banded rail (Sparse), North Island fernbird (Sparse), marsh crake (Sparse), variable oystercatcher (regionally significant), grey teal (regionally significant), pied stilt, little shag, pied shag, white-faced heron, black swan, paradise shelduck, mallard, kahu, pheasant, spur-winged plover, black-backed gull, NI fantail, grey warbler and other common birds.

Fish

1993 record of inanga, common bully, grey mullet, flounder and shortfin eel.

Significance

A large mesotrophic wetland complex with a fully vegetated catchment, rarely found elsewhere, supporting many threatened and regionally significant plants and animals. NIWA surveyed Waitahora Lagoon and Waitahora Lakes for the first time in 2007 and they were ranked as being ‘Outstanding’ due to their pristine nature (no pest species recorded) and the many threatened species they support. The nationally endangered bladderwort *Utricularia australis* was commonly found in the Waitahora Lakes. Representative site for ecological units Type (a) to Type (h). Sole record of type (c) in Te Paki Ecological District. Approximately 245.4 ha (94.3%) of this site is within Te Paki Recreation Reserve (DOC-administered). Approximately 4.9 ha of this site is within an ‘At Risk’ land environment (G1.1a), 214.9 ha is within an ‘Underprotected’ land environment (A2.1a) and 38.6 ha is within ‘Less Reduced and Better Protected’ land environments (A1.1a, A1.1b and A3.1a) (Walker *et al.* 2007).

UPPER KAPOWAIKUA WETLAND

Survey no.	N02/017
Survey date	25 August 1995
Grid reference	M02 985 458
Area	13.1 ha
Altitude	20 m asl

Ecological unit

(a) Raupo reedland in swamp

Landform/geology

Wetlands along stream valley in hill country of Tangihua Complex igneous rocks in the west and deeply weathered podzolised Parengarenga Group sandstone in the east.

Vegetation

Raupo is abundant in the wetland with local kuta, *Juncus* and *Baumea* species. Manuka is occasional on the wetland margin.

Significant flora

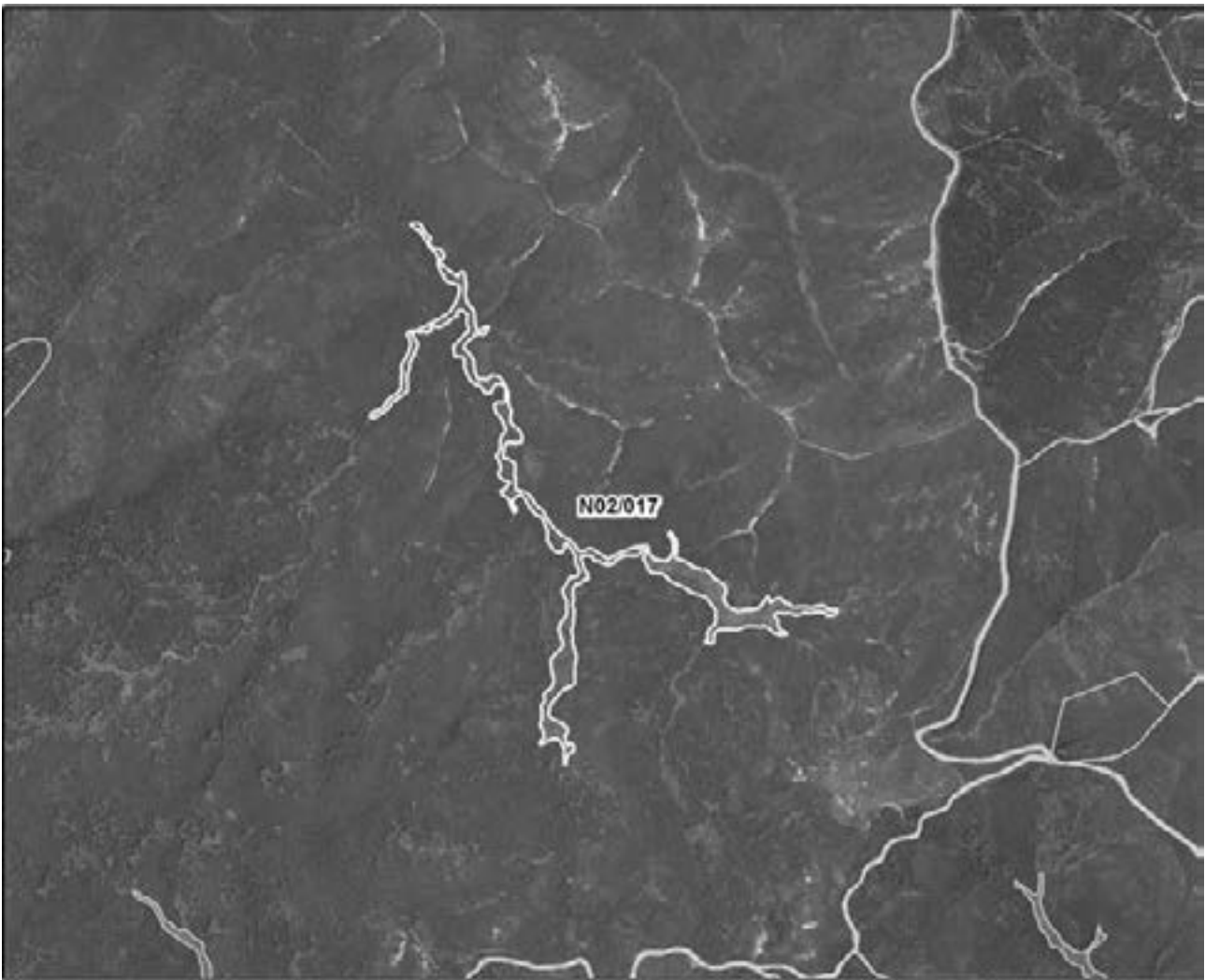
Sticherus flabellatus (Sparse) and *Ranunculus urvilleanus* (regionally significant) (unsubstantiated).

Fauna

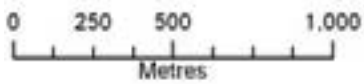
NI fernbird (Sparse), spotless crane (Sparse) and banded kokopu (regionally significant).

Significance

This site supports threatened and regionally significant flora and fauna species and is a semi-mineralised wetland with a fully vegetated catchment. Updated fauna survey is required. This site is entirely within Te Pahi Recreation Reserve (DOC-administered). All of this site is within 'Less Reduced and Better Protected' land environments (A1.1b and A3.1a) (Walker *et al.* 2007).



N02/017 Upper Kapowairua Wetland



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

BROUGHTON'S GULLY WETLAND

Survey no. N02/018
Survey date 25 August 1995
Grid reference N02 973 442
Area 7.9 ha
Altitude 20 m asl

Ecological units

(a) Raupo reedland in swamp

Landform/geology

Valley wetland in hill country of Tangihua Complex igneous rock units.

Vegetation

Raupo dominant wetland with *Carex* sp. and surrounded by manuka.

Significant flora

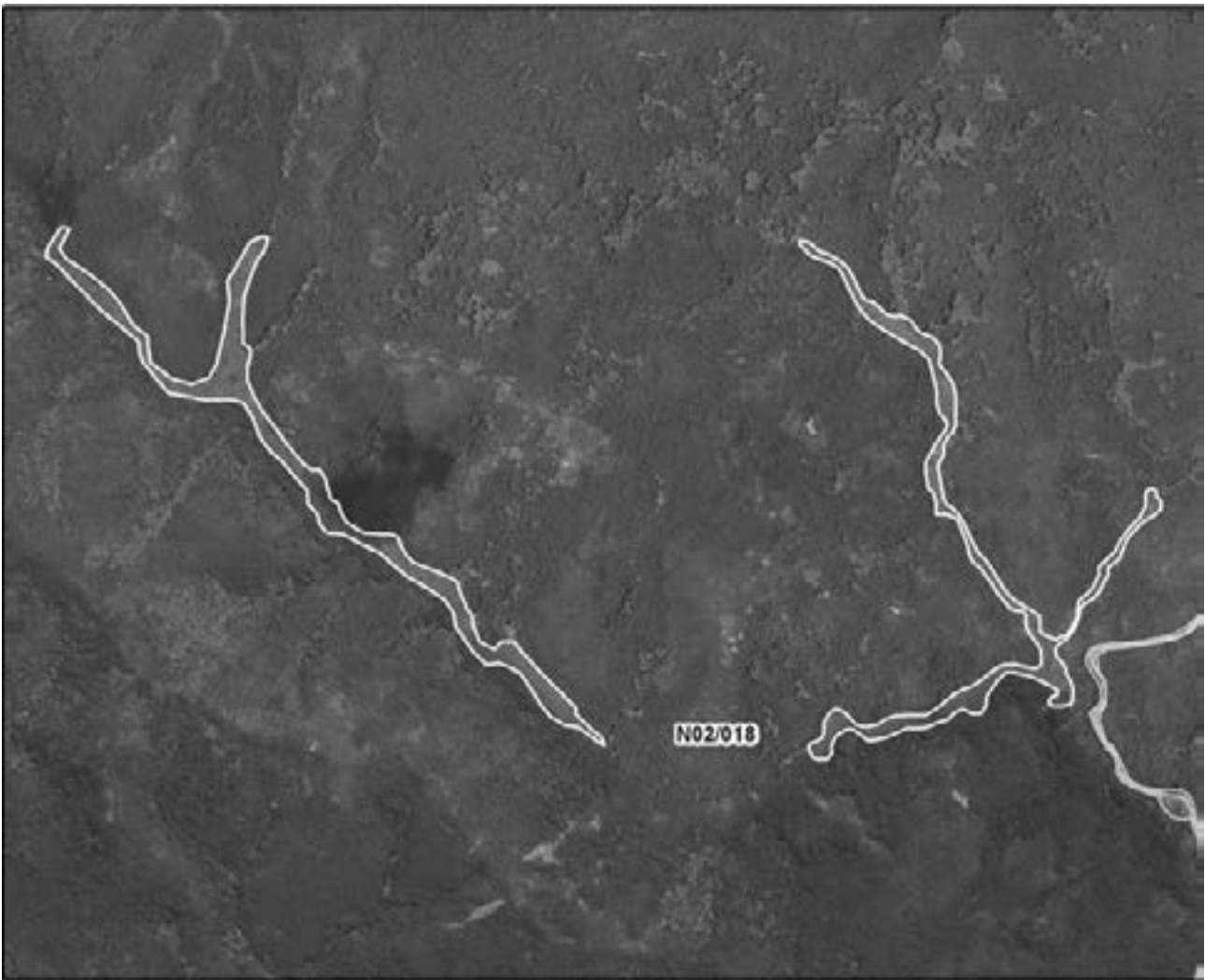
Ranunculus urvilleanus (regionally significant).

Fauna

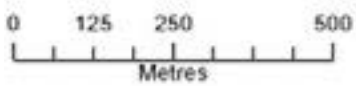
NI fernbird (Sparse), spotless crane (Sparse) and banded kokopu (regionally significant).

Significance

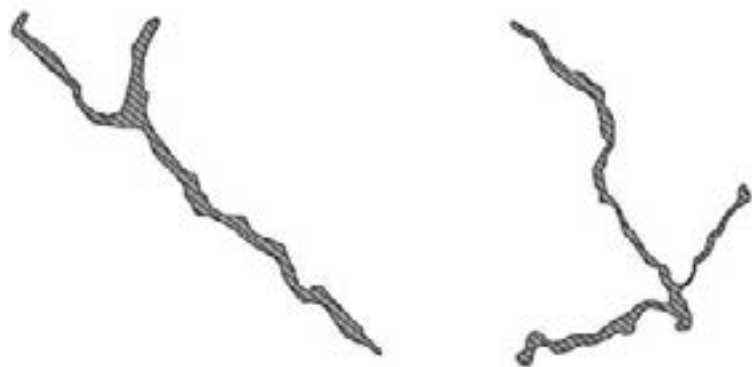
A mineralised wetland adjoining a mature forest edge, which is an uncommon ecological sequence in Te Paki Ecological District. Updated fauna survey is required. This site is entirely within Te Paki Recreation Reserve (DOC-administered). All of this site is within 'Less Reduced and Better Protected' land environment (A1.1b) ((Walker *et al.* 2007).



N02/018 Broughton's Gully Wetland



Habitat Type



Aerial photography flown 2003

KAPOWAIKUA WETLAND AND LAGOON

Survey no.	N02/019
Survey date	24 August 1995
Grid reference	N02 990 513
Area	26.4 ha
Altitude	0–20 m asl

Ecological units

- (a) Raupo reedland in swamp
- (b) Open water in lagoon

Landform/geology

Freshwater wetland banded by hill country of Parengarenga Group sandstone and conglomerate.

Vegetation

- (a) Ti kouka is frequent along the fringes of this raupo-dominant wetland. Kanuka and manuka are also scattered around the edge.
- (b) The lagoon at the eastern end of Kapowairua is around 2.8 ha of open water (2003 aerial photography).

Significant flora

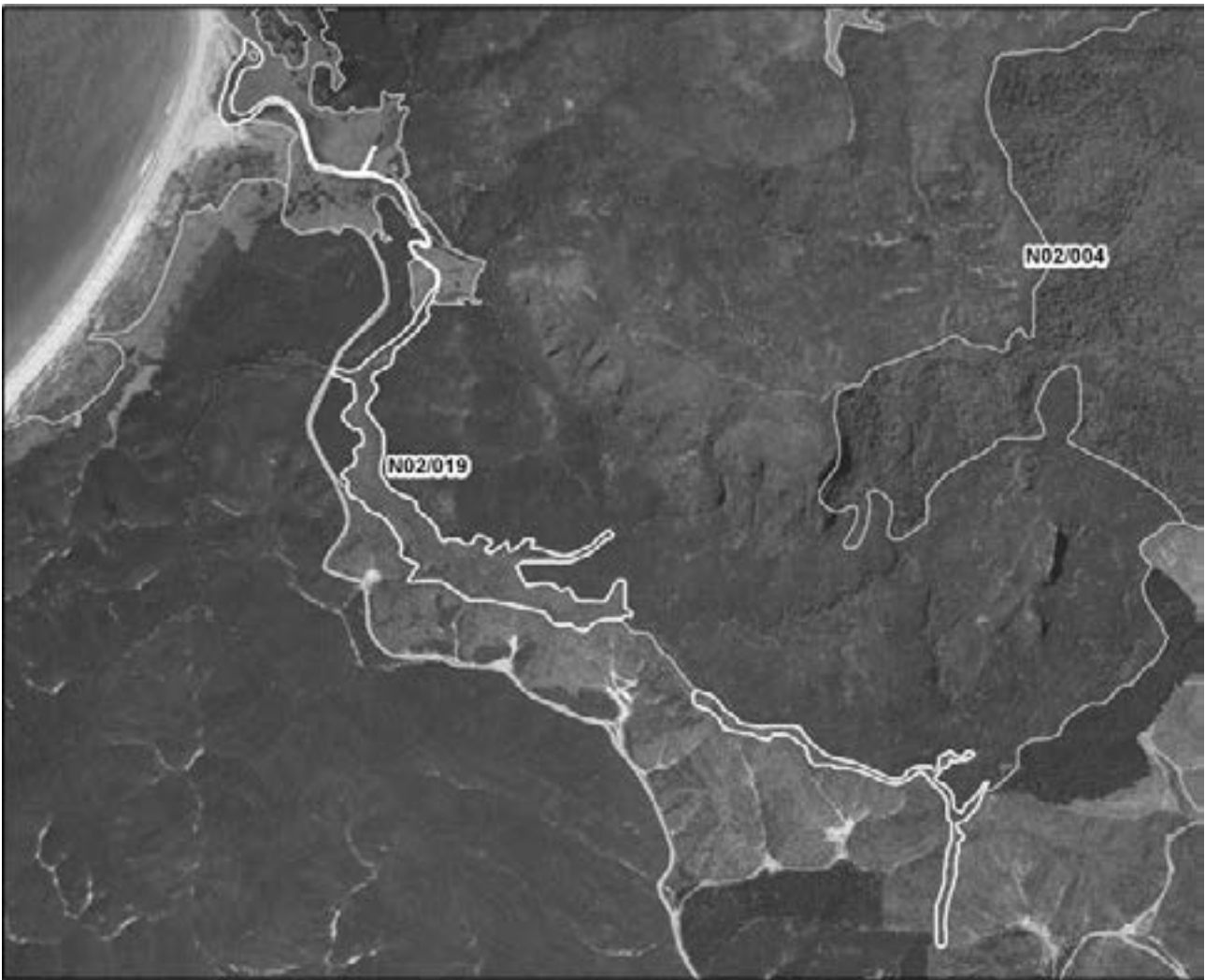
Mimulus repens (Sparse). Historic record of *Korthalsella salicornioides* (Sparse) (1949) at a waterfall, possibly on the margins of this wetland.

Fauna

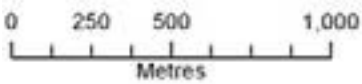
Grey duck (Nationally Endangered), Australasian bittern (Nationally Endangered), Caspian tern (Nationally Vulnerable), northern NZ dotterel (Nationally Vulnerable), banded dotterel (Gradual Decline), white-fronted tern (Gradual Decline), red-billed gull (Gradual Decline), North Island fernbird (Sparse), spotless crane (Sparse), variable oystercatcher (regionally significant), pied shag, little shag, white-faced heron, paradise shelduck, kahu, black-backed gull, cattle egret, NZ kingfisher, NZ pipit and other common birds.

Significance

An important sequence from freshwater wetland to tidal lagoon supporting threatened and regionally significant species. Representative site. Approximately 0.3 ha of this site is within Kapowairua Marginal Strip, 20.3 ha within Te Pahi Recreation Reserve (DOC-administered) and 0.5 ha has been recently protected by Nga Whenua Rahui. Approximately 19.7 ha of this site is within an 'Underprotected' land environment (A2.1a), 0.6 ha within a 'At Risk' land environment (G1.1a), and 6.1 within a 'Less Reduced and Better Protected' land environments (A1.1a and A1.1b) (Walker *et al.* 2007).



N02/019 Kapowairua Wetland and Lagoon



- Habitat Type**
- Duneland/Sandfield
 - Estuarine
 - Forest
 - Shrubland
 - Wetland



Aerial photography flown 2003

TE HURUWAI STREAM WETLAND

Survey no. N02/020
Survey date 25 August 1995
Grid reference N02 015 450
Area 17.0 ha
Altitude <20 m asl

Ecological unit

(a) Raupo reedland in swamp

Landform/geology

Freshwater wetland forming an upper arm of the Parengarenga Harbour.

Vegetation

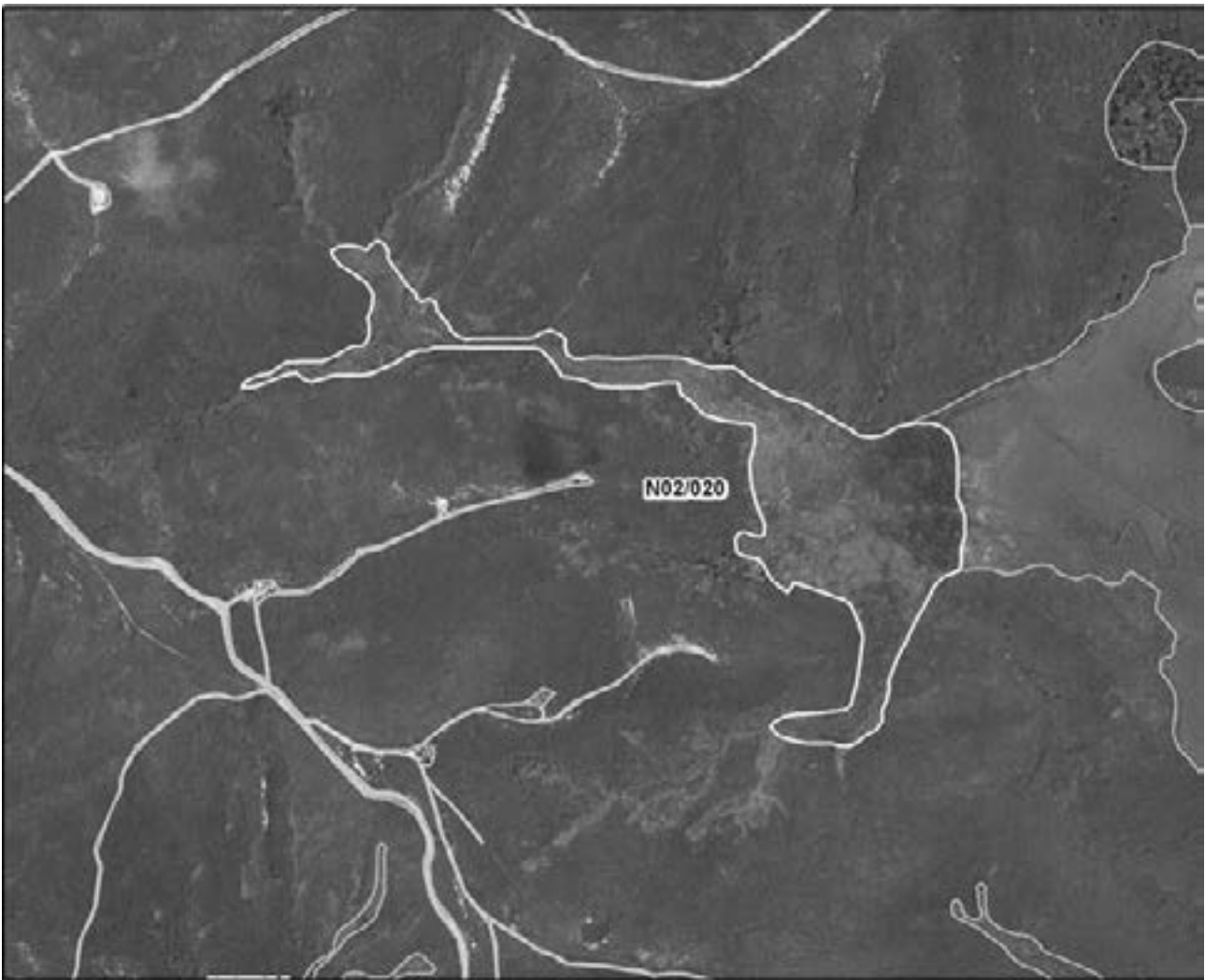
The wetland has abundant raupo in association with ti kouka, sedges, and rushes.

Fauna

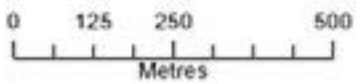
This site is likely to be used by Australasian bittern (Nationally Endangered) and spotless crane (Gradual Decline) (R. Pierce pers. comm.).

Significance

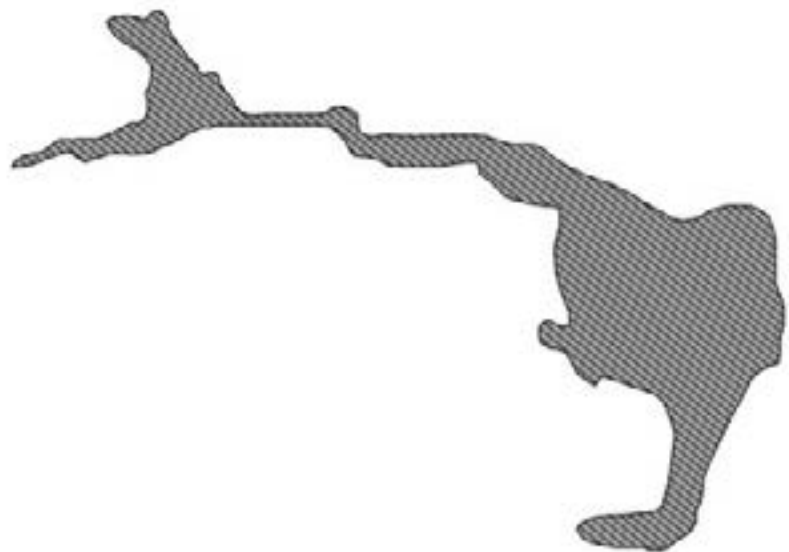
A mineralised wetland with a fully vegetated catchment, forming a sequence from Parengarenga Harbour, being a nationally uncommon habitat type. This site has no formal protection. Approximately 13.8 ha of this site is within an 'At Risk' land environment (A4.1a), 0.4 ha is within an 'Underprotected' land environment (A2.1a) and 2.3 ha is within a 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).



N02/020 Te Huruwai Stream Wetland



Habitat Type



Aerial photography flown 2003

TE HAPUA WETLAND

Survey no.	N02/021
Survey date	24 August 1995
Grid reference	N02 027 435
Area	25.2 ha
Altitude	5 m asl

Ecological units

- (a) Sedgeland on interglacial flats
- (b) Manuka shrubland on interglacial flats

Landform/geology

Freshwater wetland on terrace surface on last interglacial unconsolidated estuarine sand.

Vegetation

- (a) Sedges (likely to be *Eleocharis* or *Baumea*) are dominant with frequent manuka in this wetland.
- (b) The shrubland community is manuka-dominant with frequent kanuka, emergent radiata pine and oxylobium, and occasional gorse, sedges and dally pine.

Fauna

Not surveyed.

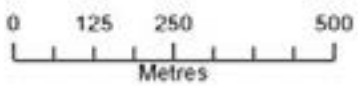
This habitat is likely to be used by NI fernbird (Sparse).

Significance

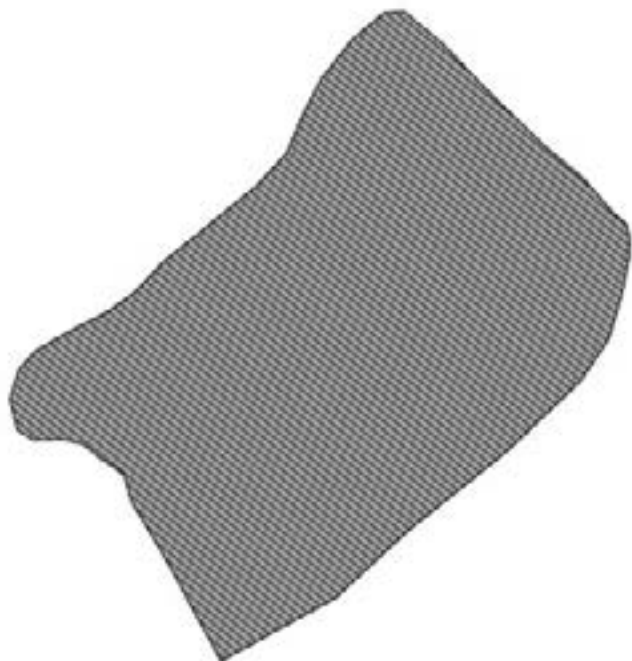
This site has not been surveyed in detail but is significant in being the only example of indigenous wetland vegetation on this landform in Te Paki Ecological District and wetlands are a nationally rare habitat type. This site may have significance for indigenous ground orchids and is likely to be fernbird habitat. This site has no formal protection. Approximately 25.2 ha of this site is within an 'At Risk' land environment (A4.1a) (Walker *et al.* 2007).



N02/021 Te Hapua Wetland



Habitat Type



Aerial photography flown 2003

TE HAPUA SETTLEMENT WETLAND

Survey no. N02/022
Survey date 25 August 1995
Grid reference N02 020 433
Area 22.6 ha
Altitude <2 m asl

Ecological unit

(a) Raupo-rush spp. reedland in swamp

Landform/geology

Freshwater wetland at head of an arm of Parengarenga Harbour.

Vegetation

Raupo and rush swamp.

Fauna

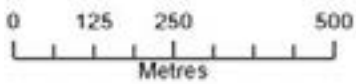
Not surveyed. This habitat is likely to be used by Australasian bittern (Nationally Endangered) and spotless crane (Gradual Decline) (R. Pierce pers. comm.).

Significance

Wetlands are a nationally rare habitat type and this site provides an important wetland habitat and buffer to the Parengarenga Harbour. This site has no formal protection. Approximately 12.3 ha of this site is within an 'At Risk' land environment (A4.1a), 8.0 ha is within an 'Underprotected' land environment (A2.1a) and 1.4 ha is within a 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).

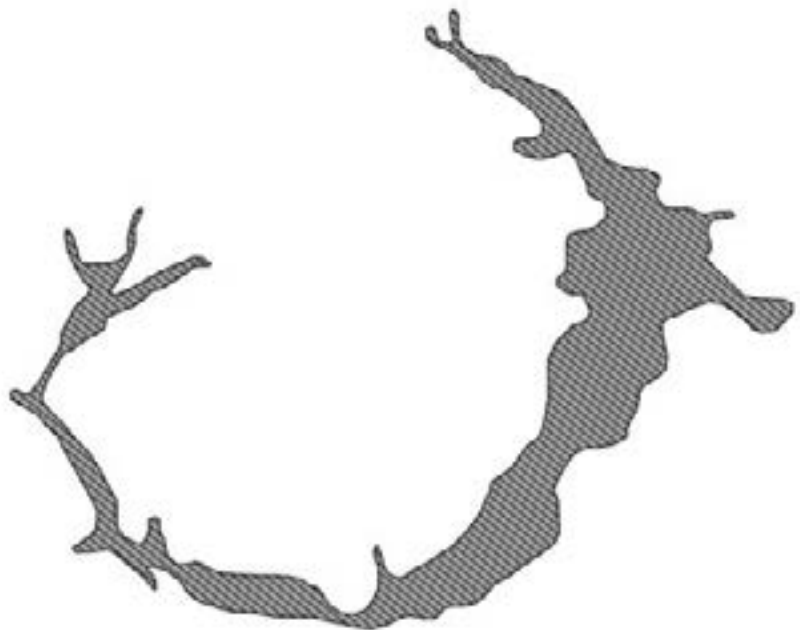


N02/022 Te Hapua Settlement Wetland



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

PAINGATAI CHANNEL WETLANDS

Survey no.	N02/023
Survey date	August 1993
Grid reference	N02 056 485 and 059 476
Area	12.8 ha
Altitude	<2 m asl

Ecological unit

(a) Raupo reedland in swamp

Landform/geology

Freshwater wetland at head of an arm of the Parengarenga Harbour.

Vegetation

(a) Raupo is abundant in the upper wetland with ti kouka common on margins.

The wetland grades into oioi dominant saltmarsh and mangrove forest (part of the Parengarenga Harbour in the Aupouri Ecological District).

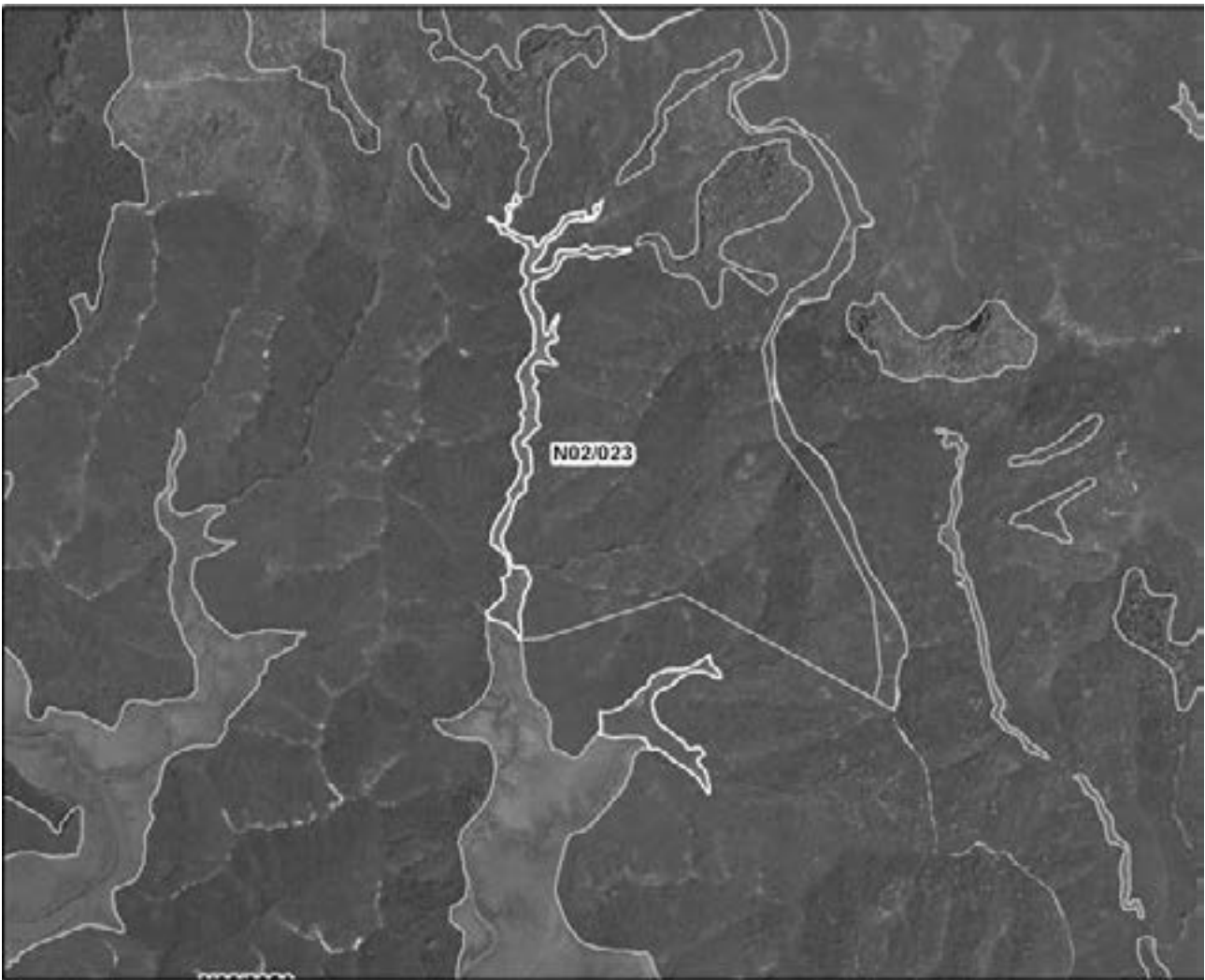
The surrounding vegetation is manuka dominant with gullies of tall kanuka (contiguous with N02/005 (a)).

Fauna

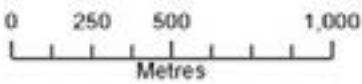
Not surveyed. This habitat is likely to be used by Australasian bittern (Nationally Endangered) and spotless crane (Gradual Decline) (R. Pierce pers. comm.).

Significance

Wetlands are a nationally uncommon habitat type. This wetland is a representative example of raupo reedland and is part of an ecological sequence from tidal estuary to shrubland and forest (contiguous with N02/005(a)). All of this site is within Mokaikai Scenic Reserve (DOC-administered). Approximately 9.3 ha of this site is within an 'Underprotected' land environment (A2.1a) and 3.4 ha is within a 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).



N02/023 Paingatai Channel Wetlands



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

TE HAPUA ROAD WETLAND

Survey no. N02/024
Survey date August 1993
Grid reference N02 007 439
Area 1.8 ha
Altitude 0-20 m asl

Ecological unit

(a) Raupo-rush spp. reedland in swamp

Landform/geology

Freshwater wetland in hill country of Tangihua Complex igneous rocks and Parengarenga Group sandstone.

Vegetation

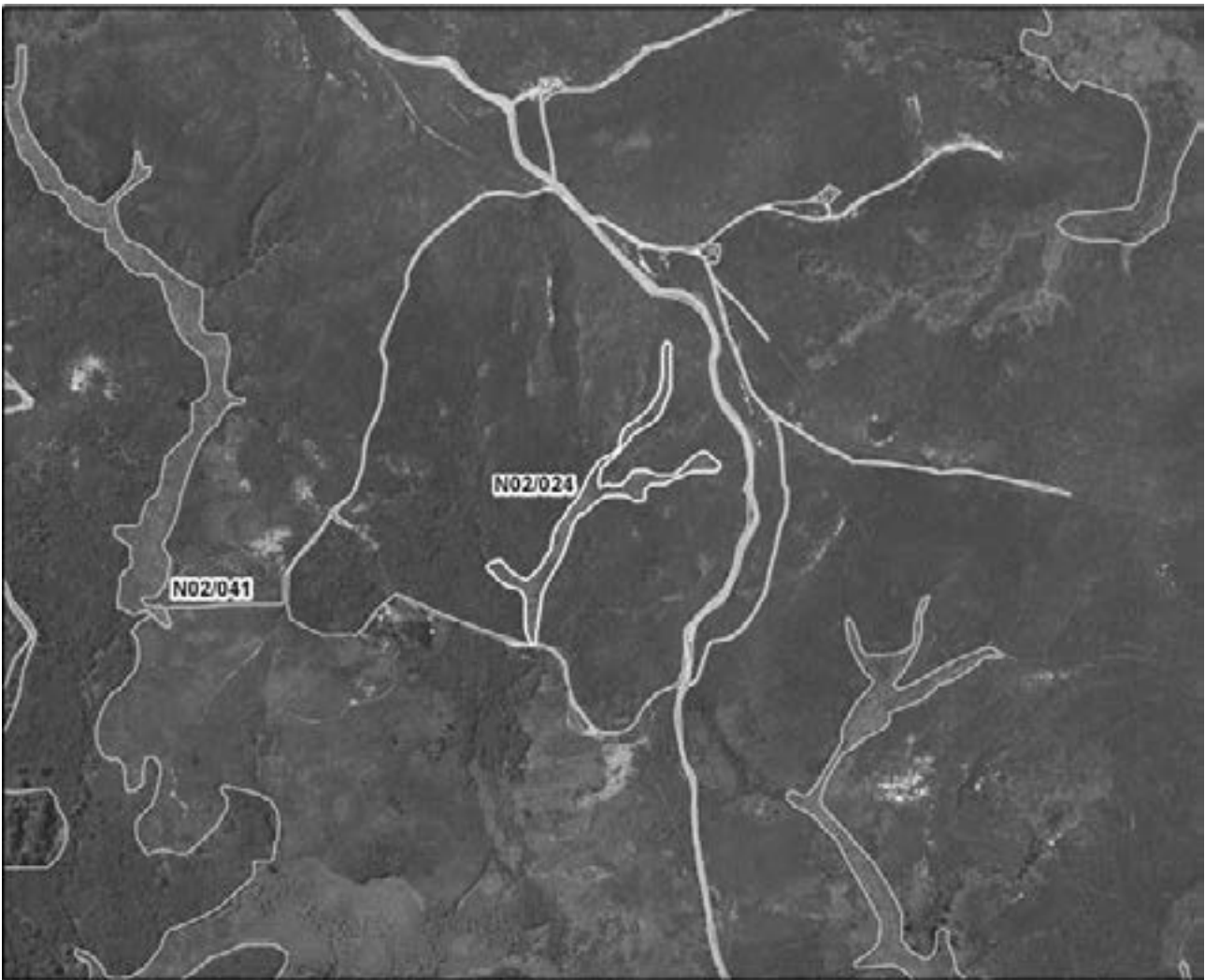
Raupo is abundant in this wetland with rushes common.

Fauna

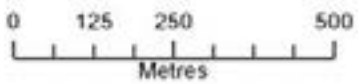
Not surveyed.

Significance

Wetlands are a nationally threatened habitat type. This site has no formal protection. Approximately 1.4 ha of this site is within an 'Underprotected' land environment (A2.1a) and 0.4 ha is within 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).

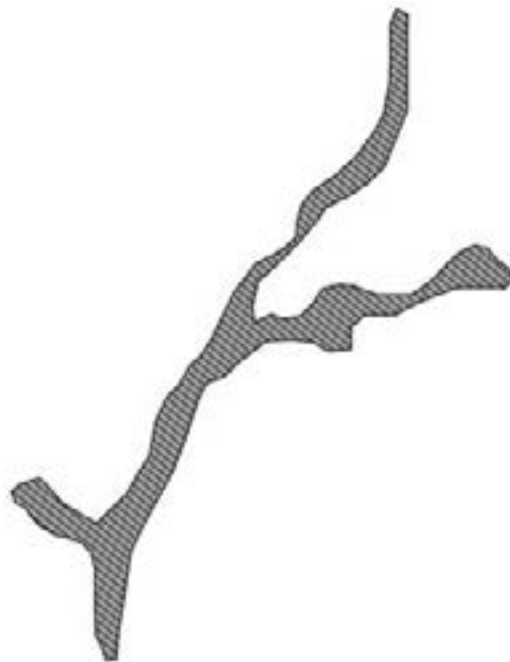


N02/024 Te Hapua Road Wetland



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

WAIWHERO STREAM WETLAND

Survey no.	N02/025
Survey date	9 January 1997
Grid reference	N02 095 530
Area	7.7 ha
Altitude	0–20 m asl

Ecological units

- (a) Raupo reedland on ponded sand flats
- (b) Knobby clubrush-*Baumea juncea* sedgeland on ponded sand flats
- (c) *Baumea juncea* sedgeland on sand flats

Landform/geology

Freshwater wetland ponded in Pleistocene to Holocene muddy and sandy interdune deposits.

Vegetation

- (a) A raupo-dominant wetland with harakeke and ti kouka extends west from and links with Tawakewake Wetland (N02/036). *Eleocharis sphacelata*, *E. acuta*, *Juncus* sp., knobby clubrush, *Sparganium subglobosum* and kuta are also present. Ti kouka is common near the centre of Tom Bowling Bay, and locally abundant at the western end.
- (b) Where the Waiwhero Stream emerges between the dunes, a small area of knobby clubrush-*Baumea juncea* sedgeland occurs with coastal toetoe, harakeke, giant umbrella sedge and *Lotus* sp.
- (c) Near the beach *Baumea juncea* is dominant with frequent to common giant umbrella sedge.

Significant flora

Sparganium subglobosum (regionally significant).

Fauna

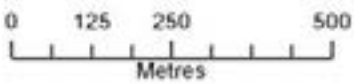
Australasian bittern (Nationally Endangered).

Significance

Wetlands are a nationally rare habitat type and this site is an integral part of the now rare sequence of dunefield-wetland-shrubland-wetland-dunefield system on a tombolo and a good example of a fertile backdune swamp. Representative site all ecological units. Only record of type (b) in Te Pahi Ecological District. Approximately 7.0 ha of this site is within Mokaikai Scenic Reserve (DOC-administered). Approximately 1.3 ha of this site is within an 'At Risk' land environment (G1.1a) and 6.4 ha is within an 'Underprotected' land environment (A2.1a) (Walker *et al.* 2007).

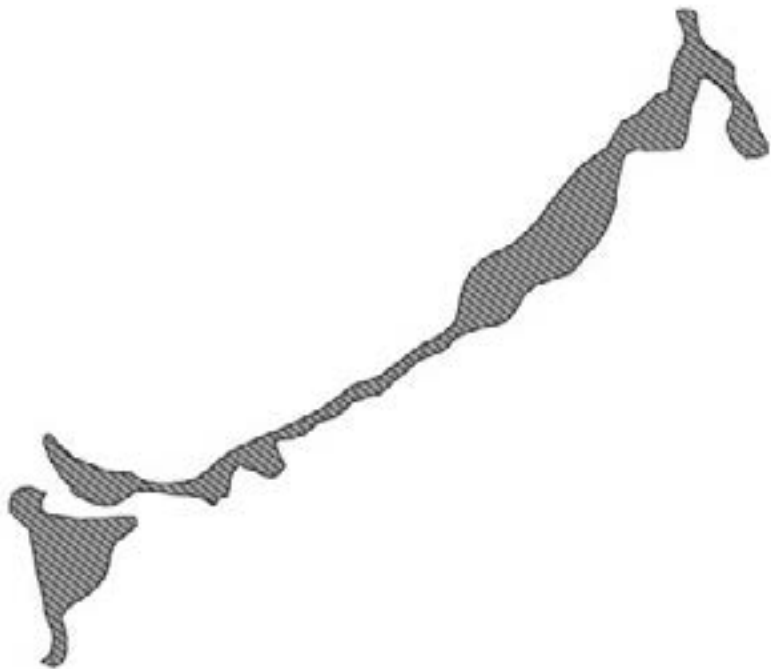


N02/025 Waiwhero Stream Wetland



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

K A P O W A I R U A

Survey no.	N02/027
Survey date	24 August 1995
Grid reference	N02 955 504
Area	141.6 ha
Altitude	<5 m asl

Ecological units

- (a) Spinifex grassland on foredunes
- (b) Sea rush saltmarsh on estuary
- (c) Remuremu-sea primrose herbfield on estuary

Landform/geology

Holocene foredune belt and deflated dune areas.

Vegetation

- (a) Spinifex is abundant on the dunes, with occasional marram grass, pohuehue, *Coprosma acerosa*, tauhinu, knobby clubrush, shore bindweed, lupin, and *Pimelea arenaria*.
- (b) A small saltmarsh occurs at the mouth of the Waitapu Stream at Kapowairua. Sea rush is dominant and grades into a turf of remuremu and sea primrose, type (c).

Pananehe Island

The vegetation at Pananehe Island, at the eastern end of Kapowairua, is described as being dominated by exotic grasses with an area of harakeke. There is a rock platform (SSBI N02/H048).

Significant flora

Hibiscus richardsonii (Nationally Endangered), *Hibiscus diversifolius* (Nationally Vulnerable), *Austrofestuca littoralis* (Gradual Decline), *Pimelea arenaria* (Gradual Decline), pingao (Gradual Decline) and *Arthropodium bifurcatum* (Gradual Decline).

Regionally significant species: *Asplenium obtusatum* subsp. *northlandicum*, ngaio, arrow grass and *Coprosma acerosa*.

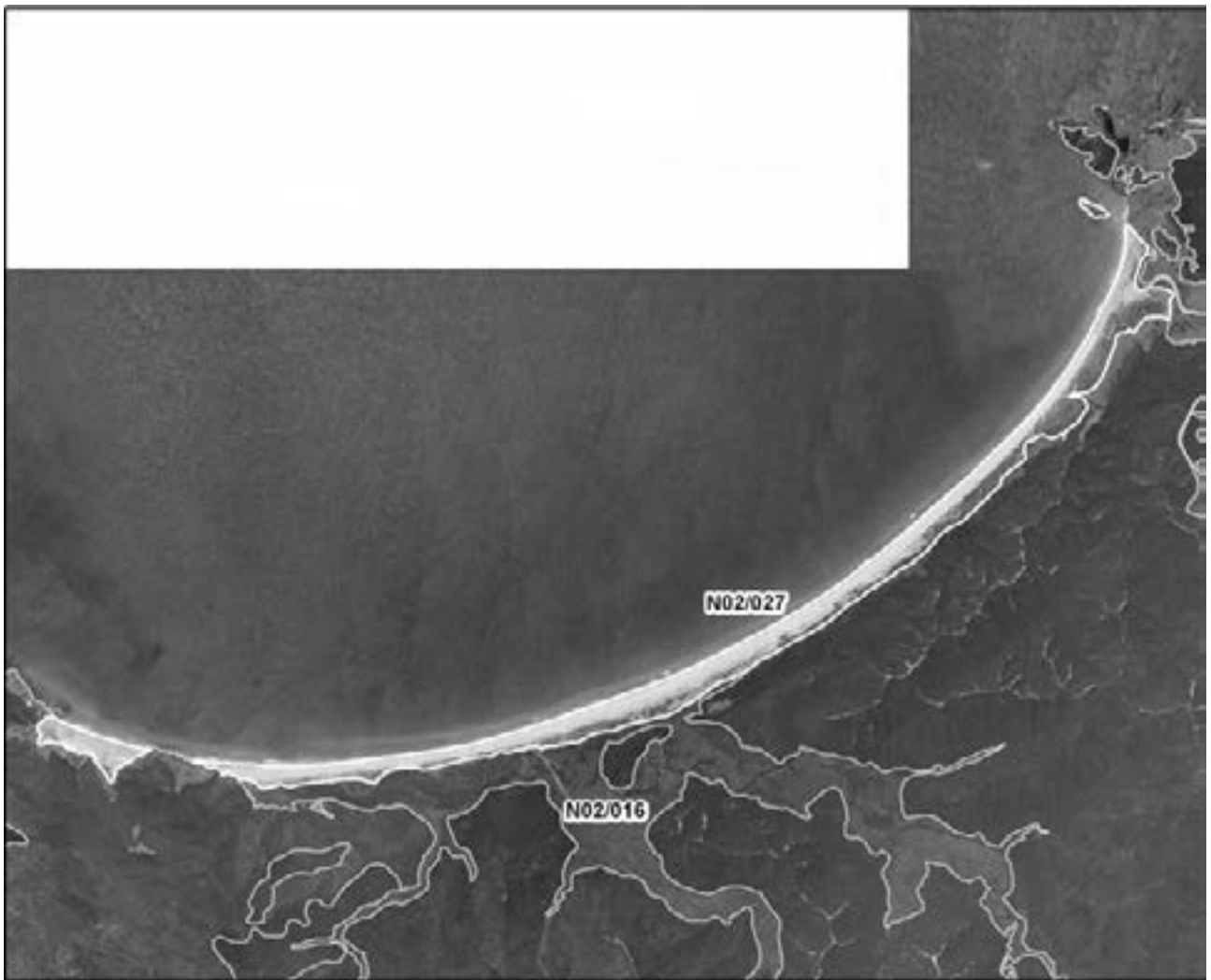
Historic records of *Sonchus kirkii* (Gradual Decline) (1927) and *Fuchsia procumbens* (Sparse) (1928).

Fauna

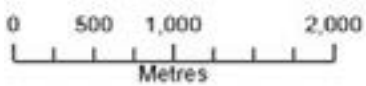
Birds

Northern NZ dotterel (Nationally Vulnerable), banded dotterel (Gradual Decline), white-fronted tern (Gradual Decline) and variable oystercatcher (regionally significant) breed and tern species roost (R. Pierce pers. comm.). Variable oystercatchers are known to breed on Pananehe Island and there are records of visits to the island by the rare arctic migrants, common sandpiper and tattler sp. (SSBI N02/H048).

An historical record of white-capped noddy (Sparse) from Kapowairua in 1965.

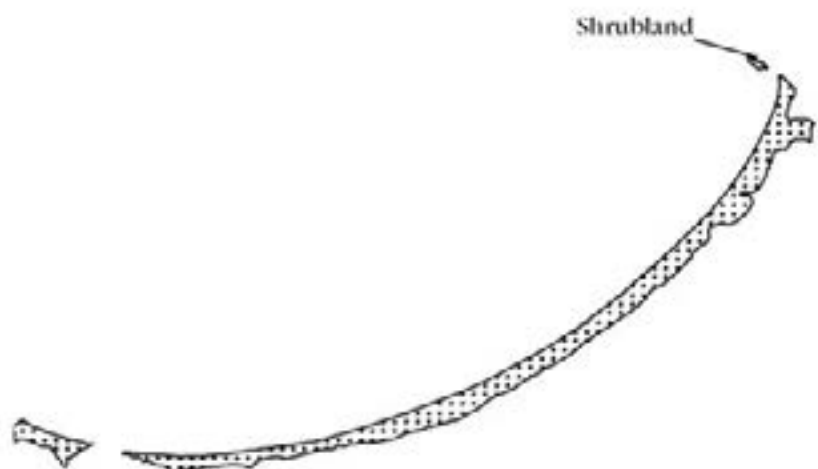


N02/027 Kapowairua



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Landsnails

Succinea arcbeiy (Serious Decline).

Extinct: The nationally threatened *Placostylus ambagiosus* is extinct from this site.

Non-threatened landsnails

Centareus aspersus and *Candidula intesecta*.

Lizards

Ornate skink (Gradual Decline), North Cape green gecko (Sparse) and copper skink (P. Anderson pers. comm.). Yellow-bellied sea snake (Vagrant) recorded in 2005 (P. Whaley pers. comm.).

Other terrestrial invertebrates

Black katipo spider (Serious Decline).

Significance

The dunes at Kapowairua form an important barrier for the Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex (N02/016) and Te Werahi Wetland (N02/010). If this were to fail, the hydrological regime in these wet areas would be drastically changed having a significant ecological impact. The Kapowairua dunes are a very significant example of extensive sand dunes with limited modification compared to other similar areas, and they provide habitat for several threatened species. Representative site and sole record of type (b) sea rush saltmarsh and type (c) sea primrose-remuremu herbfield in the Te Paki ED. Approximately 140.6 ha of this site is within Te Paki Recreation Reserve (DOC-administered). Approximately 109.3 ha of this site is within an 'At Risk' land environment (G1.1a), 2.2 ha is within an 'Underprotected' land environment (A2.1a) and 5.6 ha is within a 'Less Reduced and Better Protected' land environments (A1.1a and A1.1b) (Walker *et al.* 2007).

TOM BOWLING BAY

Survey no. N02/029
Survey date 26 August 1995, 9 January 1997
Grid reference N02 092 532
Area 103.1 ha
Altitude <20 m asl

Ecological units

- (a) Spinifex grassland on dunes
- (b) Dunefield
- (c) Pohuehue-kikuyu grass-vineland on consolidated dunes
- (d) Coastal toetoe-harakeke tussockland on dunes

Landform/geology

Holocene foredunes overlying eroded Pleistocene consolidated dune sand.

Vegetation

(a) Spinifex is sparse to common on the foredunes.

(b) Towards the western end of the bay much of the dunes are almost devoid of any vegetation cover, except for scattered tauhinu, knobby clubbrush, *Pimelea arenaria*, and harakeke. Pingao is very uncommon. Lupin is locally common nearer the eastern end.

(c) At the eastern end the back dunes between the beach and the wetland are covered in pohuehue and kikuyu with clumps of harakeke, and scattered *Ipomoea cairica* and knobby clubbrush.

(d) In the central area, coastal toetoe and harakeke are locally dominant on the seaward face near the stream outlet. Tauhinu and lupin are also present.

Areas adjacent to the wetland and west of Waitangi Stream are heavily impacted by stock and horses.

Significant flora

Hibiscus richardsonii (Nationally Endangered), *Hibiscus diversifolius* (Nationally Vulnerable) (possibly plantings), *Austrofestuca littoralis* (Gradual Decline), *Pimelea arenaria* (Gradual Decline), and pingao (Gradual Decline).

Fauna

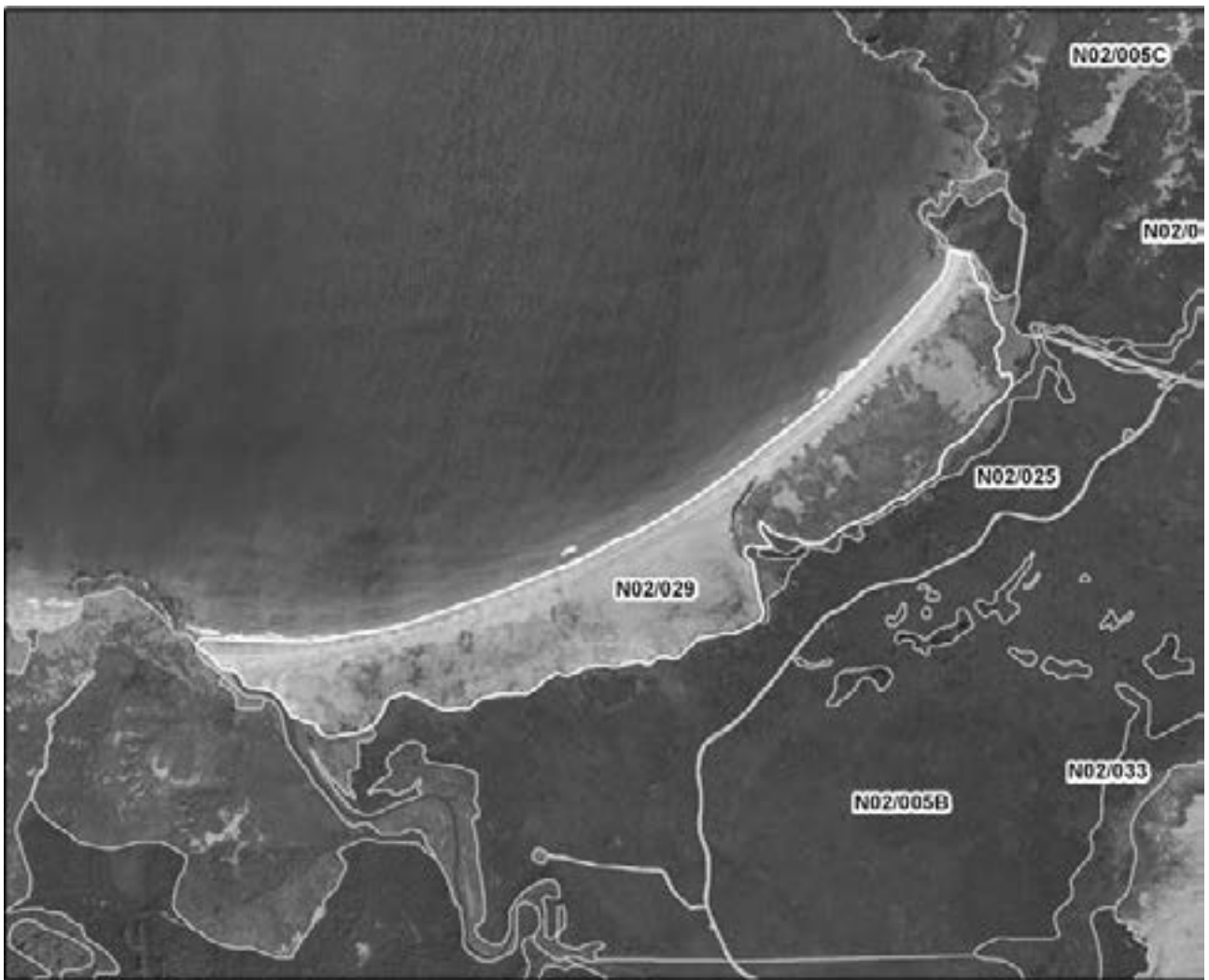
Birds

Northern NZ dotterel (Nationally Vulnerable), Caspian terns (Nationally Vulnerable) roost (R. Pierce pers. comm.), banded dotterel (Gradual Decline) and variable oystercatcher (regionally significant) breed (R. Pierce pers. comm.).

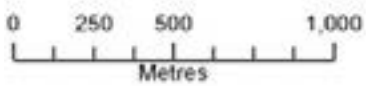
Landsnails

Succinea archeyi (Serious Decline), *Cytora tepakiensis* (Range Restricted), *Delos* sp. 2 (Range Restricted) and *Therasiella* "narrow umbilicus" (Data Deficient).

Non-threatened landsnails: *Cavellia buccinella*, *Paraloama caputspinulae*, *Pbenacobelix tholoides*, Punctid sp. 25, *Mocella eta* and *Tornatellinops novoseelandica*.

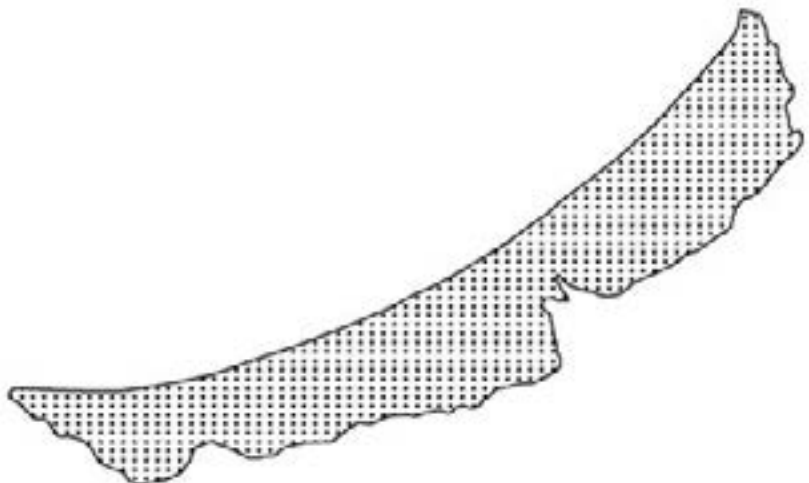


N02/029 Tom Bowling Bay



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Lizards

North Cape green gecko (Sparse).

Significance

Tom Bowling Bay contains a diverse array of plant and animal taxa, including several threatened species within a nationally uncommon habitat type (dunefields). Holocene subfossil vertebrate fauna is recorded at this site which is internationally significant (F. Brook pers. comm.). Representative site for type (a), (b) and (d). Approximately 49.1 ha of this site is within Mokaikai Scenic Reserve (DOC-administered) and 2.2 ha has recently been protected by Kawenata through Nga Whenua Rahui. Approximately 92.4 ha of this site is within an 'At Risk' land environment (G1.1a), 2.6 ha is within an 'Underprotected' land environment (A2.1a) and 1.2 ha is within a 'Less Reduced and Better Protected' land environment (A1.1a) (Walker *et al.* 2007).

WAIKUKU BEACH

Survey no. N02/030
Survey date 26 August 1995, 9 January 1997
Grid reference N02 115 522
Area 186.3 ha
Altitude <5 m asl

Ecological units

- (a) Dunefield
- (b) Pohuehue-kikuyu grass-vineland on consolidated dunes
- (c) Sedgeland on dunes

Landform/geology

Holocene foredunes overlying eroded Pleistocene consolidated dune sand.

Vegetation

(a) At the north end of the beach, the foredunes are mostly bare sand with sparse spinifex, and a few examples of pingao, tauhinu, *Pimelea arenaria*, and harakeke.

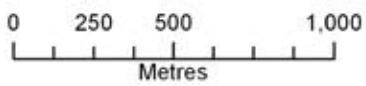
A managed population of the acutely threatened endemic herb *Atriplex hollowayi* occurs on the strand line.

Where the dunes grade into manuka at the end of the beach, kikuyu is widespread with scattered clumps of harakeke.

(b) Between the beach and Carl's Hut (inland from the northern end of the beach) an extensive area of intertwined pohuehue and kikuyu with occasional apple of Sodom, lupin and knobby clubrush. Elsewhere there is scattered harakeke and clumps of knobby clubrush.

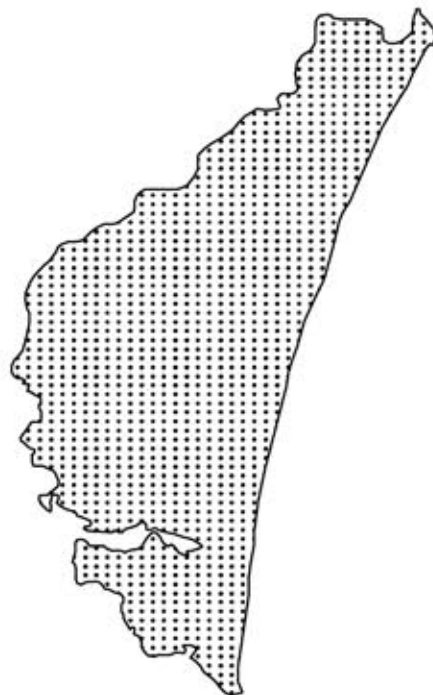


N02/030 Waikuku Beach



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

The central and southern dunes are sparsely vegetated. Mid-beach inland dunes are primarily bare sand with only local scattered spinifex, pingao, marram grass, harakeke and tauhinu. Vegetation on consolidated sand is variable with kikuyu, lotus and white clover being locally dominant.

(c) Knobby clubrush is common with spinifex, shore bindweed, patches of harakeke and occasional tauhinu, coastal toetoe, lupin, *Ipomoea cairica*, *Coprosma acerosa*, patotara, and *Pimelea urvilleana* agg.. Behind the dunes knobby clubrush is dominant with frequent to common pampas, and occasional tauhinu and *Baumea juncea*. Hare's-tail and a variety of exotic herb species are scattered throughout.

A managed population of the acutely threatened endemic herb *Atriplex hollowayi* occurs on the strand line.

Significant flora

Atriplex hollowayi (Nationally Critical), *Hibiscus diversifolius* (Nationally Vulnerable), *Euphorbia glauca* (Serious Decline), *Austrofestuca littoralis* (Gradual Decline), *Eleocharis neozelandica* (Gradual Decline), *Pimelea arenaria* (Gradual Decline), pingao (Gradual Decline), *Myriophyllum votschii* (regionally significant), *Glossostigma elatinoides* (regionally significant), and *Coprosma acerosa* (regionally significant).

Fauna

Birds

Northern NZ dotterel (Nationally Vulnerable), Caspian tern roost (Nationally Vulnerable), banded dotterel (Gradual Decline) (unofficial record) and variable oystercatcher (regionally significant).

Landsnails

Extinct: *Placostylus ambagiosus* are extinct from this site (F. Brook pers. comm.).

Other

Green turtle (Migrant).

Significance

A good example of a nationally threatened habitat type supporting threatened and regionally significant species. Grazing animals are however impacting negatively on the indigenous plant species in this area. Representative site for type (a) and (c). Contains two nationally important fossil records for marine middle or late Miocene fauna, which are the only site records north of East Cape or Kawhia (Kenny and Hayward 1996). Approximately 183.1 ha of this site is within Mokaikai Scenic Reserve (DOC-administered). Approximately 178.1 ha of this site is within an 'At Risk' land environment (G1.1a), 3.4 ha is within an 'Underprotected' land environment (A2.1a) and 4.1 ha is within a 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).

WHAREANA BAY

Survey no.	N02/031
Survey date	26 August 1995
Grid reference	N02 111 494
Area	41.8 ha
Altitude	<5 m asl

Ecological unit

(a) Spinifex grassland on dunes

Landform/geology

Holocene foredunes overlying eroded Pleistocene consolidated dune sand.

Vegetation

Spinifex is common with frequent coastal toetoe and occasional harakeke, tauhinu and knobby clubrush.

A managed population of the acutely threatened endemic herb *Atriplex hollowayi* occurs on the strand line.

Significant flora

Atriplex hollowayi (Nationally Critical), *Utricularia australis* (Nationally Endangered) (stream), *Hibiscus diversifolius* (Nationally Vulnerable), *Austrofestuca littoralis* (Gradual Decline), and *Ipomoea pes-caprae* subsp. *brasiliensis* (Range Restricted).

Historic record of *Euphorbia glauca* (Serious Decline) (1959).

Fauna

Birds

Northern NZ dotterel (Nationally Vulnerable), banded dotterel (Gradual Decline) and variable oystercatcher (regionally significant).

Landsnails

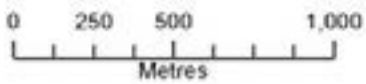
Placostylus ambagiosus whareana (Nationally Critical), *Cytora kerrana* (Range Restricted), *Delos* sp. 2 (Range Restricted) and *Climocella reinga* (Range Restricted).

Non-threatened landsnails

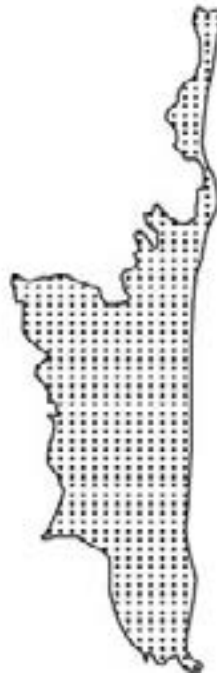
Cantareus aspersus, *Paralaoma caputspinulae*, *Phenacohelix tholoides*, *Therasia* sp. Punctidae sp. 84, *Mocella eta*, *Tornatellinops novoseelandiae* and *Cavellia buccinella*.



N02/031 Whareana Bay



Habitat Type



Aerial photography flown 2003

Significance

A representative, unmodified, nationally threatened habitat type which supports threatened and regionally significant species. Approximately 35.8 ha of this site is within Mokaikai Scenic Reserve (DOC-administered). Approximately 37.4 ha of this site is within an 'At Risk' land environment (G1.1a) and 4.1 ha within a 'Less Reduced and Better Protected' land environments (A1.1a and A1.1b) (Walker *et al.* 2007).

PONAKI WETLAND

Survey no.	N02/032
Survey date	26 August 1995, 15 February 1997
Grid reference	N02 098 461
Area	55 ha
Altitude	<20 m asl

Ecological units

- (a) Raupo reedland in gully and ponded by dunes
- (b) *Baumea arthropphylla*-*B. articulata*-*B. juncea*-*B. rubiginosa* sedgeland in swamp
- (c) *Eleocharis sphacelata* sedgeland in swamp
- (d) Open water

Landform/geology

Freshwater wetlands ponded by Holocene foredunes and valley freshwater wetland in hill country of Parengarenga Group sandstone.

Vegetation

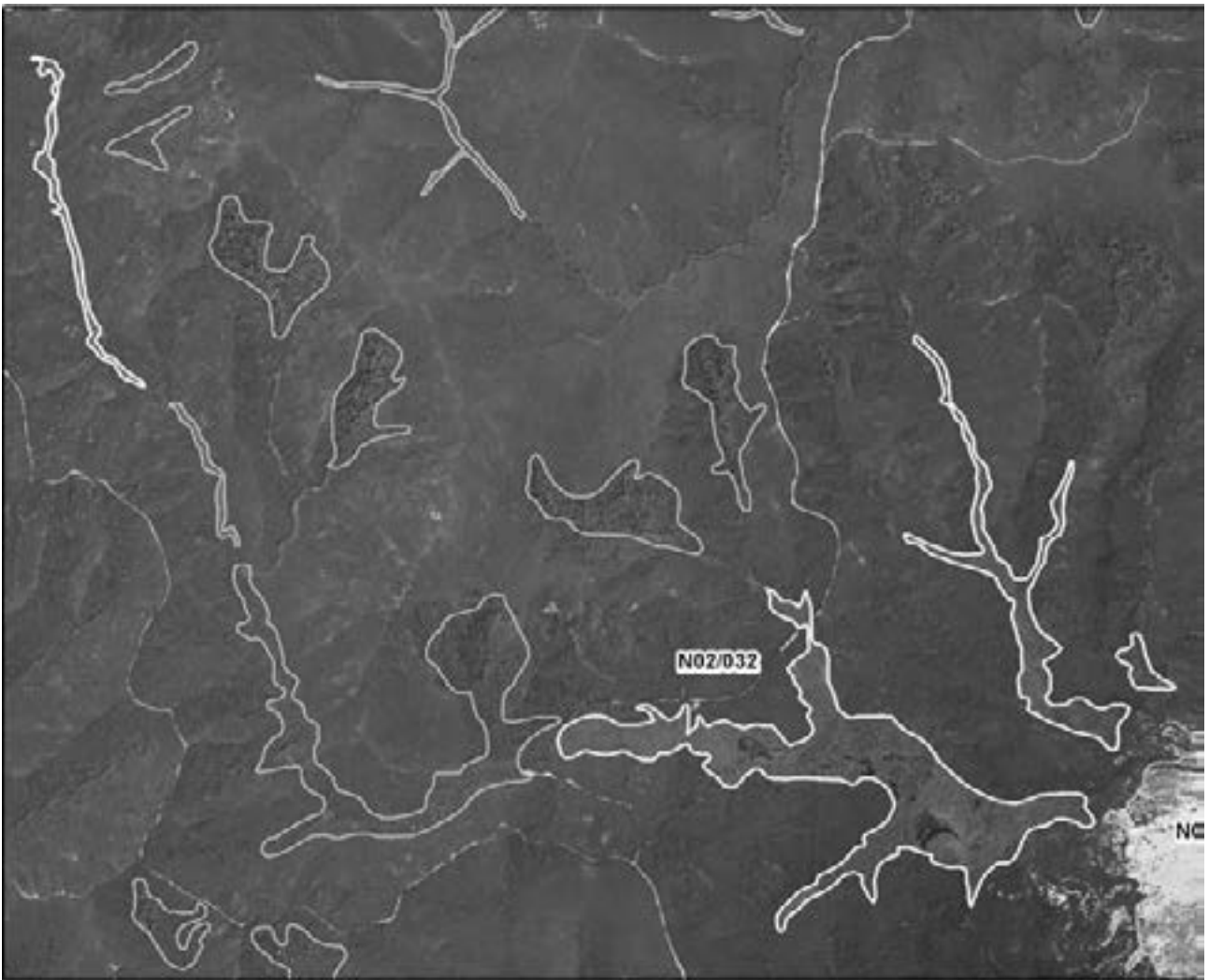
(a) In the southern and northern sections of the main swamp, raupo is dominant with frequent sedges.

(b) *Baumea arthropphylla*, *Baumea articulata*, *B. juncea* and *B. rubiginosa* comprise about 20% of the central wetland area. *Eleocharis sphacelata*, type (c), covers about 5% of this area.

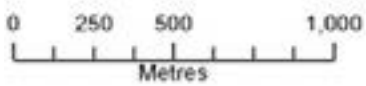
Other species present are swamp millet, kuta, kiokio, *Juncus prismatocarpus*, *J. articulatus*, *J. effusus*, *Sparganium subglobosum*, *Myriophyllum propinquum*, *Persicaria decipiens*, umbrella fern, *Lycopodiella lateralis*, *L. cernua*, *Schizaea fistulosa*, *Drosera binata*, and several herb and grass species, both indigenous and introduced. Sun orchids (*Thelymitra* spp.) are also present.

(d) Several areas of open water occur in the lower reaches, comprising between 5-10% of the total area. Low manuka and ti kouka are frequent approaching the coast.

The surrounding shrubland comprises manuka and kanuka, with frequent ti kouka on the margins.



N02/032 Ponaki Wetland



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

The separate northern swamps are raupo-dominant (type (a)) with frequent kuta and *Baumea juncea*, and occasional *Sparganium subglobosum*, and *Myriophyllum* sp. Oioi occurs on the margins near the beach.

Raupo is also dominant in the upper catchment of the Ponaki Stream, below Kaiwhetu Pā, with scattered manuka and ti kouka.

Significant flora

Telypteris confluens (Gradual Decline), *Spiranthes* aff. *novae-zelandiae* (CHR 518297; Motutangi) (Data Deficient).

Regionally significant: *Spiranthes novae-zelandiae*, *Sparganium subglobosum*, *Drosera binata* and *Ranunculus urvilleanus*.

Fauna

Birds

Spotless crane (Sparse) and North Island fernbird (Sparse).

Fish

Banded kokopu (regionally significant), giant bully (regionally significant), shortfin eel, inanga and common bully (M. McGlynn pers. comm.).

Significance

This is a large mineralised wetland with a fully vegetated catchment including a secondary forest remnant along the creek between the valley ponded wetland and foredune ponded wetland. Wetlands are a nationally rare habitat type and this site supports threatened and regionally significant species. Representative site for type (b). Cattle and horses impact the edge of the wetland and there are two areas of taro (in the north and south of the largest wetland) which suggests past cultivation (P. Whaley pers. comm.). This site is entirely within Mokaikai Scenic Reserve (DOC-administered). Approximately 43.9 ha is within an 'Underprotected' land environment (A2.1a) and 9.0 ha within a 'Less Reduced and Better Protected' land environment (A1.1.b) (Walker *et al.* 2007).

WAIKUKU WETLANDS

Survey no.	N02/033
Survey date	26 August 1995, 9 January 1997
Grid reference	N02 108 526
Area	41.1 ha
Altitude	0–20 m asl

Ecological units

- (a) Raupo reedland on ponded flats and sand
- (b) Giant umbrella sedge sedgeland on sand
- (c) Bachelor's button-saltwater paspalum-*Juncus articulatus* herbfield on sand flats

WAIKUKU WETLANDS

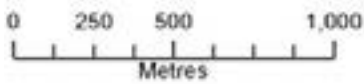
Survey no. N02/033
Survey date 26 August 1995, 9 January 1997
Grid reference N02 108 526
Area 41.1 ha
Altitude 0-20 m asl

Ecological units

- (a) Raupo reedland on ponded flats and sand
- (b) Giant umbrella sedge sedgeland on sand
- (c) Bachelor's button-saltwater paspalum-*Juncus articulatus* herbfield on sand flats



N02/033 Waikuku Wetlands



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Landform/geology

Freshwater wetland ponded in Pleistocene to Holocene muddy and sandy interdune deposits.

Vegetation

(a) Behind Waikuku Beach is an extensive area of raupo-dominant wetlands which occur between tongues of manuka. Ti kouka is frequent to common on the margins, with frequent giant umbrella sedge and scattered harakeke.

At the northern end the raupo becomes less dominant, grading into kikuyu. Raupo is common at the stream outlet with local patches of giant umbrella sedge with harakeke (Type (b)). Oioi dominates a small area.

(c) On the damp sand flats bachelor's button, saltwater paspalum, and *Juncus articulatus* can be found.

Significant flora

Hibiscus diversifolius (Nationally Vulnerable), *Ranunculus urvilleanus* (regionally significant).

Fauna

Birds

Spotless crane (Sparse) and North Island fernbird (Sparse).

Fish

Longfin eel (Gradual Decline), banded kokopu (regionally significant), giant bully (regionally significant), red-finned bully, shortfin eel and inanga.

Significance

This large representative wetland system is an integral part of the sequence from dunefield-wetland-shrubland-wetland-dunefield on the Waikuku tombolo, a nationally uncommon occurrence. This site supports threatened and regionally significant species however grazing animals are impacting negatively on the indigenous species in this area. This site is entirely within Mokaikai Scenic Reserve (DOC-administered). Approximately 6.3 ha of this site is within an 'At Risk' land environment (G1.1a), 33.1 ha is within an 'Underprotected' land environment (A2.1a) and 1.7 ha is within a 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).

WAITANGI STREAM WETLAND AND RIPARIAN STRIP

Survey no.	N02/034
Survey date	26 August 1995
Grid reference	N02 083 524
Area	90.4 ha (6.7 ha forest, 63.2 ha shrubland, 20.5 ha wetland)
Altitude	<20 m asl

Ecological units

- (a) Raupo reedland in swamp
- (b) Kanuka-kohekohe-mamaku forest on hillslope
- (c) Shrubland

Landform/geology

Freshwater wetland along Waitangi Stream valleys.

Vegetation

- (a) Raupo is dominant with *Baumea juncea*, *B. articulata*, harakeke, oioi, saltmarsh ribbonwood and *Hibiscus diversifolius*.
- (b) On the steep banks of the Inimangimangi Stream, kanuka, kohekohe and mamaku are common and rewarewa is a frequent emergent. Pohutukawa also occurs in the canopy with occasional ti kouka and hangehange.
- (c) 2003 aerial photography shows that most of the site is shrubland (not surveyed) and is likely to be dominated by manuka/kanuka.

Significant flora

Hibiscus diversifolius (Nationally Vulnerable), *Calystegia marginata* (Sparse) and *Sparganium subglobosum* (regionally significant).

Fauna

Birds

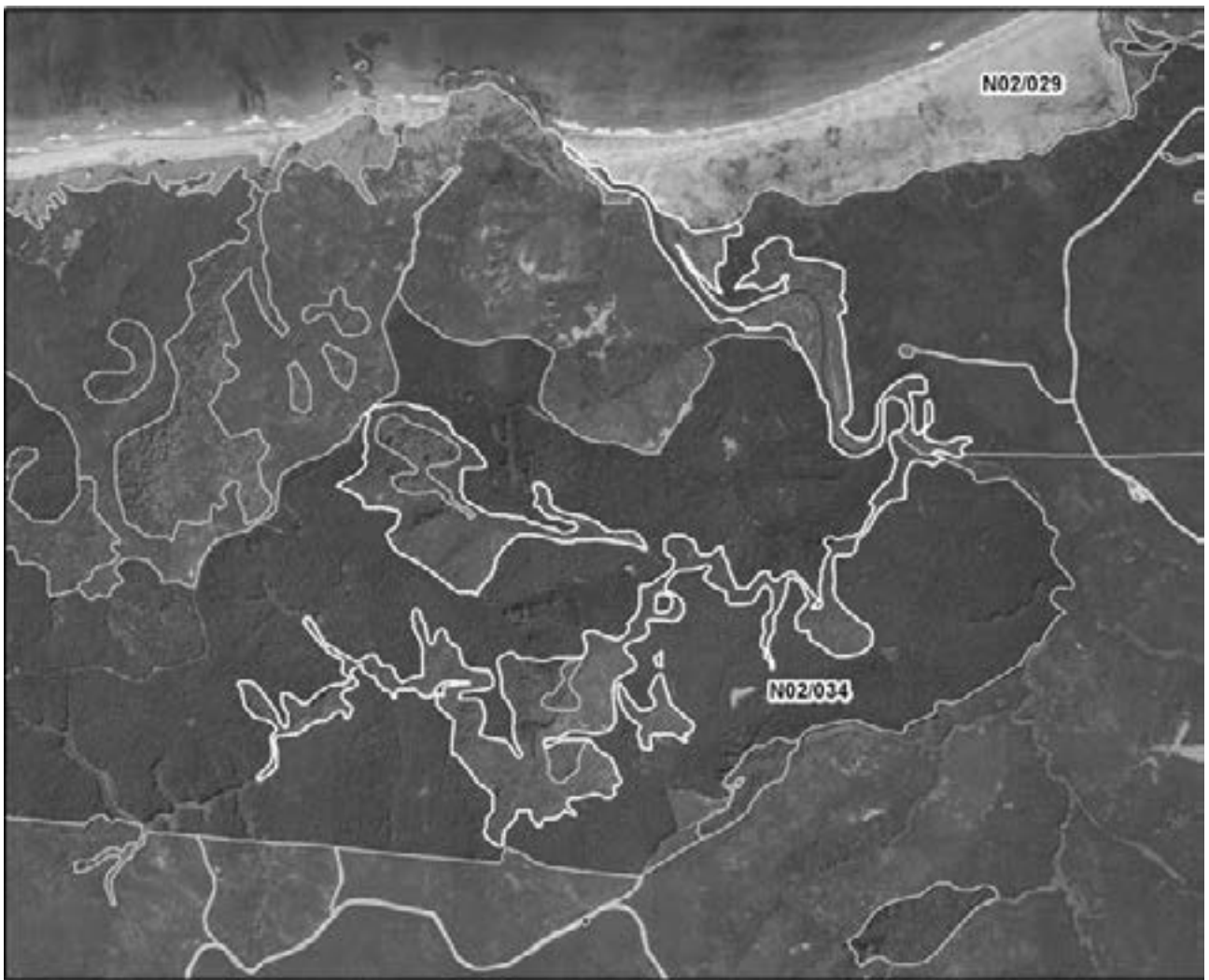
North Island fernbird (Sparse) and spotless crane (Sparse).

Fish

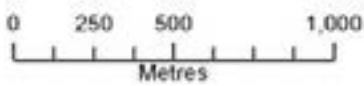
Giant bully (regionally significant), inanga, shortfin eel and common bully.

Landsnails

Amborybtida duplicata (Gradual Decline), Charopidae sp. 73 (Range Restricted), Punctidae sp. 11 (Range Restricted), *Allodiscus spiritus* (Range Restricted), *Climocella reinga* (Range Restricted), *Cytora kerrana* (Range Restricted), *Cytora ampla* (Range Restricted) and *Liaria aupaourica* (Range Restricted) (*L. a. aupaourica* Hitchmough *et al.* (comp.) 2007).



N02/034 Waitangi Stream Wetland and Riparian Strip



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Non-threatened landsnails

Cavellia buccinella, *Chaureopa hazelwoodi*, *Mocella eta*, *Therasiella celinde*, *Cavellia* sp. cf. *C. irregularis* and Punctidae sp. D.

Significance

This site contains a semi-mineralised wetland, which is a nationally rare habitat type. The riparian forest in the mid-catchment, performs a refuge and soil conservation function during logging of adjoining radiata pines. Representative site supporting threatened and regionally significant species. Approximately 38.5 ha of this site has been recently protected by Kawenata through Nga Whenua Rahui. Approximately 3.8 ha of this site is within a 'Chronically Threatened' land environment (A1.1c), 0.1 ha of this site is within an 'At Risk' land environments (G1.1a), 2.1 ha is within an 'Underprotected' land environment (A2.1a) and 78.8 ha is within a 'Less Reduced and Better Protected' land environment (A1.1a and A1.1b) (Walker *et al.* 2007).

WAIHAKARI WETLAND

Survey no. N02/035
Survey date 26 August 1995, 15 February 1997
Grid reference N02 106 447
Area 7.0 ha
Altitude <20 m asl

Ecological units

- (a) Raupo reedland in swamp
- (b) Oioi rushland on sand

Landform/geology

Wetland ponded by Holocene foredunes.

Vegetation

- (a) Raupo is the dominant species in the main wetland with locally frequent *Baumea articulata*.
- (b) Oioi lines the stream which flows from the southern end of the beach towards the wetland. There are occasional coastal toetoe, raupo, *Baumea articulata*, *Juncus* sp., giant umbrella sedge and umbrella fern.

Significant flora

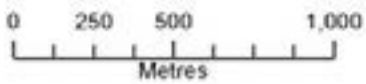
Eleocharis neozelandica (Gradual Decline) and *Myriophyllum votschii* (regionally significant).

Fauna

Not surveyed.



N02/035 Waihakari Wetland



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003



Significance

A nationally uncommon habitat type in a remote spot with minimal modification. Representative site for type (b) oioi rushland. Approximately 5.5 ha of this site is within Mokaikai Scenic Reserve (DOC-administered). Approximately 0.7 ha of this site is within a 'Chronically Threatened' land environment (A1.1c), 2.5 ha of this site is within an 'At Risk' land environment (G1.1a), 2.3 ha is within an 'Underprotected' land environment (A2.1a) and 0.5 ha is within a 'Less Reduced and Better Protected' land environment (A1.1a) (Walker *et al.* 2007).

TAWAKEWAKE WETLAND

Survey no.	N02/036
Survey date	26 August 1995, December 1996, 9 January 1997
Grid reference	N02 104 538
Area	5.6 ha
Altitude	<20 m asl

Ecological units

- (a) *Schoenus brevifolius*-*Baumea juncea* sedgeland in gully
- (b) *Eleocharis sphacelata* sedgeland in swamp
- (c) Raupo-harakeke-ti kouka reedland in swamp

Landform/geology

Freshwater wetland ponded by Pleistocene to Holocene muddy and sandy interdune deposits.

Vegetation

- (a) The valley floor of the upper Tawakewake Stream is dominated by *Schoenus brevifolius* and *Baumea juncea*.
- (b) As it approaches Waikuku Flat, there are small patches of *Eleocharis sphacelata*.
- (c) Nearer Tom Bowling Bay, raupo is dominant with patches of harakeke and ti kouka.

This wetland is contiguous with the Waiwhero Stream Wetland, an extensive wetland system, behind Tom Bowling Bay.

Significant flora

Ophioglossum petiolatum (Nationally Endangered).

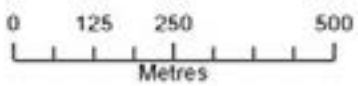
Fauna

Birds

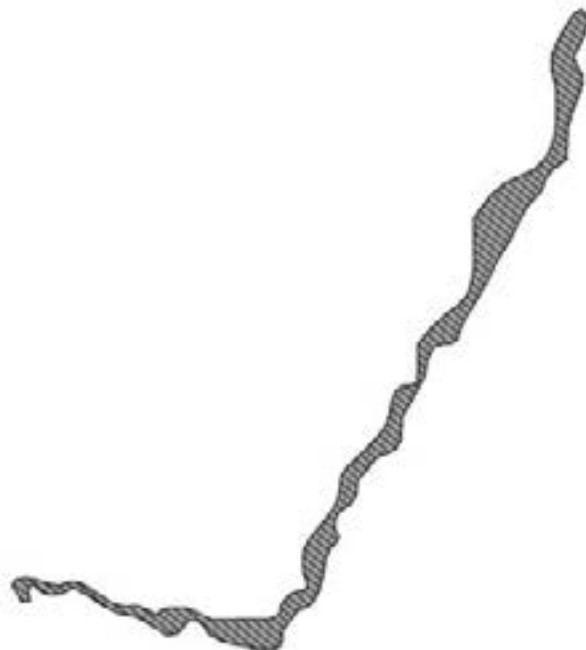
Australasian bittern (Nationally Endangered), North Island fernbird (Sparse) and spotless crane (Sparse).



N02/036 Tawakewake Wetland



Habitat Type



Aerial photography flown 2003

Fish

Inanga, common bully and common smelt.

Significance

A representative, nationally uncommon habitat type supporting threatened species. Approximately 1.6 ha of this site is within North Cape Scientific Reserve (DOC-administered) (28.5% protected). Approximately 0.2 ha of this site is within a 'Chronically Threatened' land environment (A1.1c) and 5.4 ha is within a 'Less Reduced and Better Protected' land environment (A1.1a) (Walker *et al.* 2007).

WAIHEUHEU CATCHMENT WETLANDS

Survey no.	N02/037
Survey date	6 December 1995
Grid reference	N02 036 484
Area	50.3 ha (18.1 ha forest, 32.2 ha wetland)
Altitude	<2 m asl

Ecological units

- (a) Raupo reedland in swamp
- (b) Kanuka shrubland on gully sides

Landform/geology

Freshwater wetland along Waiheuheu Creek and tributaries.

Vegetation

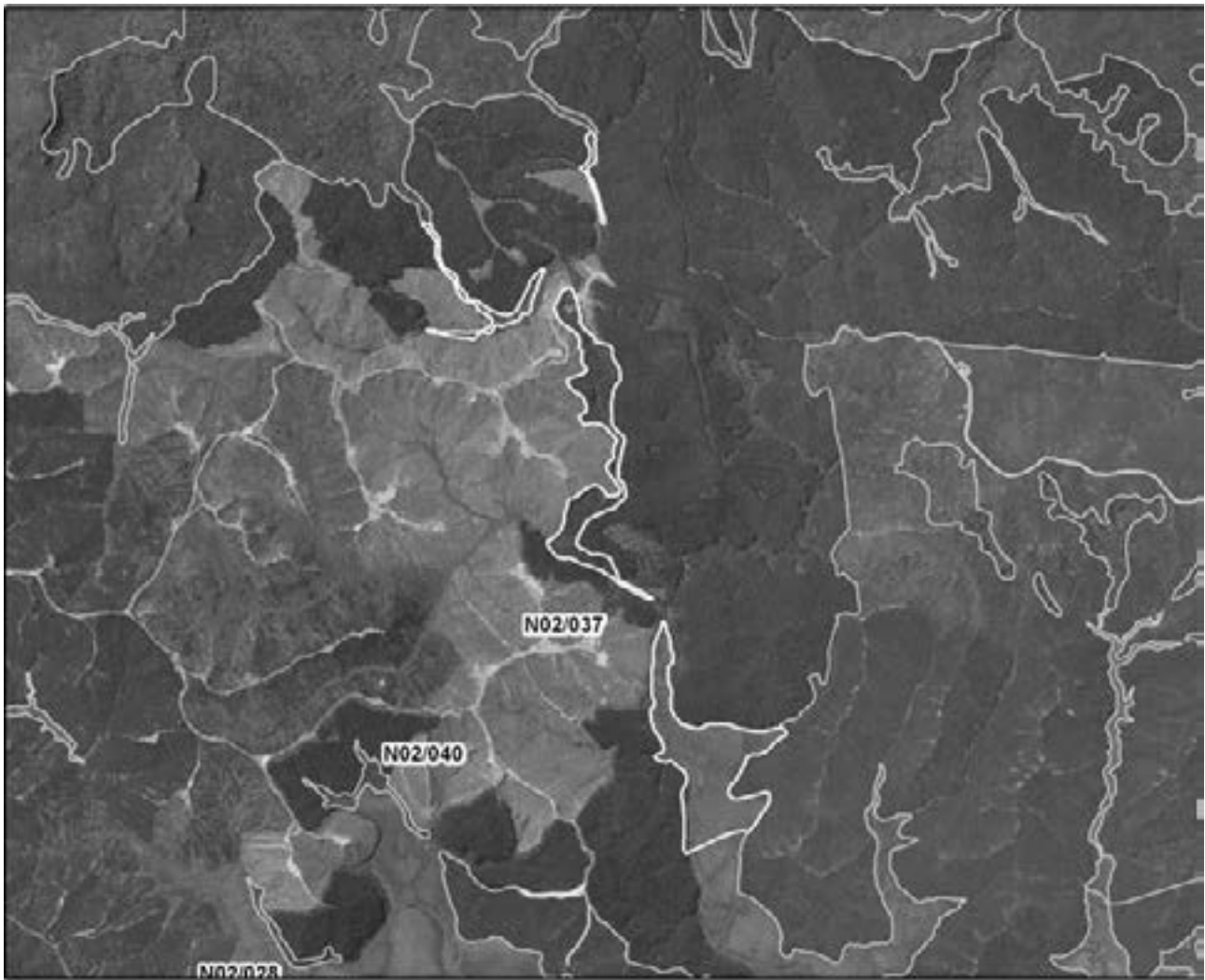
- (a) Raupo is the dominant vegetation in the valley floors in association with ti kouka and occasional harakeke and mamaku.
- (b) In the mid-catchment tall kanuka is dominant in association with houhere, ti kouka, mamaku and mahoe. Kiokio is present in the understorey.

Fauna

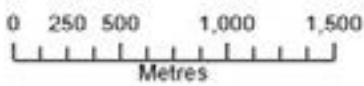
Not surveyed.

Significance

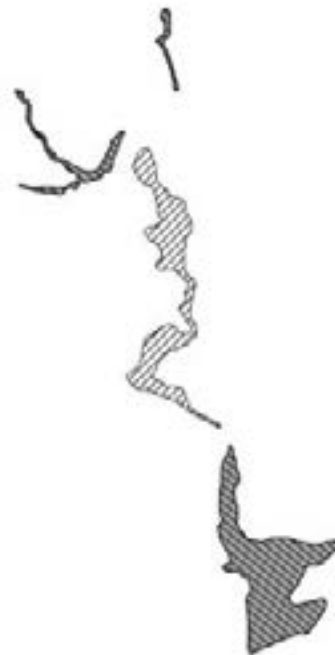
A relatively large wetland providing a water quality buffer between an upper catchment radiata pine plantation and the Parengarenga Harbour. Representative site for type (a) and example of a nationally rare habitat type. This site has no formal protection. Approximately 18.2 ha of this site is within an 'Underprotected' land environment (A2.1a) and 30.1 ha is within a 'Less Reduced and Better Protected' land environments (A1.1a and A1.1b) (Walker *et al.* 2007).



N02/037 Waiheuheu Catchment Wetlands



Habitat Type



Aerial photography flown 2003

HAUPATOTO/WHAREANA BAY WETLANDS

Survey no.	N02/038
Survey date	6 December 1995
Grid reference	N02 080 491 and N02 110 491
Area	14.9 ha
Altitude	0–80 m asl

Ecological units

- (a) Raupo reedland in swamp
- (b) *Baumea* sp. sedgeland in swamp
- (c) Open water

Landform/geology

Freshwater wetland in hill country of Parengarenga Group sandstone and freshwater wetland ponded behind Holocene coastal dunes.

Vegetation

Hauptoto

(a) Raupo is dominant in the valley bottoms with scattered clumps of harakeke, manuka, ti kouka and kiokio. Ti kouka is common in the easternmost arm.

Whareana

Raupo is abundant, type (a), with frequent *Baumea* sp. and occasional kanuka and ti kouka. At the coast the vegetation grades into oioi.

(b) Higher up in the catchment, *Baumea* (not specified, presumably *Baumea articulata*) is dominant with frequent ti kouka and occasional harakeke and raupo.

The wetland grades into manuka with ti kouka and tree fern scattered in the gullies.

Significant flora

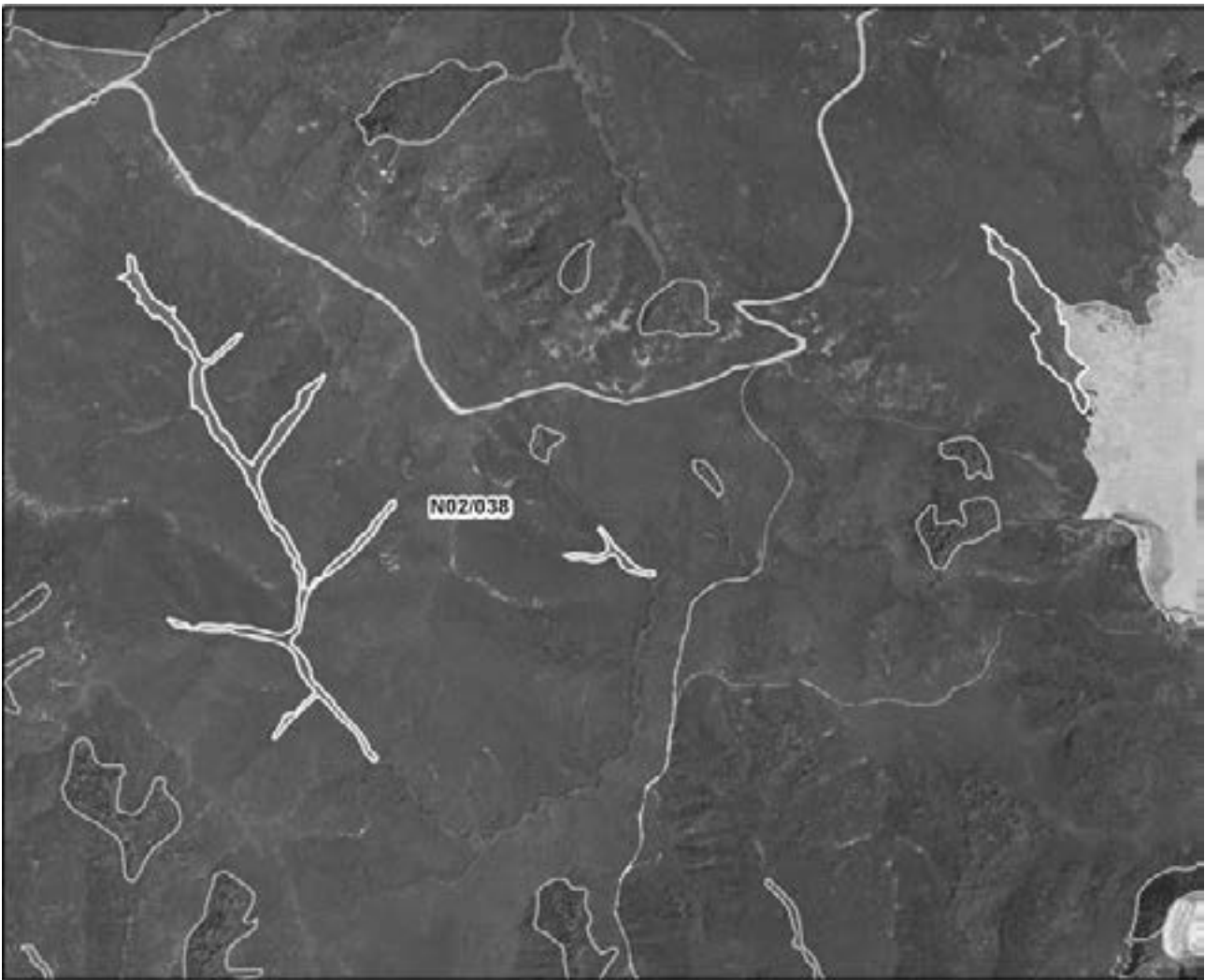
Hibiscus diversifolius (Nationally Vulnerable).

Fauna

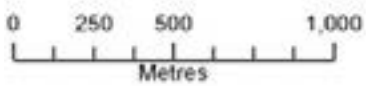
North Island fernbird (Sparse).

Significance

This site is defined by a largely unmodified wetland system in the valley floor of a fully vegetated catchment and a coastal sequence from duneland to shrubland in a fully vegetated catchment. Wetlands are a nationally rare habitat type and this site supports threatened species. Representative site for type (a) raupo reedland. This site is entirely within Mokaikai Scenic Reserve (DOC-administered). Approximately 0.9 ha of this site is within an 'At Risk' land environment (G1.1a), 9.1 ha is within an 'Underprotected' land environment (A2.1a) and 4.9 ha within a 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).



N02/038 Haupatoto/Whareana Bay Wetlands



Habitat Type



Aerial photography flown 2003

TAHUNA CHANNEL WETLANDS

Survey no. N02/039
Survey date 6 December 1995
Grid reference N02 065 461
Area 4.4 ha
Altitude <2 m asl

Ecological unit

(a) *Juncus* spp. rushland in swamp

Landform/geology

Freshwater wetlands at head of Tahuna Channel.

Vegetation

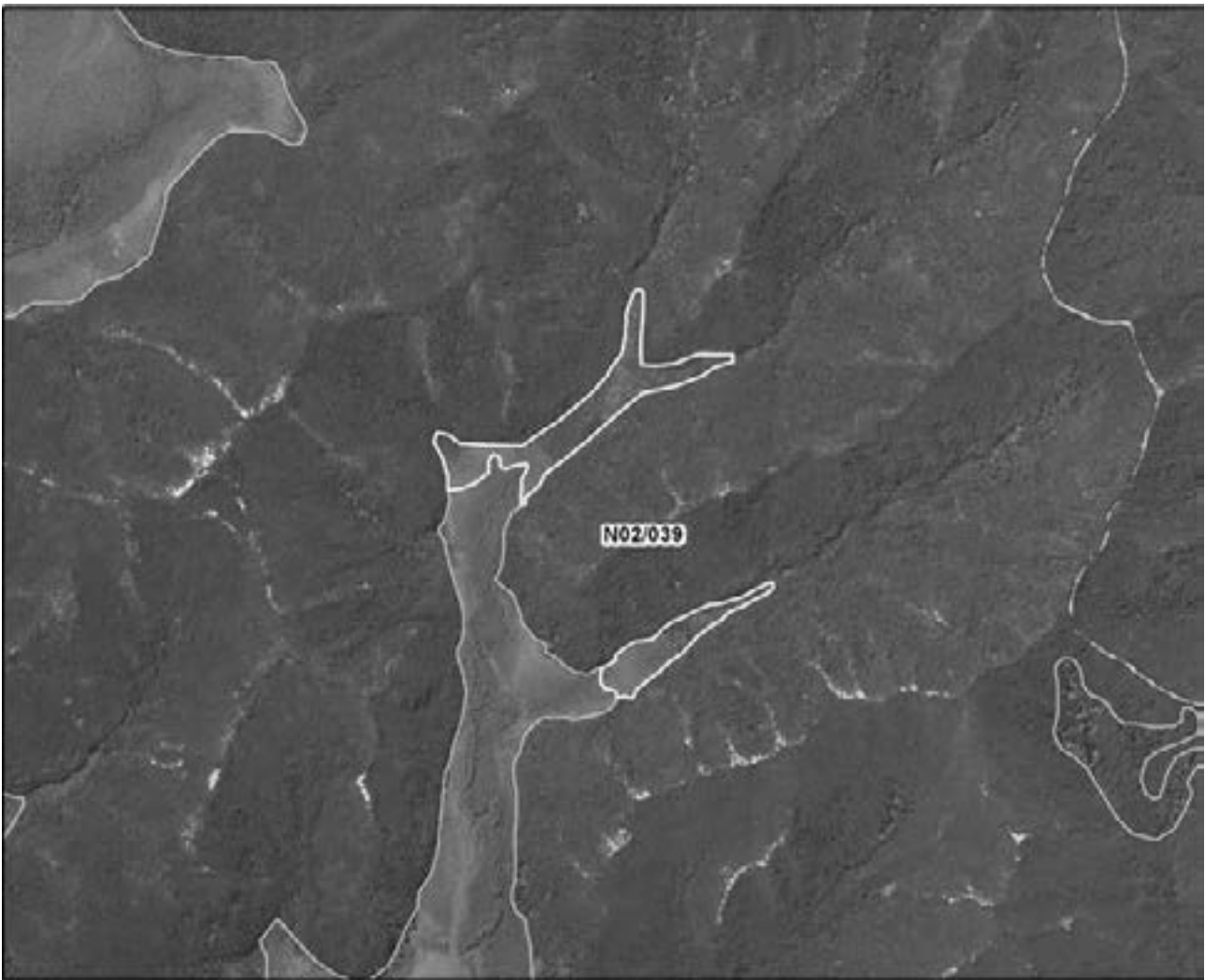
Dominated by rushes (*Juncus* spp.) with occasional harakeke, ti kouka and raupo.

Fauna

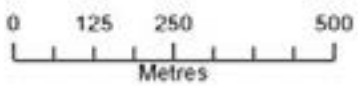
Not surveyed.

Significance

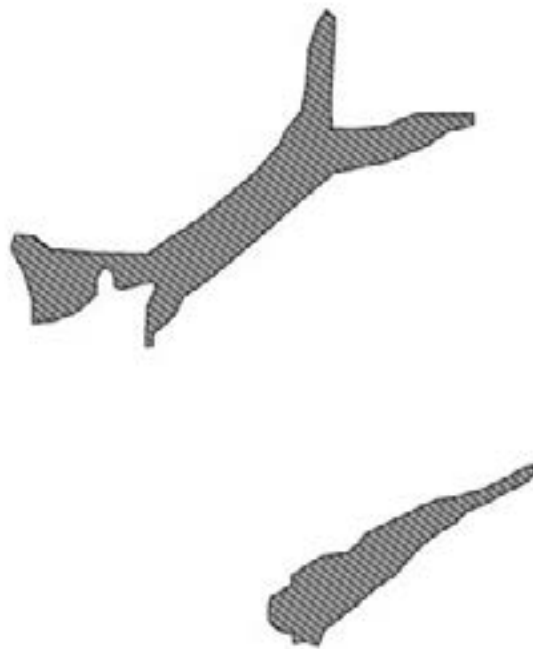
A mineralised wetland buffer to the Parengarenga Harbour and a nationally rare habitat type. This site is entirely within Mokaikai Scenic Reserve (DOC-administered). All of this site is within a 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).



N02/039 Tahuna Channel Wetlands



Habitat Type



Aerial photography flown 2003

WAINGATEPUA CHANNEL

Survey no. N02/040
Survey date August 1993
Grid reference N02 018 484
Area 4.2 ha
Altitude <2 m asl

Ecological unit

(a) Raupo reedland in swamp

Landform/geology

Freshwater wetland at head of Waingatepua channel.

Vegetation

A raupo dominant wetland.

Fauna

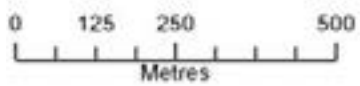
Not surveyed.

Significance

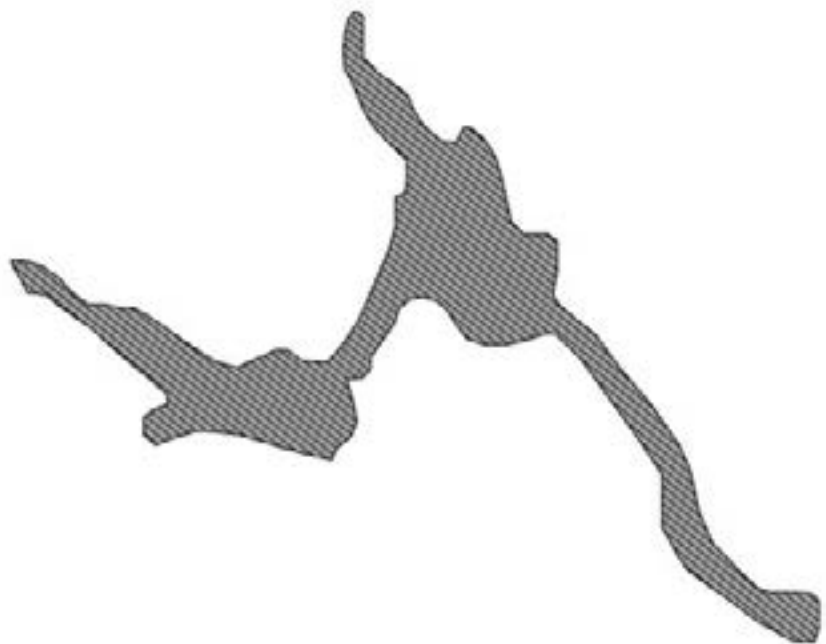
A nationally rare habitat type which forms a buffer between a radiata pine plantation and mangroves in the Parengarenga Harbour. This site has no formal protection. All of this site is within a 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).



N02/040 Waingatepua Channel



Habitat Type



Aerial photography flown 2003

TE HUREWAI STREAM WETLAND

Survey no. N02/041
Survey date 6 December 1995
Grid reference N02 002 443
Area 4.8 ha
Altitude 0-20 m asl

Ecological units

- (a) Raupo reedland in swamp
- (b) Umbrella fern fernland in valley bottom

Landform/geology

Freshwater wetland in Te Hurewai Stream valley.

Vegetation

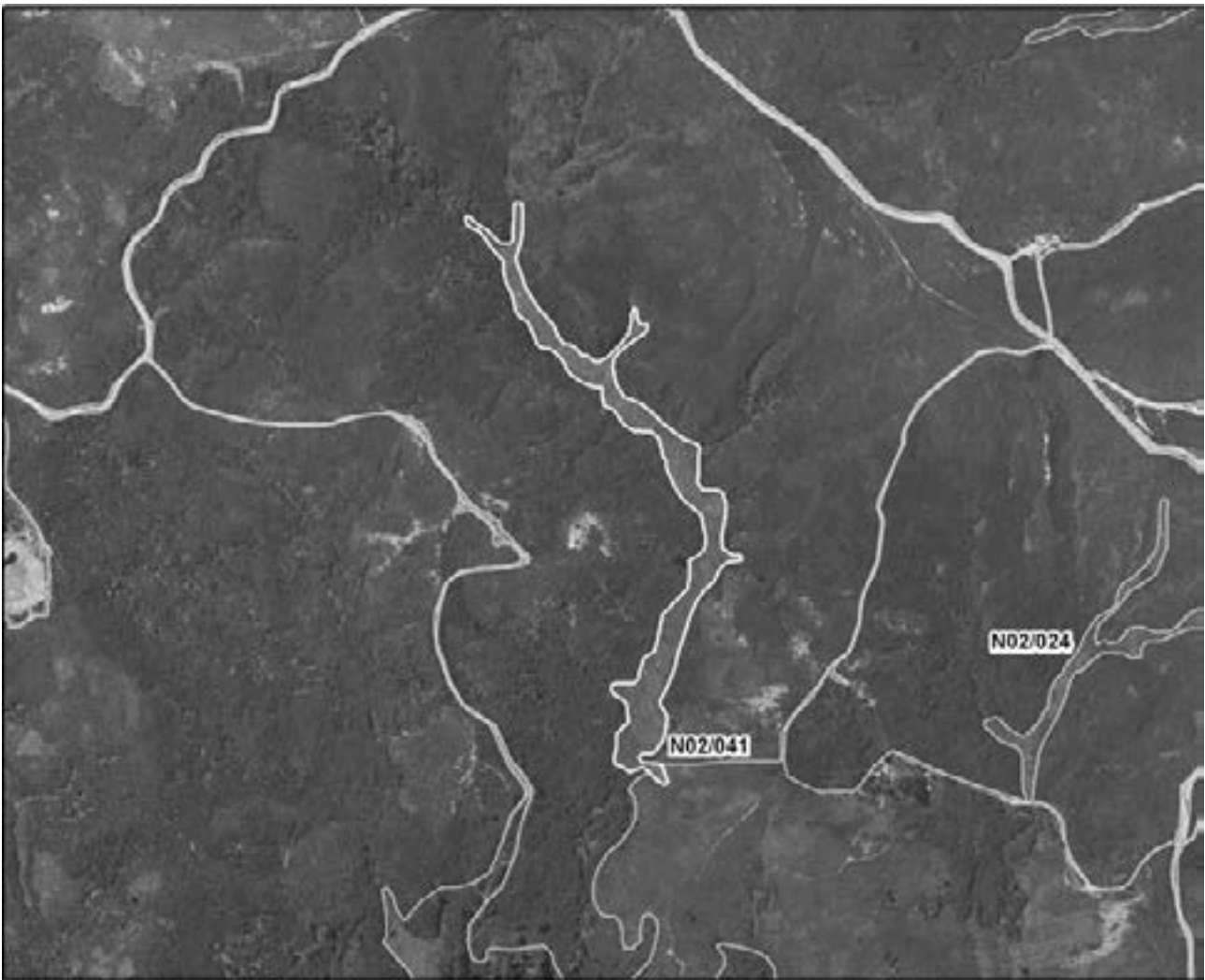
- (a) Kuta and swamp millet occur amongst the raupo reedland with scattered clumps of manuka, scattered *Baumea* sp. and occasional harakeke, mamaku, and kiokio.
- (b) Umbrella fern occurs in small patches with clumps of manuka.

Fauna

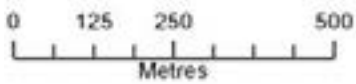
Not surveyed.

Significance

A nationally rare habitat type and representative site for raupo reedland. This site has no formal protection. Approximately 4.3 ha of this site is within an 'Underprotected' land environment (A2.1a) and 0.2 ha is within a 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).

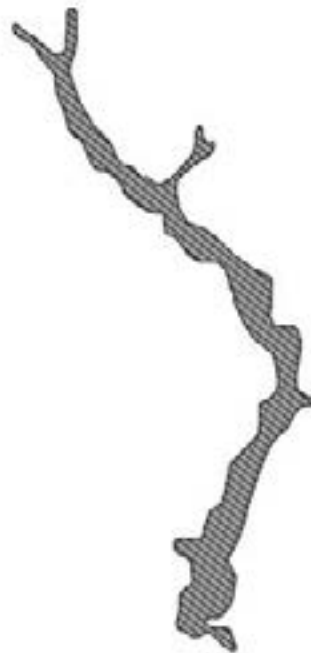


N02/041 Te Hurewai Stream Wetland



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

NGAKENGO BEACH

Survey no.	N02/062
Survey date	6 December 1995, 15 February 1997
Grid reference	N01 110 460
Area	165 ha
Altitude	0-20 m asl

Ecological units

- (a) Spinifex grassland on foredune
- (b) Dunefield
- (c) Oioi-coastal toetoe tussock-sedgeland on dunes
- (d) Sand sedge sedgeland on damp sand flats

Landform/geology

Holocene dunes overlying eroded Pleistocene consolidated dune sand.

Vegetation

- (a) Spinifex is abundant on the foredunes.
- (b) At the southern end of the beach there are a few tauhinu, coastal toetoe, clumps of oioi, lupin, *Coprosma acerosa*, and knobby clubbrush over bare sand. Pingao is occasional to locally frequent.
- (c) On the more densely vegetated backdunes, oioi and coastal toetoe are common with occasional pohutukawa. At the northern end of the beach pohuehue and kanuka are also present on the backdunes.
- (d) Sedge is common on damp sand flats, with *Eleocharis neozelandica* locally common in wet sand next to stream mouths.

Significant flora

Eleocharis neozelandica (Gradual Decline), pingao (Gradual Decline) and *Coprosma acerosa* (regionally significant).

Fauna

Birds

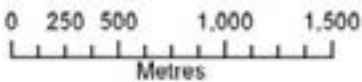
Caspian tern (roosting) (Nationally Vulnerable), northern NZ dotterel (Nationally Vulnerable), red-billed gull (Gradual Decline), banded dotterel (Gradual Decline), white-fronted tern (roosting) (Gradual Decline) and variable oystercatcher (regionally significant). In 1997, 48 northern NZ dotterel, about 20 white-fronted terns and 30 variable oystercatchers were recorded (SSBI M02/N02/H020).

Significance

An unmodified dune system representative of a rare habitat type and outstanding habitat for threatened shorebirds; threatened and regionally significant flora also recorded. Representative site for all vegetation types.



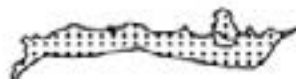
N02/062 Ngakengo Beach



- Habitat Type**
-  Duneland/Sandfield
 -  Estuarine
 -  Forest
 -  Shrubland
 -  Wetland



Aerial photography flown 2003



Approximately 105.2 ha of this site (63.7%) is within Mokaikai Scenic Reserve (DOC-administered). Approximately 5.3 ha of this site is within a 'Chronically Threatened' land environment (A1.1c), 146.5 ha of this site is within an 'At Risk' land environment (G1.1a), 1.1 ha is within an 'Underprotected' land environment (A2.1a) and 6.8 ha is within a 'Less Reduced and Better Protected' land environments (A1.1a and A1.1b) (Walker *et al.* 2007).

TAPOTUPOTU BEACH

Survey no. M02/063
Survey date 26 August 1995, 16 February 1997
Grid reference M02 857 517
Area 8.7 ha
Altitude <5 m asl

Ecological units

- (a) Spinifex grassland on dunes
- (b) Buffalo grass grassland on dunes

Landform/geology

Holocene foredunes.

Vegetation

- (a) Spinifex is common on the foredune with scattered shore bindweed and clumps of knobby clubrush.
- (b) Buffalo grass forms the dominant vegetation on the back dune.

Marram grass is local in both types.

Significant flora

Hibiscus richardsonii (Nationally Endangered) and *Austrofestuca littoralis* (Gradual Decline).

Fauna

Birds

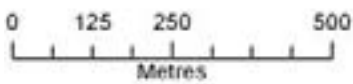
Northern NZ dotterel (Nationally Vulnerable), red-billed gull (Gradual Decline), variable oystercatcher (Regionally significant), black-backed gull.

Lizards

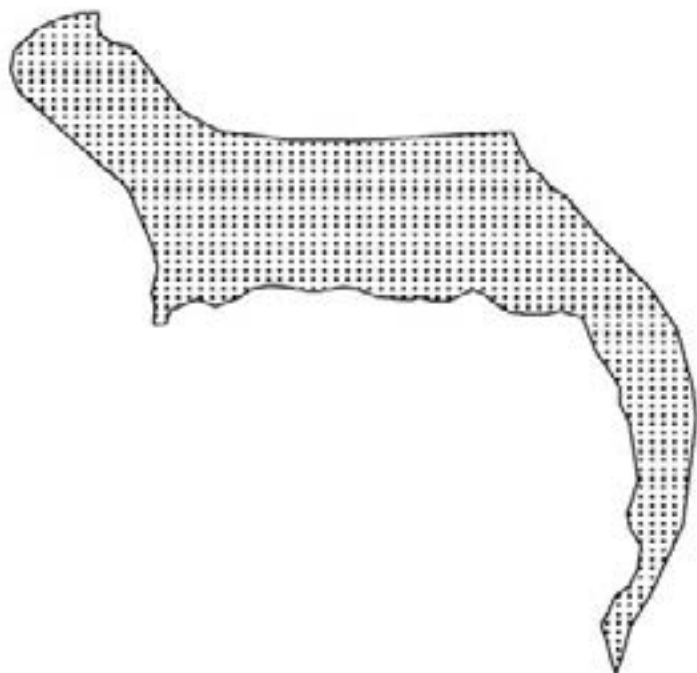
North Cape Pacific gecko (Gradual Decline), ornate skink (Gradual Decline), Suter's skink (Range Restricted), North Cape green gecko (Sparse) and shore skink.



M02/063 Tapotupotu Beach



Habitat Type



Aerial photography flown 2003

Non-threatened landsnails

Tornatellinops novoseelandica, *Paralaoma caputspinulae*, *Cantareus aspersus*, *Candidula intesecta*, Punctidae sp. 84, *Prietocella barbara* and *Vallonia excentrica*.

Other invertebrates

Black katipo spider (Serious Decline).

Significance

Tapotupotu Beach provides important habitat for threatened species and is a representative site for type (a). Approximately 8.2 ha of this site is within Te Paki Recreation Reserve (DOC-administered). Approximately 5.3 ha of this site is within a 'Chronically Threatened' land environment (A1.1c) and 1 ha is within a 'Less Reduced and Better Protected' land environment (A1.1a) (Walker *et al.* 2007).

THE BIG LAKE

Survey no. N02/067
Survey date 27 February 1996
Grid reference N02 952 398
Area 1.0 ha
Altitude 60 m asl

Ecological units

- (a) Open water in dune lake
- (b) *Eleocharis sphacelata* reedland on sand
- (c) Manuka shrubland in shallow depression

Landform/geology

Freshwater wetland in interdune hollow on Pleistocene dunefield.

Vegetation

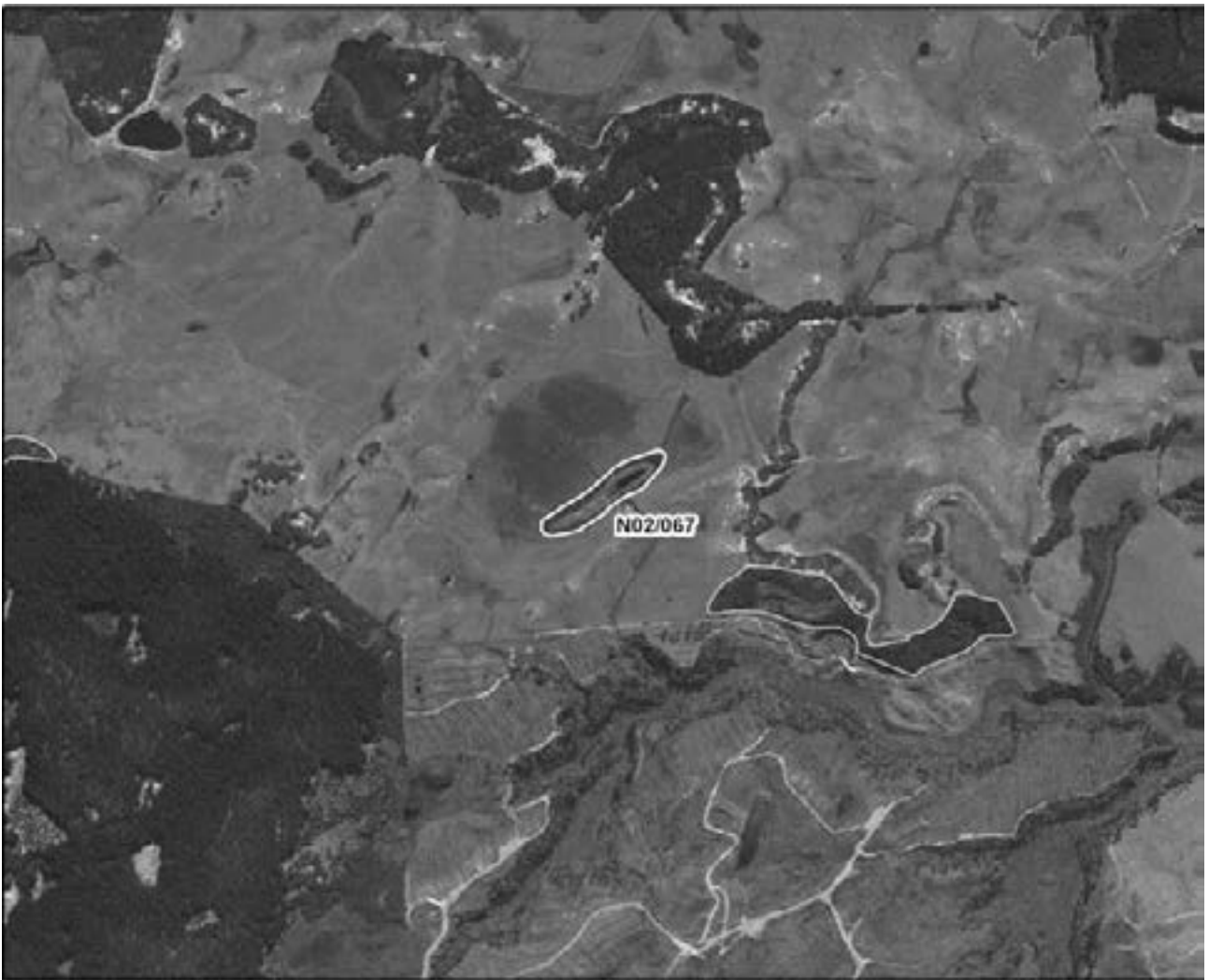
- (a) The 2003 aerial photography for the site shows a very small area of open water (500 sqm or 0.05 ha).
- (b) A greater area is covered with *Eleocharis sphacelata* reedland.
- (c) Low manuka shrubland (<0.5 m tall) covers a shallow depression which is seasonally wet. Manuka 1-2 m tall occurs on the periphery.

Significant flora

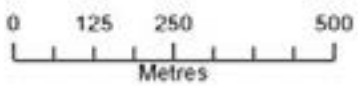
Todea barbara (Nationally Endangered).

Fauna

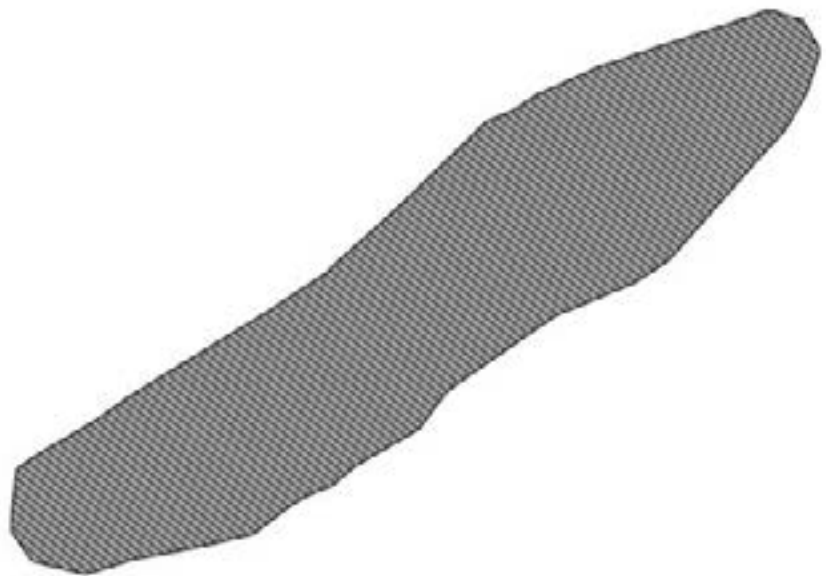
North Island fernbird (Sparse), little shag, paradise shelduck, mallard, pukeko and white-faced heron.



N02/067 The Big Lake



Habitat Type



Aerial photography flown 2003

Significance

This lake is a remnant of its former extent having been altered by gumdiggers and later by a private landowner. Dunelakes are a nationally rare habitat type. An updated survey is required. This site has no formal protection. All of this site is within an 'Underprotected' land environment (A2.1a) (Walker *et al.* 2007).

MOTUOPAO ISLAND AND ROCKSTACK

Survey no.	M02/071
Survey date	various 1993 and 1999 (see below)
Grid reference	M02 778 480
Area	30 ha (24 ha shrubland, 6 ha duneland)
Altitude	0-110 m asl

Ecological units

- (a) Taupata shrubland on steep coastal cliffs and banks
- (b) Buffalo grass on hillslope
- (c) *Bromus* spp. grassland
- (d) Harakeke flaxland on ridge top, hillslope and gully
- (e) Coastal herbfield on brackish seepage
- (f) Marram grassland on sand
- (g) Spinifex grassland on sand
- (h) *Coprosma acerosa*-pohuehue shrubland on sand

Landform/geology

An island with two hills of highly faulted, altered basaltic pillow lavas separated by a low saddles of Holocene dune sands and slopewash deposits overlying the basalt lava.

Vegetation

- (a) Taupata occurs in patches on steep slopes on the southern, western and northern coasts and on the rock stack to the north, with occasional native ice plant. Also present are hare's-tail, knobby clubrush, Mercury Bay weed and *Pimelea prostrata* agg. Salt tolerant herbs present around the splash zones include shore groundsel, sea celery, sea primrose, and glasswort.
- (b) The northern faces of both hills are covered in dense swards of buffalo grass with scattered harakeke and knobby clubrush. Patches of bracken and coastal toetoe are present on some ridge tops, with pohuehue on the southern hill.
- (c) *Bromus* spp. form a grassland at the northern tip of the island.
- (d) A dense harakeke association occurs on the ridge tops and southern sides of both hills with frequent coastal toetoe, hangehange, *Parsonsia*

capsularis, *mingimingi* and locally frequent bracken. The vegetation is less dense on ridge tops where open areas of bracken, grasses and herbs are present. Dense harakeke is dominant in gullies.

- (e) A brackish seepage at the western mouth of the central valley contains a patch of watercress, oioi, sea celery, glasswort, sea primrose and *Isolepis cernua*.
- (f) A band of marram grass extends across the central valley on the eastern side of the dividing saddle, broken by patches of bare sand.
- (g) The majority of the central valley is sandfield with spinifex, shore bindweed and knobby clubrush, and scattered harakeke, NZ spinach, *Coprosma acerosa* and pohuehue.
- (h) Dense patches of *Coprosma acerosa* and pohuehue with occasional harakeke, coastal toetoe and knobby clubrush are present in the south central valley extending up a gully on the southern hill.

The nearby northern rockstack has two “high points” and a “saddle” and is described as mainly bare rock with three patches of taupata shrubland (type a) and an area of grassland. The rock stack is rat free (SSBI M02/N02/H043).

Significant flora

Sicyos australis sens. str. (Nationally Critical), Cook’s scurvy grass (Nationally Endangered)¹⁶, *Artropodium bifurcatum* (Gradual Decline), *Cyperus insularis* (Gradual Decline), pingao (Gradual Decline), *Calystegia marginata* (Sparse), *Coprosma acerosa* (regionally significant), ngaio (regionally significant), arrow grass and *Asplenium obtusatum* subsp. *northlandicum* (regionally significant).

Fauna

Birds

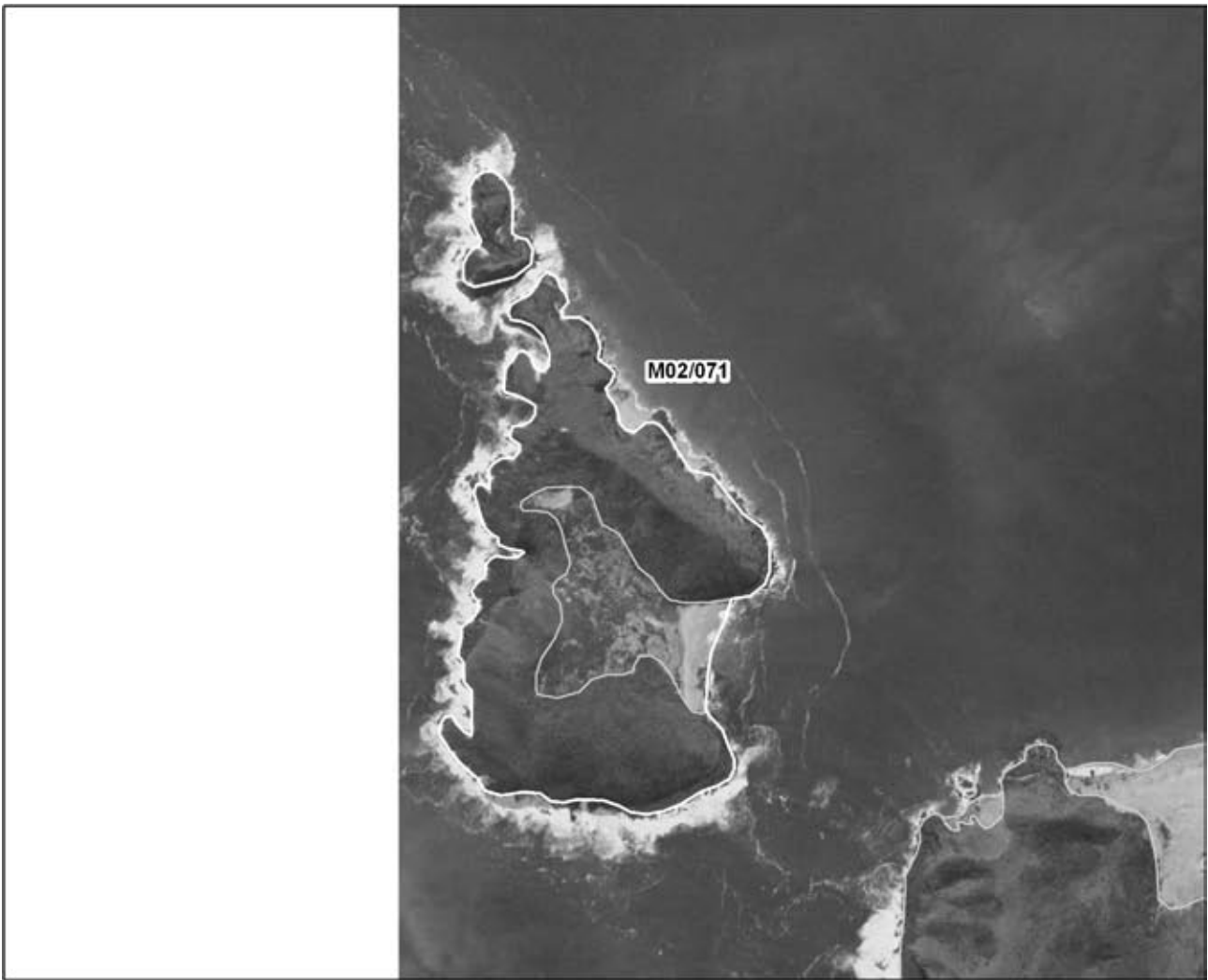
Breeding site for Northern little blue penguin (Gradual Decline), sooty shearwater (Gradual Decline), northern diving petrel (regionally significant), grey-faced petrel (regionally significant), black-winged petrel (regionally significant), white-faced storm petrel (regionally significant), fluttering shearwater, NZ pipit and black-backed gull are recorded as breeding on the nearby rock stack (SSBI M02/N02/H043). Breeding paradise shelducks were noted in 2007 (A. Booth pers. comm.).

Visitors include Caspian tern (Nationally Vulnerable), reef heron (Nationally Vulnerable), white-fronted tern (Gradual Decline), variable oystercatcher (regionally significant), pied shag and other common birds.

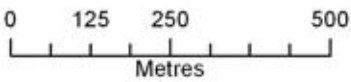
Mammals

NZ fur seal have also been recorded (A. Booth pers. comm.).

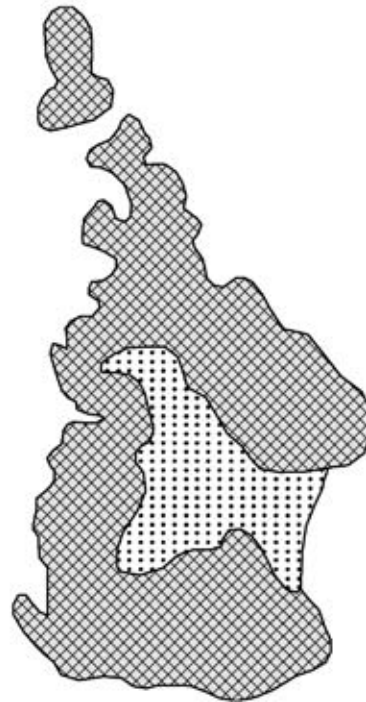
16. No longer present on Motuopao Island and more than likely gone from the rockstack although a followup survey is recommended.



M02/071 Motuopao Island and Rockstack



- Habitat Type**
- Duneland/Sandfield
 - Estuarine
 - Forest
 - Shrubland
 - Wetland



Aerial photography flown 2003

Landsnails

Placostylus ambagiosus ambagiosus (Nationally Critical), Punctidae sp. 156 (Nationally Critical) (P. sp. 27 in Hitchmough *et al.* (comp.) 2007), *Succinea archbeyi* (Serious Decline), *Cytora hispida* (Range Restricted), *Cytora tepakiensis* (Range Restricted), *Climocella reinga* (Range Restricted), *Allodiscus wairua* (Range Restricted) (status from Marshall and Barker 2008), *Delouagapia cordelia* (Sparse).

Sub-fossils of *Placostylus a. binemoa* (endemic to Motuopao Is) and *Liarea aupouria* (*L. a. aupouria* in Hitchmough *et al.* (comp.) 2007), *Amborhytida duplicata* (Gradual Decline) also recorded. Subfossil tuatara bones have also been recorded (F. Brook pers. comm.).

Non-threatened landsnails

Gerrissa purchasi, *Paracharopa delicatula*, *Pbenacobelix tholoides*, *Paralaoma caputspinulae*, Punctidae sp. 84 and *Cochlicopa lubrica*.

Lizards

Hoplodactylus “Matapia Island” (Gradual Decline), #North Cape Pacific gecko (Gradual Decline), robust skink (Range Restricted) translocated in 1997 from Matapia Island (Parrish and Anderson 1999), #Suter’s skink (Range Restricted), moko skink (Sparse), #shore skink and copper skink.

#=also recorded on northern rockstack

Significance

An outstanding fauna habitat for many species which was expected to increase in value following eradication of kiore which begun in 1989. Some significant changes are: the *Placostylus* population has increased significantly (presumed extinct in Bell 1986), the breeding area for diving petrels has doubled since the 1990’s, robust skinks are breeding and shore skinks are much more abundant (A. Booth pers. comm.). The site is also home to many threatened and regionally significant species. The island has an unusually high diversity of seabirds for its size with six species of breeding petrels (Pierce and Parrish 1993); the dominant species being black-winged petrel (Parrish and Anderson 1999). Cook’s scurvy grass was recorded on the island before the eradication of kiore and has also been recorded on the rockstack. Since the eradication, numbers of the common garden snail have increased dramatically decimating this species on the island and a follow up survey on the rockstack (post 1990) failed to record its presence (L. Forester pers. comm.). A followup survey of the rockstack is recommended. Representative site for type (a), (d), (e), (g) and (h). Approximately 21.9 ha of this site is within Motuopao Island Nature Reserve (DOC-administered). Approximately 28.6 ha of this site is within a ‘Less Reduced and Better Protected’ land environment (A1.1a) (Walker *et al.* 2007).

Site report drawn directly from the following sources:

Forester, L. J. 1993: Vascular Plants and Vegetation of Motuopao Island, Northland, New Zealand. *Tane* 34: 33-44.

- Parrish, G. R.; Pierce, R. J. 1993: Reptiles of Motuopao Island, Northland, New Zealand. *Tane* 34: 53-58.
- Parrish, G. R.; Sherley, G. H. 1993: Invertebrates of Motuopao Island, Northland, New Zealand in *Tane* 34: 45-52.
- Pierce, R. J.; Parrish, G. R. 1993: Birds of Motuopao Island, Northland, New Zealand. *Tane* 34: 59-67.
- Parrish, G. R.; Anderson, P. R. 1999: Lizard transfers from Matapia Island to Motuopao Island, Northland and observations on other fauna. *Tane* 37: 1-14.

MURIMOTU ISLAND

Survey no.	N02/072
Survey date	Not visited in this survey. Vegetation description derived from Wright and Cameron 1996
Grid reference	N02 157 541
Area	8.1 ha
Altitude	0-97 m asl

Ecological units

- (a) Exotic grasses-bracken on steep hillslope
- (b) Coastal shrubland on steep hillslope

Landform/geology

Island of Cretaceous gabbro and microgabbro intrusions.

Vegetation

Murimotu Island is a steep island whose vegetation is defined by a mixture of exotic grassland with bracken (Type (a)) and regenerating shrubland 1.5-2m tall including harakeke, coastal toetoe and stands of ti kouka (Type (b)). Other shrubs present include hangehange, *Coprosma macrocarpa* subsp. *minor*, taupata and *Coprosma neglecta*. There are scattered pohutukawa 4-7 m tall on the steep western rocky faces and on the more gentle slopes at the southern end.

Significant flora

Picris burbridgeae (Nationally Endangered), *Kunzea ericoides* var. *linearis* (Serious Decline), *Coprosma neglecta* (Range Restricted), *Cordyline obtecta* (Range Restricted), *Asplenium obtusatum* subsp. *northlandicum* (regionally significant), *Psilotum nudum* (regionally significant).

There is an unconfirmed record of *Petalochilus alatus* (Range Restricted).

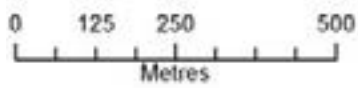
Fauna

Birds

Only common species recorded; NZ pipit, welcome swallow, silvereye, yellowhammer and mynah.

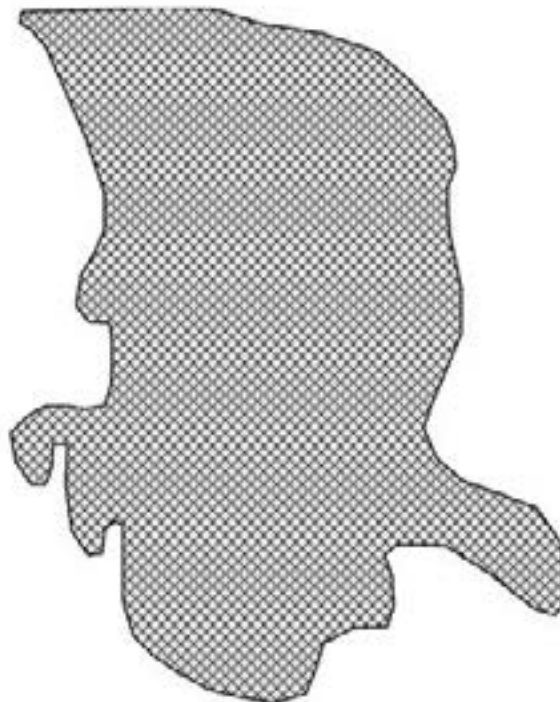


N02/072 Murimotu Island



Habitat Type

-  Duneland/Sandfield
-  Estuarine
-  Forest
-  Shrubland
-  Wetland



Aerial photography flown 2003

Mammals

NZ fur seal (roosting seals—outer rocks) (R. Parrish pers. comm. 2002 in SSBI N02/H047).

Landsnails

Te Paki endemic landsnail *Cytora tepakiensis* (Range Restricted).

Non-threatened: *Tornatellinops novoseelandica*.

Lizards

Shore skink.

Significance

A remote island with good regeneration, few environmental weeds, and an apparent lack of possums and rats. This island is the only other area of ultramafic rock in Te Paki ED outside North Cape Scientific Reserve. At least 66 indigenous plant species are present, with others likely to establish due to the island's proximity to seed sources on the nearby mainland. (Wright and Cameron 1996)

Representative site for type (b) coastal shrubland. This site has no formal protection. Further survey work is required. Approximately 7.4 ha of this site is within a 'Less Reduced and Better Protected' land environment (A1.1a) (Walker *et al.* 2007).

TAUPIRI ISLAND

Survey no.	M02/074
Survey date	Not visited in this survey. Information derived 1992 SSBI M02/N02/H044
Grid reference	N02 792 469
Area	3.5 ha
Altitude	0-69 m asl

Ecological units

- (a) Grassland on steep coastal hillslope
- (b) Coastal shrubland on steep hillslope

Landform/geology

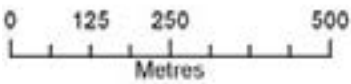
Island of Tangihua Complex basalt.

Vegetation

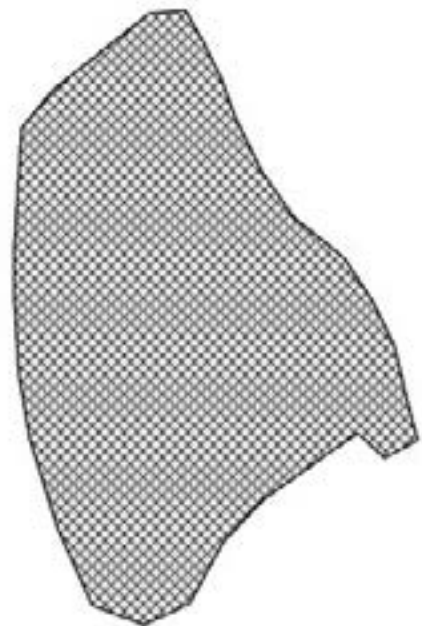
The island is mainly grassland (*Paspalum*, *Bromus*, and *Zoysia* spp.) (Type (a)), with shrubland (Type (b)) consisting of coastal toetoe, knobby clubbrush, harakeke and pockets of species like mingimingi and taupata. Ti kouka, pohutukawa, wharangi and tawapou are also present. Eighty plant species have been recorded of which 59 are indigenous (SSBI M02/N02/H044).



M02/074 Taupiri Island



- Habitat Type**
-  Duneland/Sandfield
 -  Estuarine
 -  Forest
 -  Shrubland
 -  Wetland



Aerial photography flown 2003

Significant flora

Tawapou (regionally significant) and coastal mahoe (regionally significant).

Fauna

Birds

Variable oystercatcher (regionally significant), pied shag, black-backed gull, welcome swallow, blackbird and silvereye.

Lizards

North Cape pacific gecko (Gradual Decline).

Landsnails

Delouagapia cordelia (Sparse), *Allodiscus wairua* (Range Restricted) (status from Marshall and Barker 2008) and *Climocella reinga* (Range Restricted).

Remains of a threatened Te Pahi endemic landsnail *Placostylus ambagiosus* subsp. recorded in 1990 (SSBI M02/N02/H044).

Non-threatened landsnails

Paracharopa delicatula, *Pbenacobelix tholoides*, *Paralaoma caputspinulae*, Punctidae sp. 84 and *Cochlicopa lubrica*.

Other

Around 6 NZ fur seals were sighted at the island in 1990 (SSBI M02/N02/H044).

Significance

Regeneration of the vegetation of this island would improve its potential as a habitat for threatened and endemic landsnails. Threatened and regionally significant species recorded. This site has no formal protection. Approximately 3.2 ha of this site is within a 'Less Reduced and Better Protected' land environment (A1.1a) (Walker *et al.* 2007).

4.2 LEVEL 2 SITES

SITE	SURVEY NO.	GRID REF.
Kerr Point Road Shrubland	N02/028	N02 004 485

KERR POINT ROAD SHRUBLAND

Survey no.	N02/028
Survey date	24 August 1995
Grid reference	N02 004 485
Area	4.9 ha
Altitude	0-40 m asl

Ecological unit

(c) (a) Kanuka shrubland on hillslope

Landform/geology

Hill country of Parengarenga Group sandstone and mudstone.

Vegetation

Kanuka is dominant with occasional mamaku, pohutukawa, ti kouka, and mahoe in the canopy. Recent logging has reduced the indigenous vegetation in the upper catchment to a very narrow area.

Fauna

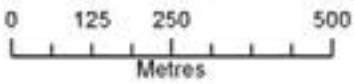
Not surveyed.






Significance

A small shrubland remnant forming a buffer between the upper tidal estuarine reaches of the Parengarenga Harbour and radiata pine plantation. Approximately 2.4 ha (48.9%) of this site is within Te Paki Recreation Reserve (DOC-administered). Approximately 4.6 ha of this site is within a 'Less Reduced and Better Protected' land environment (A1.1b) (Walker *et al.* 2007).



N02/028 Kerr Point Road Shrubland



- Habitat Type**
-  Duneland/Sandfield
 -  Estuarine
 -  Forest
 -  Shrubland
 -  Wetland



Aerial photography flown 2003

5. Summary and conclusions

5.1 ANALYSIS OF EXISTING PROTECTED AREAS

5.1.1 Overview

Te Paki Ecological District covers a total extent of 30,917 ha, of which natural areas cover 23,234.5 ha (75% of the Ecological District). The natural areas comprise 19,462.3 ha shrubland, 1620.2 ha duneland/sandfield, 1163.8 ha freshwater wetland, 986.5 ha forest, and 13.0 ha estuary.

Approximately 30.3% (7041.2 ha) of the natural areas are formally protected for conservation values and a further 56.8% (13,210.5 ha) are within Recreation Reserve, making a total of 87.1% (33,243.9 ha) natural areas within reserves. This is equivalent to about 59% of the total extent of Te Paki ED. The various types of protection status within natural areas are summarised in Table 1.

As most of the protected areas are under Recreation Reserve status, it is important to note that the primary purpose of a Recreation Reserve is not biodiversity protection, but recreation, and that, with the exception of animals protected by the Wildlife Act (1953), recreation generally overrides biodiversity protection.

A list of ecological units recorded in Te Paki Ecological District and their current protection status is set out in Table 2 (page X) and a summary of the site evaluations is given in Table 3 (page X).

5.1.2 Ecological units protected

The field survey did not identify which ecological units within each site were protected. Sites **without** protection or with very little protection were identified as follows.

Sites with no formal protection

Taupiri Island (M02/074)

Te Huruwai Stream Wetland (N02/020)

Te Hapua Wetland (N02/021)

Te Hapua Settlement Wetland (N02/022)

Te Hapua Road Wetland (N02/024)

Waiheuheu Catchment Wetlands (N02/037)

Waingatepua Channel (N02/040)

Te Hurewai Stream Wetland (N02/041)

The Big Lake (N02/067)

Murimotu Island (N02/072)

Sites with large parts unprotected

Tawakewake Wetland (N02/036); 28.5% protected

Tom Bowling Bay (N02/029); 49.7% protected

Kerr Point Road Shrubland (N02/028); 48.9% protected

Ngakengo Beach (N02/062); 63.7% protected

North Cape Scientific Reserve and Surrounds (N02/005(c)); 69.7% protected

Kapowairua Wetland and Lagoon (N02/019); 79.9% protected

Waitangi Stream Wetland and Riparian Strip (N02/034); 42.6% protected

Waihakari Wetland (N02/035); 78.3% protected

The remaining sites have over 80% of their area within reserves, however some ecological units within them may not be protected.

TABLE 5. PROTECTED NATURAL AREAS NETWORK IN TE PAKI ECOLOGICAL DISTRICT (Area in ha).

Key: MS = Marginal Strip, RR= Recreation Reserve; SCER = Scenic Reserve; NR=Nature Reserve; NWR=Nga Whenua Rahui, ScIR=Scientific Reserve

SITE	SURVEY NO.	MS	SCER	NR	STATUS	NWR	SCIR	SUB-TOTAL AREA PROTECTED (EXCLUDING RR)	RR	TOTAL AREA PROTECTED (INCLUDING RR)	TOTAL SITE AREA	PERCENTAGE SITE PROTECTED
Maungatikeke Point Shrubland	M02/007							0.0	281.6	281.6	284.8	98.8%
Scott Point Shrubland and Coastal Associations	M02/008							0.0	615.0	615.0	623.5	98.6%
Te Werahi Wetland	M02/010							0.0	563.7	563.7	567.6	99.3%
Twilight Beach	M02/011							0.0	521.6	521.6	551.5	94.5%
Te Werahi Beach and Cape Maria van Diemen	M02/012							0.0	333.2	333.2	423.7	78.6%
Tapotupotu Stream Wetland and Estuary	M02/015							0.0	25.1	25.1	25.1	100.0%
Tapotupotu Beach	M02/063							0.0	8.2	8.2	8.7	94.7%
Motuopao Island and Rockstack	M02/071			21.9				21.9		21.9	30.0	73.0%
Taupiri Island	M02/074							0.0		0.0	3.5	0.0%
Lake Ngakaketa, Te Paki Lake and Surrounds	N02/001							0.0	317.3	317.3	317.6	99.9%
Cape Road Wetlands and Shrubland	N02/002							0.0	16.7	16.7	16.7	100%
Te Paki Shrublands and Forest Remnants	N02/003							0.0	9220.8	9220.8	10629.8	86.7%
Unuwaho Bush and Shrublands	N02/004	1.4				1372		1373.4	68.5	1441.9	1486.8	96.9%
Mokaikai Scenic Reserve and Surrounds	N02/005(a)		4026.1			3.5		4029.6		4029.6	4720.7	85.3%
Waikuku Flat	N02/005(b)		286.9			51.7		338.6		338.6	348.3	97.2%
North Cape Scientific Reserve and Surrounds	N02/005(c)		32.4			688.2		720.6		720.6	1032.9	69.7%
Shenstone Block	N02/009							0.0	801.8	801.8	829.7	96.6%
Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex	N02/016							0.0	245.4	245.4	269.6	90.9%
Upper Kapowairua Wetland	N02/017							0.0	13.1	13.1	13.1	100.0%
Broughton's Gully Wetland	N02/018							0.0	7.9	7.9	7.9	100.0%
Kapowairua Wetland and Lagoon	N02/019	0.3				0.5		0.8	20.3	21.1	26.4	79.9%
Te Huruwai Stream Wetland	N02/020							0.0		0.0	17.0	0.0%
Te Hapua Wetland	N02/021							0.0		0.0	25.2	0.0%
Te Hapua Settlement Wetland	N02/022							0.0		0.0	22.6	0.0%
Paingatai Channel Wetlands	N02/023		12.8					12.8		12.8	12.8	100.0%
Te Hapua Road Wetland	N02/024							0.0		0.0	1.8	0.0%
Waiahero Stream Wetland	N02/025					7.0		7.0		7.0	7.7	90.9%
Kapowairua	N02/027							0.0	140.6	140.6	141.6	99.3%

SITE	SURVEY NO.	MS	SCER	STATUS			SCIR	SUB-TOTAL AREA PROTECTED (EXCLUDING RR)	RR	TOTAL AREA PROTECTED (INCLUDING RR)	TOTAL SITE AREA	PERCENTAGE SITE PROTECTED
				NR	NWR	RR						
Kerr Point Road Shrubland	N02/028						0.0	2.4	2.4	4.9	48.9%	
Tom Bowling Bay	N02/029		49.1		2.2		51.3		51.3	103.1	49.7%	
Waikuku Beach	N02/030		183.1				183.1		183.1	186.3	98.2%	
Whareana Bay	N02/031		35.8				35.8		35.8	41.8	85.6%	
Ponaki Wetland	N02/032		55.0				55.0		55.0	55.0	100.0%	
Waikuku Wetlands	N02/033		41.1				41.1		41.1	41.1	100.0%	
Waitangi Stream Wetland and Riparian Strip	N02/034		0.1	38.5			38.6		38.6	90.4	42.6%	
Waihakari Wetland	N02/035		5.5				5.5		5.5	7.0	78.3%	
Tawakewake Wetland	N02/036					1.6	1.6		1.6	5.6	28.5%	
Waiheuheu Catchment Wetlands	N02/037						0.0		0.0	50.3	0.0%	
Hauptoto/Whareana Bay Wetlands	N02/038		14.9				14.9		14.9	14.9	100.0%	
Tahuna Channel Wetlands	N02/039		4.4				4.4		4.4	4.4	100.0%	
Waingatepua Channel	N02/040						0.0		0.0	4.2	0.0%	
Te Hurewai Stream Wetland	N02/041						0.0		0.0	4.8	0.0%	
Ngakengo Beach	N02/062		105.2				105.2		105.2	165.0	63.7%	
The Big Lake	N02/067						0.0		0.0	1.0	0.0%	
Murimotu Island	N02/072						0.0		0.0	8.1	0.0%	
TOTAL		1.7	4859.4	21.9	1468.4	689.8	7041.2	13203.2	20244.4	23234.6	87.1%	

5.2 THREATENED ENVIRONMENTS OF TE PAKI ECOLOGICAL DISTRICT

Land Environments of New Zealand (LENZ) is an environmental classification system that uses modelling techniques to classify New Zealand into broadly similar environments based on climatic, landform and soil factors, and the distribution of species. The Threatened Environment Classification is a combination of three national databases: Land Environments of New Zealand, the Land Cover Database 2 (LCDB 2), and Protected Areas of New Zealand (PANZ). The classification divides New Zealand into six land environments with defining criteria (see Figure 1). Land environments are assigned one of six categories on the basis of past habitat loss (percentage indigenous cover remaining) and current legal protection (Walker et al. 2007).

Most of the natural areas in the Te Paki ED are do not fall within a threatened land environment category (see Figure 1). This is because a large proportion of the natural areas are under some form of protection (Table 1); much of which is recreation reserve.

Approximately 77% or 17,761.6 ha of the land covered by natural areas falls into the non-threatened category of Less Reduced and Better Protected (>30% left and >20% protected); 12% or 2847.7 ha falls into the Underprotected threatened category (>30% left, 10-20% protected); 9% or 2105.4 ha falls into the At Risk threatened category (20-30% indigenous vegetation left); 0.9% or 226.2 ha falls into the Chronically Threatened category (10-20% indigenous vegetation left) and only 1.7 ha falls into the Acutely Threatened category (<10% indigenous vegetation left).

Please note that LENZ areas may differ from PNA site areas due to calculation methods. The LENZ areas are of lesser accuracy.

TABLE 6: AREA (ha) OF LENZ LEVEL IV ENVIRONMENTS WITHIN TE PAKI PNA SITES AND THEIR RESPECTIVE THREAT CATEGORIES.

SITE NUMBER	CRITERIA	THREATENED ENVIRONMENT	LENZ LEVEL 4	TOTAL (ha)
N02/001	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	234.5
		<i>Subtotal</i>		234.5
	>30% left and 10-20% protected	Underprotected	A2.1a	0.8
		<i>Subtotal</i>		0.8
	20-30% left	At Risk	G1.1a	61.3
		<i>Subtotal</i>		61.3
Total LENZ			296.6	
N02/002	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	3.0
			A1.1b	13.7
	<i>Subtotal</i>		16.7	
	Total LENZ		16.7	
N02/003	<10% indigenous cover left	Acutely Threatened	A5.1a	1.7
			<i>Subtotal</i>	1.7
	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	5935.1
			A1.1b	3394.6
			A3.1a	308.7
			<i>Subtotal</i>	9638.4
	>30% left and 10-20% protected	Underprotected	A2.1a	791.0
			<i>Subtotal</i>	791.0
	10-20% left	Chronically Threatened	A1.1c	2.7
			<i>Subtotal</i>	2.7
	20-30% left	At Risk	A4.1a	68.1
G1.1a			97.6	
<i>Subtotal</i>			165.7	
Total LENZ		10597.8		
N02/004	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	1390.9
			A1.1b	76.4
	<i>Subtotal</i>		1467.3	
	>30% left and 10-20% protected	Underprotected	A2.1a	6.9
			<i>Subtotal</i>	6.9
	20-30% left	At Risk	G1.1a	10.3
<i>Subtotal</i>			10.3	
Total LENZ		1484.4		
N02/005(a)	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	749.1
			A1.1b	2467.8
	<i>Subtotal</i>		3216.9	
	>30% left and 10-20% protected	Underprotected	A2.1a	1158.9
<i>Subtotal</i>			1158.9	

SITE NUMBER	CRITERIA	THREATENED ENVIRONMENT	LENZ LEVEL 4	TOTAL (ha)
	10-20% left	Chronically Threatened	A1.1c	203.4
		<i>Subtotal</i>		203.4
	20-30% left	At Risk	G1.1a	89.8
		<i>Subtotal</i>		89.8
Total LENZ				4669.0
N02/005(b)	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	2.9
			A1.1b	13.7
		<i>Subtotal</i>		16.6
	>30% left and 10-20% protected	Underprotected	A2.1a	329.3
		<i>Subtotal</i>		329.3
	10-20% left	Chronically Threatened	A1.1c	2.9
		<i>Subtotal</i>		2.9
	20-30% left	At Risk	G1.1a	1.1
		<i>Subtotal</i>		1.1
Total LENZ				349.8
N02/005(c)	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	551.2
			A1.1b	465.8
		<i>Subtotal</i>		1016.9
	>30% left and 10-20% protected	Underprotected	A2.1a	7.4
		<i>Subtotal</i>		7.4
	10-20% left	Chronically Threatened	A1.1c	0.6
		<i>Subtotal</i>		0.6
	20-30% left	At Risk	G1.1a	1.6
		<i>Subtotal</i>		1.6
Total LENZ				1026.6
M02/007	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	138.8
			A1.1b	7.9
			A3.1a	6.5
		<i>Subtotal</i>		153.2
	>30% left and 10-20% protected	Underprotected	A2.1a	7.8
		<i>Subtotal</i>		7.8
	20-30% left	At Risk	G1.1a	119.6
		<i>Subtotal</i>		119.6
Total LENZ				280.6
M02/008	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	184.9
			A1.1b	166.6
			A3.1a	1.6
		<i>Subtotal</i>		353.1
	>30% left and 10-20% protected	Underprotected	A2.1a	103.6
		<i>Subtotal</i>		103.6
	20-30% left	At Risk	G1.1a	164.9
		<i>Subtotal</i>		164.9
Total LENZ				621.6

SITE NUMBER	CRITERIA	THREATENED ENVIRONMENT	LENZ LEVEL 4	TOTAL (ha)
N02/009	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	755.3
		<i>Subtotal</i>		755.3
	>30% left and 10-20% protected	Underprotected	A2.1a	43.2
		<i>Subtotal</i>		43.2
	20-30% left	At Risk	G1.1a	31.0
	<i>Subtotal</i>			31.0
Total LENZ				829.4
M02/010	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	43.6
			A1.1b	106.9
			A3.1a	367.4
	<i>Subtotal</i>		518.0	
	>30% left and 10-20% protected	Underprotected	A2.1a	11.3
				<i>Subtotal</i>
	20-30% left	At Risk	G1.1a	13.1
	<i>Subtotal</i>		13.1	
	Total LENZ			542.4
M02/011	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	3.3
			A1.1b	0.7
			A3.1a	9.4
	<i>Subtotal</i>		13.4	
	>30% left and 10-20% protected	Underprotected	A2.1a	3.9
				<i>Subtotal</i>
	20-30% left	At Risk	G1.1a	498.5
	<i>Subtotal</i>		498.5	
	Total LENZ			515.8
M02/012	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	64.1
			A1.1b	1.2
			A3.1a	3.4
	<i>Subtotal</i>		68.8	
	20-30% left	At Risk	G1.1a	317.0
	<i>Subtotal</i>		317.0	
Total LENZ			385.8	
M02/015	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	1.6
			A3.1a	16.0
			<i>Subtotal</i>	17.6
	10-20% left	Chronically Threatened	A1.1c	1.3
	<i>Subtotal</i>		1.3	
Total LENZ			18.9	
N02/016	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	17.6
			A1.1b	8.9
			A3.1a	12.1

SITE NUMBER	CRITERIA	THREATENED ENVIRONMENT	LENZ LEVEL 4	TOTAL (ha)
		<i>Subtotal</i>		38.6
	>30% left and 10-20% protected	Underprotected	A2.1a	214.9
		<i>Subtotal</i>		214.9
	20-30% left	At Risk	G1.1a	4.9
		<i>Subtotal</i>		4.9
Total LENZ				258.4
N02/017	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	0.6
			A3.1a	12.5
		<i>Subtotal</i>		13.1
Total LENZ				13.1
N02/018	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	7.9
		<i>Subtotal</i>		7.9
Total LENZ				7.9
N02/019	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	5.0
			A1.1b	1.1
		<i>Subtotal</i>		6.1
	>30% left and 10-20% protected	Underprotected	A2.1a	19.7
		<i>Subtotal</i>		19.7
	20-30% left	At Risk	G1.1a	0.6
		<i>Subtotal</i>		0.6
Total LENZ				26.3
N02/020	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	2.3
		<i>Subtotal</i>		2.3
	>30% left and 10-20% protected	Underprotected	A2.1a	0.4
		<i>Subtotal</i>		0.4
	20-30% left	At Risk	A4.1a	13.8
		<i>Subtotal</i>		13.8
Total LENZ				16.5
N02/021	20-30% left	At Risk	A4.1a	25.1
		<i>Subtotal</i>		25.1
Total LENZ				25.1
N02/022	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	1.4
		<i>Subtotal</i>		1.4
	>30% left and 10-20% protected	Underprotected	A2.1a	8.0
		<i>Subtotal</i>		8.0
	20-30% left	At Risk	A4.1a	12.3
		<i>Subtotal</i>		12.3
Total LENZ				21.7
N02/023	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	3.4

SITE NUMBER	CRITERIA	THREATENED ENVIRONMENT	LENZ LEVEL 4	TOTAL (ha)
		<i>Subtotal</i>		3.4
	>30% left and 10-20% protected	Underprotected	A2.1a	9.3
		<i>Subtotal</i>		9.3
Total LENZ				12.7
N02/024	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	0.4
		<i>Subtotal</i>		0.4
	>30% left and 10-20% protected	Underprotected	A2.1a	1.4
		<i>Subtotal</i>		1.4
Total LENZ				1.9
N02/025	>30% left and 10-20% protected	Underprotected	A2.1a	6.4
		<i>Subtotal</i>		6.4
	20-30% left	At Risk	G1.1a	1.3
		<i>Subtotal</i>		1.3
Total LENZ				7.7
N02/027	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	5.4
			A1.1b	0.3
		<i>Subtotal</i>		5.6
	>30% left and 10-20% protected	Underprotected	A2.1a	2.0
		<i>Subtotal</i>		2.0
	20-30% left	At Risk	G1.1a	109.3
		<i>Subtotal</i>		109.3
Total LENZ				116.9
N02/028	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	4.6
		<i>Subtotal</i>		4.6
Total LENZ				4.6
N02/029	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	1.2
		<i>Subtotal</i>		1.2
	>30% left and 10-20% protected	Underprotected	A2.1a	2.6
		<i>Subtotal</i>		2.6
	20-30% left	At Risk	G1.1a	92.4
		<i>Subtotal</i>		92.4
Total LENZ				96.2
N02/030	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	4.1
		<i>Subtotal</i>		4.1
	>30% left and 10-20% protected	Underprotected	A2.1a	3.4
		<i>Subtotal</i>		3.4
	20-30% left	At Risk	G1.1a	178.1
		<i>Subtotal</i>		178.1
Total LENZ				185.6

SITE NUMBER	CRITERIA	THREATENED ENVIRONMENT	LENZ LEVEL 4	TOTAL (ha)
N02/031	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	0.3
			A1.1b	3.8
	<i>Subtotal</i>		4.1	
	20-30% left	At Risk	G1.1a	37.4
			<i>Subtotal</i>	37.4
Total LENZ			41.5	
N02/032	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	9.0
			<i>Subtotal</i>	9.0
	>30% left and 10-20% protected	Underprotected	A2.1a	43.9
			<i>Subtotal</i>	43.9
	Total LENZ			52.9
N02/033	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	1.7
			<i>Subtotal</i>	1.7
	>30% left and 10-20% protected	Underprotected	A2.1a	33.1
			<i>Subtotal</i>	33.1
	20-30% left	At Risk	G1.1a	6.3
<i>Subtotal</i>			6.3	
Total LENZ			41.1	
N02/034	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	78.6
			A1.1b	0.2
	<i>Subtotal</i>		78.8	
	>30% left and 10-20% protected	Underprotected	A2.1a	2.1
			<i>Subtotal</i>	2.1
	10-20% left	Chronically Threatened	A1.1c	3.8
			<i>Subtotal</i>	3.8
	20-30% left	At Risk	G1.1a	0.1
<i>Subtotal</i>			0.1	
Total LENZ			84.8	
N02035	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	0.5
			<i>Subtotal</i>	0.5
	>30% left and 10-20% protected	Underprotected	A2.1a	2.3
			<i>Subtotal</i>	2.3
	10-20% left	Chronically Threatened	A1.1c	0.7
			<i>Subtotal</i>	0.7
20-30% left	At Risk	G1.1a	2.5	
		<i>Subtotal</i>	2.5	
Total LENZ			6.0	
N02/036	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	5.4
			<i>Subtotal</i>	5.4
	10-20% left	Chronically Threatened	A1.1c	0.2

SITE NUMBER	CRITERIA	THREATENED ENVIRONMENT	LENZ LEVEL 4	TOTAL (ha)
		<i>Subtotal</i>		0.2
Total LENZ				5.6
N02/037	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	19.2
			A1.1b	10.9
		<i>Subtotal</i>		30.1
	>30% left and 10-20% protected	Underprotected	A2.1a	18.6
		<i>Subtotal</i>		18.6
Total LENZ				48.7
N02/038	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	4.9
		<i>Subtotal</i>		4.9
	>30% left and 10-20% protected	Underprotected	A2.1a	9.1
		<i>Subtotal</i>		9.1
	20-30% left	At Risk	G1.1a	0.9
		<i>Subtotal</i>		0.9
N02038 Total				14.9
N02/039	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	4.4
		<i>Subtotal</i>		4.4
Total LENZ				4.4
N02/040	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	4.2
		<i>Subtotal</i>		4.2
Total LENZ				4.2
N02/041	>30% left and >20% protected	Less Reduced and Better Protected	A1.1b	0.2
		<i>Subtotal</i>		0.2
	>30% left and 10-20% protected	Underprotected	A2.1a	4.3
		<i>Subtotal</i>		4.3
Total LENZ				4.4
N02/062	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	5.2
			A1.1b	1.6
		<i>Subtotal</i>		6.8
	>30% left and 10-20% protected	Underprotected	A2.1a	1.1
		<i>Subtotal</i>		1.1
	10-20% left	Chronically Threatened	A1.1c	5.3
		<i>Subtotal</i>		5.3
	20-30% left	At Risk	G1.1a	146.5
		<i>Subtotal</i>		146.5
Total LENZ				159.6
M02/063	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	1.0
		<i>Subtotal</i>		1.0
	10-20% left	Chronically Threatened	A1.1c	5.3

SITE NUMBER	CRITERIA	THREATENED ENVIRONMENT	LENZ LEVEL 4	TOTAL (ha)
		<i>Subtotal</i>		5.3
Total LENZ				6.3
N02/067	>30% left and 10-20% protected	Underprotected	A2.1a	1.0
		<i>Subtotal</i>		1.0
Total LENZ				1.0
N02/072	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	7.4
		<i>Subtotal</i>		7.4
Total LENZ				7.4
M02/071	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	28.6
		<i>Subtotal</i>		28.6
Total LENZ				28.6
M02/074	>30% left and >20% protected	Less Reduced and Better Protected	A1.1a	3.2
		<i>Subtotal</i>		3.2
Total LENZ				3.2
GRAND LENZ TOTAL				22942.6

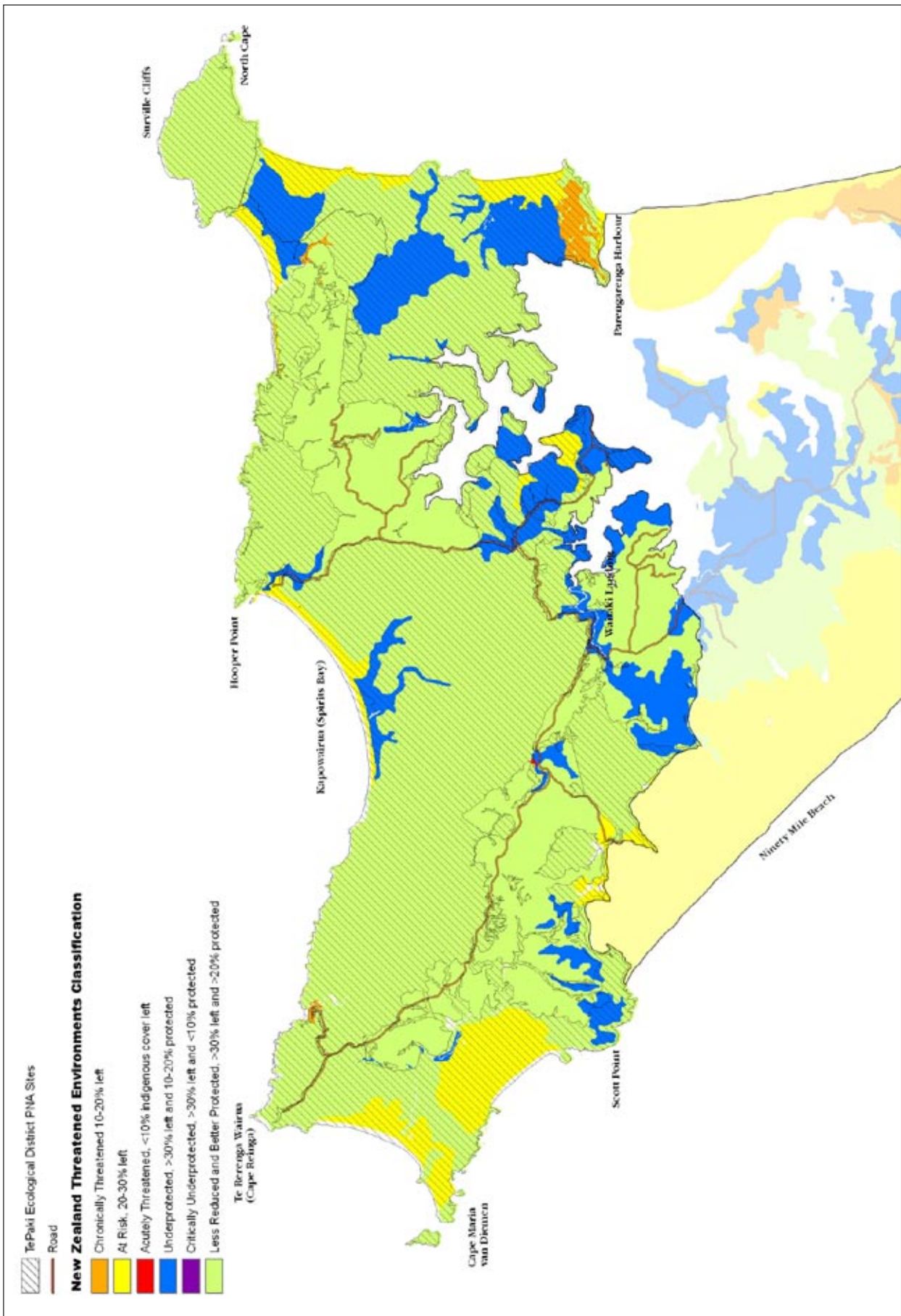


Figure 1: PNA sites and threatened environments of Te Pahi Ecological District.

5.3 PRIORITY NATURAL AREAS FOR PROTECTION IN THE PAKI ECOLOGICAL DISTRICT

The purpose of this section is to identify the unprotected natural areas documented in this report that best supplement the existing protected natural areas network, to make it more fully representative of the diversity and character of Te Paki Ecological District.

Te Paki Ecological District is one of the few Ecological Districts in Northland in which most of the ecological diversity is contained in protected areas. However, it must be emphasized that the type of protection that Te Paki Recreation Reserve allows for does not adequately protect biodiversity or sites of geological and soil importance. Some authors have suggested that all major representative ecosystems in Te Paki ED are included in protected areas (Conning 2001), however the nature of this legal protection should be critically examined. The primary purpose of a recreation reserve is not biodiversity protection, but recreation.

Priorities for protection in Te Paki Ecological District include:

1. Change in status of Te Paki Recreation Reserve to a Scenic Reserve or higher level of formal protection.

- The current protection status of Te Paki Recreation Reserve is not adequate to protect the very high biodiversity values it contains.

2. Protection of sites containing threatened species endemic to Te Paki Ecological District or Northern Northland Ecological Region.

- Murimotu Island (N02/072) is habitat for a threatened landsnail (*Cytora tepakiensis*), which is endemic to Te Paki ED, as well as four threatened plant species.

3. Protection of a buffer to North Cape Scientific Reserve

- The North Cape Scientific Reserve and Surrounds (N02/005(c)) site includes c.332 ha of unprotected land. Legal protection of this c.1 km wide strip between the Scientific Reserve and Waikuku Flat is crucial to protecting the outstanding habitats of the reserve which support high numbers of threatened and endemic plant and animal species.

4. Protection of habitats for nationally threatened and regionally significant species

- Te Paki ED has many threatened species for its size, not all of which are adequately protected by the current protected natural areas network. At present, nationally threatened taxa include 98 plants, 23 birds, 63 landsnails, 6 beetles, one weta, one moth, one slug, one earthworm, one spiders, two freshwater invertebrates, 7 lizards and two fish as well as several species ranked as Data Deficient. There are also a further 82 regionally significant taxa, which are considered rare or threatened in Northland (including 69 plants, 10 birds, two reptiles and two fish).

- Complete protection of Ngakengo Beach (N02/062) is a priority as it is an outstanding habitat for shorebirds.

5. Protection of buffers to the Parengarenga Harbour

- Natural areas acting as protective buffers to the Parengarenga Harbour; these include unprotected shrubland areas within N02/003 and wetland habitats such as N02/020, N02/022, and N02/037.

6. Protection of enclaves of unprotected land within Mokaikai Scenic Reserve and Surrounds (N02/005(a))

	CRETACEOUS-CENOZOIC ROCK UNITS				PLEISTOCENE-HOLOCENE SEDIMENTS				LAKES	HARBOURS			
	Tangihua Complex gabbro & serpentinite	Tangihua Complex gabbro & basalt	Mangakahia Complex sandstone, mudstone and limestone	Parengarenga Group igneous conglomerate and polymict mudstone	Parengarenga Group sandstone, mudstone and polymict conglomerate	Parengarenga Group microdiorite sill	Pleistocene Holocene dune belts	Pleistocene acolian sand terraces on high level	Pleistocene consolidated intertidal and estuarine sands forming low coastal terraces	Alluvial and swamp deposits ponded by coastal dune belts	Alluvial and swamp deposits contiguous with estuaries	Other alluvial and swamp deposits	
Raupo	N02/001 (part of), N02/002 (part of), N02/003 pt RR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of), N02/003 pt RR (part of)	N02/005 (a) pt SceR (part of), N02/003 pt RR (part of)	N02/003 pt RR (part of), N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/003 pt RR (part of), N02/005 (a) pt SceR (part of)	M02/010 RR, N02/025 pt SceR, N02/032 RR, N02/033 SceR, N02/034, N02/035 pt SceR, N02/038 SceR (part of), N02/016 RR	M02/015 RR (part of), N02/020, N02/023 pt SceR, N02/037, N02/040	M02/015 RR (part of), N02/017 RR, N02/018 RR, N02/019 pt RR pt MS, N02/024, N02/038 RR (part of), N02/041	N02/001 RR (part of)	M02/015 RR (part of)
Raupo-Baumea articulata-B. arboreophylla													
Raupo-harakeke-ti kouka													
Raupo-rush													
Schoenus brevifolius-Baumea juncea scdgeland													
Scdgeland													
Umbrella fern													
Wirerush													
SEDGELAND & ASSOCIATIONS													
Baumea juncea-Schoenus brevifolius	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/009 pt RR (part of)	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/009 pt RR (part of)	N02/009 pt RR (part of)	N02/009 pt RR (part of)	N02/009 pt RR (part of)
Baumea teretifolia-manuka													
Manuka-Schoenus brevifolius	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/009 pt RR (part of)	N02/005 (c) pt SceR (part of)	N02/005 (c) pt SceR (part of)	N02/009 pt RR (part of)	N02/009 pt RR (part of)	N02/009 pt RR (part of)	N02/009 pt RR (part of)

	CRETACEOUS-CENOZOIC ROCK UNITS				PLEISTOCENE-HOLOCENE SEDIMENTS				LAKES	HARBOURS		
Knobby clubbrush Oioi	Tangihua Complex gabbro & serpentinite	Tangihua Complex basalt	Mangakahia Complex sandstone and mudstone limestone	Parengarenga Group igneous conglomerate	Parengarenga group sandstone and polymict conglomerate	Parengarenga Group microdiorite sill	Pleistocene dune belts	Pleistocene acolian sand on high level terraces	Pleistocene consolidated intertidal and estuarine sands forming low coastal terraces	Alluvial and swamp deposits ponded by coastal dune belts	Alluvial and swamp deposits contiguous with estuaries	Other alluvial and swamp deposits
		M02/008 pt RR (part of)					N02/030 pt SceR					
Oioi-harakeke		M02/008 pt RR (part of)					M02/008 pt RR (part of)					
Oioi-coastal toetoc							N02/062 pt RR					
Pohuehue-kikuyu							M02/011 pt RR,					
Pohuehue-kikuyu							N02/029 pt RR,					
Pohuehue-kikuyu							N02/030 pt SceR					
Pohuehue-kikuyu		M02/008 pt RR (part of)					M02/008 pt RR (part of)					
<i>Coprosmia acerosa</i>							M02/011 pt RR					
Sand sedge							N02/062 pt SceR					
Spinifex		M02/012 pt RR (part of)					M02/011 pt RR,					
							M02/012 pt RR (part of),					
							N02/027 pt RR,					
							N02/029 pt RR,					
							N02/031 pt SceR,					
							N02/062 pt SceR,					
							M02/063 RR					

	CRETACEOUS-CENOZOIC ROCK UNITS				PLEISTOCENE-HOLOCENE SEDIMENTS				LAKES	HARBOURS	
	Tangihua Complex gabbro & serpentinite	Tangihua Complex basalt	Mangakahia sandstone and mudstone	Parengarenga Group igneous conglomerate	Parengarenga group sandstone and polymict mudstone	Parengarenga Group microdiorite sill	Pleistocene acolian sand on high level terraces	Pleistocene consolidated intertidal and estuarine sands forming low coastal terraces	Alluvial and swamp deposits ponded by coastal dune belts	Alluvial and swamp deposits contiguous with estuaries	Other alluvial and swamp deposits
Coastal toetoe harakeke Islands <i>Bromus</i>	M02/008 pt RR (part of), M02/012 pt RR (part of)	M02/008 pt RR (part of), M02/012 pt RR (part of)					M02/008 pt RR (part of), M02/011 pt RR, M02/012 pt RR (part of)	N02/029 pt SceR			
Coastal toetoe harakeke Islands <i>Bromus</i>	M02/071 pt NR (part of)	M02/071 pt NR (part of)					M02/071 pt NR (part of)				
Buffalo grass	M02/071 pt NR (part of)	M02/071 pt NR (part of)					M02/071 pt NR (part of)				
Coastal	N02/072	M02/071 pt NR (part of), N02/074 (Level 2)					M02/071 pt NR (part of)				
<i>Coprosma acerosa</i> pohuehue	M02/071 pt NR (part of)	M02/071 pt NR (part of)					M02/071 pt NR (part of)				
Exotic grasses-bracken	N02/072										
Harakeke	M02/071 pt NR (part of)	M02/071 pt NR (part of)					M02/071 pt NR (part of)				
Grassland	N02/074 (Level 2)	N02/074 (Level 2)									
Marram grass	M02/071 pt NR (part of)	M02/071 pt NR (part of)					M02/071 pt NR (part of)				
Spinifex	M02/071 pt NR (part of)	M02/071 pt NR (part of)					M02/071 pt NR (part of)				

	CRETACEOUS-GENOZOIC ROCK UNITS				PLEISTOCENE-HOLOCENE SEDIMENTS				LAKES	HARBOURS			
Taupata	Tangihua Complex gabro & serpentinite	Tangihua Complex basalt	Mangakahia Complex sandstone, mudstone and limestone	Parengarenga Group igneous conglomerate	Parengarenga group sandstone, mudstone and polymict conglomerate	Parengarenga Group microdiorite sill	Pleistocene dune belts	Pleistocene acolian sand terraces	Pleistocene consolidated intertidal and estuarine sands forming low coastal terraces	Alluvial and swamp deposits ponded by coastal dune belts	Alluvial and swamp deposits contiguous with estuaries	Other alluvial and swamp deposits	
	N02/005 (c) pt ScIR (part of)	N02/003 pt RR (part of), M02/007 RR (part of)	N02/005 (a) pt ScER (part of)	N02/005 (a) pt ScER (part of)	N02/005 (a) pt ScER (part of)	N02/005 (c) pt ScIR (part of)	N02/003 pt RR (part of)	N02/005 (a) pt ScER (part of)	N02/005 (a) pt ScER (part of)	N02/010 pt RR	N02/037	N02/002 RR (part of)	N02/001 RR (part of)
SHRUBLANDS													
Kanuka		N02/001 RR (part of), N02/002 RR (part of)	N02/005 (a) pt ScER (part of)	N02/005 (a) pt ScER (part of)	N02/005 (a) RR (part of)								
Kanuka/ manuka			N02/005 (a) pt ScER (part of)	N02/005 (a) pt ScER (part of)	N02/005 (a) pt ScER (part of)								
Manuka	N02/005 (c) pt ScIR (part of)	N02/003 pt RR (part of), M02/007 RR (part of)	N02/005 (a) pt ScER (part of)	N02/005 (a) pt ScER (part of)	N02/005 (a) pt ScER (part of)	N02/005 (c) pt ScIR (part of)	N02/003 pt RR (part of)	N02/005 (a) pt ScER (part of)	N02/005 (a) pt ScER (part of)				
Manuka & manuka- <i>Lepidosperma filiforme</i>		N03/003 pt RR (part of)											
Manuka- <i>Cassinia amoena</i>	N02/005 (c) pt ScIR (part of)	N02/005 (c) pt ScIR (part of)											
Manuka-kanuka		N02/003 pt RR (part of), M02/008 pt RR (part of)											N02/009 pt RR (part of)

	CRETACEOUS-CENOZOIC ROCK UNITS				PLEISTOCENE-HOLOCENE SEDIMENTS				LAKES	HARBOURS	
Manuka-prickly hakca	Tangihua Complex gabro & serpentinite	Mangakahia Complex sandstone, mudstone and limestone	Parengarenga Group igneous conglomerate	Parengarenga group sandstone, mudstone and polymict conglomerate	Parengarenga Group microdiorite sill	Pleistocene Holocene dune belts	Pleistocene acolian sand on high level terraces	Pleistocene consolidated intertidal and estuarine sands forming low coastal terraces	Alluvial and swamp deposits pounded by coastal dune belts	Alluvial and swamp deposits contiguous with estuaries	Other alluvial and swamp deposits
Mixed cliff shrubland	N02/003 pt RR (part of) N02/004 pt RR pt MS pt MS (part of)	N02/004 pt RR pt MS pt MS (part of)	N02/004 pt RR pt MS pt MS (part of)	N02/003 pt RR (part of) N02/004 pt RR pt MS pt MS (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)			
COASTAL SHRUBLANDS											
Coastal	N02/005 (c) pt ScR (part of) M02/008 pt RR (part of)	N02/005 (c) pt ScR (part of), M02/008 pt RR (part of)	N02/005 (a) pt ScR (part of)	N02/005 (c) pt ScR (part of)	N02/005 (c) pt ScR (part of)	M02/008 pt RR (part of)	N02/005 (a) pt ScR (part of)	N02/005 (a) pt ScR (part of)			
Harakeke-ti kouka-kanuka	M02/008 pt RR (part of) N02/004 pt RR pt MS (part of), M02/007 pt RR (part of), M02/012 pt RR (part of)	N02/005 (a) pt ScR (part of)	N02/004 pt RR pt MS (part of), N02/028 pt RR	N02/004 pt RR pt MS (part of), N02/028 pt RR	N02/004 pt RR pt MS (part of), N02/028 pt RR	M02/008 pt RR (part of)	N02/005 (a) pt ScR (part of)	N02/005 (a) pt ScR (part of)			
Kanuka	M02/008 pt RR (part of) N02/004 pt RR pt MS (part of), M02/007 pt RR (part of), M02/012 pt RR (part of)	N02/005 (a) pt ScR (part of)	N02/004 pt RR pt MS (part of), N02/028 pt RR	N02/004 pt RR pt MS (part of), N02/028 pt RR	N02/004 pt RR pt MS (part of), N02/028 pt RR	M02/008 pt RR (part of)	N02/005 (a) pt ScR (part of)	N02/005 (a) pt ScR (part of)			
Kanuka-pampas	M02/012 pt RR (part of)	M02/012 pt RR (part of)	M02/012 pt RR (part of)	M02/012 pt RR (part of)	M02/012 pt RR (part of)	M02/008 pt RR (part of)	N02/005 (a) pt ScR (part of)	N02/005 (a) pt ScR (part of)			
Manuka	N02/004 pt RR pt MS (part of), M02/007 pt RR (part of)	N02/004 pt RR pt MS (part of)	N02/004 pt RR pt MS (part of)	N02/004 pt RR pt MS (part of)	N02/004 pt RR pt MS (part of)	M02/008 pt RR (part of)	N02/005 (a) pt ScR (part of)	N02/005 (a) pt ScR (part of)			

	CRETACEOUS-CENOZOIC ROCK UNITS				PLEISTOCENE-HOLOCENE SEDIMENTS				LAKES	HARBOURS	
Manuka-harakeke	Tangihua Complex gabbro & serpentinite	Tangihua Complex basalt	Mangakahia sandstone and limestone	Parengarenga Group igneous conglomerate	Parengarenga group sandstone, mudstone and polymict conglomerate	Parengarenga Group microdiorite sill	Pleistocene dune belts	Pleistocene acolian sand on high level terraces	Pleistocene consolidated intertidal and estuarine sands forming low coastal terraces	Alluvial and swamp deposits contiguous with estuaries	Other alluvial and swamp deposits
Manuka-kanuka-harakeke	N02/003 pt RR (part of)	M02/008 pt RR (part of)	N02/003 pt RR (part of)	N02/004 pt RR pt MS (part of)	N02/004 pt RR pt MS (part of)	N02/004 pt RR pt MS (part of)	N02/003 pt RR (part of)	M02/008 pt RR (part of)	N02/003 pt RR (part of)		
Mixed	N02/004 pt RR pt MS (part of)	N02/004 pt RR pt MS (part of)	N02/004 pt RR pt MS (part of)	N02/004 pt RR pt MS (part of)	N02/004 pt RR pt MS (part of)	N02/004 pt RR pt MS (part of)					
Shrubland	N02/005 (c) pt ScIR (part of)	N02/005 (c) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (c) pt ScIR (part of)	N02/005 (c) pt ScIR (part of)	N02/005 (c) pt ScIR (part of)					
COASTAL FOREST											
Pohutukawa	N02/005 (c) pt ScIR (part of)	N02/005 (c) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (c) pt ScIR (part of)	N02/005 (c) pt ScIR (part of)	N02/005 (c) pt ScIR (part of)	M02/011 RR				
Pohutukawa treeland	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)		
Pohutukawa-kohekohe	N02/005 (a) RR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)		N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)		
BROADLEAF FOREST											
Kanuka	N02/003 pt RR (part of)	N02/004 pt RR pt MS (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/003 pt RR (part of)	N02/004 pt RR pt MS (part of)	N02/003 pt RR (part of)	N02/005 (a) pt ScIR (part of)	N02/003 pt RR (part of)		
Kanuka-karaka	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)		N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)		
Kanuka-kohekohe-mamaku	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)		N02/005 (a) pt ScIR (part of)	N02/005 (a) pt ScIR (part of)		N02/034

	CRETACEOUS-CENOZOIC ROCK UNITS				PLEISTOCENE-HOLOCENE SEDIMENTS				LAKES	HARBOURS
Kanuka-kohekohe-puniri-rewarewa	Tangihua Complex gabbro & serpentinite	Mangakahia Complex sandstone, mudstone and limestone	Parengarenga Group igneous conglomerate	Parengarenga Group sandstone, mudstone and polymict conglomerate	Parengarenga Group microdiorite sill					
Kanuka-nikau-taraire	N02/003 pt RR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/009 pt RR (part of)	
Kanuka-puniri	N02/001 RR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/001 RR (part of)	
Kanuka-taraire	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)		
Kohekohe-puniri	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)		
Kohekohe-puniri-taraire	N02/003 pt RR (part of), N02/004 pt RR pt. MS (part of)	N02/005 (a) pt SceR (part of)	N02/004 pt RR pt. MS (part of)	N02/003 pt RR (part of), N02/004 pt RR pt. MS (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)		
Kohekohe-taraire	N02/003 pt RR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/003 pt RR (part of), N02/005 (a) pt SceR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)		
Pohutukawa-puniri		N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)	N02/005 (a) pt SceR (part of)		
Pongataraire	N02/003 pt RR (part of)			N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)		

	CRETACEOUS-CENOZOIC ROCK UNITS				PLEISTOCENE-HOLOCENE SEDIMENTS				LAKES	HARBOURS		
Puriri-tarairē	Tangihua Complex gabbro & serpentinite	Tangihua Complex basalt	Mangakahia Complex sandstone, mudstone and limestone	Parengarenga Group igneous conglomerate	Parengarenga group sandstone, mudstone and polymict conglomerate	Parengarenga Group microdiorite sill	Pleistocene dune belts	Pleistocene acolian sand on high level terraces	Pleistocene consolidated intertidal and estuarine sands forming low coastal terraces	Alluvial and swamp deposits ponded by coastal dune belts	Alluvial and swamp deposits contiguous with estuaries	Other alluvial and swamp deposits
	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/005 (a) pt SccR (part of)	N02/005 (a) pt SccR (part of)	N02/003 pt RR (part of), N02/005 (a) SccR (part of)	N02/003 pt RR (part of)	N02/003 pt RR (part of)	N02/005 (a) pt SccR (part of)	N02/003 pt RR (part of), N02/005 (a) pt SccR (part of)			
Puriri-rewarewa-tarairē			N02/005 (a) pt SccR (part of)	N02/005 (a) pt SccR (part of)								
Puriri-tree fern		N02/003 pt RR (part of)			N02/003 pt RR (part of)							
Tarairē		N02/003 PT RR (part of)										
KAURI FOREST												
Kanuka-kauri forest		N02/003 pt RR (part of)			N02/003 pt RR (part of)							
Kauri-monoso		N02/003 pt RR (part of)			N02/003 pt RR (part of)							

TABLE 8. SUMMARY OF SITE EVALUATIONS

Key: reg. significant=regionally significant species; e.u.=ecological unit

	SURVEY NUMBER	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE	SIZE & SHAPE
LEVEL 1 SITES							
Lake Ngaketa, Te Pahi Lake and Surrounds	N02/001	2 e.u.	Dune lake. Fauna: 6 threatened,	4 e.u.s Shrubland/wetland.	Weeds occasional. Hornwort (Lake Ngaketa)	Riparian buffer around lakes. Adjoins reserve (part) N02/013 in the south.	317.6 ha
Cape Road Wetlands and Shrubland	N02/002		Relatively unmodified fertile wetland. Flora: 1 reg. significant Fauna: 1 threatened, 2 reg. significant.	2 e.u.s.	Relatively unmodified. Some weeds.	Buffer to the upper catchment of Waitiki Stream. Adjoins N02/003 in the north.	16.7 ha
Te Pahi Shrublands and Forest Remnants	N02/003	24 e.u.s	Forest. Contains nationally significant geopreservation site. Flora: 28 threatened; 3 Data Deficient, 34 reg significant. Fauna: at least 53 threatened, 2 reg. significant	25 e.u.s. Forest/shrubland/ forest/ swamp sedgeland.	Large contiguous habitat. Some weeds present.	Abuts many wetlands, adjoins several habitats.	10629.8 ha
Unuwahao Bush and Shrublands	N02/004	all e.u.s.	Coastal forest. Flora: 24 threatened, 1 Data Deficient, 17 reg. significant. Fauna: 40 threatened, 2 Data Deficient	6 e.u.s. Shrubland/ forest.	Some modified (grass) coastal faces. Many coastal flats/hillslopes, grazed. Forestry abuts southern border.	Links wetlands and bush remnants. Provides corridor. Coastal buffer.	1486.8 ha
Mokaikai Scenic Reserve and Surrounds	N02/005(a)	all e.u.s.	Coastal forest. Flora: 7 threatened, 6 reg. significant. Fauna: 32 threatened, 1 reg. significant.	14 e.u.s. Shrubland/ forest/ swamp.	Some weeds present.	Adjoins N02/005 (b), N02/030, N02/033. Buffers and links many wetlands.	4720.7 ha
Waikuku Flat	N02/005(b)	all e.u.s.	Sand tombolo Flora: 1 threatened, 3 reg. significant Fauna: 3 threatened, 1 reg. significant	5 e.u.s. Shrubland, wetland, sedgeland	Semi-modified sand tombolo.	Buffers wetlands. Links North Cape with rest of Te Pahi.	348.3 ha

SURVEY NUMBER	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE	SIZE & SHAPE
North Cape Scientific Reserve and Surrounds	N02/005(C)	all e.u.s.	Coastal forest. Ultramafic. Flora: 45 threatened, 2 Data Deficient, 18 reg. significant. Fauna: 26 threatened, 2 reg. significant.	9 e.u.s. Forest/shrubland/sedge/land.	Some weeds, pampas, Hakea etc. Coastal. Buffers wetlands.	1052.9 ha
Maungatike Point Shrubland	M02/007	2 e.u.s.	Part of significant ecosystem. Flora: 3 reg. significant. Fauna: 7 threatened.	4 e.u.s. Shrubland/sedge/land.	Weed e.u. Weeds present. Integral part of Te Rerenga Wairua-Scott Point ecosystem. Buffers wetland, abuts several habitats.	284.8 ha
Scott Point Shrubland and Coastal Associations	M02/008	7 e.u.s.	Good example of coastal shrubland. Flora: 6 threatened, 5 reg. significant. Fauna: 6 threatened.	10 e.u.s. Shrubland, fernland/tussockland/sedge/land.	Weed component in 3 e.u.s. Kikuyu patches. Buffers wetlands, mobile dunes, buffers against farmland.	623.5 ha
Shenstone Block	N02/009	all e.u.s.	Rare habitat types. Flora: 8 threatened, 15 reg. significant. Fauna: 2 threatened, 1 reg. significant.	8 e.u.s. Shrubland/forest/wetland/sedge/land.	Contiguous with mobile dunes to the coast (N02/013). Adjacent to several habitats.	829.7 ha
Te Werahi Wetland	M02/010	4 e.u.s.	Largest wetland system in Te Pahi ED/2nd largest mineralised freshwater system in Northland. Flora: 7 threatened, 1 Data Deficient, 5 reg. significant. Fauna: 7 threatened, 2 reg. significant.	5 e.u.s. Shrubland/reedland/sedge/land.	Some weeds. Coastal link. Contiguous with several habitats, buffering wetland.	567.6 ha
Twilight Beach	M02/011	7 e.u.s.	Dune system. Pohutukawa forest on sand. Flora: 4 threatened, 1 reg. significant. Fauna: 2 threatened, 1 reg. significant.	8 e.u.s. Dune/field, sedge/land, grassland, tussockland/forest.	Some weeds incl. kikuyu. Adjoins coast and several habitats.	551.5 ha

SURVEY NUMBER	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE	SIZE & SHAPE	
Te Werahi Beach and Cape Maria van Diemen	M02/012	8 e.u.s.	Dune complex. Flora: 6 threatened, 2 reg. significant. Fauna: 14 threatened, 4 reg. significant.	9 e.u.s. Sandfield/ grassland/ sedgeland/ shrubland.	Some weeds incl. marram grass.	Coastal. Adjoins several habitats.	423.7 ha
Tapotupotu Stream Wetland and Estuary	M02/015	2 e.u.s.	Fauna: 1 threatened.	3 e.u.s. Mangrove forest/ saltmarsh/ reedland.	Links to coast. Contiguous with several habitats.	25.1 ha	
Paranoa Swamp, Waitahora Lagoon and Waitahora Lakes Wetland Complex	N02/016	8 e.u.s.	Mesotrophic wetland complex. Flora: 7 threatened, 1 Data Deficient, 6 reg. significant. Fauna: 8 threatened, 2 reg. significant	8 e.u.s. Swamp/ sedgeland.	Waitahora Lagoon is free from pest weeds.	269.6 ha	
Upper Kapowairua Bay Wetland	N02/017		Raupo wetland. Flora: 1 threatened, 1 reg. significant. Fauna: 2 threatened, 1 reg. significant.	1 e.u.	Contained within N02/003.	13.1 ha	
Broughton's Gully Wetland	N02/018		Raupo wetland. Flora: 1 reg. significant. Fauna: 2 threatened, 1 reg. significant.	1 e.u.	Contained within N02/003.	7.9 ha	
Kapowairua Wetland and Lagoon	N02/019	all e.u.s	Raupo wetland. Flora: 1 threatened. Fauna: 9 threatened, 1 reg. significant.	2 e.u.s	Forestry adjoins in southeast.	26.4 ha	
Te Huruwai Stream Wetland	N02/020		Raupo wetland.	1 e.u.	Link to Parengarenga Harbour.	17 ha	
Te Hapua Wetland	N02/021		Wetland on rare landform in ED and nationally. Fauna: Not surveyed.	2 e.u.s.	Weeds present. Adjoins N02/003.	25.2 ha	
Te Hapua Settlement Wetland	N02/022		Raupo wetland. Fauna: Not surveyed.	1 e.u.	Wetland buffer to Parengarenga Harbour.	22.6 ha	

	SURVEY NUMBER	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE	SIZE & SHAPE
Paingatai Channel Wetlands	N02/023	Rep site	Raupo wetland. Fauna: Not surveyed.	1 e.u.		Links to Parengarenga Harbour.	12.8ha
Te Hapua Road Wetland	N02/024		Raupo wetland. Fauna: Not surveyed.	1 e.u.		Links to Parengarenga Harbour. Contained within N02/003.	1.8ha
Waiwhero Stream Wetland	N02/025	all e.u.s.	Fertile backdune swamp. Flora: 1 reg. significant. Fauna: 1 threatened.	Reedland/ sedgeland/ 3 e.u.s.		Links to coast. Contiguous with N02/036/	7.7ha
Kapowairua	N02/027	all e.u.s.	Flora: 6 threatened, 4 reg. significant. Fauna: 7 threatened, 1 reg. significant.	3 e.u.s.	Limited modification. Marram grass/ lupin.	Buffers N02/016. Adjoins N02/003.	141.6ha
Tom Bowling Bay	N02/029	3 e.u.s.	Dunefield. Holocene subfossil invertebrate fauna (internationally significant). Flora: 5 threatened. Fauna: 7 threatened, 1 Data Deficient, 1 reg. significant.	4 e.u.s.	Weed e.u.	Coastal buffer, links to several habitats.	103.1 ha
Waikuku Beach	N02/030	2 e.u.s.	Dunefield. Flora: 7 threatened, 3 reg. significant. Fauna: 3 threatened, 1 reg. significant.	3 e.u.s. Dunefield, grassland/ shrubland/ sedgeland.	Some weeds.	Contiguous with several habitats.	186.3 ha
Whareana Bay	N02/031	Rep site	Dunefield. Flora: 5 threatened, Fauna: 6 threatened, 1 reg. significant.	1 e.u.		Contiguous with several habitats.	41.8 ha
Ponaki Wetland	N02/032	1 e.u.	Freshwater wetland. Flora: 1 threatened, 1 Data Deficient, 4 reg. significant. Fauna: 2 threatened, 2 reg. significant.	4 e.u.s.	Exotic herbs/ grasses.	Links with several habitats. Contiguous with N02/005 (a).	55 ha

SURVEY NUMBER	REPRESENT-ATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE	SIZE & SHAPE	
Waikuku Wetlands	N02/033	all e.u.s.	Nationally uncommon habitat. Flora: 1 threatened, 1 reg. significant. Fauna: 3 threatened, 2 reg. significant.	3 e.u.s.	Grazing animals.	Contiguous with several habitats.	41.1 ha
Waitangi Stream Wetland and Riparian Strip	N02/034	all e.u.s	Raupou wetland, riparian forest. Flora: 2 threatened, 1 reg. significant. Fauna: 10 threatened, 1 reg. significant.	3 e.u.s. Wetland/ forest.	Forestry adjoins south west.	Coastal link. Contiguous with several habitats.	90.4 ha
Waihakari Wetland	N02/035	1 e.u.	Freshwater wetland. Flora: 1 threatened, 1 reg. significant. Fauna: Not surveyed.	2 e.u.s.		Coastal link. Contiguous with N02/065, 005(a).	7 ha
Tawakewake Wetland	N02/036	all e.u.s.	Freshwater wetland. Flora: 1 threatened. Fauna: 3 threatened.	3 e.u.s.		Contiguous with several habitats.	5.6 ha
Waiheuheu Catchment Wetlands	N02/037	1 e. u.	Freshwater wetland. Fauna: Not surveyed	2 e.u.s.		Buffer between radiata pine forest and Parengarenga Harbour.	50.3 ha
Haupatoto/Whareana Bay Wetlands	N02/038	1 e.u.	Freshwater wetland. Flora: 1 threatened. Fauna: 1 threatened.	3 e.u.s.	Largely unmodified wetland system.	Contiguous with N02/005 (a).	14.9 ha
Tahuna Channel Wetlands	N02/039		Freshwater wetland. Fauna: Not surveyed.	1 e.u.		Buffer to Parengarenga Harbour. Contiguous with N02/005(a).	4.4 ha
Waingatepua Channel	N02/040		Freshwater wetland. Fauna: Not surveyed.	1 e.u.		Buffers Parengarenga from radiata pine plantation.	4.2 ha
Te Hurewai Stream Wetland	N02/041	1 e.u	Association of fertile and infertile wetland. Fauna: Not surveyed.	2 e.u.s.		Contiguous with N02/003. Links with Parengarenga Harbour.	4.8 ha

SURVEY NUMBER	REPRESENTATIVENESS	RARITY/SPECIAL FEATURES	DIVERSITY & PATTERN	NATURALNESS	BUFFER/LINKAGE	SIZE & SHAPE
Ngakengo Beach N02/062	all e.u.s.	Dunefield. Flora: 2 threatened, 1 reg. significant. Fauna: 5 threatened, 1 reg. significant.	4 e.u.s.	Unmodified dune system. Lupin present.	Contiguous with N02/005(a), N02/035.	165 ha
Tapotupotu Beach M02/063	1 e.u.	Dunefield. Flora: 2 threatened, Fauna: 7 threatened, 1 reg. significant.	2 e.u.s.	Weed e.u., other weeds present.	Contiguous with several habitats.	8.7 ha
The Big Lake N02/067		Freshwater wetland. Flora: 1 threatened. Fauna: 1 threatened.	3 e.u.s.		Close to several habitats.	1 ha
Motuopao Island and Rockstack M02/071	5 e.u.s.	Island. High diversity of sea birds. Flora: 7 threatened, 4 reg. significant. Fauna: 18 threatened, 4 reg. significant.	8 e.u.s. Grassland/ tussockland/ herbfield.	Madeira vine present.		30 ha
Murimotu Island N02/072	1 e.u.s.	Island. Possibly no possums or rats. Flora: 4 threatened, 2 reg. significant. Fauna: 1 threatened.	2 e.u.s.	Exotic grassland.		8.1 ha
Taupiri Island M02/074		Island. Flora: 2 reg. significant. Fauna: 4 threatened, 1 reg. significant	2 e.u.s.	Mainly grassland.		3.5 ha
SUBTOTAL						23,229.6 ha
LEVEL 2 SITES						
Kerr Point Road Shrubland N02/028		Fauna: Not surveyed.	1 e.u.		Buffer between Parengarenga Harbour and radiata pine plantation.	4.9 ha
SUBTOTAL						4.9 ha
TOTAL						23,234.5 ha

6. Acknowledgements

We thank the landowners who cooperated with this survey, and other surveys which have preceded it over past years, as well as staff at the Kaitaia Area Office and the then Te Paki Field Centre for their advice and assistance.

Special acknowledgment is due to the following members of the survey team, without whom this report would not have been completed. Karen Riddell and the late Fraser Moors carried out field work and produced a working draft. Karen Riddell also supplied supplementary information on species distributions. Geomorphological data was compiled and written by Fred Brook. The late Fraser Moors kept the paper, data analysis and map preparation for the early drafts and contributed significantly to the compilation of the glossary.

Peter Anderson was a constantly positive and encouraging Supervisor and had considerable input into the introductory section and review process.

Linda Conning produced the first original draft which was later updated by Wendy Holland.

In the earlier drafts Richard Parrish provided advice and assistance with regard to fauna distribution and status, particularly with regard to landsnails, and Lisa Forester, Michael Heads and Ewen Cameron were frequently called upon for plant identification and botanical advice. Early editorial comment was provided by Peter de Lange, Lisa Forester, Peter Anderson, Ray Pierce, Nigel Clunie and scientific advice was given by Neil Mitchell.

Under contract to DOC, Wildland Consultants updated and revised the report during May and June 2007. Flora and fauna nomenclature and threat categories were updated and checked, and species lists were compiled. During this process fauna advice was provided by Olivier Ball (NorthTec), Fred Brook, Phil Sirvid (Te Papa Museum), John Early (Auckland Museum), Andrea Booth and Amy Macdonald (DOC). Herbarium records were supplied by Ewen Cameron (Auckland Museum Herbarium—AK), Leon Perrie (Te Papa Museum Herbarium—WELT), and Casey Patten and Ines Schoenberger (Allan Herbarium, Landcare Research—CHR). Flora advice was given by Jessica Beever (Landcare Research), Matt Renner (University of Sydney), Lisa Forester (Northland Regional Council), Andrew Townsend (DOC) and Peter de Lange (DOC). Recent species information from the DOC Kaitaia Area Office was obtained from Patrick Whaley, Janeen Collings and Lester Bridson.

Melanie Stephen (Wildland Consultants) compiled the plant species list and gathered information on some of the regionally significant plant species.

The report was then further updated and completed by Wendy Holland with Fred Brook contracted to update and compile the landsnail list for

the Ecological District (both threatened and non-threatened) and their distribution throughout the ED. He wrote the introductory section for the threatened landsnail section (3.4) and the threats to landsnails in 3.5. Fred also provided a list and summary of fossil vertebrates recorded from dunefields in the Te Paki ED (see table in Appendix 8). Thanks to Dr Oliver Ball and his interest and knowledge of invertebrates. Additional fauna information was provided to us by Mike Fitzgerald (honorary research associate Te Papa-Tongarewa Museum) who provided significant information on spiders and Stephen Thorpe providing significant information on beetles. Dr Oliver Ball coordinated and supplemented this information.

The original site maps were prepared by Eric Dutton with financial assistance from the Far North District Council. Roger Bawden (Wildland Consultants) and Jenny Lux (Wildland Consultants) updated site maps according to recent aerial photography (2003). The maps were rechecked and updated by Wendy Holland and Kaye Seymour (DOC) and Kaye Seymour prepared the final maps for publication using ArcGIS v. 9.2.

The final draft report was peer reviewed by Dr Ray Pierce (EcoOceania Ltd), Peter Anderson (DOC), Andrew Townsend (DOC), Andrea Booth (DOC), Patrick Whaley (DOC) and Lisa Forester (NRC). Wendy Holland prepared the report for publication.

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Appendix 1

FIELD SURVEY FORM

DEPARTMENT OF CONSERVATION PROTECTED NATURAL AREAS PROGRAMME

NAME OF HABITAT:..... DATE:
 GRID REF.: SSBI NO.: PNA NO.:
 HABITAT TYPE(S):.....

GEOMORPHOLOGICAL TYPE(S):

VEGETATION TYPE(S):

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

Appendix 2

LETTER TO RATEPAYERS/NEWS MEDIA ITEM



Department of Conservation
Te Papa Atawhai

Dear Landowner,

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

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

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

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

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

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

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

A handwritten signature in black ink that reads "Gerry Rowan".

Gerry Rowan
REGIONAL CONSERVATOR



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

Natural sites studied in the Far North

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

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

The study is being done for a number of reasons, including the fact that many lowland forests, gumlands, 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 Moore and Linda Winch have begun gathering information by checking DOC's database and then looking at areas from the roadside.

Identification

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

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

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

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

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

Appendix 3

CATEGORIES OF THREAT

In this report categories of threat are based on the New Zealand Threat Classification system developed by Molloy *et al.* (2002).

Below are sections 3 and 7 of Molloy *et al.* (2002) which explain the species classification system.

Classification structure and categories

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

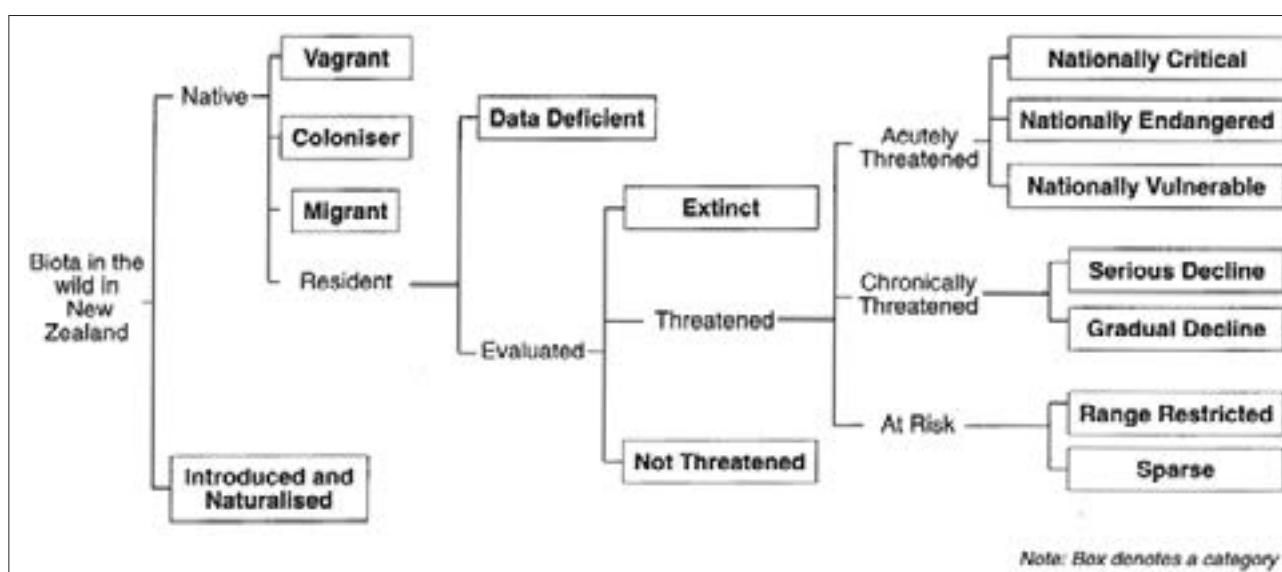


Figure 1. Structure of the New Zealand Threat Classification System.

INTRODUCED AND NATURALISED

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

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

VAGRANT

For the purposes of this document, vagrants are taxa that are found unexpectedly and rarely in New Zealand, and whose presence in our region is naturally transitory. These are taxa that do not establish

themselves beyond their point of arrival because of reproductive failure or for specific ecological reasons (see de Lange & Norton 1998). Examples include the red-kneed dotterel (*Erythrogonys cinctus*) and the blue moon butterfly (*Hypolimnna bolina nerina*), both from Australia, and the spotted sawtail (*Prionurus maculatus*) from the tropical south-west Pacific Ocean.

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

COLONISER

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

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

MIGRANT

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

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

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

DATA DEFICIENT

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

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

EXTINCT

A taxon is listed as Extinct when there is no reasonable doubt, after repeated surveys in known or expected habitats at appropriate times (diurnal, seasonal and annual) and throughout the taxon's historic range, that the last individual has died. Examples include huia (*Heteralocha acutirostris*) and Adams's mistletoe (*Trilepidea adamsii*). Only taxa that have become extinct since 1840 are included in the list. Taxa that are extinct in the wild but occur in captivity or cultivation are not listed in this category. These are listed as Critically Endangered and are qualified with the letters EW (Extinct in the Wild).

THREATENED

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

Acutely Threatened

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

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

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

Chronically Threatened

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

At Risk

Taxa that do not meet the criteria for Acutely Threatened or Chronically Threatened, but have either restricted ranges or small scattered subpopulations, are listed in one of two categories (Range Restricted and Sparse) that fall under the division 'At Risk'. Although these taxa are not currently in decline, their population characteristics mean a new threat could rapidly deplete their population(s). Range Restricted taxa

either occur in a small geographic area (e.g. Three Kings Islands), are restricted to a particular habitat (e.g. geothermal areas), or require very specific substrates (e.g. ultramafic rock), and for colonial breeders, have fewer than 10 subpopulations. Taxa that have naturally restricted ranges and taxa that have become restricted as a result of human activities are both included in this category. This is because both would face the same risk of extinction in the face of a new threat. The two groups are differentiated by the use of a qualifier (see Section 4).

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

NOT THREATENED

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

Criteria for the Acutely Threatened and Chronically Threatened categories

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

NATIONALLY CRITICAL

Very small population or a very high predicted decline A taxon is Nationally Critical when available scientific evidence indicates that it meets any of the following three criteria:

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

NATIONALLY ENDANGERED

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

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

Status criteria

1. The total population size is 250-1000 mature individuals.
2. There are < 5 sub-populations and either:
 - a. < 300 mature individuals in the largest sub-population, or
 - b. the total area of occupancy is < 10 ha (0. 1 km²).

Trend criteria

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

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

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

Status criteria

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

Trend criteria

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

NATIONALLY VULNERABLE

Small to moderate population and moderate recent or predicted decline

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

Status criteria

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

Trend criteria

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

SERIOUS DECLINE

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

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

Status criteria

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

Trend criterion

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

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

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

Status criteria

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

Trend criterion

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

GRADUAL DECLINE

Moderate to large population and small to moderate decline

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

Status criteria

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

Trend criterion

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

Appendix 4

CATEGORIES OF IMPORTANCE FOR GEOLOGICAL SITES AND SOILS

Important geological sites

Ranking criteria for important geological sites and landforms in the Northland Region follow Kenny and Hayward (1996). The importance assessment given to each site has been assessed by those informants familiar with the site.

Sites are listed in this inventory under three levels of importance:

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

Important soil sites

Ranking criteria for important soils in the Northland Region follow Arand *et al.* (1993).

The three importance categories are:

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.

Appendix 5

CHECKLIST OF VASCULAR PLANT SPECIES IN TE PAKI ECOLOGICAL DISTRICT

This is a preliminary list is based on records from herbaria (AK, WELT, CHR, OTA, AKU), and the SSBI information system from Northland Conservancy.

Key

Following the format in the rest of the report, current threat classification by Hitchmough *et al.* (comp.) 2007 is listed in upper case and regionally significant status¹⁷ in indicated in lower case.

Qualifiers (Molloy *et al.* 2002):

EW	Extinct in the Wild	Exists only in cultivation or in captivity
CD	Conservation Dependent	Likely to move to a higher threat category if current management ceases
DP	Data Poor	Confidence in the listing is low due to the poor data available for assessment
RC	Recovering	Total population showing a sustained recovery
ST	Stable	Total population stable
SO	Secure Overseas	Secure in other parts of its natural range outside New Zealand
TO	Threatened Overseas	Threatened in those parts of its natural range outside New Zealand
HI	Human Induced	Present distribution is a result of direct or indirect human activity
RF	Recruitment Failure	Current population may appear stable but the age structure is such that catastrophic declines are likely in the future
EF	Extreme Fluctuations	Extreme unnatural population fluctuations, or natural fluctuations overlaying human-induced declines, that increase the threat of extinction
OL	One Location	Found at one location (geographically or ecologically distinct area) in which a single event (e.g. a predator irruption) could soon affect all individuals of the taxon.

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
Gymnosperms – Indigenous		
<i>Agathis australis</i>		
<i>Dacrycarpus dacrydioides</i>		
<i>Dacrydium cupressinum</i>		
<i>Halocarpus kirkii</i>	Sparse	RF
<i>Lepidothamnus intermedius</i> (doubtful record)	regionally significant	
<i>Libocedrus plumosa</i>	Sparse	
<i>Manoao colensoi</i>	regionally significant	
<i>Phyllocladus toatoa</i>	regionally significant	

17. Regionally significance status is determined by DOC, Northland Conservancy

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Phyllocladus trichomanoides</i>		
<i>Phyllocladus</i> aff. <i>trichomanoides</i> (AK 138439; Surville Cliffs)	Range Restricted	CD OL ST
<i>Podocarpus hallii</i>		
<i>Podocarpus totara</i>		
<i>Prumnopitys ferruginea</i>		
<i>Prumnopitys taxifolia</i>		
Gymnosperms – Naturalised		
<i>Lagarostrobos franklinii</i>		
<i>Pinus radiata</i>		
Dicots – Indigenous		
<i>Acaena anserinifolia</i>		
<i>Ackama rosifolia</i>		
<i>Alectryon excelsus</i>		
<i>Alseuosmia quercifolia</i>		
<i>Apium prostratum</i>		
<i>Aristolelia serrata</i>		
<i>Ascarina lucida</i>	regionally significant	
<i>Atriplex bollowayi</i>	Nationally Critical	CD EF
<i>Avicennia marina</i> var. <i>australasica</i>		
<i>Beilschmiedia tarairi</i>		
<i>Beilschmiedia tawa</i>		
<i>Brachyglottis kirkii</i> var. <i>angustior</i>	regionally significant	
<i>Brachyglottis repanda</i>		
<i>Calystegia marginata</i>	Sparse	SO EF
<i>Calystegia sepium</i>		
<i>Calystegia soldanella</i>		
<i>Calystegia tuguriorum</i>		
<i>Carmichaelia australis</i>		
<i>Carpodetus serratus</i>		
<i>Cassinia amoena</i>	Range Restricted	
<i>Cassytba paniculata</i>		
<i>Centella uniflora</i>		
<i>Centipeda minima</i> subsp. <i>minima</i>	Nationally Critical	SO EF
<i>Chenopodium glaucum</i> subsp. <i>ambiguum</i>		
<i>Clematis paniculata</i>		
<i>Colensoa physaloides</i>	Gradual Decline	
<i>Coprosma acerosa</i>	regionally significant	
<i>Coprosma acerosa</i> × <i>C. repens</i>		
<i>Coprosma arborea</i>		
<i>Coprosma areolata</i>		
<i>Coprosma crassifolia</i>	regionally significant	
<i>Coprosma distantia</i>	Range Restricted	CD OL
<i>Coprosma grandifolia</i>		
<i>Coprosma lucida</i>		
<i>Coprosma macrocarpa</i>		
<i>Coprosma macrocarpa</i> subsp. <i>minor</i>		
<i>Coprosma macrocarpa</i> subsp. <i>minor</i> × <i>C. robusta</i>		
<i>Coprosma neglecta</i>	Range Restricted	
<i>Coprosma parviflora</i>	regionally significant	
<i>Coprosma parviflora</i> × <i>C. arborea</i>		
<i>Coprosma parviflora</i> × <i>C. rhamnoides</i>		
<i>Coprosma propinqua</i> × <i>C. robusta</i>		
<i>Coprosma repens</i>		
<i>Coprosma repens</i> × <i>C. rhamnoides</i>		
<i>Coprosma rhamnoides</i>		
<i>Coprosma robusta</i>		

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Coprosma rigida</i>	regionally significant	
<i>Coprosma spathulata</i> subsp. <i>spathulata</i>		
<i>Coprosma spathulata</i> subsp. <i>bikuruana</i>	Nationally Critical	CD HI OL
<i>Coriaria arborea</i>		
<i>Coriaria sarmentosa</i>		
<i>Corokia buddleioides</i> × <i>C. cotoneaster</i>		
<i>Corokia buddleioides</i>		
<i>Corokia cotoneaster</i>	regionally significant	
<i>Corynocarpus laevigatus</i>		
<i>Cotula coronopifolia</i>		
<i>Crassula sieberiana</i>		
<i>Daucus glochidiatus</i>	Serious Decline	SO DP
<i>Dichondra repens</i>		
<i>Disphyma australe</i>		
<i>Dodonaea viscosa</i>		
<i>Dracophyllum latifolium</i>		
<i>Dracophyllum lessonianum</i>		
<i>Dracophyllum sinclairii</i>	regionally significant	
<i>Drosera auriculata</i>		
<i>Drosera binata</i>	regionally significant	
<i>Drosera peltata</i>	regionally significant	
<i>Drosera pygmaea</i>	Gradual Decline	SO
<i>Drosera spathulata</i>		
<i>Dysoxylum spectabile</i>		
<i>Einadia allanii</i>		
<i>Einadia trigonos</i> subsp. <i>trigonos</i>		
<i>Elaeocarpus dentatus</i>		
<i>Entelea arborescens</i>		
<i>Epacris pauciflora</i>	regionally significant	
<i>Epilobium billardierianum</i> subsp. <i>billardierianum</i>		
<i>Epilobium cinereum</i>	regionally significant	
<i>Epilobium hirtigerum</i>	Nationally Endangered	SO HI
<i>Epilobium pallidiflorum</i>	regionally significant	
<i>Epilobium rotundifolium</i>		
<i>Euchiton audax</i>		
<i>Euchiton collinus</i>		
<i>Euchiton sphaericus</i>		
<i>Euphorbia glauca</i>	Serious Decline	EF
<i>Fuchsia excorticata</i>		
<i>Fuchsia procumbens</i>	Sparse	
<i>Gaultheria antipoda</i>		
<i>Geniostoma ligustrifolium</i> var. <i>crassum</i>	Range Restricted	CD OL ST
<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>		
<i>Geranium homeanum</i>		
<i>Geranium potentilloides</i>		
<i>Geranium solanderi</i>		
<i>Glossostigma elatinooides</i>	regionally significant	
<i>Gonocarpus incanus</i>		
<i>Gonocarpus micranthus</i>		
<i>Gonocarpus montanus</i>		
<i>Gratiola sexdentata</i>	regionally significant	
<i>Griselinia lucida</i>		
<i>Gunnera dentata</i>	regionally significant	
<i>Haloragis erecta</i> subsp. <i>cartilaginea</i>	Range Restricted	CD OL ST
<i>Haloragis erecta</i> subsp. <i>erecta</i>		
<i>Hebe adamsii</i>	Range Restricted	OL
<i>Hebe brevifolia</i>	Range Restricted	CD OL ST
<i>Hebe brevifolia</i> × <i>H. ligustrifolia</i>	Range Restricted	CD OL ST

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Hebe diosmifolia</i>	regionally significant	
<i>Hebe ligustrifolia</i>		
<i>Hebe macrocarpa</i> var. <i>macrocarpa</i>	regionally significant	
<i>Hebe speciosa</i>	Nationally Endangered	CD HI
<i>Hebe stricta</i> var. <i>stricta</i>		
<i>Hebe</i> aff. <i>ligustrifolia</i> (AK 207101; Surville Cliffs)	Range Restricted	
<i>Hedycarya arborea</i>		
<i>Helicbrysum</i> aff. <i>aggregatum</i> (AK 54473; Surville Cliffs)	Range Restricted	CD OL ST
<i>Helicbrysum lanceolatum</i>	regionally significant	
<i>Hibiscus diversifolius</i>	Nationally Vulnerable	SO
<i>Hibiscus richardsonii</i>	Nationally Endangered	
<i>Hoberia populnea</i>		
<i>Hydrocotyle elongata</i>		
<i>Hydrocotyle heteromeria</i>		
<i>Hydrocotyle moschata</i>		
<i>Hydrocotyle novae-zeelandiae</i>		
<i>Hydrocotyle pterocarpa</i>		
<i>Hypericum gramineum</i>		
<i>Hypericum japonicum</i>		
<i>Ipomoea cairica</i>		
<i>Ipomoea pes-caprae</i> subsp. <i>brasiliensis</i>	Range Restricted	
<i>Jovellana repens</i>		
<i>Knightia excelsa</i>		
<i>Kortbalsella salicornioides</i>	Sparse	EF
<i>Kunzea ericoides</i> var. <i>ericoides</i>		
<i>Kunzea ericoides</i> var. <i>linearis</i>	Serious Decline	HI
<i>Kunzea</i> "latifolia" × <i>K. ericoides</i> var. <i>linearis</i>		
<i>Lagenifera lanata</i>	regionally significant	
<i>Lagenifera pumila</i>		
<i>Laurelia novae-zeelandiae</i>		
<i>Leionema nudum</i>		
<i>Lepidium oleraceum</i>	Nationally Endangered	CD EF HI
<i>Leptinella rotundata</i>	Nationally Vulnerable	RF
<i>Leptecophylla juniperina</i>		
<i>Leptospermum scoparium</i>		
<i>Leptostigma setulosum</i>		
<i>Leucopogon fasciculatus</i>		
<i>Leucopogon fraseri</i>		
<i>Leucopogon xerampelinus</i>	Range Restricted	CD OL ST
<i>Lilaeopsis novae-zeelandiae</i>		
<i>Limosella lineata</i>		
<i>Litsea calicaris</i>		
<i>Lobelia anceps</i>		
<i>Lophomyrtus bullata</i>		
<i>Lophomyrtus bullata</i> × <i>L. obcordata</i>		
<i>Lophomyrtus obcordata</i>	regionally significant	
<i>Macropiper excelsum</i> subsp. <i>excelsum</i>		
<i>Mazus novaezeelandiae</i> subsp. <i>impolitus</i> f. <i>hirtus</i>	Nationally Critical	CD HI
<i>Melicope simplex</i>		
<i>Melicope ternata</i>		
<i>Melicytus macrophyllus</i>		
<i>Melicytus micranthus</i>		
<i>Melicytus novae-zeelandiae</i>	regionally significant	
<i>Melicytus ramiflorus</i>		
<i>Mentha cunninghamii</i>		
<i>Metrosideros bartlettii</i>	Nationally Critical	CD HI
<i>Metrosideros carminea</i>	regionally significant	
<i>Metrosideros diffusa</i>		

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Metrosideros excelsa</i>		
<i>Metrosideros excelsa</i> × <i>M. robusta</i>		
<i>Metrosideros fulgens</i>		
<i>Metrosideros perforata</i>		
<i>Metrosideros robusta</i>	regionally significant	
<i>Metrosideros umbellata</i>	regionally significant	
<i>Mida salicifolia</i>	Gradual Decline	RF
<i>Mimulus repens</i>	Sparse	DP SO
<i>Muehlenbeckia australis</i>		
<i>Muehlenbeckia australis</i> × <i>M. complexa</i>		
<i>Muehlenbeckia complexa</i>		
<i>Myoporum laetum</i>	regionally significant	
<i>Myriophyllum propinquum</i>		
<i>Myriophyllum robustum</i>	Gradual Decline	CD
<i>Myriophyllum votschii</i>	regionally significant	
<i>Myrsine australis</i>		
<i>Myrsine salicina</i>		
<i>Neomyrtus pedunculata</i>	regionally significant	
<i>Nertera dichondrifolia</i>		
<i>Nertera setulosa</i>		
<i>Nestegis lanceolata</i>		
<i>Olearia albida</i>	regionally significant	
<i>Olearia angulata</i>	Data Deficient	
<i>Olearia rani</i>		
<i>Oxalis exilis</i>		
<i>Oxalis rubens</i>		
<i>Ozothamnus leptophyllus</i>		
<i>Parietaria debilis</i>		
<i>Parsonsia capsularis</i>		
<i>Parsonsia heterophylla</i>		
<i>Parsonsia praeruptis</i>	Range Restricted	CD OL
<i>Pelargonium inodorum</i>	regionally significant	
<i>Peperomia urvilleana</i>		
<i>Persicaria decipiens</i>		
<i>Picris burbridgeae</i>	Nationally Endangered	SO
<i>Pimelea arenaria</i>	Gradual Decline	HI
<i>Pimelea prostrata</i>		
<i>Pimelea prostrata</i> var. <i>erecta</i>		
<i>Pimelea tomentosa</i>	Serious Decline	EF
<i>Pimelea urvilleana</i> agg. (Requires full taxonomic revision (NZPCN 2007))		
<i>Pimelea</i> aff. <i>tomentosa</i> (b) (AK 130893; Surville Cliffs)	Range Restricted	CD OL ST
<i>Pisonia brunoniana</i>	Sparse	SO HI
<i>Pittosporum cornifolium</i>		
<i>Pittosporum crassifolium</i>		
<i>Pittosporum ellipticum</i>	Sparse	
<i>Pittosporum pimeleoides</i> subsp. <i>majus</i>	Range Restricted	CD OL ST
<i>Pittosporum serpentinum</i>	Nationally Endangered	CD RF OL
<i>Pittosporum tenuifolium</i>		
<i>Pittosporum umbellatum</i>		
<i>Plagiantbus divaricatus</i>		
<i>Plagiantbus regius</i>	regionally significant	
<i>Plantago raoulii</i>	regionally significant	
<i>Pomaderris amoena</i>		
<i>Pomaderris edgerleyi</i>	regionally significant	
<i>Pomaderris kumerabo</i>		
<i>Pomaderris paniculosa</i> subsp. <i>novae-zelandiae</i>	Range Restricted	
<i>Pomaderris phyllicifolia</i>	Nationally Endangered	HI SO

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Pouteria costata</i>	regionally significant	
<i>Pratia angulata</i>	regionally significant	
<i>Pseudognaphalium luteoalbum</i>		
<i>Pseudopanax</i> aff. <i>lessonii</i> (AK 46066, Surville Cliffs)	Range Restricted	CD
<i>Pseudopanax arboreus</i>		
<i>Pseudopanax crassifolius</i>		
<i>Pseudopanax ferox</i>	Sparse	CD EF
<i>Pseudopanax lessonii</i>		
<i>Pseudowintera axillaris</i>	regionally significant	
<i>Pseudowintera colorata</i>	regionally significant	
<i>Ranunculus acaulis</i>		
<i>Ranunculus amphitrichus</i>		
<i>Ranunculus reflexus</i>		
<i>Ranunculus urvilleanus</i>	regionally significant	
<i>Raukaua anomalus</i>	regionally significant	
<i>Rhabdotbamnus solandri</i>		
<i>Rubus australis</i>		
<i>Rubus cissoides</i>		
<i>Samolus repens</i>		
<i>Sarcocornia quinqueflora</i>		
<i>Schefflera digitata</i>		
<i>Scleranthus biflorus</i>	regionally significant	
<i>Selliera radicans</i>		
<i>Senecio lautus</i>		
<i>Senecio quadridentatus</i>		
<i>Senecio scaberulus</i>	Nationally Endangered	EF HI
<i>Sicyos australis</i> sens. str.	Nationally Critical	CD TO
<i>Solanum americanum</i>		
<i>Sonchus kirkii</i>	Gradual Decline	HI EF
<i>Sophora chathamica</i>		
<i>Sophora microphylla</i>		
<i>Spergularia media</i>		
<i>Streblus heterophyllus</i>		
<i>Suaeda novae-zelandiae</i>	regionally significant	
<i>Syzygium maire</i>		
<i>Tetragonia implexicoma</i>		
<i>Toronia toru</i>		
<i>Utricularia australis</i>	Nationally Endangered	HI SO CD
<i>Vitex lucens</i>		
<i>Wahlenbergia gracilis</i>		
<i>Wahlenbergia vernicosa</i>		
<i>Wahlenbergia violacea</i>		
<i>Weinmannia silvicola</i>		
Dicots – Naturalised		
<i>Acacia longifolia</i>		
<i>Acacia melanoxylon</i>		
<i>Acacia paradoxa</i>		
<i>Ageratina adenophora</i>		
<i>Ageratina riparia</i>		
<i>Aleurites fordii</i>		
<i>Anagallis arvensis</i>		
<i>Anredera cordifolia</i>		
<i>Anthemis cotula</i>		
<i>Aphanes microcarpa</i>		
<i>Arctotis</i> sp.		
<i>Aster subulatus</i>		
<i>Bellis perennis</i>		
<i>Bidens pilosa</i>		

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Blackstonia perfoliata</i>		
<i>Brassica juncea</i>		
<i>Brassica napus</i>		
<i>Brassica oleracea</i>		
<i>Cakile edentula</i> var. <i>edentula</i>		
<i>Callistachys lanceolata</i>		
<i>Callitriche stagnalis</i>		
<i>Carduus tenuiflorus</i>		
<i>Carica pubescens</i>		
<i>Centaurea calcitrapa</i>		
<i>Centaurium erythraea</i>		
<i>Cerastium glomeratum</i>		
<i>Ceratophyllum demersum</i>		
<i>Cestrum aurantiacum</i>		
<i>Chenopodium album</i>		
<i>Chenopodium ambrosioides</i>		
<i>Ciclospermum leptophyllum</i>		
<i>Cirsium vulgare</i>		
<i>Citrullus lanatus</i>		
<i>Conyza albida</i>		
<i>Crassula decumbens</i>		
<i>Erechtites valerianifolia</i>		
<i>Erodium cicutarium</i> subsp. <i>circutarium</i>		
<i>Euphorbia peplus</i>		
<i>Facelis retusa</i>		
<i>Ficus carica</i>		
<i>Galium divaricatum</i>		
<i>Gamochaeta calviceps</i>		
<i>Gamochaeta coarctata</i>		
<i>Gamochaeta purpurea</i>		
<i>Gamochaeta simplicicaulis</i>		
<i>Gamochaeta subfalcata</i>		
<i>Geranium gardneri</i>		
<i>Geranium molle</i>		
<i>Hakea gibbosa</i>		
<i>Hakea sericea</i>		
<i>Haloragis aspera</i>		
<i>Helenium puberulum</i>		
<i>Hypericum humifusum</i>		
<i>Hypericum mutilum</i>		
<i>Hypochaeris radicata</i>		
<i>Lavatera arborea</i>		
<i>Leontodon taraxacoides</i>		
<i>Lepidium bonariense</i>		
<i>Lepidium pseudotasmanicum</i>		
<i>Linum bienne</i>		
<i>Linum trigynum</i>		
<i>Lotus angustissimus</i>		
<i>Lotus pedunculatus</i>		
<i>Lotus suaveolens</i>		
<i>Ludwigia palustris</i>		
<i>Lupinus arboreus</i>		
<i>Lytbrum hyssopifolia</i>		
<i>Matthiola incana</i>		
<i>Medicago arabica</i>		
<i>Medicago lupulina</i>		
<i>Medicago nigra</i>		
<i>Melaleuca armillaris</i>		

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Melilotus indicus</i>		
<i>Mentha pulegium</i>		
<i>Modiola caroliniana</i>		
<i>Moenchia erecta</i>		
<i>Myosotis discolor</i>		
<i>Myosotis scorpioides</i>		
<i>Nicotiana tabacum</i>		
<i>Oenanthe pimpinelloides</i>		
<i>Oenothera stricta</i>		
<i>Ornithopus pinnatus</i>		
<i>Orobancha minor</i>		
<i>Oxalis corniculata</i>		
<i>Oxalis perennans</i>		
<i>Oxalis radicata</i>		
<i>Paraserianthes lophantha</i>		
<i>Parentucellia viscosa</i>		
<i>Pavonia bastata</i>		
<i>Physalis peruviana</i>		
<i>Phytolacca octandra</i>		
<i>Picris hieracioides</i>		
<i>Plantago australis</i>		
<i>Plantago lanceolata</i>		
<i>Polycarpon tetraphyllum</i>		
<i>Polygala myrtifolia</i>		
<i>Portulaca oleracea</i>		
<i>Prunella laciniata</i>		
<i>Psoralea pinnata</i>		
<i>Ranunculus muricatus</i>		
<i>Ranunculus parviflorus</i>		
<i>Ranunculus sardous</i>		
<i>Rorippa nasturtium-aquaticum</i>		
<i>Rosa canina</i>		
<i>Rumex brownii</i>		
<i>Rumex conglomeratus</i>		
<i>Salsola kali</i>		
<i>Scrophularia auriculata</i>		
<i>Senecio diaschides</i>		
<i>Senecio mikanioides</i>		
<i>Sberardia arvensis</i>		
<i>Sigesbeckia orientalis</i>		
<i>Silene coronaria</i>		
<i>Silene gallica</i>		
<i>Sisymbrium officinale</i>		
<i>Solanum linnaeanum</i>		
<i>Solenopsis laurentia</i>		
<i>Soliva sessilis</i>		
<i>Sonchus asper</i>		
<i>Sonchus oleraceus</i>		
<i>Stellaria media</i>		
<i>Trifolium dubium</i>		
<i>Trifolium glomeratum</i>		
<i>Trifolium repens</i>		
<i>Trifolium resupinatum</i>		
<i>Trifolium scabrum</i>		
<i>Trifolium striatum</i>		
<i>Ulex europaeus</i>		
<i>Vellereophyton dealbatum</i>		
<i>Verbascum thapsus</i>		

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Verbena littoralis</i>		
<i>Verbena officinalis</i>		
<i>Veronica agrestis</i>		
<i>Veronica arvensis</i>		
<i>Veronica plebeia</i>		
<i>Veronica serpyllifolia</i>		
<i>Vicia sativa</i>		
<i>Vicia tetrasperma</i>		
<i>Vitis vinifera</i>		
<i>Xanthium spinosum</i>		
Pteridophytes – Indigenous		
<i>Adiantum aethiopicum</i>	regionally significant	
<i>Adiantum cunninghamii</i>		
<i>Adiantum diapbanum</i>		
<i>Adiantum fulvum</i>		
<i>Adiantum bispidulum</i>		
<i>Adiantum viridescens</i>		
<i>Anarthropteris lanceolata</i>		
<i>Asplenium bulbiferum</i>		
<i>Asplenium flabellifolium</i>	regionally significant	
<i>Asplenium flaccidum</i>		
<i>Asplenium flaccidum</i> × <i>A. oblongifolium</i>		
<i>Asplenium gracillimum</i>	regionally significant	
<i>Asplenium lamprophyllum</i>		
<i>Asplenium oblongifolium</i>		
<i>Asplenium obtusatum</i> subsp. <i>nortblandicum</i>	regionally significant	
<i>Asplenium polyodon</i>		
<i>Azolla filiculoides</i>	regionally significant	
<i>Blechnum chambersii</i>		
<i>Blechnum discolor</i>		
<i>Blechnum filiforme</i>		
<i>Blechnum fluviatile</i>	regionally significant	
<i>Blechnum fraseri</i>		
<i>Blechnum membranaceum</i>		
<i>Blechnum minus</i>		
<i>Blechnum novae-zelandiae</i>		
<i>Blechnum procerum</i>		
<i>Blechnum triangularifolium</i>		
<i>Botrychium australe</i>	Sparse	DP SO EF
<i>Cheilanthes distans</i>		
<i>Cheilanthes sieberi</i>	regionally significant	
<i>Christella dentata</i>	Nationally Critical	CD HI OL SO
<i>Cyathea cunninghamii</i>	regionally significant	
<i>Cyathea dealbata</i>		
<i>Cyathea medullaris</i>		
<i>Cyclosorus interruptus</i>	Gradual Decline	SO
<i>Deparia petersenii</i>		
<i>Deparia tenuifolia</i>		
<i>Dicksonia lanata</i>	regionally significant	
<i>Dicksonia squarrosa</i>		
<i>Diplazium australe</i>		
<i>Doodia aspera</i>	Vagrant	EW SO
<i>Doodia australis</i>		
<i>Gleichenia dicarpa</i>		
<i>Gleichenia microphylla</i>		
<i>Grammitis billardierei</i>		
<i>Huperzia varia</i>		

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Hymenophyllum demissum</i>		
<i>Hymenophyllum dilatatum</i>		
<i>Hymenophyllum flabellatum</i>		
<i>Hymenophyllum flexuosum</i>		
<i>Hymenophyllum rarum</i>		
<i>Hymenophyllum revolutum</i>		
<i>Hymenophyllum sanguinolentum</i>		
<i>Hypolepis ambigua</i>		
<i>Lastreopsis glabella</i>		
<i>Lastreopsis hispidula</i>		
<i>Lastreopsis microsora</i>		
<i>Lastreopsis velutina</i>		
<i>Leptopteris hymenophylloides</i>		
<i>Lindsaea linearis</i>		
<i>Lindsaea trichomanoides</i>		
<i>Lycopodiella cernua</i>		
<i>Lycopodiella lateralis</i>		
<i>Lycopodiella serpentina</i>	Nationally Vulnerable	TO
<i>Lycopodium deuterodensum</i>		
<i>Lycopodium volubile</i>		
<i>Lygodium articulatum</i>		
<i>Macrothelypteris torresiana</i>	Sparse	SO EF
<i>Microsorium pustulatum</i>		
<i>Microsorium scandens</i>		
<i>Opbioglossum coriaceum</i>	regionally significant	
<i>Opbioglossum petiolatum</i>	Nationally Endangered	CD HI SO
<i>Paesia scaberula</i>		
<i>Pellaea calidirupium</i>	regionally significant	
<i>Pellaea rotundifolia</i>		
<i>Phylloglossum drummondii</i>	Nationally Endangered	EF HI SO
<i>Pneumatopteris pennigera</i>		
<i>Polystichum neozelandicum</i> subsp. <i>neozelandicum</i>		
<i>Polystichum wawranum</i>		
<i>Psilotum nudum</i>	regionally significant	
<i>Pteridium esculentum</i>		
<i>Pteris comans</i>		
<i>Pteris comans</i> × <i>P. saxatilis</i>		
<i>Pteris macilenta</i>		
<i>Pteris saxatilis</i>		
<i>Pteris tremula</i>		
<i>Pyrosia eleagnifolia</i>		
<i>Rumobra adiantiformis</i>		
<i>Schizaea bifida</i>	regionally significant	
<i>Schizaea fistulosa</i>		
<i>Sticherus cunninghamii</i>		
<i>Sticherus flabellatus</i>	Sparse	SO
<i>Tbelypteris confluens</i>	Gradual Decline	CD SO
<i>Tmesipteris elongata</i>		
<i>Tmesipteris lanceolata</i>		
<i>Tmesipteris sigmatifolia</i>	Sparse	
<i>Tmesipteris tannensis</i>		
<i>Todea barbara</i>	Nationally Endangered	SO
<i>Trichomanes elongatum</i>		
<i>Trichomanes venosum</i>		
Pteridophytes – Naturalised		
<i>Azolla pinnata</i>		

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Cyrtomium falcatum</i> (Recorded for the first time in Te Pahi ED by Andrew Townsend in Nov. 2007 (specimen to to AK, W. Holland pers. comm.).		
Grasses – Indigenous		
<i>Austrofestuca littoralis</i>	Gradual Decline	CD HI SO
<i>Austrostipa stipoides</i>		
<i>Cortaderia splendens</i>		
<i>Deyeuxia quadriseta</i>		
<i>Dichelachne crinita</i>		
<i>Dichelachne micrantha</i>		
<i>Echinopogon ovatus</i>		
<i>Elymus multiflorus</i>		
<i>Isachne globosa</i>		
<i>Lachnagrostis billardierei</i>		
<i>Lachnagrostis filiformis</i>		
<i>Lachnagrostis littoralis</i> subsp. <i>littoralis</i>		
<i>Microlaena avenacea</i>		
<i>Microlaena polynoda</i>		
<i>Microlaena stipoides</i>		
<i>Optismenus hirtellus</i>		
<i>Poa pusilla</i>		
<i>Rytidosperma biannulare</i>		
<i>Rytidosperma gracile</i>		
<i>Rytidosperma unarede</i>		
<i>Spinifex sericeus</i>		
<i>Trisetum arduanum</i>		
<i>Trisetum serpentinum</i>		
<i>Zoysia minima</i>		
<i>Zoysia pauciflora</i>		
Grasses – Naturalised		
<i>Agrostis capillaris</i>		
<i>Aira caryophyllea</i> subsp. <i>caryophyllea</i>		
<i>Aira caryophyllea</i> subsp. <i>multiculmis</i>		
<i>Aira praecox</i>		
<i>Ammophila arenaria</i>		
<i>Andropogon virginicus</i>		
<i>Anthoxanthum odoratum</i>		
<i>Avena barbata</i>		
<i>Axonopus fissifolius</i>		
<i>Bothriocloa macra</i>		
<i>Briza minor</i>		
<i>Bromus diandrus</i>		
<i>Bromus bordeaceus</i>		
<i>Bromus willdenowii</i>		
<i>Catapodium rigidum</i>		
<i>Cortaderia seloana</i>		
<i>Critesion murinum</i> subsp. <i>leporinum</i>		
<i>Cynodon dactylon</i>		
<i>Dichelachne rara</i>		
<i>Dichelachne sieberiana</i>		
<i>Digitaria sanguinalis</i>		
<i>Ehrbarta erecta</i>		
<i>Eragrostis brownii</i>		
<i>Holcus lanatus</i>		
<i>Lagurus ovatus</i>		
<i>Lolium perenne</i>		
<i>Lolium temulentum</i>		

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Parapholis incurva</i>		
<i>Parapholis strigosa</i>		
<i>Paspalum dilatatum</i>		
<i>Paspalum orbiculare</i>		
<i>Paspalum urvillei</i>		
<i>Paspalum vaginatum</i>		
<i>Pennisetum clandestinum</i>		
<i>Poa pratensis</i>		
<i>Poa trivialis</i>		
<i>Polypogon fugax</i>		
<i>Polypogon monspeliensis</i>		
<i>Rytidosperma pilosum</i>		
<i>Rytidosperma racemosum</i>		
<i>Rytidosperma tenuius</i>		
<i>Spartina alterniflora</i>		
<i>Sporobolus africanus</i>		
<i>Stenotaphrum secundatum</i>		
<i>Vulpia bromoides</i>		
<i>Vulpia myuros</i> var. <i>myuros</i>		
Sedges – Indigenous		
<i>Baumea arthrophylla</i>		
<i>Baumea articulata</i>		
<i>Baumea complanata</i>	Range Restricted	HI
<i>Baumea juncea</i>		
<i>Baumea rubiginosa</i>		
<i>Baumea tenax</i>		
<i>Baumea teretifolia</i>		
<i>Carex breviculmis</i>		
<i>Carex dissita</i>		
<i>Carex fascicularis</i>		
<i>Carex flagellifera</i>		
<i>Carex inversa</i>		
<i>Carex lambertiana</i>		
<i>Carex maorica</i>		
<i>Carex ochrosaccus</i>		
<i>Carex opbiolithica</i>	Range Restricted	CD OL ST
<i>Carex pumila</i>		
<i>Carex solandri</i>		
<i>Carex spinirostris</i>		
<i>Carex testacea</i>		
<i>Carex virgata</i>		
<i>Cyperus insularis</i>	Gradual Decline	
<i>Cyperus ustulatus</i>		
<i>Desmoschoenus spiralis</i>	Gradual Decline	CD EF
<i>Eleocharis acuta</i>		
<i>Eleocharis gracilis</i>		
<i>Eleocharis neozelandica</i>	Gradual Decline	EF
<i>Eleocharis sphacelata</i>		
<i>Ficinia nodosa</i>		
<i>Gabnia lacera</i>		
<i>Gabnia pauciflora</i>		
<i>Gabnia setifolia</i>		
<i>Gabnia xanthocarpa</i>		
<i>Isolepis cernua</i>		
<i>Isolepis inundata</i>		
<i>Isolepis reticularis</i>		
<i>Lepidosperma australe</i>		

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Lepidosperma filiforme</i>		
<i>Lepidosperma laterale</i>		
<i>Morelotia affinis</i>		
<i>Schoenoplectus tabernaemontani</i>		
<i>Schoenus apogon</i>		
<i>Schoenus brevifolius</i>		
<i>Schoenus maschalinus</i>		
<i>Schoenus tendo</i>		
<i>Tetraria capillaris</i>		
<i>Uncinia banksii</i>		
<i>Uncinia perplexa</i>	Nationally Critical	CD HI OL
<i>Uncinia uncinata</i>		
Sedges – Naturalised		
<i>Cyperus brevifolius</i>		
<i>Cyperus congestus</i>		
<i>Cyperus eragrostis</i>		
<i>Cyperus polystachyos</i>		
<i>Cyperus tenellus</i>		
<i>Isolepis sepulcralis</i>		
<i>Isolepis tenella</i>		
<i>Kyllinga brevifolia</i>		
Rushes – Indigenous		
<i>Empodisma minus</i>	regionally significant	
<i>Juncus australis</i>		
<i>Juncus caespiticus</i>		
<i>Juncus edgariae</i>		
<i>Juncus holoschoenus</i> ¹⁸	?	
<i>Juncus kraussii</i> var. <i>australiensis</i>		
<i>Juncus pallidus</i>		
<i>Juncus pauciflorus</i>	regionally significant	
<i>Juncus planifolius</i>		
<i>Juncus prismatocarpus</i>		
<i>Juncus usitatus</i>		
<i>Luzula picta</i> var. <i>picta</i>	regionally significant	
Rushes – Adventive		
<i>Juncus acuminatus</i>		
<i>Juncus articulatus</i>		
<i>Juncus bufonius</i>		
<i>Juncus capitatus</i>		
<i>Juncus dichotomus</i>		
<i>Juncus effusus</i>		
<i>Juncus flavidus</i>		
<i>Juncus homalocaulis</i>		
<i>Juncus microcephalus</i>		
Orchids – Indigenous		
<i>Acianthus sinclairii</i>		
<i>Anzybas rotundifolius</i>	Sparse	
<i>Calochilus</i> aff. <i>herbaceus</i> (CHR65825, Kaimaumu)	Nationally Critical	EF SO
<i>Corunastylis pumila</i>	Sparse	SO EF
<i>Corybas cheesemanii</i>	regionally significant	
<i>Cyrtostylis oblonga</i>		
<i>Cyrtostylis reniformis</i>		
<i>Diplodium alobulum</i>		

18. Variety not specified; threat status not clear. *Juncus holoschoenus* var. *holoschoenus* is Nationally Critical.

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Diplodium brumatum</i>		
<i>Diplodium trullifolium</i>		
<i>Drymoanthus adversus</i>		
<i>Earina autumnalis</i>		
<i>Earina mucronata</i>		
<i>Gastrodia sesamoides</i>	regionally significant	
<i>Ichthyostomum pygmaeum</i>		
<i>Linguella puberula</i>	Nationally Critical	EF HI
<i>Microtis parviflora</i>		
<i>Microtis unifolia</i>		
<i>Molloybas cryptanthus</i>	regionally significant	
<i>Nematoceras acuminatum</i>		
<i>Nematoceras rivulare</i>	Data Deficient	
<i>Nematoceras trilobum</i>		
<i>Orthoceras novae-zeelandiae</i>		
<i>Petalocbilus alatus</i>	Range Restricted	DP TO
<i>Petalocbilus bartlettii</i>	Sparse	DP EF
<i>Petalocbilus chlorostylus</i>		
<i>Petalocbilus minor</i>		
<i>Plumaticbilos tasmanicum</i>	Serious Decline	EF HI SO
<i>Prasophyllum bectorii</i>	Nationally Vulnerable	CD DP
<i>Pterostylis agathicola</i>		
<i>Pterostylis banksii</i>		
<i>Pterostylis graminea</i>		
<i>Simpliglottis cornuta</i>		
<i>Singularybas oblongus</i>		
<i>Spiranthes novae-zeelandiae</i>		
<i>Spiranthes</i> aff. <i>novae-zeelandiae</i> (CHR 518297; Motutangi)	Data Deficient	HI EF
<i>Thelymitra</i> (a) (WELT 79140; Ahipara)	Nationally Critical	CD DP EF HI
<i>Thelymitra</i> (b) (CHR 518036; "Darkie")	Range Restricted	
<i>Thelymitra</i> (c) (CHR 518036; "rough leaf")	Range Restricted	EF
<i>Thelymitra aemula</i>		
<i>Thelymitra carnea</i>		
<i>Thelymitra colensoi</i>		
<i>Thelymitra</i> aff. <i>ixioides</i> (AK 251348; New Zealand)	Sparse	DP SO EF
<i>Thelymitra</i> aff. <i>longifolia</i>	regionally significant	
<i>Thelymitra malvina</i>	Coloniser	SO
<i>Thelymitra matthewsii</i>	Coloniser	TO
<i>Thelymitra pauciflora</i>		
<i>Thelymitra pulchella</i>		
<i>Thelymitra sanscilia</i>	Nationally Critical	DP EF
<i>Thelymitra tholiformis</i>	Sparse	EF
<i>Winika cunninghamii</i>		
Monocots (other than grasses, sedges, rushes and orchids) – Indigenous		
<i>Apodasmia similis</i>		
<i>Artbropodium bifurcatum</i>	Gradual Decline	
<i>Artbropodium cirratum</i>		
<i>Astelia banksii</i>		
<i>Astelia grandis</i>	regionally significant	
<i>Astelia solandri</i>		
<i>Astelia trinervia</i>		
<i>CollospERMUM bastatum</i>		
<i>Cordyline australis</i>		
<i>Cordyline australis</i> × <i>C. banksii</i>		
<i>Cordyline banksii</i>		
<i>Cordyline banksii</i> × <i>C. pumilio</i>		

BOTANICAL NAME	THREAT CATEGORY	QUALIFIER(S)
<i>Cordyline oblecta</i>	Range Restricted	
<i>Cordyline pumilio</i>		
<i>Cordyline rubra</i>		
<i>Dianella nigra</i>		
<i>Freycinetia banksii</i>		
<i>Libertia grandiflora</i>		
<i>Libertia ixioides</i>		
<i>Phormium tenax</i>		
<i>Potamogeton cheesemanii</i>		
<i>Rhopalostylis sapida</i>		
<i>Ripogonum scandens</i>		
<i>Ruppia polycarpa</i>		
<i>Sparganium subglobosum</i>	regionally significant	
<i>Thismia rodwayi</i>	Sparse	DP EF SO
<i>Triglochin striata</i>	regionally significant	
<i>Typha orientalis</i>		
Monocots (other than grasses, sedges, rushes and orchids) – Naturalised		
<i>Agapanthus praecox</i>		
<i>Colocasia esculenta</i>		
<i>Egeria densa</i>		
<i>Gladiolus dalenii</i>		
<i>Gladiolus undulatus</i>		
<i>Gladiolus × cardinalis</i>		
<i>Musa acuminata</i>		
<i>Ottelia ovalifolia</i>		
<i>Sisyrinchium micranthum</i>		
<i>Yucca gloriosa</i> ¹⁹		

19. Recorded from Whareana and Ngatehe and possibly Ponaki (L. Forester pers. comm.)

Appendix 6

COMMON PLANT NAMES USED IN TEXT

* = exotic species

akeake	<i>Dodonea viscosa</i>
apple of Sodom*	<i>Solanum linnaeanum</i>
Bartlett's rata	<i>Metrosideros bartlettii</i>
bracken	<i>Pteridium esculentum</i>
broom	<i>Carmichaelia australis</i>
brush wattle*	<i>Paraserianthes lophantha</i>
buffalo grass*	<i>Stenotaphrum secundatum</i>
bush lawyer	<i>Rubus australis</i>
bush rice grass	<i>Microlaena avenacea</i>
cestrum*	<i>Cestrum aurantiacum</i>
climbing rata	<i>Metrosideros</i> sp.
coastal mahoe	<i>Melicytus novae-zelandiae</i>
coastal toetoe	<i>Cortaderia splendens</i>
dally pine*	<i>Psoralea pinnata</i>
dwarf ti kouka	<i>Cordyline pumilio</i>
eucalyptus*	<i>Eucalyptus</i> sp.
five-finger	<i>Pseudopanax arboreus</i>
fleabane*	<i>Conyza albida</i>
giant umbrella sedge	<i>Cyperus ustulatus</i>
glasswort	<i>Sarcocornia quinqueflora</i>
gorse*	<i>Ulex europaeus</i>
gully fern	<i>Pneumatopteris pennigera</i>
gully tree fern	<i>Cyathea cunninghamii</i>
Hall's totara	<i>Podocarpus ballii</i>
hangehange	<i>Geniostoma ligustrifolium</i> var. <i>ligustrifolium</i>
hanging spleenwort	<i>Asplenium flaccidum</i>
harakeke	<i>Phormium tenax</i>
hare's-tail*	<i>Lagurus ovatus</i>
heketara	<i>Olearia rani</i>
hinau	<i>Elaeocarpus dentatus</i>
hook sedge	<i>Uncinia uncinata</i>
hornwort*	<i>Ceratophyllum demersum</i>
horopito	<i>Pseudowintera axillaris</i>
houhere	<i>Hoberia populnea</i>
hound's tongue	<i>Microsorium pustulatum</i>
houpara	<i>Pseudopanax lessonii</i>
kahikatea	<i>Dacrydium dacrydioides</i>
kanono	<i>Coprosma grandifolia</i>
kanuka	<i>Kunzea ericoides</i>
karaka	<i>Corynocarpus laevigatus</i>
karamu	<i>Coprosma robusta</i>
karo	<i>Pittosporum crassifolium</i>
kauri	<i>Agathis australis</i>
kawaka	<i>Libocedrus plumosa</i>
kawakawa	<i>Macropiper excelsum</i>
kiekie	<i>Freycinetia banksii</i>
kikuyu*	<i>Pennisetum clandestinum</i>
kiokio	<i>Blechnum novae-zelandiae</i>
Kirk's tree daisy	<i>Brachyglottis kirkii</i>
knobby clubbrush	<i>Ficinia nodosa</i>

kohekohe	<i>Dysoxylum spectabile</i>
kohuhu	<i>Pittosporum tenuifolium</i>
kowhai	<i>Sophora microphylla</i> or <i>S. chatbamica</i>
kowharawhara	<i>Astelia banksii</i>
kumarahou	<i>Pomaderris kumerabo</i>
kuta	<i>Schoenoplectus tabernaemontani</i>
lancewood	<i>Pseudopanax crassifolius</i>
lupin*	<i>Lupinus arboreus</i>
macrocarpa*	<i>Cupressus macrocarpa</i>
Madeira vine*	<i>Anredera cordifolia</i>
mahoe	<i>Melicytus ramiflorus</i>
maire tawake	<i>Syzygium maire</i>
mairehau	<i>Leionema nudum</i>
mamaku	<i>Cyathea medullaris</i>
mamangi	<i>Coprosma arborea</i>
mangeao	<i>Litsea calicaris</i>
mangrove	<i>Avicennia marina</i> var. <i>australasica</i>
manoao	<i>Manoao colensoi</i>
manuka	<i>Leptospermum scoparium</i>
mapou	<i>Myrsine australis</i>
marram grass*	<i>Ammophila arenaria</i>
matai	<i>Prumnopitys taxifolia</i>
mawhai	<i>Cassytba paniculata</i>
Mercury Bay weed	<i>Dichondra repens</i>
mingimingi	<i>Leucopogon fasciculatus</i>
miro	<i>Prumnopitys ferruginea</i>
mistflower*	<i>Ageratina riparia</i>
monoao	<i>Halocarpus kirkii</i>
native grass	<i>Oplismenus imbecillis</i>
native iceplant	<i>Disphyma australe</i>
ngaio	<i>Myoporum laetum</i>
nikau	<i>Rhopalostylis sapida</i>
northern rata	<i>Metrosideros robusta</i>
oioi	<i>Apodasmia similis</i>
oxylobium*	<i>Callistachys lanceolata</i>
pampas*	<i>Cortaderia selloana</i>
parapara	<i>Pisonia brunoniana</i>
pate	<i>Schefflera digitata</i>
patotara	<i>Leucopogon fraseri</i>
pigeonwood	<i>Hedycarya arborea</i>
pingao	<i>Desmoschoenus spiralis</i>
poataniwha	<i>Melicope simplex</i>
pohutukawa	<i>Metrosideros excelsa</i>
ponga	<i>Cyathea dealbata</i>
prickly hakea*	<i>Hakea sericea</i>
pukatea	<i>Laurelia novae-zelandiae</i>
puriri	<i>Vitex lucens</i>
putaputaweta	<i>Carpodetus serratus</i>
radiata pine*	<i>Pinus radiata</i>
ramarama	<i>Lophomyrtus bullata</i>
rangiora	<i>Brachyglottis repanda</i>
rasp fern	<i>Doodia australis</i>
raupo	<i>Typha orientalis</i>
rengarenga lily	<i>Arthropodium cirratum</i>
rewarewa	<i>Knightia excelsa</i>
rimu	<i>Dacrydium cupressinum</i>
ring fern	<i>Paesia scaberula</i>
saltmarsh ribbonwood	<i>Plagianthus divaricatus</i>

saltwater paspalum*	<i>Paspalum vaginatum</i>
sand sedge	<i>Carex pumila</i>
sea celery	<i>Apium prostratum</i>
sea primrose	<i>Samolus repens</i>
sea rush	<i>Juncus kraussii</i> var. <i>australiensis</i>
shaking brake	<i>Pteris tremula</i>
shining karamu	<i>Coprosma lucida</i>
shining spleenwort	<i>Asplenium oblongifolium</i>
shore bindweed	<i>Calystegia soldanella</i>
shore groundsel	<i>Senecio lautus</i>
small-leaved mahoe	<i>Melicytus micranthus</i>
spinifex	<i>Spinifex sericeus</i>
sundew	<i>Drosera</i> spp.
supplejack	<i>Ripogonum scandens</i>
swamp kiokio	<i>Blechnum minus</i>
swamp millet	<i>Isachne globosa</i>
reed sweet grass*	<i>Arundo donax</i>
Sydney golden wattle*	<i>Acacia longifolia</i>
tanekaha	<i>Phyllocladus trichomanoides</i>
taraire	<i>Beilschmiedia tarairi</i>
taro*	<i>Colocasia esculenta</i>
tauhinu	<i>Ozotamnus leptophyllus</i>
taupata	<i>Coprosma repens</i>
tawa	<i>Beilschmiedia tawa</i>
tawapou	<i>Pouteria costata</i>
ti kouka	<i>Cordyline australis</i>
titoki	<i>Alectryon excelsus</i>
toro	<i>Myrsine salicina</i>
toru	<i>Toronia toru</i>
totara	<i>Podocarpus totara</i>
turutu	<i>Dianella nigra</i>
tutu	<i>Coriaria arborea</i>
umbrella fern	<i>Gleichenia dicarpa</i> and/or <i>Gleichenia microphylla</i>
watercress*	<i>Rorippa nasturtium-aquaticum</i>
water purslane*	<i>Ludwigia palustris</i>
wattle*	<i>Acacia</i> spp.
wharangi	<i>Melicope ternata</i>
whau	<i>Entelea arborescens</i>
wheki	<i>Dicksonia squarrosa</i>
white maire	<i>Nestegis lanceolata</i>
willow weed*	<i>Polygonum</i> sp.
wirerush	<i>Empodisma minus</i>
woolly hakea*	<i>Hakea gibbosa</i>

Appendix 7

CHECKLIST OF FAUNA SPECIES IN TE PAKI ECOLOGICAL DISTRICT

PL = Present in high numbers (>100) R = Recorded (or <10)

P = Present in low numbers (<100) * = Breeding confirmed

U = Unconfirmed

(i) Mammals

SCIENTIFIC NAME	COMMON NAME	
Indigenous		
<i>Arctocephalus forsteri</i>	New Zealand fur seal; kekeno	outer rocks Murimotu Island, Motuopao Island
Introduced (feral)¹		
<i>Bos taurus</i>	cattle	R
<i>Canis familiaris</i>	feral dog	R
<i>Erinaceus europeus occidentalis</i>	European hedgehog	PL
<i>Felis catus</i>	feral cat	P
<i>Mus musculus</i>	mouse	PL
<i>Mustela erminea</i>	stoat	P
<i>Mustela furo</i>	ferret	U ²
<i>Mustela nivalis</i>	weasel	P
<i>Oryctolagus cuniculus</i>	European rabbit	PL
<i>Rattus exulans</i> ³	kiore	R
<i>Rattus norvegicus</i>	Norway rat	PL
<i>Rattus rattus rattus</i>	black ship rat, ship rat	PL
<i>Sus scrofa</i>	pig	PL
<i>Trichosurus vulpecula</i>	brushtail possum	PL

1. Goats have been eradicated from Te Paki ED (P. Whaley pers. comm.)
2. No confirmed records in Te Paki ED, but this species is spreading northward.
3. Eradication of kiore began in 1989 on Motuopao Island.

(ii) Birds

This list includes bird species recorded in Parengarenga Harbour (Aupouri ED) which are likely to utilise habitat within Te Paki ED.

SCIENTIFIC NAME	COMMON NAME	PARENGARENGA HARBOUR (AUPOURI ED)	TE PAKI ED
Indigenous			
<i>Anarhynchus frontalis</i>	wrybill, ngutuparore	PL	
<i>Anas gracilis</i>	grey teal, tete		P
<i>Anas rhynchosotis</i>	NZ shoveler, kuruwhengi	P	P
<i>Anas superciliosa</i>	grey duck, parera	P*	P

SCIENTIFIC NAME	COMMON NAME	PARENGARENGA HARBOUR (AUPOURI ED)	TE PAKI ED
<i>Anous tenuirostris minutus</i>	white-capped noddy		R
<i>Anthus n. novaeseelandiae</i>	NZ pipit, pihoihoi		P
<i>Ardea novaebollandiae</i>	white-faced heron	PL*	P
<i>Arenaria interpres</i>	turnstone, ruddy turnstone	PL	P
<i>Aythya novaeseelandiae</i>	NZ scaup, paponga		P
<i>Botaurus poiciloptilus</i>	Australasian bittern, matuku	P	P
<i>Bowdleria punctata vealeae</i>	North Island fernbird, matata	P*	P
<i>Bubulcus ibis</i>	cattle egret	P	P
<i>Calidris accuminata</i>	sharp-tailed sandpiper	P	
<i>Calidris alba</i>	sanderling	R	
<i>Calidris canutus</i>	lesser knot, huahou	PL	P
<i>Calidris ferruginea</i>	curlew sandpiper	P	
<i>Calidris fuscicollis</i>	white-rumped sandpiper	R	
<i>Calidris melanotos</i>	pectoral sandpiper	R	
<i>Calidris ruficollis</i>	red-necked stint	P	
<i>Charadrius bicinctus</i>	banded dotterel, tuturiwhatu	PL*	P
<i>Charadrius leschenaultii</i>	large sand dotterel	R	
<i>Charadrius obscurus aquilonius</i>	Northern NZ dotterel, tuturiwhatu	P*	P
<i>Charadrius veredus</i>	oriental dotterel	R	
<i>Chrysococcyx lucidus</i>	shining cuckoo, pipiwharau		P
<i>Circus approximans</i>	kahu, Australasian harrier	P*	P
<i>Egretta alba</i>	white heron, kotuku	R	
<i>Egretta garzetta nigripes</i>	little egret	R	
<i>Egretta sacra</i>	reef heron, matuku moana	R	P
<i>Eudynamis taitensis</i>	long-tailed cuckoo, koekoea		P
<i>Eudyptula minor iredalei</i>	Northern little blue penguin, korora	P	P
<i>Falco cinctiroides</i>	nankeen kestrel		P ¹
<i>Gerygone igata</i>	grey warbler, riroriro		P
<i>Haematopus ostralegus</i>	pied oystercatcher, torea	P	P
<i>Haematopus ostralegus finschi</i>	South Island pied oystercatcher	P	P
<i>Haematopus unicolor</i>	variable oystercatcher, torea	P*	P
<i>Halcyon sancta vagans</i>	NZ kingfisher	PL*	P
<i>Hemipbaga novaeseelandiae</i>	kukupu, NZ pigeon		P
<i>Himantopus himantopus</i>	pied stilt, poaka	PL*	P
<i>Hirundo tabita neoxena</i>	welcome swallow	PL*	P
<i>Hirundapus caudacutus</i>	spinetailed swift		P
<i>Larus bulleri</i>	black-billed gull, Buller's gull, Tara Puka	P	P
<i>Larus dominicanus</i>	black-backed gull, karoro	PL*	P
<i>Larus novaebollandiae</i>	red-billed gull, tarapunga	PL	P
<i>Limicola falcinellus sibiricus</i>	broad billed sandpiper	R	
<i>Limosa haemastica</i>	Hudsonian godwit	R	
<i>Limosa lapponica</i>	bar-tailed godwit, kuaka	PL	P

1. Taylor and Parrish 1992

SCIENTIFIC NAME	COMMON NAME	PARENGARENGA HARBOUR (AUPOURI ED)	TE PAKI ED
<i>Limosa limosa melanuroides</i>	Asiatic black-tailed godwit	R	
<i>Morus serrator</i>	Australasian gannet, takapu	P	
<i>Ninox novaeseelandiae</i>	morepork, ruru		P
<i>Numenius madagascariensis</i>	eastern curlew	R	
<i>Numenius minutus</i>	little whimbrel	R	
<i>Numenius phaeopus budsonicus</i>	American whimbrel	R	
<i>Numenius phaeopus variegatus</i>	Asiatic whimbrel	P	
<i>Pelecanoides urinatrix urinatrix</i>	northern diving petrel, kuaka		P
<i>Pelagodroma marina</i>	white-faced storm petrel, takahikare-moana		P
<i>Petroica macrocephala</i>	NI tomtit, toitoi		P
<i>Phaethon rubricauda</i>	red-tailed tropic bird	R	P
<i>Phalacrocorax carbo</i>	black shag, kawau	P	P
<i>Phalacrocorax melanoleucos</i>	little shag, kawaupaka	P	P
<i>Phalacrocorax sulcirostris</i>	little black shag	P	P
<i>Phalacrocorax varius</i>	pieb shag, karuhiruhi	P	P
<i>Platalea regia</i>	royal spoonbill	P	
<i>Plegadis falcinellus peregrinus</i>	glossy ibis	R	
<i>Pluvialis fulva</i>	Pacific golden plover	PL	P
<i>Pluvialis squatarola</i>	grey plover	R	
<i>Poliocephalus rufopectus</i>	NZ dabchick, weweia		P
<i>Porphyrio porphyrio</i>	pukeko	P*	P
<i>Porzana pusilla</i>	marsh crane, koitareke		P
<i>Porzana tabuensis</i>	spotless crane, puweto	P	P
<i>Prosthemadera novaeseelandiae</i>	tui		P
<i>Pterodroma macroptera</i>	grey-faced petrel		P
<i>Pterodroma nigripennis</i>	black-winged petrel		P
<i>Puffinus carneipes</i>	flesh-footed shearwater, tuanui		P
<i>Puffinus griseus</i>	sooty shearwater		R
<i>Puffinus gavia</i>	fluttering shearwater		R
<i>Rallus philippensis</i>	banded rail, moho-pereru	P*	P
<i>Rhipidura fuliginosa placabilis</i>	North Island fantail, piwakawaka		P
<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		R ²
<i>Stercorarius parasiticus</i>	Arctic skua	P	
<i>Stercorarius pomarinus</i>	Pomarine skua	P	
<i>Sterna albifrons sinensis</i>	eastern little tern	R	
<i>Sterna bergii</i>	great eastern tern		
<i>Sterna caspia</i>	Caspian tern, taranui	P*	P
<i>Sterna striata striata</i>	white-fronted tern, tara	PL	P
<i>Tachybaptus novaehollandiae</i>	Australasian little grebe		P

2. A dead specimen of this vagrant species was found in mixed pasture-shrubland near Te Paki station (Brackenbury 1997).

SCIENTIFIC NAME	COMMON NAME	PARENGARENGA HARBOUR (AUPOURI ED)	TE PAKI ED
<i>Tadorna tadornoides</i>	chestnut-breasted shelduck		P
<i>Tadorna variegata</i>	paradise shelduck, putangitangi	PL*	P
<i>Tringa brevipes</i>	Siberian tattler, grey-tailed tattler	R	
<i>Tringa incana</i>	wandering tattler	R	
<i>Tringa nebularia</i>	greenshank	R	
<i>Tringa stagnatilis</i>	marsh sandpiper	R	
<i>Tringa terek</i>	terek sandpiper	R	
<i>Vanellus miles</i>	spur-winged plover	P*	P
<i>Zosterops lateralis</i>	silveryeye, tahou, whiteye		P
Introduced			
<i>Acridotheres tristis</i>	myna		P
<i>Alauda arvensis</i>	skylark		P
<i>Anas platyrhynchos</i>	mallard	PL*	P
<i>Callipepla californica</i>	California quail		P
<i>Carduelis carduelis</i>	goldfinch		P
<i>Carduelis flammea</i>	redpoll		P
<i>Carduelis chloris</i>	greenfinch		R
<i>Corvus frugilegus</i>	rook		R ³
<i>Cygnus atratus</i>	black swan	PL*	P
<i>Emberiza cintrinella</i>	yellowhammer		P
<i>Fringilla coelebs</i>	chaffinch		P
<i>Gymnorhina tibicen</i>	Australian magpie		P
<i>Passer domesticus</i>	house sparrow		P
<i>Phasianus colchicus</i>	ring-necked pheasant		P
<i>Platycercus eximius</i>	eastern rosella		P
<i>Prunella modularis</i>	dunnock, hedge sparrow		P
<i>Sturnus vulgaris</i>	starling		P
<i>Synoicus ypsilophorus</i>	brown quail		P
<i>Turdus merula</i>	blackbird		P
<i>Turdus philomelos</i>	song thrush		P

3. Vagrants, mainly juveniles, have been recorded in Northland (Heather and Robertson 1996).

(iii) Reptiles

SCIENTIFIC NAME	COMMON NAME	
Indigenous		
<i>Chelonia mydas</i>	green turtle	R
<i>Cyclodina alani</i>	robust skink	R
<i>Cyclodina ornata</i>	ornate skink	R
<i>Cyclodina levidensa</i>		R
<i>Hoplodactylus</i> "Matapia Island"	Matapia gecko	R
<i>Hoplodactylus</i> "North Cape Pacific gecko"	North Cape Pacific gecko	R
<i>Hoplodactylus duvaucelii</i>	Duvaucel's gecko	R ¹
<i>Hoplodactylus maculatus</i>	common gecko	R
<i>Naultinus</i> "North Cape green gecko"	North Cape green gecko	R

1. Recorded at Cape Maria van Diemen in 1965 (Bioweb 2007).

<i>Oligosoma moco</i>	Moko skink	R
<i>Oligosoma smithi</i>	shore skink	R
<i>Oligosoma suteri</i>	Suter's skink, egg-laying skink	R
Other		
<i>Dermochelys coriacea</i>	leatherback turtle (Migrant)	R
<i>Pelamis platurus</i>	yellow-bellied sea snake (Vagrant)	R
Introduced		
<i>Litoria aurea</i>	green and golden bell frog	R
<i>Litoria raniformis</i>	southern bell frog	R

(iv) Aquatic fauna

SCIENTIFIC NAME	COMMON NAME	
Indigenous		
<i>Anguilla dieffenbachii</i>	longfin eel	R
<i>Anguilla australis</i>	shortfin eel	R
<i>Galaxias maculatus</i>	inanga	R
<i>Galaxias fasciatus</i>	banded kokopu	R
<i>Gobiomorphus cotidianus</i>	common bully	R
<i>Gobiomorphus gobioides</i>	giant bully	R
<i>Gobiomorphus buttoni</i>	red-finned bully	R
<i>Grabamina</i> sp.	estuarine triplefin	R
<i>Hyridella menziesi</i>	freshwater mussel	R
<i>Mugil cephalus</i>	grey mullet	R
<i>Neochanna diversus</i>	black mudfish	R
<i>Retropinna retropinna</i>	common smelt	R
<i>Rhombosolea</i> sp.	flounder	R
<i>Potamopyrgus antipodarum</i>	snail	R
Introduced		
<i>Parioglossus marginalis</i>	Dart goby	R

(v) Landsnails (compiled by Fred Brook, December 2007)

Class GASTROPODA

Superorder NERITOPSINA

Superfamily NERITOIDEA

HYDROCENIDAE

Georissa purchasi (Pfeiffer, 1862)

[Ogle *et al.* 1985; Goulstone *et al.* 1993, Parrish and Sherley 1993—in *Omphalorissa*; Brook 1999a]

Order Architaenioglossa

Superfamily CYCLOPHOROIDEA

LIAREIDAE

Cytora brooki Marshall and Barker, 2007

[Goulstone *et al.* 1993—in *C. ampla*; Brook 1999a, McGuinness 2001—in *C. aff. ampla*; Brook 2002, Hitchmough *et al.* (comp.) 2007—as *Cytora* sp. 16; Hitchmough 2002—as *Cytora* sp. 1; Marshall and Barker 2007]

Distribution: Endemic to northwestern Aupouri Peninsula (Brook 2002; Marshall and Barker 2007).

Threat classification: Nationally Vulnerable (Marshall and Barker 2007)

Cytora cytora (Gray, 1850)

[Marshall and Barker 2007]

Cytora fasciata (Suter, 1894)

[Goulstone *et al.* 1993—as *C. n.sp. fasciata* group]

Cytora gardneri Marshall and Barker, 2007

[McGuinness 2001—as *Cytora* sp. “Kohuronaki”; Brook 2002—as *Cytora* sp. 11; Hitchmough 2002—as *Cytora* sp. 2; Hitchmough *et al.* (comp.) 2007—as *Cytora* sp. 11; Marshall and Barker 2007]

Distribution: Endemic to northern Aupouri Peninsula; recorded from Radar Bush, Kohuronaki and Taumataroa Flat (Marshall and Barker 2007).

Threat classification: Nationally Critical (Brook 2002, Marshall and Barker 2002; Hitchmough *et al.* (comp.) 2007)

Cytora hispida Gardner, 1967

[Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007; Marshall and Barker 2007]

Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Motuopao and North Cape (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002; Marshall and Barker 2007).

Threat classification: Nationally Vulnerable (Marshall and Barker 2007); Range Restricted Hitchmough *et al.* (comp.) 2007

Cytora kerrana Gardner, 1968

[Ogle *et al.* 1985; Goulstone *et al.*—as *C. kerrana* and *C. pallida*; McGuinness 2002; Brook 2002; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007; Marshall and Barker 2007]

Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and North Cape (Gardner 1968; Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 2002; Marshall and Barker 2007).

Threat classification: Range Restricted (Brook 2002; Marshall and Barker 2007; Hitchmough *et al.* (comp.) 2007).

Cytora lignaria (Pfeiffer, 1857)

[Powell 1941—as *Murdochia ampla*; Ogle *et al.* 1985—as *C. ampla*; Goulstone *et al.* 1993—as *C. ampla*; Brook 1999a, 2002—as *C. ampla*; McGuinness 2001—as *C. ampla*; Hitchmough 2002—as *C. ampla*; Hitchmough *et al.* (comp.) 2007—as *C. ampla*; Marshall and Barker 2007]

Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and Mokaikai (Powell 1941; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002; Marshall and Barker 2007).

Threat classification: Range Restricted (Brook 2002; Marshall and Barker 2007; Hitchmough *et al.* (comp.) 2007).

Cytora tepakiensis Gardner, 1967

[Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007; Marshall and Barker 2007]

Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Motuopao and North Cape (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002; Marshall and Barker 2007).

Threat classification: Range Restricted (Brook 2002; Marshall and Barker 2007; Hitchmough *et al.* (comp.) 2007).

Cytora tokerau Marshall and Barker, 2007

[Ogle *et al.* 1985—as *C. torquilla*; Goulstone *et al.* 1993—as *C. torquilla*; Marshall and Barker 2007]

Liarea aupouria (Powell, 1954)

[Powell 1954—as *L. a. aupouria* and *L. a. tara*; Ogle *et al.* 1985; Goulstone *et al.* 1993—as *L. a. aupouria* and *L. a. tara*; Parrish *et al.* 1993—as *L. a. aupouria*; Brook 1999a, 2002; McGuinness 2001—as *L. aupouria* species complex; Hitchmough 2002—as *L. a. aupouria*, *L. a. tara*, *L. aupouria* “west”; Hitchmough *et al.* (comp.) 2007—as *L. a. aupouria*]

Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and North Cape (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a, 2002). Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Order SORBEOCONCHA

Infraorder LITTORINIMORPHA

ASSIMINEIDAE

Suterilla sp.

[Goulstone *et al.* 1993—as *S. neozelanica*; Brook 1999a—as *S. neozelanica*]

Note: this species is probably *S. neozelanica* or *S. climoi*—see Fukuda *et al.* (2006).

Order PULMONATA

SUCCINEIDAE

Succinea archeyi Powell, 1933

[Goulstone *et al.* 1993; Brook 1999a, 1999b, 2002; McGuinness 2001; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007]

Distribution: Dunefields in northern and eastern Northland, and eastern Coromandel Peninsula; in Te Pahi ED known from Motuopao, Cape Maria van Diemen, Kapowairua and Tom Bowling Bay (Brook 1999b; 2002).

Threat classification: Serious Decline (Brook 2002; Hitchmough *et al.* (comp.) 2007).

ATHORACOPHORIDAE

Athoracophorus sp. 4 (NMNZ M.151430)

[Hitchmough 2002; Hitchmough *et al.* (comp.) 2007]

Distribution: Endemic to northwestern Aupouri Peninsula (G. M. Barker pers. comm.).

Threat classification: Gradual Decline (Hitchmough *et al.* (comp.) 2007).

Athoracophorus sp.

[Goulstone *et al.* 1993]

ACHATINELLIDAE

Tornatellides subperforata (Suter, 1909)

[Goulstone *et al.* 1993]

Tornatellinops novoseelandica (Pfeiffer, 1853)

[Ogle *et al.* 1985—in *Lamellidea*; Goulstone *et al.* 1993; Parrish *et al.* 1993—in *Lamellidea*; Brook 1999a]

BULIMULIDAE

Placostylus ambagiosus Suter, 1906

[Goulstone *et al.* 1993; Brook 1999a, 2002; McGuinness 2002—listed 22 subspecies/populations; Hitchmough 2002—listed 19 subspecies/populations; Hitchmough *et al.* (comp.) 2007—listed 22 subspecies/populations]

Distribution: Endemic to northern Aupouri Peninsula; sporadically distributed between Motuopao and North Cape (Powell 1979; Brook 2002).

Threat classification: Nationally Vulnerable (Brook 2002); constituent populations listed as Nationally Critical and Nationally Endangered (Brook 2002; Hitchmough *et al.* (comp.) 2007).

RHYTIDIDAE

Amborbytida duplicata (Suter, 1904)

[Ogle *et al.* 1985—in *Rhytidarex*; Goulstone *et al.* 1993—in *Rhytidarex*; Parrish and Sherley 1993—in *Rhytida* (*Amborbytida*); Brook 1999a, 2002; McGuinness 2001; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007]

Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Te Werahi and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a).

Threat classification: Gradual Decline (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Delos sp. 2 (NMNZ M.38250)

[Ogle *et al.* 1985—as *Delos* n.sp.; Goulstone *et al.* 1993—as *Delos* cf. *coresia*; Brook 1999a—as *Delos* cf. *coresia*; McGuinness 2001—as *Delos* cf. *coresia*; Brook 2002; Hitchmough 2002—as *Delos* sp. 4; Hitchmough *et al.* (comp.) 2007]

Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Cape Maria van Diemen and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a, 2002).

Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Delouagapia cordelia (Hutton, 1883)

[Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002; McGuinness 2001; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007]

Distribution: Endemic to northern and eastern Northland (Powell 1979).

Threat classification: Sparse (Hitchmough *et al.* (comp.) 2007).

Parypbanta watti Powell, 1946

[Goulstone *et al.* 1993—as *P. busbyi watti*; Brook 1999a, 2002; McGuinness 2001—as *P. b. watti*; Hitchmough 2002—as *P. b. watti*; Hitchmough *et al.* (comp.) 2007—as *P. b. watti*]

Distribution: Endemic to northern Aupouri Peninsula, extant populations at Radar Bush, Kohuronaki and Unuwahao (Goulstone *et al.* 1993; Stringer and Montefiore 2001; Brook 2002; Stringer *et al.* 2003).

Threat classification: Gradual Decline (Brook 2002; Hitchmough *et al.* (comp.) 2007).

CHAROPIDAE

Allodiscus basiliratus Gardner, 1967

[Ogle *et al.* 1985—as *Allodiscus* n.sp. ‘coloured urquharti’; Goulstone *et al.* 1993; Brook 1999a, 2002; McGuinness 2001; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007; Marshall and Barker 2008]

Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and North Cape (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a; Marshall and Barker 2008).

Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007; Marshall and Barker 2008).

Allodiscus pumilus Marshall and Barker, 2008

[Goulstone *et al.* 1993—as *Allodiscus spiritus* ‘small’; Brook 1999a, 2002—as *A. spiritus*; McGuinness 2001—as *A. aff. spiritus*; Hitchmough 2002—as Charopidae sp. 1; Hitchmough *et al.* (comp.) 2007—as Charopidae sp. 177; Marshall and Barker 2008]

Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and North Cape (Goulstone *et al.* 1993; Marshall and Barker 2008).

Threat classification: Range Restricted (Hitchmough *et al.* (comp.) 2007; Marshall and Barker 2008).

Allodiscus spiritus Powell, 1952

[Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a, 2002; McGuinness 2001; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007; Marshall and Barker 2008]

Distribution: Endemic to Aupouri Peninsula, sporadically distributed between Reinga and Mokaikai (Ogle *et al.* 1985; Goulstone *et al.* 1993; Marshall and Barker 2008).

Threat classification: Range Restricted (Hitchmough *et al.* (comp.) 2007; Marshall and Barker 2008).

Allodiscus wairua Marshall and Barker, 2008

[Goulstone *et al.* 1993—as *A. basiliratus* in part and *A. cf. basiliratus*; Parrish and Sherley 1993—as *A. basiliratus*; Brook 1999a—as *A. basiliratus* in part; Marshall and Barker 2008]

Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Motuopao and North Cape (Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a; Marshall and Barker 2008).

Threat classification: Range Restricted (Marshall and Barker 2008). Not listed in Hitchmough *et al.* (comp.) 2007.

Cavellia buccinella (Reeve, 1852)

[Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a]

Charopa coma (Gray in Dieffenbach, 1843)

[Goulstone *et al.* 1993]

Charopa parva (Suter, 1909)

[Goulstone *et al.* 1993; Brook 1999a]

Chaureopa hazelwoodi Climo, 1985

[Goulstone *et al.* 1993]

Chaureopa titirangiensis (Suter, 1896)

[Ogle *et al.* 1985; Goulstone *et al.* 1993]

Climocella reinga Goulstone, 1997
 [Ogle *et al.* 1985—as “*Mocella*” n.sp. cf. *manawatawhia*; Goulstone *et al.* 1993—as *Mocella* cf. *manawatawhia*; Goulstone 1997; Parrish and Sherley 1993—as *Mocella* n.sp. cf. *manawatawhia*; Brook 1999a, 2002; McGuinness 2001; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to Aupouri Peninsula, sporadically distributed between Motuopao and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002).
 Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Climocella runga Goulstone, 1997
 [Goulstone 1997; Brook 1999a]

Costalodiscus parrisbi Marshall and Barker, 2008
 [Goulstone *et al.* 1993—as *Allodiscus* sp.; Brook 1999a—as *Allodiscus* sp. “te paki”; McGuinness 2001—as *Allodiscus* sp. “te paki”; Brook 2002—as Charopidae sp. 165; Hitchmough 2002—as Charopidae sp. 5; Hitchmough *et al.* (comp.) 2007—as Charopidae sp. 165; Marshall and Barker 2008]
 Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and Tom Bowling Bay (Goulstone *et al.* 1993; Brook 1999a, 2002; Marshall and Barker 2008).
 Threat classification: Nationally Endangered (Hitchmough *et al.* (comp.) 2007; Marshall and Barker 2008).

Egestula pandora Gardner, 1967
 [Ogle *et al.* 1985; Goulstone *et al.* 1993; McGuinness 2001; Brook 2002; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to Aupouri Peninsula, sporadically distributed between Reinga and North Cape (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a, 2002).
 Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Fectola charopiformis (Gardner, 1967)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993]

Fectola infecta (Reeve, 1852)
 [Goulstone *et al.* 1993]

Flammulina cornea (Hutton, 1883)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993]

Flammulina perdita (Hutton, 1883)
 [Goulstone *et al.* 1993]

Flammulina tepakiensis Gardner, 1977
 [Ogle *et al.* 1985—in “*Flammoconcha*”; Goulstone *et al.* 1993; Brook 1999a, 2002; McGuinness 2001; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to northern Aupouri Peninsula, known from Radar Bush, Kohuronaki and Unuwahao (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).
 Threat classification: Nationally Endangered (Hitchmough *et al.* (comp.) 2007).

Huonodon bectori (Suter, 1890)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a]

Mocella eta (Pfeiffer, 1853)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a]

Paracharopa chrysaugia (Webster, 1904)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a]

Paracharopa delicatula Climo, 1983
 [Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a]

Paracharopa fuscata (Suter, 1894)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993]

Phenacobelix tholoides (Suter, 1907)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a]

Phenacharopa pseudanguicula (Iredale, 1913)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993—as *P.* cf. *pseudanguicula*; Brook 1999a]

Serpbo kivi (Gray in Dieffenbach, 1843)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a]

Serpbo matthewsi Suter, 1909
 [Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a, 2002; McGuinness 2001; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to Aupouri Peninsula, sporadically distributed between Reinga and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a, 2002).
 Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Tbalassobelix zelandiae (Gray in Dieffenbach, 1843)
 [Goulstone *et al.* 1993—in *Therasia*]

Therasia sp. (juveniles)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993]

Therasiella celinde (Gray, 1850)
 [Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 1999a]

Therasiella elevata Cumber, 1967
 [Ogle *et al.* 1985; Goulstone *et al.* 1993]

Therasiella serrata Cumber, 1967
 [Ogle *et al.* 1985; Goulstone *et al.* 1993]

Therasiella tamora (Hutton, 1883)
 [Ogle *et al.* 1985]

Therasiella sp. “North Cape” Goulstone *et al.* 1993
 [Ogle *et al.* 1985—as *Therasiella* n.sp. ‘cf. neozelanica N. Block’; Goulstone *et al.* 1993]

Therasiella “narrow umbilicus” n.sp. McGuinness, 2001
 [McGuinness 2001]
 Distribution: Te Paki endemic (Karin Mahlfeld pers. comm. in McGuinness 2001).

Therasiella n.sp. “Unuwahao” McGuinness, 2001
 [McGuinness 2001; Hitchmough 2002—as *Therasiella* sp. “Unuwahao”]
 Distribution: Te Paki endemic (Karin Mahlfeld pers. comm. in McGuinness 2001).

Charopidae sp. 1 (NMNZ M.79608)
 [Goulstone *et al.* 1993—as *Therasiella* cf. *elevata*; McGuinness 2001—as *Therasiella* cf. *elevata* n.sp.; Karin Mahlfeld pers. comm. 2007]

Charopidae sp. 16 (NMNZ M.127828)
 [Ogle *et al.* 1985—as *C.* cf. *irregularis*; Goulstone *et al.* 1993—as *C.* cf. *irregularis* and *C.* cf. *reeftonensis*; Brook 1999a—as *C.* cf. *irregularis*; Karin Mahlfeld pers. comm. 2007]

Charopidae sp. 27 (NMNZ M.58110)
 [McGuinness 2001—as *Sinployea* “paucilamellata”; Brook 2002; Hitchmough 2002—as Charopidae sp. 7; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to northwestern Aupouri Peninsula, known from Tapotupotu Bay only (Brook 2002).
 Threat classification: Nationally Endangered (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Charopidae sp. 46 (NMNZ M.87828)
 [McGuinness 2001—as Helicodiscid (?) “sunken spire” n.sp. and N.Gen. “Tom Bowling Bay” n.sp.; Brook 2002; Hitchmough 2002—as Charopidae sp. 9; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to northern Aupouri Peninsula, known from Ngaruariki Stream and Te Huka (Brook 2002).
 Threat classification: Nationally Critical (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Charopidae sp. 73 (NMNZ M.77056)
 [Ogle *et al.* 1985—as *Therasiella* n.sp. “tall tamora”; Goulstone *et al.* 1993—as *Therasiella* cf. *tamora* ‘tall’; Brook 1999a—as *Therasiella* sp. cf. *tamora*; McGuinness 2001—*Therasiella* cf. “tall tamora” n.sp. and *Therasiella* sp. cf. *tamora* sensu Goulstone *et al.* 1993; Brook 2002; Hitchmough 2002—as Charopidae sp. 15; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to northern Aupouri Peninsula; sporadically distributed between Reinga and North Cape.
 Threat classification: Range Restricted (Hitchmough *et al.* (comp.) 2007).

Charopidae sp. 105 (NMNZ M.77007)
 [Ogle *et al.* 1985—"Cbaropa" n.sp. 'hazelwoodi-group'; *Flammocharopa* n.sp. a; McGuinness 2001—as *Sinployea* "hazelwoodi"; Brook 2002; Hitchmough 2002—as Charopidae sp. 16; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).
 Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Charopidae sp. 166 (NMNZ M.79360)
 [Brook 2002; Hitchmough 2002—as Charopidae sp. 10; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to northwestern Aupouri Peninsula, known from Radar Bush (Brook 2002).
 Threat classification: Nationally Endangered (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Charopidae sp. 169 (NMNZ M.160257)
 [Hitchmough *et al.* (comp.) 2007—as *Tberasiella* sp. "Unuwahao"]
 Distribution: not determined.
 Threat classification: Range Restricted (Hitchmough *et al.* (comp.) 2007).

Charopidae sp. 170 (NMNZ M.160258)
 [Ogle *et al.* 1985—as *Fectola mira*; Goulstone *et al.* 1993—as *F. mira*; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and Mokaikai (Ogle *et al.* 1985; Goulstone *et al.* 1993).
 Threat classification: Range Restricted (Hitchmough *et al.* (comp.) 2007)

PUNCTIDAE

Kokikora angulata Climo and Goulstone, 1995
 [Ogle *et al.* 1985—as *Kokikora* n.gen. *angulata* n.sp.; Goulstone *et al.* 1993—as Punctid n.sp. 38; Brook 1999a]

Laomarex minuta (Gardner, 1967)
 [Ogle *et al.* 1985—as *Kirapotaka* n.gen. *minuta*; Goulstone *et al.* 1993; McGuinness 2001—as *L. minuta* and *Kirapotaka minuta*; Brook 2002; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007]
 Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and Mokaikai (Gardner 1967; Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).
 Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Papulaoma monticola Jutting, 1964
 [Goulstone *et al.* 1993]

Paralaoma lateumbilicata (Suter, 1890)
 [Goulstone *et al.* 1993]

Paralaoma serratocostata Webster, 1906
 [Ogle *et al.* 1985—as *Serratopunctatum* n.gen. *serratocostata*; Goulstone *et al.* 1993—in *Pbrixgnathus*]

Paralaoma servilis (Shuttleworth, 1852)
 [Goulstone *et al.* 1993—as *P. caputspinulae*; Brook 1999a—as *P. caputspinulae*]

Pbrixgnathus aupouria (Cumber, 1967)
 [Goulstone *et al.* 1993—as *Laoma mariae aupouria*; McGuinness 2001—as *P. auporia*; Brook 2002; Hitchmough 2002; Hitchmough *et al.* (comp.) 2007—as *Laoma mariae aupouria*]
 Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and Mokaikai (Goulstone *et al.* 1993; Brook 2002).
 Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Pbrixgnathus glabriusculus (Pfeiffer, 1853)
 [Goulstone *et al.* 1993]

Pbrixgnathus sciadium (Pfeiffer, 1857)
 [Ogle *et al.* 1985—as *Ultralaoma* n.gen. *sciadium*; Goulstone *et al.* 1993; Brook 1999a]

Pbrixgnathus viridulus (Suter, 1909)
 [Goulstone *et al.* 1993]

Taguabelix crispata Climo and Goulstone, 1993
 [Goulstone *et al.* 1993—as Punctid sp. 17; Climo and Goulstone 1993]

Punctidae sp. 25 (NMNZ M.99812)
[Goulstone *et al.* 1993—as *Pbrixgnathus* n.sp. *conella* group; McGuinness 2001—as *Sericoconcha* “bakeri” n.sp.; Karin Mahlfeld pers. comm. 2007]

Punctidae sp. 30 (NMNZ M.87982)
[Goulstone *et al.* 1993—as Punctid n.sp. (Kohuronaki); McGuinness 2001—as *Pbrixgnathus* sp. “Kohuronaki”; Brook 2002; Hitchmough 2002—as Punctidae sp.17; Hitchmough *et al.* (comp.) 2007—as Punctidae sp.17]
Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and Tom Bowling Bay (Goulstone *et al.* 1993; Brook 2002).
Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. 33 (NMNZ M.87987)
[Goulstone *et al.* 1993—as Punctid n.sp. 56; McGuinness 2001—as punctid sp. 56; Brook 2002; Hitchmough 2002—as Punctidae sp.16; Hitchmough *et al.* (comp.) 2007—as Punctidae sp. 16]
Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Te Pahi and Mokaikai (Goulstone *et al.* 1993; Brook 2002).
Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. 56 (NMNZ M.62133)
[Goulstone *et al.* 1993—as *Pbrixgnathus* cf. *glabriusculus*; Brook 1999a—as punctid sp. 59]

Punctidae sp. 62 (NMNZ M.62504)
[Goulstone *et al.* 1993—as Punctid n.sp. 58]

Punctidae sp. 63 (NMNZ M.68881)
[Ogle *et al.* 1985—as *Argyroserikon* n.gen. *compacta* n.sp.; Goulstone *et al.* 1993—as Punctid n.sp. cf. 58; McGuinness 2001—as Rohapapa “compacta” n.sp.; Brook 2002; Hitchmough 2002—as Punctidae sp. 7; Hitchmough *et al.* (comp.) 2007]
Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Reinga and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).
Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. 71 (NMNZ M.77798)
[Goulstone *et al.* 1993—as Punctid n.sp. 8]

Punctidae sp. 72 (NMNZ M.93105)
[Goulstone *et al.* 1993—as Punctid n.sp. cf. 7]

Punctidae sp. 84 (NMNZ M.63193)
[Ogle *et al.* 1985—as Koropapa n.gen. *aupouria* n.sp.; Goulstone *et al.* 1993—as Punctid n.sp. 24; Parrish and Sherley 1993—as punctum n.sp. 24; Brook 1999a—as punctid n.sp. 24]

Punctidae sp. 96 (NMNZ M. 80251)
[Ogle *et al.* 1985—as Haurakora n.gen. *corrugata* n.sp.; Goulstone *et al.* 1993—as Punctid n.sp. 7]

Punctidae sp. 99 (NMNZ M.83503)
[Goulstone *et al.* 1993—as Punctid n.sp. a; McGuinness 2001—as punctid sp. “Pandora”; Brook 2002; Hitchmough 2002—as Punctidae sp.23; Hitchmough *et al.* (comp.) 2007—as Punctidae sp.23]
Distribution: Endemic to northern Aupouri Peninsula, known from Radar Bush and Kapowairua (Goulstone *et al.* 1993; Brook 2002).
Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. 100 (NMNZ M.84972)
[Ogle *et al.* 1985—as “Iotula” arewa; Goulstone *et al.* 1993—as Punctid n.sp. 29]

Punctidae sp. 104 (NMNZ M.54260)
[Ogle *et al.* 1985—as “Iotula” pararaki n.sp.; Goulstone *et al.* 1993—as Punctid n.sp. 25; McGuinness 2001—as punctid n.sp. 25 and *Paralaoma* “pararaki” n.sp.; Brook 2002; Hitchmough 2002—as Punctidae sp. 25; Hitchmough *et al.* (comp.) 2007—as Punctidae sp. 25]
Distribution: Endemic to North Cape headland (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).
Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. 130 (NMNZ M.62132)
 [Ogle *et al.* 1985—as *Gardneraoma* n.gen. *gardneri* n.sp.; Goulstone *et al.* 1993—as Punctid n.sp. 68; Brook 1999a—as punctid sp. 68; McGuinness 2001—as punctid sp. 68 and *Poripotaka gardneri*; Brook 2002; Hitchmough 2002—as Punctidae sp. 10; Hitchmough *et al.* (comp.) 2007—as Punctidae sp. 10]
 Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Te Pahi and Mokaikai (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).
 Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. 133 (NMNZ M.62141)
 [Goulstone *et al.* 1993—as Punctid n.sp. 55]

Punctidae sp. 153 (NMNZ M.87994)
 [Goulstone *et al.* 1993—as Punctid n.sp. “north cape”; McGuinness 2001—as punctid sp. “north cape”; Brook 2002; Hitchmough 2002—as Punctidae sp. 9; Hitchmough *et al.* (comp.) 2007—as Punctidae sp. 9]
 Distribution: Endemic to North Cape headland (Goulstone *et al.* 1993; Brook 2002).
 Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. 156 (NMNZ M.79798)
 [Goulstone *et al.* 1993—as *Pbrixgnathus* cf. *alfredi*; Parrish and Sherley 1993—as *Pbrixgnathus* n.sp. cf. *alfredi* group; Brook 1999a—as *Pbrixgnathus* cf. *alfredi*; McGuinness 2001—as *Pbrixgnathus* cf. *alfredi*; Brook 2002; Hitchmough 2002—as Punctidae sp. 27; Hitchmough *et al.* (comp.) 2007—as Punctidae sp. 27]
 Distribution: Endemic to Motuopao and Cape Maria van Diemen (Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a, 2002).
 Threat classification: Nationally Critical (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. 223 (NMNZ M.151458)
 [Brook 1999a—as *Pbrixgnathus* sp. “smugglers”; McGuinness 2001—as *Pbrixgnathus* sp. “smugglers”; Brook 2002; Hitchmough 2002—as Punctidae sp. 6; Hitchmough *et al.* (comp.) 2007—as Punctidae sp. 6]
 Distribution: Formerly widely distributed on dunefields in northern and eastern Northland; two extant populations known, including one at Kaurahoupo Rocks in Te Pahi ED (Brook 2002).
 Threat classification: Nationally Critical (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. 229 (NMNZ M.79639)
 [Ogle *et al.* 1985—as *Powellaoma* n.gen. sp.; Goulstone *et al.* 1993—as Punctid n.sp. 67; McGuinness 2001—as *Powellaoma* “tepaki”; Brook 2002; Hitchmough 2002—as Punctidae sp. 11; Hitchmough *et al.* (comp.) 2007—as Punctidae sp. 11]
 Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Te Pahi and North Cape (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).
 Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. 250 (NMNZ M.55454)
 [Ogle *et al.* 1985—as *Aureopunctum* n.gen. *brunneum* n.sp.; McGuinness 2001—as punctid sp. 16; Brook 2002; Hitchmough 2002—as Punctidae sp. 22; Hitchmough *et al.* (comp.) 2007—as Punctidae sp. 22]
 Distribution: Endemic to northern Aupouri Peninsula, sporadically distributed between Te Pahi and Mokaikai (Ogle *et al.* 1985; Goulstone *et al.* 1993; Brook 2002).
 Threat classification: Range Restricted (Brook 2002; Hitchmough *et al.* (comp.) 2007).

Punctidae sp. A
 [Ogle *et al.* 1985—as “Koropapa” n.gen. *taipa* n.sp.]

Punctidae sp. B
 [Goulstone *et al.* 1993—as Punctid n.sp. 3]

Punctidae sp. C
 [Goulstone *et al.* 1993—as Punctid cf. n.sp. 33]

Punctidae sp. D
 [Goulstone *et al.* 1993—as *Obanella* cf. *rimutaka*]

Punctidae sp. E
 [Goulstone *et al.* 1993—as Punctid sp. b; McGuinness 2001—as punctid sp. “Unuwahao”]

Introduced landsnail species

COCHLICOPIDAE

Cochlicopa lubrica (Muller, 1774)

[Goulstone *et al.* 1993; Parrish and Sherley 1993; Brook 1999a]

HELICIDAE

Cornu aspersum (Muller, 1774)

[Goulstone *et al.* 1993—in *Helix*; Parrish and Sherley 1993—in *Helix*; Barker 1999—in *Cantareus*; Brook 1999a—in *Cantareus*]

HYGROMINIDAE

Candidula intesepta (Poiret, 1801)

[Goulstone *et al.* 1993; Barker 1999]

Prietocella barbara (Linnaeus, 1758)

[Barker 1999]

PUPILLIDAE

Lauria cylindracea (da Costa, 1778)

[Barker 1999]

VALLONIIDAE

Vallonia excentrica Sterki, 1893

[Goulstone *et al.* 1993; Barker 1999]

ZONITIDAE

Oxychilus cellarius (Muller, 1774)

[Goulstone *et al.* 1993—as *Oxychilus* sp.; Barker 1999]

(vi) Freshwater invertebrates

Native

Paranebrops planifrons White koura, freshwater crayfish R

Tepakia caligata Towns and Peters, 1996 mayfly R

(vii) Spiders (compiled by Mike Fitzgerald)

AMPHINECTIDAE

Paramamoea pandora Forster & Wilton 1973.

Specimens were collected by Keith Wise in February 1967 from a forest remnant near Unuwahao, North Cape area (♂ & ♀ described). Several males and females have recently been caught at Unuwahao and Kohuronaki.

Reinga apica Forster & Wilton 1973.

Previously known only from the holotype female and one other female collected by Forster at Cape Reinga in January 1967. A small number of males and females have been trapped within native bush (Radar Bush), pine forest (Kapowairua) and shrubland (Darkies Ridge) habitats.

DESIDAE

Hapona reinga Forster 1970.

Forster collected the holotype ♀ and allotype ♂ at Cape Reinga in January 1967 and no other specimens have been recorded until 2007 when they were caught in native forest remnants (Radar Bush and Unuwahao).

GNAPHOSIDAE

Hypodrassodes apicus Forster 1979.

Previously known only from one female collected under a log at Cape Reinga by Forster in January 1967. Many males and females were collected at native forest remnants (Unuwahao, Radar Bush and Kohuronaki), pine forests (Kapowairua, Kerr Point and Whakapuku) and shrubland (Kapowairua, Darkies Ridge and Taumatara Flat) sites in 2007. It is close to *H. dalmasi* Forster 1979.

HAHNIIDAE

At least three species have recently (2007) been collected but identities have not yet been confirmed. They probably include *Alistra reinga* (Forster 1970) (of which Forster collected a male and female at Cape Reinga in January 1967 and other specimens were collected at Te Paki), and an undescribed species of *Rinawa*, which is much larger than any of the hahniid species that have been thus far described. Hahniids are very common in recent samples.

HUTTONIIDAE

Huttonia sp.

One male of an undescribed species was found at Radar Bush in 2007.

LYCOSIDAE

Artoria separata Vink 2002

This species was previously known from Taranaki and Omahuta forest (one male at the latter site). In a recent survey (2006–7), *A. separata* was common within native forest remnants at Unuwahao, Kohuronaki and Radar Bush, but was less abundant at shrubland sites (Kapowairua, Darkies Ridge and Taumataroa Flat), where the predominant lycosid was *Anoteropsis bilaris* (L. Koch 1877). This latter species is widespread throughout New Zealand.

MYSMENIDAE

An undescribed but common species has recently been found within native forest (Radar Bush and Unuwahao), pine forest (Kerr Point), and shrubland (Kapowairua) habitats.

NEMESIIDAE

Stanwellia hollowayi (Forster and Wilton, 1973).

The holotype of this species of spider was collected by B. A. Holloway, 1 Dec 1960 on the slopes of "Mt Te Paki" (part of N02/003). It is currently classified as being Data Deficient (Hitchmough *et al.* (comp) 2007). Its previous name was *Aparua hollowayi*.

STIPHIDIIDAE

Cambridgea foliata (L. Koch 1872).

This is a widespread species in the North Island and northern part of the South Island. One specimen was collected at Cape Reinga by Forster in January 1967. Although specimens of *Cambridgea* species are not often caught in pitfall trap surveys, they may nonetheless be common in the area. One female specimen was caught at Kohuronaki in February 2007.

Cambridgea reinga Forster & Wilton 1973.

This species is known only from the holotype female, collected by Forster at Cape Reinga in January 1967.

Nanocambridgea grandis Blest & Vink 2000.

Known previously only from three males collected at Cape Reinga by J.W. Early and R.F. Gilbert in 1995. One male was also collected in 2007 from Unuwahao. No females have yet been found. *Nanocambridgea grandis* is currently classified as being Data Deficient (Hitchmough *et al.* (comp) 2007).

The only other species of *Nanocambridgea*, *N. gracilipes* Forster and Wilton 1973, is found in the southern half of the North Island and north-west South Island.

SYNOTAXIDAE

An undescribed *Paboroides* species has been found in native forest remnants at Kohuronaki (2006), Unuwahao (2006) and Radar Bush (2007). One male and several females have been found. The nearest *Paboroides* species geographically is *P. whangarei* whose range extends up to Kaikohe and Kaitaia

Wairua reinga Forster, 1990.

The spider *Wairua reinga* is known from the type locality, in a web on a tree trunk in a small patch of forest at Te Rerenga Wairua (part of N02/003) (coll. RR Forster, Jan 7, 1967). This species is currently classified as being Data Deficient (Hitchmough *et al.* (comp) 2007).

THERIDIIDAE

Black katipo spider *Latrodectus atritus* Urquhart, 1889.

The black katipo spider inhabits dune systems north of New Plymouth and East Cape with a threat classification of Serious Decline (Hitchmough *et al.* (comp) 2007).

THOMISIDAE

An undescribed species, *Sidymella* “pincushion”, has been found at one native forest location (Kohuronaki) in recent (2006–7) surveys. This species may be closely related to a species from the Three Kings Islands.

HARVESTMEN

At least five species have been trapped, including *Zeopsopilio novaezealandiae*, which appears to be little more than a big eyemound with a pair of large eyes.

(viii) Other invertebrates

SCIENTIFIC NAME	COMMON NAME	
Indigenous		
<i>Anisoura nicobarica</i> Ander	Northland tusked weta	R
<i>Athoracophorus</i> sp. 4 (NMNZ M.151430)	slug	R
<i>Brullea antarctica</i> (Castelnau, 1867)	carabid beetle	R
<i>Ericodesma aerodana</i> (Meyrick, 1881)	moth	R
<i>Izatha</i> sp. “small grey”	moth	R
<i>Latrodectus atritus</i> Urquhart, 1890	black katipo spider	R
<i>Limotettix condylus</i>	plant hopper	R
<i>Mecodema</i> sp. “Te Paki”	ground beetle	R
<i>Megascolex animae</i>	earthworm	R
<i>Menimus borealis</i> Watt, 1992	darkling beetle	R
<i>Menimus brouni</i> Watt, 1992	darkling beetle	R
<i>Metablax cinctiger</i> (White, 1846)	click beetle	R
<i>Metablax</i> sp.	click beetle	R
<i>Notoreas</i> sp. “northern”	moth	R
<i>Paralissotes oconnori</i> (Holloway, 1961)	stag beetle	R
<i>Syrphetodes decoratus</i> Broun, 1880	beetle	R
<i>Syrphetodes</i> sp. “Te Paki”	beetle	R
Introduced		
<i>Radumeris tasmaniensis</i> (Saussure, 1855)	yellow flower wasp	R
<i>Steatoda capensis</i> Hann, 1990	black cobweb spider, false katipo spider	R

Appendix 8

TE PAKI ECOLOGICAL DISTRICT FOSSIL FAUNA

Rich fossil assemblages of mid to late Holocene age (c. 6000–800 yrs BP) containing landsnails and the bones of birds, reptiles and marine mammals are present locally in dunefields in the Te Paki Ecological District (i.e., at Motuopao, between Cape Maria van Diemen and Te Werahi, Tapotupotu Bay, Kapowairua, Tom Bowling Bay, Waikuku Beach and Whareana Beach: Millener 1981; Brook 1999a; Gill 1996, 1998, 2002; Worthy and Holdaway 2002). Paleontological evidence indicates these dunefields, which are presently unvegetated or support only low scrubby vegetation, were formerly forested (Millener 1981; Brook 1999).

Fossil shells of the giant landsnail *Placostylus ambagiosus* are abundant in several dunefields, and shells of *Paryphanta watti* are present in the dunes at Te Werahi and Tom Bowling Bay (Powell 1938, 1947; Millener 1981; Brook 1999).

A list of the fossil vertebrates recorded from dunefields in the Te Paki ED is given in Table F. Bones of a wide variety of bird species are represented, including many that are globally extinct (e.g., Little bush moa, Coastal moa, Mappin's moa, Large bush moa, Finsch's duck, New Zealand musk duck, New Zealand pink-eared duck, Eyle's harrier, New Zealand quail, North Island adzebill, Snipe rail, New Zealand coot, North Island takahe, Laughing owl, Huia, North Island Piopio, New Zealand raven), and others that are locally extinct (e.g., Northern brown kiwi, Little spotted kiwi, Brown teal, New Zealand falcon, Weka, Yellow-crowned parakeet, Red-crowned parakeet, Kakapo, Rifleman, Whitehead, North Island robin, Stitchbird, North Island kokako, North Island saddleback).

Tuatara remains are locally common in the Te Paki dunefields, and bones of skinks and geckos are present locally (Millener 1981; Brook 1999).

Teeth and bones of three species of bats (*Chalinolobus tuberculatus*, *Mystacina robusta*, *M. tuberculata*) have been recorded from the Te Werahi dunefield (Gill 2002). The New Zealand sea lion formerly bred at Tom Bowling Bay and Waikuku Beach, as indicated by the presence of fossil bones of small pups in the dunes (Gill 1998).

TE PAKI ECOLOGICAL DISTRICT - HOLOCENE FOSSIL VERTEBRATE FAUNA .
 PREPARED BY FRED BROOK (DECEMBER 2007)

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME	FOSSIL RECORDS FROM TE PAKI ED	GLOBALY EXTINCT	EXTINCT IN TE PAKI ED
Reptilia	Sphenodontidae	<i>Sphenodon punctatus</i>	Tuatara	Millener 1981; Brook 1999		Y
	Gekkonidae	indet.		Millener 1981; Brook 1999		
Aves	Scincidae	indet.		Millener 1981; Brook 1999		
	Emeidae	<i>Anomalopteryx didiformis</i>	Little bush moa	Millener 1981; Worthy and Holdaway 2002	Y	
		<i>Euryapteryx curtus</i>	Coastal moa		Millener 1981 (as <i>E. curtus</i> and <i>E. geranoides</i>); Brook 1999; Worthy and Holdaway 2002	Y
		<i>Pachyornis mappini</i>	Mappin's moa	Millener 1981; Worthy and Holdaway 2002	Y	
		<i>Dinornis novaeseelandiae</i> (note: includes <i>D. giganteus</i> and <i>D. struthoides</i> —see Bunce <i>et al.</i> 2003)	Large bush moa	Millener 1981 (as <i>D. giganteus</i> , <i>D. novaeseelandiae</i> and <i>D. struthoides</i>); Worthy and Holdaway 2002	Y	
		<i>Apteryx oweni</i>	Little spotted kiwi	(as <i>D. struthoides</i>); Worthy and Holdaway 2002		Y
	Apterygidae	<i>Apteryx mantelli</i>	Northern brown kiwi	Millener 1981 (as <i>A. australis</i>)		Y
	Diomedidae	<i>Diomedeidae</i> sp.		Millener 1981		
		<i>Thalassarche</i> sp.		Millener 1981		
	Procellariidae	<i>Daption capense</i>	Northern Buller's albatross	Millener 1981		
<i>Pachyptila turtur</i>		White-capped albatross	Millener 1981 (as <i>T. bulleri</i>)			
<i>Pachyptila salvini</i>		Cape petrel	Millener 1981			
<i>Pachyptila vittata</i>		Fairy prion	Millener 1981			
<i>Pelecanoides urinatrix</i>		Lesser broad-billed prion	Millener 1981			
<i>Pterodroma cooki</i>		Broad-billed prion	Millener 1981			
<i>Pterodroma inexpectata</i>		Northern diving petrel	Millener 1981			
<i>Pterodroma lessonae</i>		Cook's petrel	Millener 1981			
<i>Pterodroma macroptera</i>		Mottled petrel	Millener 1981			
<i>Puffinus assimilis</i>		White-headed petrel	Millener 1981			
<i>Puffinus bulleri</i>		Grey-faced petrel	Millener 1981			
<i>Puffinus carneipes</i>		Little shearwater	Millener 1981			
<i>Puffinus gavia</i>		Buller's shearwater	Millener 1981			
<i>Puffinus griseus</i>		Flesh-footed shearwater	Millener 1981			
<i>Puffinus tenuirostris</i>		Fluttering shearwater	Millener 1981			
<i>Pelagodroma marina</i>		Sooty shearwater	Millener 1981			
Hydrobatidae		<i>Eudyptula minor</i>	Short-tailed shearwater	Millener 1981		
	<i>Morus serrator</i>	White-faced storm petrel	Millener 1981; Brook 1999			
Spheniscidae	<i>Phalacrocorax carbo</i>	Australasian gannet	Millener 1981 (as <i>Sula bassana</i>)			
	<i>Phalacrocorax melanoleucos</i>	Great cormorant	Millener 1981			
Sulidae	<i>Phalacrocorax varius</i>	Little cormorant	Millener 1981			
	<i>Stictocarbo punctatus</i>	Pied cormorant	Brook 1999			
Ardeidae	<i>Casmerodius albus</i>	Spotted shag	Millener 1981			
	<i>Anas chlorotis</i>	White heron	Millener 1981 (in <i>Egretta</i>)			
Anatidae	<i>Anas superciliosa</i>	Brown teal	Millener 1981 (as <i>A. aucklandica</i>)		Y	
	<i>Aythya novaeseelandiae</i>	Grey duck	Millener 1981			
	<i>Biziura delatouri</i>	New Zealand scaup	Millener 1981			
	<i>Cygnus atratus</i>	New Zealand musk duck	Millener 1981		Y	
	<i>Euryanus finschi</i>	Australasian black swan	Millener 1981 (as <i>C. summerensis</i>)		Y	
	<i>Malacorhynchus scarletti</i>	Finsch's duck	Millener 1981		Y	
		New Zealand pink-eared duck	Worthy and Gill 2002			

ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME	FOSSIL RECORDS FROM TE PAKI ED	GLOBALY EXTINCT	EXTINCT IN TE PAKI ED
	Accipitridae	<i>Tadorna variegata</i>	Paradise shelduck	Millener 1981		
		<i>Circus approximans</i>	Kahu, Australasian harrier	Millener 1981; Brook 1999	Y	
		<i>Circus eylessi</i>	Eyle's harrier	Millener 1981		
	Falconidae	<i>Falco novaeseelandiae</i>	New Zealand falcon	Millener 1981	Y	Y
	Phasianidae	<i>Coturnix novaeseelandiae</i>	New Zealand quail	Millener 1981	Y	
	Aptornithidae	<i>Aptornis otidiformis</i>	North Island adzebill	Millener 1981; Brook 1999	Y	
	Rallidae	<i>Capellirallus karamu</i>	Snipe rail	Millener 1981	Y	
		<i>Gallirallus australis</i>	Weka	Millener 1981 (as <i>G. australis</i> and <i>G. minor</i>); Brook 1999		Y
		<i>Gallirallus pbittippensis</i>	Banded rail	Millener 1981		
		<i>Fulica prisca</i>	New Zealand coot	Brook 1999	Y	
		<i>Porphyrio mantelli</i>	North Island takahe	Millener 1981; Brook 1999	Y	
	Haematopodidae	<i>Haematopus unicolor</i>	Variable oystercatcher	Millener 1981		
	Recurvirostridae	<i>Himantopus novaeseelandiae</i>	Black stilt	Millener 1981		
		<i>Charadrius bichtinctus</i>	Banded dotterel	Millener 1981		
	Charadriidae	<i>Charadrius obscurus</i>	New Zealand dotterel	Millener 1981; Brook 1999		
	Scolopacidae	<i>Limosa lapponica</i>	Eastern bar-tailed godwit	Millener 1981		
	Laridae	<i>Larus dominicanus</i>	Southern black-backed gull	Millener 1981		
		<i>Larus novaebollandiae</i>	Red-billed gull	Millener 1981 (as <i>L. scopulinus</i>)		
		<i>Sterna caspia</i>	Caspian tern	Millener 1981 (in <i>Hydroprogne</i>)		
		<i>Sterna nereis</i>	Fairy tern	Millener 1981		
		<i>Sterna striata</i>	White-fronted tern	Millener 1981		
	Columbidae	<i>Hemiphaga novaeseelandiae</i>	New Zealand pigeon	Millener 1981; Brook 1999		
		<i>Cyanoramphus auriceps</i>	Yellow-crowned parakeet	Millener 1981		Y
		<i>Cyanoramphus novaeseelandiae</i>	Red-crowned parakeet	Millener 1981		Y
		<i>Nestor meridionalis</i>	Kaka	Millener 1981; Brook 1999		Y
	Strigidae	<i>Strigops habroptilus</i>	Morepork	Millener 1981		Y
		<i>Ninox novaeseelandiae</i>	Laughing owl	Millener 1981; Brook 1999	Y	
		<i>Sceloglaux albifacies</i>	Rifleman	Gill 1996; Brook 1999		
	Acanthistitidae	<i>Acanthisitta chloris</i>	New Zealand pipit	Millener 1981		
	Motacillidae	<i>Bouldleria punctata</i>	New Zealand fernbird	Millener 1981		
	Sylviidae	<i>Mobua albicilla</i>	Whitehead	Millener 1981		Y
	Pacycephalidae	<i>Petroica longipes</i>	North Island robin	Millener 1981 (as <i>P. australis</i>)		Y
	Petroicidae	<i>Anthornis melanura</i>	New Zealand bellbird	Millener 1981		Y
	Maliphagidae	<i>Notiomystis cincta</i>	Stitchbird	Millener 1981		Y
		<i>Prosthemadera novaeseelandiae</i>	Tui	Millener 1981; Brook 1999		Y
	Callaeidae	<i>Callaeas wilsoni</i>	North Island kokako	Millener 1981 (as <i>C. cinerea</i>); Brook 1999 (as <i>C. cinerea</i>)		Y
		<i>Heteralocha acutirostris</i>	Huia	Millener 1981; Brook 1999	Y	
		<i>Philesturnus rufusater</i>	North Island saddleback	Millener 1981 (as <i>P. carunculatus</i>)		Y
	Tumagridae	<i>Turnagra tangra</i>	North Island piopio	Millener 1981 (as <i>T. capensis</i>)	Y	
	Corvidae	<i>Corvus "mainland"</i>	New Zealand raven	Millener 1981 (as <i>Paleocorax mortorum</i>); Brook 1999 (as <i>P. mortorum</i>)	Y	
Mammalia	Otariidae	<i>Phocarcos bookeri</i>	New Zealand sea lion	Gill 1998		Y
	Mystacinidae	<i>Mystacina robusta</i>	New Zealand greater short-tailed bat	Gill 2002		
		<i>Mystacina tuberculata</i>	New Zealand lesser short-tailed bat	Gill 2002		Y
	Vespertilionidae	<i>Chalinolobus tuberculatus</i>	New Zealand long-tailed bat	Gill 2002		Y

Glossary of terms

Aeolian Relating to, caused by, or carried by the wind.

Allochthonous Geologic units that have been transported to their present position.

Alluvial Deposited by a river or other running water.

Basalt A type of igneous rock consisting of feldspar and other silicate minerals rich in iron and magnesium. Basalt has a relatively low silica content of 40-50 percent and is the main component of the oceanic crust of the earth.

Conglomerate A sedimentary rock composed of welded fine-grained and coarse-grained rock fragments.

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 A peatland which receives its water supply only from precipitation, receiving neither groundwater nor any nutrients from adjacent or underlying mineral soils. Bogs are oligotrophic (nutrient poor), poorly aerated and usually markedly acidic. Bog peat is poorly drained, having almost no water movement, and the water table is generally close to or just above the ground surface, and relatively constant (Johnson and Gerbeaux 2004). In Te Pahi ED, bogs are usually characterised by sedges, manuka and umbrella fern.

Buffer A zone surrounding a natural area which reduces the effects of external influences on the natural area. For example, shrubland or exotic plantations surrounding an indigenous remnant provide physical protection to it by reducing changes in wind and light, reducing the chance of weed infestation and providing a corridor for the movement of wildlife into and out of it, so that it is less isolated. Vegetation is often considered a buffer to waterways—riparian vegetation and wetlands protect both water quality and habitat from influences arising on 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/duneland/dunefield An association of mobile and consolidated sand dunes, which may include small interdune lakes, wetlands, and shrubland communities.

Dune lake A lake formed behind a dune.

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 other living organisms 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 to New Zealand; not indigenous.

Fernland Vegetation in which the cover of ferns in the canopy is 20–100% and in which the fern cover exceeds that of any other growth form or bare ground. Tree ferns >10 cm dbh are excluded as trees (cf. forest) (Atkinson 1985). In Te Pahi ED, fernlands are dominated by ferns such as *Gleichenia dicarpa* and *Gleichenia microphylla*, bracken, and tree ferns, with occasional woody plants also present.

Foredune Mobile and fixed transverse dunes along coastal margins.

Forest Woody vegetation in which the cover of trees and shrubs in the canopy is >80% and in which tree cover exceeds that of shrubs. Trees are woody plants > 10 cm diameter at breast height (dbh) and shrubs are woody plants < 10 cm dbh. Tree ferns > 10 cm dbh are treated as trees (Atkinson 1985).

Gabbro A usually coarse-grained igneous rock composed chiefly of calcic plagioclase and pyroxene.

Grassland Vegetation in which the cover of grass in the canopy is 20–100% and in which grass cover exceeds that of any other growth form or bare ground. Tussock grasses are excluded from the grass growth-form (Atkinson 1985).

Gumland Wardle (1991) defines gumlands as wet heathlands occupying areas which were previously kauri (*Agathis australis*) forests.

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

Hemiparasite A parasite which lives on and derives part of its nourishment from its host, but also conducts photosynthesis, for example mistletoe species and willow-leaved maire.

Herbfield Vegetation in which the cover of herbs in the canopy is 20–100% and in which herb cover exceeds that of any other growth form or bare ground. Herbs include all herbaceous and low-growing semi-woody

plants that are not separated as ferns, tussocks, grasses, sedges, rushes, reeds, chion plants, mosses, or lichens (Atkinson 1985).

Holocene Period of geologic time from the end of the Pleistocene Ice Age (about 10,000 years before present) until the present day.

Igneous Formed by solidification of molten rock that has come from within the earth.

Indigenous Native to New Zealand. This includes species which occur naturally in New Zealand *and* other places (e.g. migratory bar-tailed godwits which return to New Zealand from Siberia every summer). Species which only occur in New Zealand are 'endemic'.

Landform A part of the land's surface with distinctive naturally formed physical characteristics e.g. hillslope, gully, ridge top, etc.

Linkages/corridors An area of habitat which links two or more other habitat areas. Depending on the habitat type, this a linkage or corridor can comprise indigenous vegetation (e.g. forest, shrubland), exotic vegetation (e.g. pine forest), aquatic habitat (e.g. a farm pond) or any other feature which assists the movement of indigenous species between habitat patches. Where a linkage exists between habitats the opportunities for genetic exchange within a species are greater, which enhances the viability of that population. For many species, in particular mobile fauna such as birds, a corridor does not have to be continuous to be utilisable. Small remnants can act as stepping stones between two larger habitats.

Miocene A geologic epoch within the Tertiary period (about 24 to 5 million years before present).

Mudstone A fine-grained sedimentary rock consisting mainly of clay mineral particles.

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.

Ophiolitic Of igneous and metamorphic rocks, rich in iron and magnesium, whose origin is associated with an early phase of the development of a geosyncline (continental margin downwarping in the earth's crust that has seen sedimentation and volcanic activity).

Pliocene The geological epoch from 5.2-1.64 million years ago. The Pliocene was a period of gradual cooling leading up to the Pleistocene ice ages.

Pleistocene An epoch of the Quaternary period, after the Pliocene of the Tertiary and before the Holocene. It began one to two million years ago and lasted until the start of the Holocene, some 10,000 years ago. When the Quaternary is designated as an era, the Pleistocene is considered to be a period.

Plutonic Of igneous rock that has solidified beneath the earth's surface; granite or diorite or gabbro.

Podzol A soil type formed under some types of forest and characterised by very strong vertical leaching of nutrients in the profile and the development of whitish-grey sub-soils.

Rarity This is a measure of commonness and may apply to entire ecosystems through to single species. It may refer to the conservation status of a species (see Appendix 3) or habitat type in any one of the following ways: formerly common but now rare; confined to a limited geographic area; at the limit of its range; or with a contracting or fragmented range.

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

Reedland Reedlands comprise 20-100% cover of reeds, which are tall erect herbs emergent from shallow water, having branched leaves or stems that are either hollow or have very spongy pith, e.g. raupo, *Baumea articulata* and lake clubrush (Johnson and Gerbeaux 2004, adapted from Atkinson 1985).

Regionally significant Assessed by the Department of Conservation (Northland Conservancy) to be either rare or threatened within the Northland Region.

Regolith The layer of loose rock resting on bedrock, constituting the surface of most land.

Representativeness The extent to which an area represents or exemplifies the components of the natural diversity of a larger reference area (in this case, the reference area is the part of Otamatea ED which falls within Northland Conservancy boundaries). This implies consideration of the full range of natural ecosystems and landscapes that were originally found in the reference area and how well they are represented in today's environment. The reference period for 'original' land cover used for this study was the immediate pre-human era (late Holocene).

The identification and evaluation of the key representative natural areas in all Ecological Districts is the principal objective of the PNA Programme (Myers *et al.* 1987).

Riparian zone An area of land immediately adjacent to a watercourse.

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 form or bare ground. Included in the rush growth form are some species of *Juncus* and all species of *Empodisma*. Tussock-rushes are excluded (Atkinson 1985).

Saltmarsh A wetland class embracing estuarine habitats of mainly mineral substrate in the intertidal and subtidal zones, but also including those habitats in the supratidal zone (such as wet coastal platforms) and in the inland saline hydrosystem, which although non-tidal have

similar saline substrates and constancy of soil moisture. Water source is from groundwater and adjacent saline or brackish estuary waters. The saltmarsh wetland class includes non-vegetated habitats such as mudflats, and the full range of vegetation types typical of the intertidal zone, from herbfield to rushland, scrub, and mangrove scrub or low forest (Johnson and Gerbeaux 2004).

Sandfield Land in which the area of bare sand (grain size 0.02–2 mm diameter) exceeds the area covered by any one class of plant growth-form. Dune vegetation often includes sandfields which are named from the leading plant species when plant cover $\geq 1\%$ (Atkinson 1985).

Sandstone A sedimentary stone made of sand that has been fused with some cementing element like clay or quartz.

Saprophytic An organism that obtains nutrition from dead or decaying plant or animal tissue.

Scrub In this study, 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 Indigenous vegetation established after destruction or disturbance of the previous vegetation and which is essentially different from the original vegetation.

Sedgeland Vegetation in which the cover of sedges in the canopy is 20–100% and in which the sedge cover exceeds that of any other growth form or bare ground. Included in the sedge growth form are species of *Carex*, *Isolepis*, and *Bolboschoenus* (Atkinson 1985).

Sedimentary Rocks formed from material, including debris of organic origin, deposited as sediment by water, wind, or ice and then compressed and cemented together by pressure.

Seral Describes a plant community in an early stage of plant succession following natural or human-caused disturbance. The seral stage may succeed towards the pre-disturbed state or to an alternative climax community.

Serpentine Serpentine is a group of common rock-forming hydrous magnesium iron phyllosilicate minerals. Serpentine soils are highly infertile with low levels of potassium, phosphorus and calcium and often high concentrations of iron and magnesium and the toxic metals nickel and chrome. As a consequence, serpentine vegetation often has fewer trees, and more sclerophyllous shrubs, grasses and sedges. In New Zealand, serpentine areas are known for their high levels of floristic diversity and plant endemism.

Shrubland In this report areas of shrubland are defined as vegetation dominated by shrubs, with a closed canopy, and in more advanced stages containing an understorey of indigenous species.

In Te Pahi ED, 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 etc e.g. gumland manuka shrubland, pohuehue shrubland on dunes.

Site An area of habitat or habitats identified during the field survey phase of the PNAP. Some small habitats occurring in close geographical proximity, with similar characteristics and functions, have been grouped and addressed as one site e.g. small forest remnants and farm ponds in the within same catchment. 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.

Subfossil A partly fossilised organism.

Succession Succession is the dynamic process whereby one plant community changes into another, involving the immigration and local extinction of species, coupled with changes in the relative abundance of different plants (Crawley 1997). Change may be due to natural or human-induced factors, or both. Primary succession refers to the colonisation of a bare surface by vegetation (e.g. the greening of new volcano after it erupts out of the sea). Secondary succession refers to the process of colonisation and change after original vegetation has been destroyed e.g. by fire, human-induced land clearance etc.

Successional Describes a plant community in the process of succession.

Survey no. A sequential number given to each site (e.g. M02/007). The first letter and two figures refer to the NZMS 260 topographical map sheet which covers the site.

Sustainability The long-term ecological viability of a natural area, including the sustenance of habitat quality and natural biodiversity. This is related to the size and shape of the area, as well as to threats from introduced pests and other factors including human disturbance.

Swamp A wetland that receives a relatively rich supply of nutrients and often also sediment via surface runoff and groundwater from adjacent land. Swamps usually have a combination of mineral and peat substrates. Leads of standing water or surface channels are often present, with gentle permanent or periodic flow, and the water table is usually permanently above some of the ground surface, or periodically above much of it (Johnson and Gerbeaux 2004). In Te Pahi ED, swamps are usually dominated by raupo, *Carex*, *Baumea articulata*, harakeke and ti kouka.

Sympatric Occupying the same or overlapping geographic areas without interbreeding. Used of populations of closely related species.

Taxonomically indeterminate Species for which information on their taxonomic relationships has either not been formally evaluated or remains in doubt. These species may warrant further conservation attention once their taxonomic status is clarified (de Lange *et al.* 2004).

Tombolo A sandspit or sandbar joining an island to the mainland or to another island.

Treeland Vegetation in which the cover of trees in the canopy is 20–80%, with tree cover exceeding that of any other growth form, and in which the trees form a discontinuous upper canopy above either a lower canopy of predominantly non-woody vegetation or bare ground (Atkinson 1985), e.g. ‘totara treeland’ refers to a common type in Otamatea ED Northland in which sparse totara trees form the canopy over an understorey of mainly exotic grasses. Treeland is mainly induced by grazing.

Tussockland Vegetation in which the cover of tussocks in the canopy is 20–100% and in which tussock cover exceeds that of any other growth form or bare ground. Tussocks include all grasses, sedges, rushes, and other herbaceous plants with linear leaves that are densely clumped and >10 cm height. Examples include toetoe and species of *Cyperus* (Atkinson 1985).

Ultramafic Igneous rocks or magmas that are rich in iron and magnesium and very poor in silica. The high concentration of magnesium inhibits plant growth. Ultramafic areas in New Zealand have a high number of endemic species (see ‘Serpentine’).

Vegetation type The most detailed vegetation descriptive name, defined by the composition of dominant canopy species, in order of abundance (e.g. taraire-puriri-kahikatea) and the structure of the vegetation e.g. forest, treeland, shrubland, reedland etc.

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 Wetland includes permanently or intermittently wet areas, shallow water, and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions (Resource Management Act 1991). Wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres (Ramsar Convention on Wetlands 1971).

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