

NORTH TARANAKI ECOLOGICAL DISTRICT
SURVEY REPORT FOR THE
NEW ZEALAND PROTECTED
NATURAL AREAS PROGRAMME

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ABSTRACT

The North Taranaki Ecological District was surveyed to identify Recommended Areas for Protection using the rapid ecological survey techniques of the Protected Natural Areas Programme. Twenty-seven Recommended Areas for Protection were identified to complement existing protected natural areas in representing the natural diversity of the North Taranaki Ecological District.

Key Words

North Taranaki, ecology, reserve, vegetation.

1.0 INTRODUCTION

This report discusses an ecological survey carried out between June 1985 and June 1986 in North Taranaki Ecological District as part of the New Zealand Protected Natural Areas (PNA) Programme. The survey was initiated by the Biological Resources Centre and Mines Division, Ministry of Energy to enable an assessment of the ecological significance of the habitats within the proposed Mokau coal mining area on a regional basis.

The objectives of the survey were:

1. to document the natural vegetation, landforms and wildlife of the North Taranaki Ecological District;
2. to assess the adequacy of the present system of protected natural areas in terms of a representative sample of all classes of natural ecosystems and landscape which in the aggregate originally gave the district its own recognisable character;
3. to recommend areas for protection which would supplement the existing system of PNAs to make the system representative of the district's ecological diversity;
4. to evaluate the values of the natural areas in the proposed Mokau coal mining area in the context of the ecological district - subject of a separate report to Mines Division, Ministry of Energy (Bayfield 1986).

Since completion of the survey changes in environmental administration have resulted in large areas of land, formerly State forests under control of the New Zealand Forest Service and unalienated Crown land, being allocated to the stewardship of the Department of Conservation. The report has been updated to take note of these changes.

It is hoped that this report will be used as an educational text and as a resource tool for strategic planning in land management.

Technical terms used are defined in Appendix VII.

2.0 SURVEY METHODOLOGY

The methodology used in this survey followed that described by Law et al. (1984), which has been published subsequently in slightly revised form by Myers et al. (1987).

Existing ecological information was gathered from both published and unpublished sources and an initial reconnaissance was carried out to gain a broad understanding of the natural history of the ecological district.

The district was subdivided into two land systems and three bioclimatic zones. The land system, bioclimatic zone, hydrologic class and vegetation structural class were combined to give a set of ecological classes which describe the broad ecological patterns of the district. The adequacy of protection of these classes was then assessed to indicate priorities for survey.

The district was then further subdivided into study areas including land of all tenure, that were manageable for field survey. Thirty six study areas were defined the boundaries of which followed natural features. As none of the ecological classes were sufficiently protected within the existing reserve network, study areas included any area that was characterised by indigenous species and/or dominated by natural processes. Landowners were contacted for permission for access onto their properties as the survey progressed. Study areas were surveyed consecutively, beginning in the north of the district and finishing in the south.

The field survey was carried out between November 1985 and May 1986. The number in the survey team ranged from two to four involving a total of five people, with two team leaders at different times.

Areas were surveyed using the rapid ecological survey technique (Myers et al., 1987) which involves sampling of a non-area plot which typifies the ecological unit. Comments on naturalness, condition and modifying factors were included. Vegetation types for all areas were mapped at a scale of 1:63360.

Details of fauna were noted for each study area, mostly from existing information but supplemented by observations of the survey team and by Janice Molloy (NZ Wildlife Service) working in the areas at the same time.

Field survey data were hand-sorted to give a set of broad vegetation types (Appendix I) which were then combined with the landform types to give ecological units.

The ecological units provided the framework for selecting natural areas to recommend for protection. If an ecological unit is not adequately represented in existing protected natural areas one or more of the best examples of this unit has been recommended for protection, mostly in conjunction with other adjoining ecological units that would make a viable reserve. The Recommended Areas for Protection were chosen after examination on the basis of size, shape, degree of modification, diversity, representativeness, the presence of rare or special features and buffering.

It must be emphasised that this report outlines recommendations for protecting natural areas on representative ecological grounds. There are other areas of ecological value in the district which should be considered for reserves for provision of other values (ie, scenic, recreational, historic, soil and water conservation) if the opportunity arises.

Given the rapid nature of the survey, it is impossible to find every locality of rare and endangered species such as Brachyglottis turneri or North Island kokako, and it is likely that some small but important natural area may have been overlooked (eg, an isolated, intact wetland). If such places are discovered subsequent to this report, they should be assessed for protection.

Vegetation maps of the district at a scale of 1:63360 and all field survey data cards are lodged at the New Plymouth Field Centre of the Department of Conservation.

Since completion of the survey unalienated Crown Land and State Forests have been protected under the stewardship provisions of the Conservation Act (1987). Accordingly, Recommended Areas for Protection in this report do not include areas under stewardship of the Department of Conservation. However, areas of stewardship identified with important representative and special natural values have been recommended for upgrading of protective status and these are described in Section 5.0.

3.0 CHARACTER OF DISTRICT

3.1 Definition of Boundaries

Simpson (1982) outlines the characteristics of the district as follows:

'Mainly very finely dissected, steep and broken Miocene sandstone and mudstone country, shelving overall westward, nearly all below 450 m ASL. Minor areas of elevated undissected remnants (eg, Waitaanga Plateau), and narrow valley floors near coast. Podocarp-hardwood forest with hard beech dominant on most of broken land (though absent in Waitara River catchment).'

The boundaries of the district are shown in Figure 1. The boundaries between regions mark distinct changes in the landscape generally defined by geology, topography and vegetation, while the boundaries between districts of regions mark less distinct differences.

The northern boundary of the Taranaki Ecological Region coincides with the geological emergence of greywackes in the Tainui Ecological Region. The King Country Ecological Region to the north and east is characterised by broad river terraces with distinct changes in the vegetation - abundant podocarps and the virtual absence of hard beech. The Egmont Ecological Region to the west is defined by the volcanic landforms of the Taranaki volcanoes, commonly referred to as the Egmont Ring Plain.

The boundary between the two districts of the Taranaki Ecological Region - North Taranaki and Matemateaonga - is defined by two key factors. First, a major change in drainage aspect and secondly, the transition from the predominance of hard beech in the North Taranaki Ecological District to black beech in the Matemateaonga Ecological District.

3.2 Geology and Relief

Reference: Hay, 1967;
Ministry of Works and Development, 1979;
Neall, 1982;
Nicholls, 1956

The North Taranaki Ecological District includes two land systems - the highly dissected sedimentary hill country which comprises most of the district, and a narrow zone of uplifted marine terraces along the coastline (see Figure 2 - the geology of the district).

3.2.1 Dissected hill country

This land system is comprised of highly dissected upper Tertiary and lower Quaternary marine mudstones, sandstones and minor limestones that have been uplifted in Quaternary times (the last 1-2 million years) and are now gently tilted to the south-west. The mudstones and sandstones in the ecological district fall into six major groups - Matemateaonga Sandstone (grading into Tangahoe mudstone to the south), Urenui Siltstone, Mt Messenger Sandstone, Mohakatino Group, Mokau Group and small areas of Mahoenui Group to the north-east. The characteristics of these groups are all described by Hay, 1967.

Within the hill country small areas of different geological material which influence the habitat and vegetation are: alluvium; ash deposits; and occasional remnant Pleistocene deposits on ridge crests.

NORTH TARANAKI ECOLOGICAL DISTRICT LOCATION

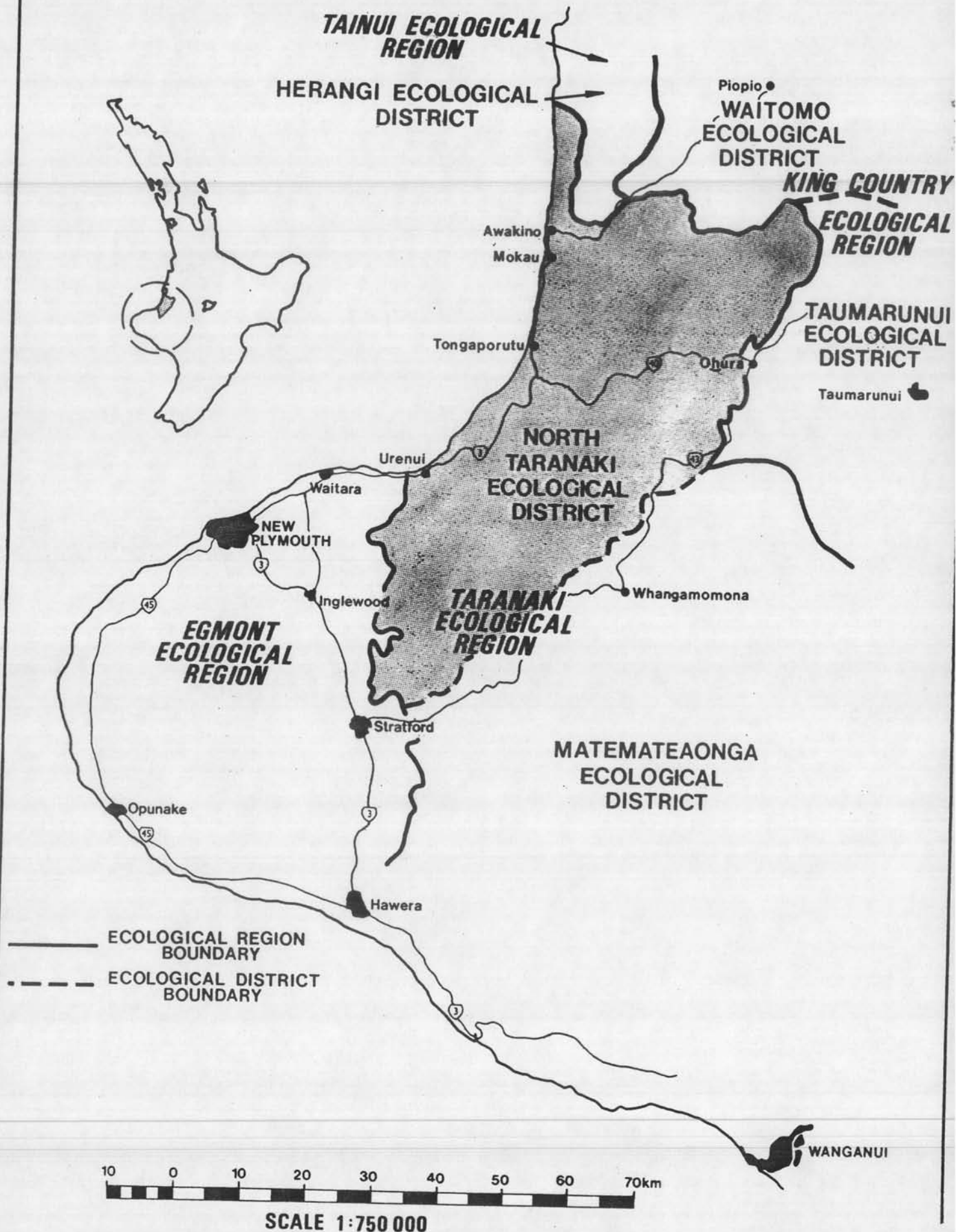
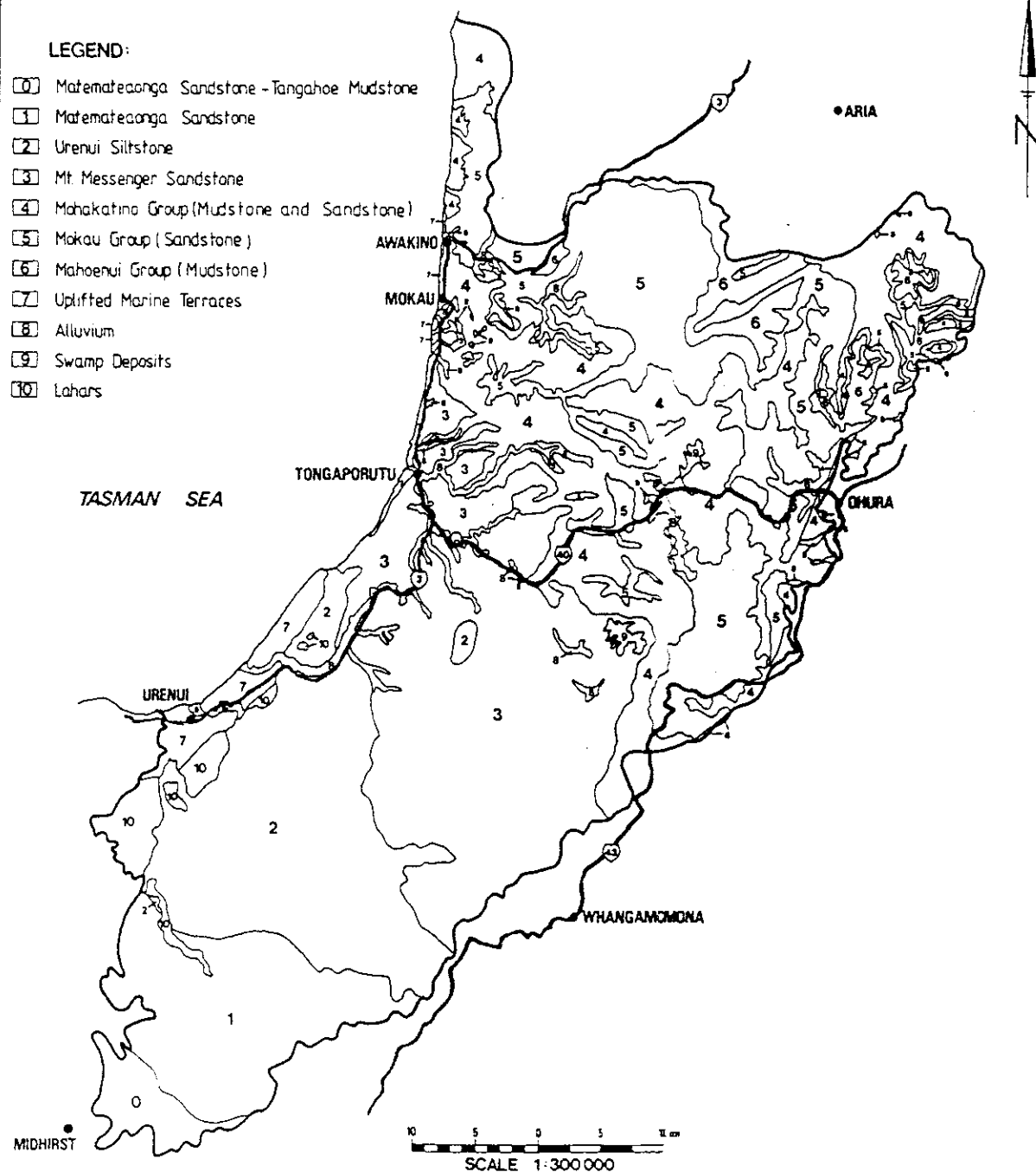


FIGURE 1

NORTH TARANAKI ECOLOGICAL DISTRICT GEOLOGY¹



¹ from Hay (1967)

FIGURE 2.

Alluvium deposits in the district are generally confined to a narrow border on a few of the larger rivers.

Ash deposits mostly derived from Mt Taranaki occur as far north as a line between Mokau and Ohura. North of this line they are derived from the central North Island volcanic centre (Mairoa ashes). Ash has been mostly eroded from the steep hillsides and has only influenced soil formation on the flat and easy country. In the gentler topography of the west and south-west of the district ash deposits have infilled valley bottoms and covered interfluvies with a protective cap.

The Mt Damper and Waitaanga Plateaux are perched basins.

The relief of the hill country is strongly dependent on the underlying geology. Active fluvial incision on these sedimentary rocks during late Pleistocene times has resulted in a highly dissected topography of narrow and steep-sided valleys with ridge systems remarkably uniform in height, gradually rising from an average of 230 metres near sea level to 500 metres inland. Streams are deeply entrenched and have no flood plain.

As the dissected hill country comprises most of the ecological district, the landform is consequently steep and very steep - over 80% of the district has slopes greater than 20°. Gently undulating to rolling land is mostly confined to dipslopes which occur predominantly in the Mokau Group sandstones where interbedded calcareous strata, conglomerates and coal measures are more resistant to erosion. A very small percentage of flat to undulating land occurs on alluvial deposits.

3.2.2 Uplifted marine terraces

Along the coast is a narrow zone of uplifted marine terraces of late Quaternary age which has been formed by successive high sea levels cutting near-planar surfaces across relatively soft late Cenozoic sediments. Upon each withdrawal of the sea, a relatively thin veneer of marine sands and gravels, sometimes containing marine fossil assemblages, was deposited immediately above each wave-cut surface. Between each high sea-level episode the land was slowly uplifted, carrying each marine bench above a level where it would be removed by a later marine planation episode. The result was the creation of an extensive sequence of marine terraces, each terrace becoming progressively higher and older as one moves inland. Each bench has a profound influence on the landscape, even though the marine beds are now buried beneath a thick succession of terrestrial cover beds (Neall, 1982).

Along the present coastline, cliffs ranging from 3 metres to 60 metres in height have formed from active wave-cutting into the underlying Quaternary, Pliocene, and Miocene marine strata. From Awakino to Tongaporutu, sand accumulation is concentrated near river mouths where estuaries have been formed in infilled valleys. All have sandy spits or sandy flats on the north side of the river mouths.

The Rapanui bench is the youngest preserved along the rugged North Taranaki coastline adjacent to the coastal cliffs. Its inland margin is marked by a fossil sea cliff (up to 12 metres high) where active marine cutting incised into the next oldest terrace - the Ngarino Terrace. This fossil sea cliff can be seen inland of State Highway 3 between Tongaporutu and Mohakatino. Along the southern part of the North Taranaki coastline from the Mimi River to Onaero River older terraces - the Ngarino and Brunswick - are preserved. Lignite beds, formed during the emergence of each bench, mark the transition from marine to terrestrial beds.

The upper surfaces of the terraces have been modified by the accumulation of coastal sands. These marine terraces comprise most of the flat to gently undulating land within the district. Uplifted marine terraces extend south to New Plymouth and also occur in the western part of the Manawatu Ecological Region between Hawera and Wanganui.

3.3 Soils

The predominant soils of North Taranaki are skeletal soils of the steep hillsides related to yellow-brown earths, which have developed on the mudstones, siltstones and sandstones of the dissected hill country. Because of the steepness of the slopes, these soils are relatively unstable and are periodically rejuvenated by erosion. Consequently, they are more strongly influenced by the nature of the parent rocks from which they are derived and are less modified by differences in climate and vegetation than older soils on easier slopes. For the most part, these soils are shallow, and under the native plant cover have fertile topsoils, but the subsoils vary in fertility according to the nature of the underlying rocks. Most of the soils from sandstone are thin with rather low natural fertility. Erosion slips are shallow and heal slowly. Deep gullies occur in those areas where the underlying sandstone is soft. Those soils developed on siltstone and mudstone have a slightly higher natural fertility and slips heal more readily.

The yellow-brown loams and related hill soils have developed from a parent material of fine-textured volcanic ash (Egmont ash in the south of the district and the Mairoa ashes in the north). These soils are generally very friable and have a medium degree of natural fertility.

On flat and easy rolling country they have been extensively developed for agriculture.

The secondary podzolic soils have formed from sediments relatively high in silica. They have a medium degree of natural fertility. Young and immature secondary podzolic soils developed from aeolian sand occur in a small area on the coast at Mokau and Awakino. These young soils are fixed by vegetation. The subsoils are loose and tend to be drought-prone.

Recent soils from alluvium are confined to the river flats and terraces where river sediments are periodically added to the land surface. They are generally deep mellow loams and lack differentiation into the normal horizons of older soils. Where drainage is adequate, the medium and fine-textured soils are highly fertile. Gravelly and sandy types are less fertile, and where drainage is poor, as on the low lying flats, many of the subsoils are grey and mottled.

Small areas of a meadow or gley soil occur on the Mt Damper and Waitaanga Plateaux. These high level basins receive a high rainfall and are subject to periodic flooding.

3.4 Climate

3.4.1 General

Situated on the western side of New Zealand, Taranaki is exposed to weather systems migrating over the Tasman Sea. The predominantly westerly air stream makes the Taranaki region one of the windiest in New Zealand. Occasional storms of both polar and tropical origin also affect the region. Surface winds are markedly influenced by local terrain effects. The steep and narrow valleys of the dissected hill country are sheltered, while the ridge crests are exposed.

The total duration of bright sunshine over most of the district is fairly uniform at about 2000 to 2100 hours per annum, although this is reduced in inland valleys which have a greater occurrence of fogs.

Temperature variation within the North Taranaki Ecological District is predominantly the result of a coastal to inland gradient. The north-western parts of the district experience the warmest temperatures, and the coolest temperatures occur in the south-east.

Most of the district has a high rainfall between 1600 and 2500mm per annum, with the coastal areas experiencing the lower rainfalls. Winter is the wettest season, while the driest month is either February or March.

3.4.2 Bioclimatic zones

The difference in climate between coastal and inland sites is reflected in the distribution of some plant species and therefore the composition and nature of the vegetation. For the purposes of this survey, the ecological district was divided into three broad zones on the basis of these differences (see Figure 3).

- (i) Coastal - that area generally within 1 km of the coastline where the vegetation is exposed to salt-laden winds and where temperatures are mild and relatively uniform, both diurnally and seasonally, compared with inland areas.
- (ii) Semi-coastal - extending from the coastal zone to approximately 5 km inland where kohekohe is an important component of the natural vegetation. Other species typical of this zone which are not found further inland include karaka and puriri. Around the inland boundary, relief and aspect play an important role in determining microclimate, to such a degree that a few small outlying areas of semicoastal forest occur within the lowland zone.
- (iii) Lowland - inland of the semicoastal zone and the major zone in the district. Tawa is the indicator species here forming the predominant forest type throughout inland Taranaki.

3.5 Hydrology

The rivers and streams of the North Taranaki Ecological District are all north-west to south-west flowing and commence in the steep inland hill country. They exemplify a dendritic drainage pattern. The larger rivers are characterised by meandering courses of deep slow-moving water, with their lower reaches dominated by tidal influences. The river beds contain substantial silt and mud deposits. The water is often naturally discoloured because of a high suspended sediment load which may continue for several days following heavy rain.

NORTH TARANAKI ECOLOGICAL DISTRICT BIOCLIMATIC ZONES

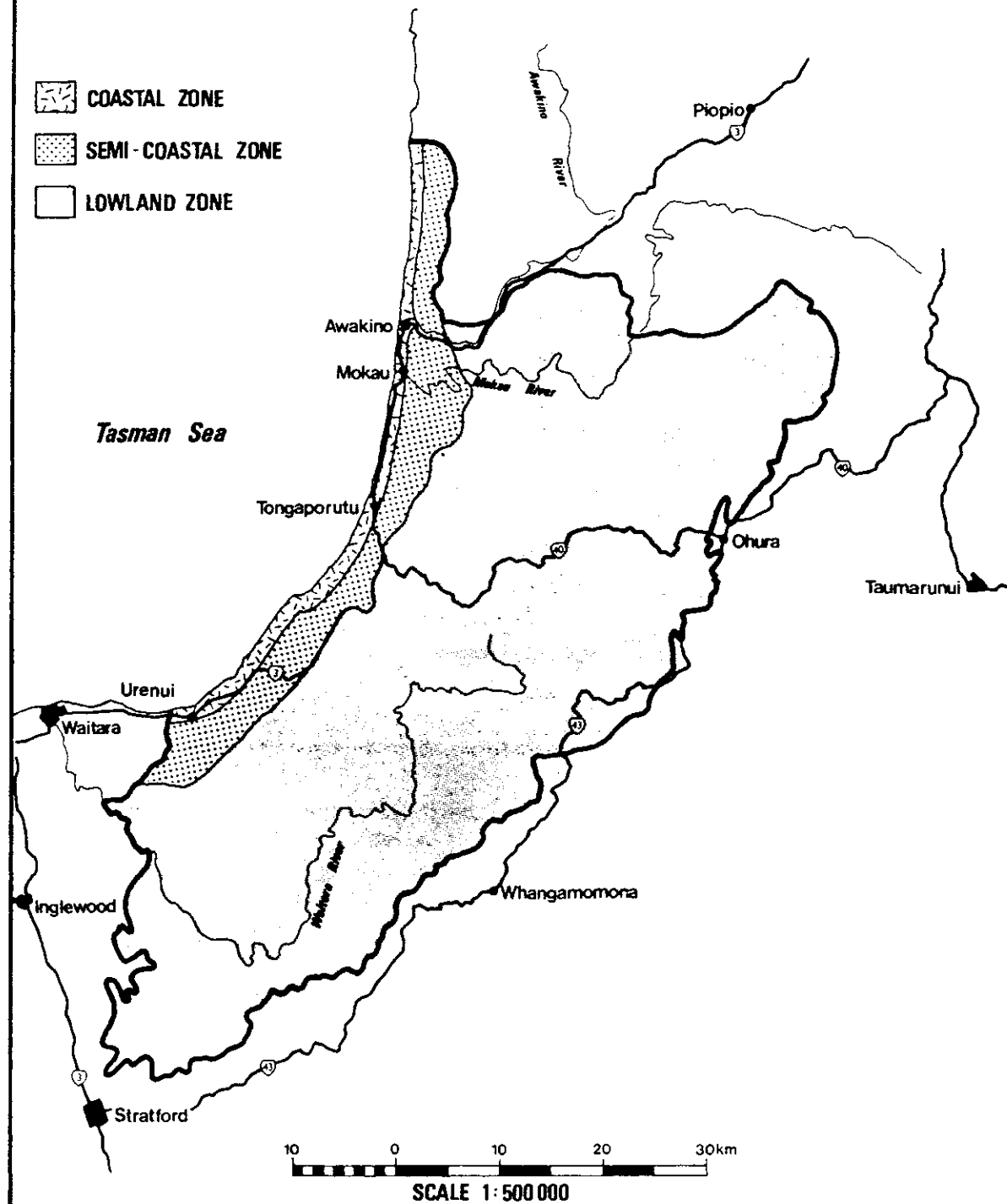


FIGURE 3.

3.6 Vegetation

3.6.1 Broad pattern

Coastal cliffs from 30 to 250 metres high are a feature of the North Taranaki coastline. They have a scattered vegetation of harakeke (Phormium tenax) and the shrubs taupata (Coprosma repens) and Hebe stricta var. macroura with herbs (eg, Samolus repens), Tetragonia trigyna, Disphyma australe scattered throughout. Olearia albida and occasional pohutukawa, houpara and karo are found north of Pukearuhe.

Estuaries of the Mohakatino River, Mokau River, Awakino River and a number of smaller streams have mud flats which carry wetland species. At Mokau there is a cabbage tree/manuka - marsh ribbonwood shrubland and at Mohakatino a flax-raupo-Cyperus ustulatus swamp.

In sheltered gullies and inland more than approximately 1 km the vegetation is forest with trees such as kohekohe, karaka, puriri, ngaio, pukatea, rewarewa and tawa forming a dense canopy. The relative abundance of these species varies according to such factors as distance from the coast, aspect, topography and soil types.

With increasing distance from the coast, a number of 'coastal' or 'semi-coastal' species disappear from the vegetation until at about 5 to 10 km inland the forest is a lowland type. Tawa predominates in the gullies and slopes, with occasional emergent rimu and northern rata. The relative abundance of canopy associates such as pukatea, hinau, kamahi and rewarewa is dependent mainly on topographically controlled factors. Kamahi replaces tawa as the canopy dominant on especially steep land. Canopy components with kamahi include northern rata, miro, mountain totara and tawheowheo. Tanekaha is occasionally present north of Moki Scenic Reserve.

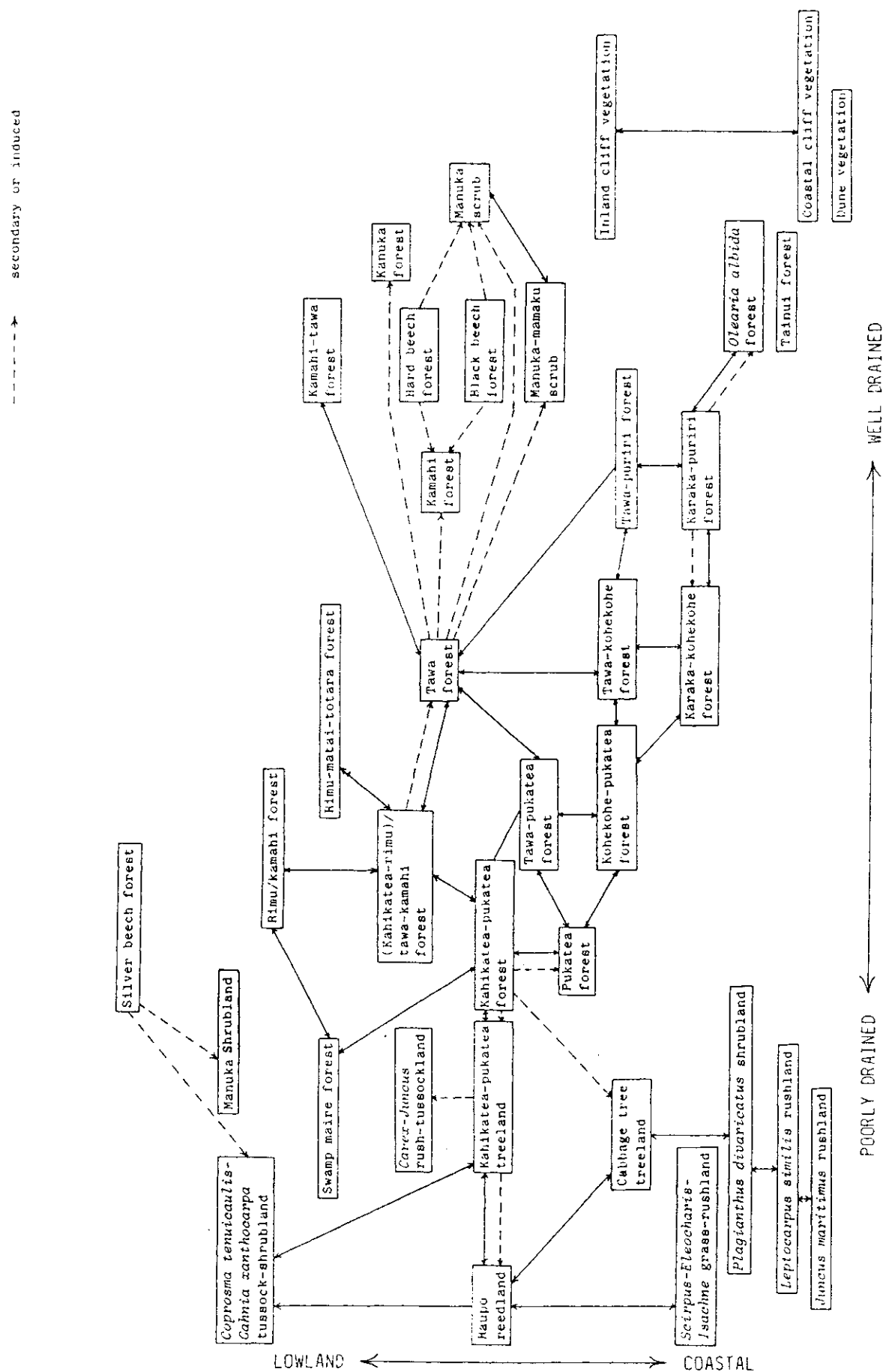
Many of the infertile sandstone ridges (excluding the Waitara catchment) carry hard or black beech forest. Hard beech forest is predominant north of 39°S latitude (Urenui) with black beech forests south of this line. Pockets of black beech, however, occur as far north as the Mokau River, with a notable outlier further north, at Waikawau. Where the two species occur together, there are sometimes hybrids.

The rich alluvial valley bottoms and flats generally contain tall conifer forest, mostly kahikatea with frequent pukatea and with black and narrow-leaved maires on the richest alluvial sites. Remnants of kahikatea forest also occur on the high-level, swampy Mt Damper Plateau.

Silver beech forest occurs in swampy depressions along the meandering Waitaanga Stream on the Waitaanga Plateau.

degree symbol

RELATIONSHIPS OF VEGETATION TYPES IN NORTH TAHANAKI



Descriptions of vegetation types for North Taranaki Ecological District are included in Appendix IV and their relationships are shown in Figure 4. A checklist of indigenous vascular plants of North Taranaki Ecological District is included in Appendix V and a list of common plant names used in the text, in Appendix VIII.

3.6.2 Threatened and Local Plants (for definitions see Appendix VII)

Desmoschoenus spiralis (pingao) is recorded by Given (1990) as having local status (ie, a species not at present threatened, but sufficiently restricted in distribution to warrant monitoring). This creeping sedge grows on coastal sandy sites, generally on dunes of lower profile than those occupied by marram grass (Ammophila arenaria) and spinifex (Spinifex sericeus). It is occasionally found on gravel substrates. At one time this species was probably common around most of the New Zealand coast wherever there was a suitable habitat. It is now restricted to scattered populations from North Cape to Stewart Island, its decline being due to the conversion of duneland to pasture and exotic forest and to competition from exotic dune plants such as marram grass. A small natural population of pingao occurs at the mouth of the Waipingau Stream in the Whitecliffs area.

Hebe speciosa (titirangi) - its greatest populations probably occur in North Taranaki where there are colonies along the coastal cliffs from Pukearuhe to Mokau. This species has been reduced in numbers by browsing animals and erosion of cliffs, and has been rated as vulnerable in Given (1990).

Hebe townsonii - of local status (Given 1990). Seems to prefer rocky bluffs of river gorges although it is also found under scrub on rocky ridges, generally on calcareous rock. It is found in north Westland and north-west Nelson and was reported from the Whitecliffs area in North Taranaki (Simpson, 1945) though it is not known to have been seen there for many years.

24 1, Pomaderris apetala (tainui) - is an endangered/ (Given 1990), coastal low-spreading tree presently known to occur naturally in New Zealand from only three colonies in North Taranaki. One is reserved and one in Department of Conservation stewardship. It is also found in Australia. The Maori of the Mokau district relate that the trees had originated from the flooring timbers of the Tainui canoe which was one of the canoes of the migration of the Maori people to New Zealand.

Marattia salicina (king fern) - is found throughout the south-west Pacific islands but in New Zealand is restricted to the northern half of the North Island and is described as rare in Given (1990). At one time it may have been quite widespread in deep ravines and on damp forest floors but is now seriously depleted due to destruction of habitat and the depredations of pigs and goats. This plant was a food to the Maori, and they may have dispersed it throughout some coastal areas. In North Taranaki it is known to inhabit a few scattered coastal and semi-coastal localities.

Brachyglottis turneri (a large herbaceous daisy) - has a local distribution (Given 1990). It grows on wet cliffs of the Wanganui River system and in the North Taranaki District is known from the Tangarakau Scenic Reserve (Bayfield et al., 1986), Mimi River Scenic Reserve (Clarkson and Boase 1982) and several other isolated localities.

Roripaa divaricata (a tall endemic cress) - of vulnerable status (Given 1990). Few recent mainland records, several on northern islands. Found near gas pipeline in Whitecliffs Forest in 1972 (Druce and Ogle 1972).

Corybas rivularis agg. "Short Tepals" - of vulnerable status (Given 1990). There are several records of this spider orchid in the District, and it is a common species on damp mudstone banks from near Stratford and eastwards across the Matemateaonga Ecological District. It is not regarded as a threatened species in the Taranaki Ecological Region.

Myosotis sp. [unnamed : M. petiolata var. pansa] - of local status (Given 1990). This endemic forget-me-not of shady areas in open forest and scrub near the coast has its southern-most record near Waipingau Stream, Whitecliffs (Druce and Ogle 1972), and occurs in scattered sites northwards to Karekare near Auckland.

Earina aestivalis (endangered), Dactylanthus taylorii (vulnerable), Melicytus angustifolius (local), and five mistletoe species Peraxilla colensoi (indeterminate), P. tetrapetala (indeterminate), Alepis flavida (indeterminate), Tupeia antarctica (local) and Ileostylus micranthus (local) may occur in the North Taranaki Ecological District but there have been no recent confirmed records.

3.6.3 Species with distributional limits within North Taranaki Ecological District

<i>Blechnum fraseri</i>	SL for NI	38° 40'	North of Mokau River (Bayfield)
<i>Dracophyllum latifolium</i>	SL for Western NZ	38° 50' 30"	South of Tongaporutu (Ogle)
* <i>Hebe speciosa</i> ¹	SL for NI		South of Pukearuhe (Druce)
<i>Hebe townsonii</i>	NL for NZ	38° 55'	Mt Messenger (Green)
<i>Litsea calicaris</i>	SL for NZ	38° 59'	Uruti SR (Clarkson & Boase)
<i>Lycopodium deuterodensum</i>	SL for NI	39° 05'	Pouiatua Trig No. 2
<i>Metrosideros carminea</i>	SL for NZ	39° 00'	Onaero SR (Clarkson & Boase)
* <i>Metrosideros excelsa</i>	SL for NZ		South of Pukearuhe (Druce)
<i>Olearia albida</i> s.s.	SL for NZ		South of Pukearuhe (Druce)
<i>Phyllocladus glaucus</i>	SL for western NZ	38° 40'	Mt Manganui (Awakino) (Clarkson and Boase)
* <i>Pittosporum crassifolium</i>	SL for NZ		South of Pukearuhe (Druce)
<i>Pomaderris apetala</i>	NL and SL for NZ	38° 44'	North of Mokau River; Mohakatino River mouth.
* <i>Pseudopanax lessonii</i>	SL for NZ	38° 45'	(Druce)
<i>Schoenus tendo</i>	SL for NZ		Waipingau Stream
<u><i>Alepis flavida</i></u>	NL for NZ	38° 50'	Waitaanga - Reported by Thompson (1979).

Avicennia marina var. *resinifera* SL for NZ 38° 40' Recorded at Awakino in 1979 (H Wellman pers. comm.) but no longer survives. Specimen planted at Mohakatino River.

SL Southern limit

NL Northern limit

NI North Island

* naturalised further south.

1 occurred at Wellington last century, now extinct there.

3.7 Fauna

3.7.1 Information Sources

Information on fauna is mainly from data of the Fauna Survey Unit of the Wildlife Service (1980), DSIR, and Fisheries Research, MAF. The Protected Natural Areas Programme survey provided a good opportunity to complement this information by recording data of regionally and nationally important species encountered in the field. Data from other surveys carried out with respect to the proposed Mokau coalfield development have also been incorporated.

A checklist of vertebrate fauna of the North Taranaki Ecological District, their habitat and abundance is included in Appendix IV.

3.7.2 Birds

All the common indigenous and introduced bird species of the North Island are present in the district.

Indigenous bird species that occur in the district which are endangered, threatened nationally (Bell 1986), or are uncommon in their district are listed below.

Endangered Nationally

- North Island Kokako. Populations recorded at Waitaanga, Moki, and Makino represent the most southern extant populations known.

Threatened Nationally

- NZ falcon. Reported in several locations within the district.
- North Island kaka. Scattered distribution in large forest tracts. In North Taranaki it has been recorded in forests adjoining the Mokau River, Waitaanga and Moki.
- North Island brown kiwi. Taranaki is one of the three remaining strongholds of this species.
- Blue duck. No recent records in the district, but there may still be small numbers present in isolated areas.
- Australasian bittern. A few records in North Taranaki around the Mohakatino-Mokau area.

Uncommon in North Taranaki Ecological District

- North Island fernbird, known from only a small number of sites in this district.
- Spotless crane. Found in a few small raupo wetlands.
- Grey-faced petrel - Cliffs at Pukearuhe are near the southern limit for breeding in New Zealand (southernmost breeding is near Sugar Loaf at New Plymouth).
- Yellow-crowned parakeet. Extremely rare in this district. Occasional records from the larger forest tracts.

The northern limit of distribution of the North Island robin for the western North Island is at the northern boundary of the ecological district.

3.7.3 Bats

There have been a number of bat sightings in the North Taranaki Ecological District, some of which were not identified to species level.

There has been a single record of the lesser short-tailed bat (Mystacina tuberculata tuberculata) in North Taranaki on the Waitaanga Plateau (1974). This bat is a threatened species (Bell, 1986).

Unidentified species records of bats (likely to be long-tailed bats - also threatened) include areas around Kohuratahi, Tahora, Te Wera, Uruti, Mt Messenger and the Makino, Moki and Waimarino Stewardship areas. The distribution of both the lesser short-tailed bat and the long-tailed bat may be more widespread in the forests of North Taranaki as the area has yet to be adequately surveyed.

3.7.4 Lizards

The striped skink, Leiopisma striatum is described by Gill (1986) as endangered. It is possibly scattered throughout North Taranaki as it has been recorded at Uruti, Waitaanga and Ohura, and also several places just outside the district. This species is arboreal, therefore difficult to detect and may well be more common than existing records indicate.

Other skinks in the district probably include Cyclodina aenea and C. ornata, and possibly L. zelandicum and L. nigriplantare. Geckos probably include Hoplodactylus maculatus, H. pacificus, H. granulatus and Naultinus elegans. (B Thomas, Ecology Division, DSIR, pers. comm.)

3.7.5 Terrestrial invertebrates

Dr K J Fox, Manaia, (pers. comm.) made collections of terrestrial invertebrates from the following locations: mouths of the Mokau and Awakino rivers, scenic reserves on the right bank of the Mokau River which are accessible by car, Tainui Scenic Reserve, Mt Messenger, Waitaanga Saddle, N G Tucker and Mangaroa Scenic Reserves, Awahou Scenic Reserve, Whangamomona and Tangarakau Gorge. Collections have also been made by scientists from the Entomology Division of DSIR at various locations, mostly restricted to areas adjoining main highways. Dr Frank Climo, of the National Museum, has studied land snails in this district, also from collections adjacent to main highways. A number of important features of the terrestrial invertebrates in the North Taranaki Ecological District are highlighted.

Tongaporutu marks the (so far known) southern limit of the micropterigid moth Sabatirica demissa Philpott. A related micropterigid, Sabatirica lucilia Clark, has its southernmost limit at the Mokau River mouth; and Sabatirica zonodoxa Meyrick has not been found south of the northern flanks of Mt Messenger (JS Dugdale, Entomology Division, DSIR, pers. comm.)

The patch of tainui forest at Mokau (Tainui Scenic Reserve) is of great interest as it is the only place where the bupestrid beetle Neocuria eremita is abundant.

Mt Messenger is the type locality for two species of osoriine beetles, Paratorchus hermes and P. microphthalmus. The former has a very restricted distribution, being recorded only from Mt Messenger, Bushy Park (Wanganui) and NW Nelson. P. microphthalmus is widespread in the South Island, but occurs only in Taranaki in the North Island. Seven species of osoriine beetles occur at Mt Messenger, more than at any other locality. (Dr H P McColl, Entomology Division, DSIR, pers. comm.) The scarab beetle Odontria velutina is known only from Mt Messenger (Dr K J Fox, pers. comm.)

The forest ringlet butterfly (Dodonidia helmsii) is recorded from the Mokau area and Waitaanga Plateau (Dr K J Fox, pers. comm.) This species has a sporadic distribution over the rest of the North Island, and NW Nelson, and is often associated with beech forest.

The only North Island record of a small, but striking Apionine weevil which galls silver beech twigs is from Waitaanga Plateau.

An unnamed giant weta, Deinacrida sp., an endangered species has been found just outside the ecological district at Mahoenui and Otangiwai. This species would have been more widespread before the introduction of mammalian predators and it is still possible that it may occur in the north of this district.

3.7.6 Freshwater fauna

Source: Fisheries Research Division, Ministry of Agriculture and Fisheries

Twelve fish species were recorded as a result of sample netting at 16 sites in a total of eight catchments. They are: lamprey, short-finned eel, long-finned eel, giant kokopu, koaro, banded kokopu, short-jawed kokopu, red-finned bully, torrent fish, koura (freshwater crayfish), yellow-eyed mullet and brown trout (adventive).

The giant kokopu and short-jawed kokopu both have indeterminate status (Williams and Given, 1981), ie, they are thought to be endangered, vulnerable or rare but there are too few data to determine which category.

The rivers of North Taranaki, particularly the Mokau River, are well-known fisheries for whitebait (Galaxias spp.). A survey conducted by the Taranaki Catchment Commission in 1981 reports that the Mokau, Tongaporutu and Waitara Rivers are the most important whitebait fisheries in Taranaki, while the Mokau has the reputation for being the most productive. The vegetated banks of the Mokau, Tongaporutu, Onaero and Waitara rivers offer the most potential for locating inanga spawning areas.

Data on freshwater invertebrates have been collected in the Mokau and Awakino Catchments (Stark and Stark 1986, Hayes et al. 1989, Hanchett and Hayes in press).

3.7.7 Introduced mammals

Introduced mammals found in the North Taranaki Ecological District are listed in Appendix VI, including the following species:

- brush-tailed possum, ship rat, Norwegian rat, mouse, goat, stoat, weasel, ferret, rabbit, hare, hedgehog, sheep, cattle, pig, cat and, rarely, red deer.

Of these animals, possums and goats are the most abundant, having a marked detrimental effect on most natural areas.

Pigs are common, particularly in the north of the district. The ship rat, stoat and weasel are also common, and are probably affecting bird populations throughout the district. Where natural areas are unfenced and adjoining farmland, sheep and cattle often cause serious damage by grazing and trampling, although generally they do not penetrate very far into larger tracts of forest.

4.0 EXISTING PROTECTED NATURAL AREAS

Existing protected natural areas (ie, scenic and allied reserves, conservation covenants, forest sanctuaries, and stewardship lands) in North Taranaki Ecological District are listed and mapped in Tables 1 and 2 and Figures 5A and 5B; Appendix I provides further relevant details including name, size, grid reference, bioclimatic zone, landform and vegetation types of each protected area.

Stewardship areas are shown separately as they do not have full reserve status. However, these areas are currently managed by the Department of Conservation in accordance with the stewardship provisions of the Conservation Act 1987, which gives a considerable degree of protection.

Table 3 shows the percentage of each land system and bioclimatic zone which is currently protected (including stewardship areas). Kelly (1980) suggests that a minimum of 10% of the original area of each habitat class should be preserved to adequately represent the natural character of a district. Table 3 shows that 21.2% of the total district is protected, but that coastal and semi-coastal zones are under-represented. Further analysis of the ecological units within protected areas (Appendix I) shows that, as would be expected, the flat fertile areas of the district have generally been developed and the steep hillsides remain in native vegetation. The majority of protected areas are land not suited for agriculture. Thus, while there is already a significant proportion of the district in protected areas, it is not fully representative of the region's ecological diversity.

There are so few natural areas left on the uplifted marine terrace that there is very little opportunity for further reservation. Within the dissected hill country, however, it is still possible to protect significant ecological units which are as yet under-represented in the reserve system such as vegetation on dipslopes (eg, Mangaawakino), and alluvial terraces (eg, upper Waitara River, Mangaone and Totara Streams).

Table 1:

**EXISTING PROTECTED NATURAL AREAS OF NORTH TARANAKI
ECOLOGICAL DISTRICT - SCENIC AND ALLIED RESERVES**

<u>Uplifted Hill Country</u>		<u>Department of Conservation</u> <u>Scenic Reserve Number</u>
5	Kawau Pa Historic Reserve	(14A)
24	Pukearuhe Scenic Reserve	(47)
25	Mimi Scenic Reserve	(47A)
 <u>Dissected Hill Country</u>		
1	Huikomako Scenic Reserve (part only)	(295*)
2	Awakino Scenic Reserve	(294*)
3	Tainui Scenic Reserve	(111A*)
4	Arorangi Scenic Reserve	(111*)
6	Mokau River Scenic Reserve complex	(14,112*)
7	Puketehi Scenic Reserve	(5A)
8	Waitaka Scenic Reserve	(11)
9	Hapu Scenic Reserve	(12)
10	Pura Scenic Reserve	(13)
11	Waikaka Scenic Reserve	(19)
12	Piki Scenic Reserve	(22)
13	Mangaroa Scenic Reserve	(23)
14	N G Tucker Scenic Reserve	(23A)
15	Waiaraia Scenic Reserve	(38)
16	Kotare Scenic Reserve	(40)
17	Okau Scenic Reserve	(110)
18	Mataru Scenic Reserve	(112)
19	Mangapapa Scenic Reserve	(111)
20	Tangarakau Scenic Reserve	(37)
21	Tahora Scenic Reserve	(37A)
22	Pou Tehia Historic Reserve	(45A)
23	Mount Messenger Scenic Reserve	(45)
26	Moki Scenic Reserve	(44)
27	Miro Scenic Reserve	(43)
28	Mironui Scenic Reserve	(42)
29	Uruti Scenic Reserve	(43A)
30	Okoki Pa Scenic and Historic Reserve	(48)
31	Pehu Scenic Reserve	(70)
32	Mangare Scenic Reserve	(72)
33	Mangapaka Scenic Reserve	(105)
34	Wills' Conservation Covenant	(WCC)
35	Purangi Scenic Reserve	(71)
36	Magnus Forbes Scenic Reserve	(101)
37	Oapui Forest Sanctuary	(ODS)

NORTH TARANAKI ECOLOGICAL DISTRICT EXISTING PROTECTED NATURAL AREAS SCENIC AND ALLIED RESERVES

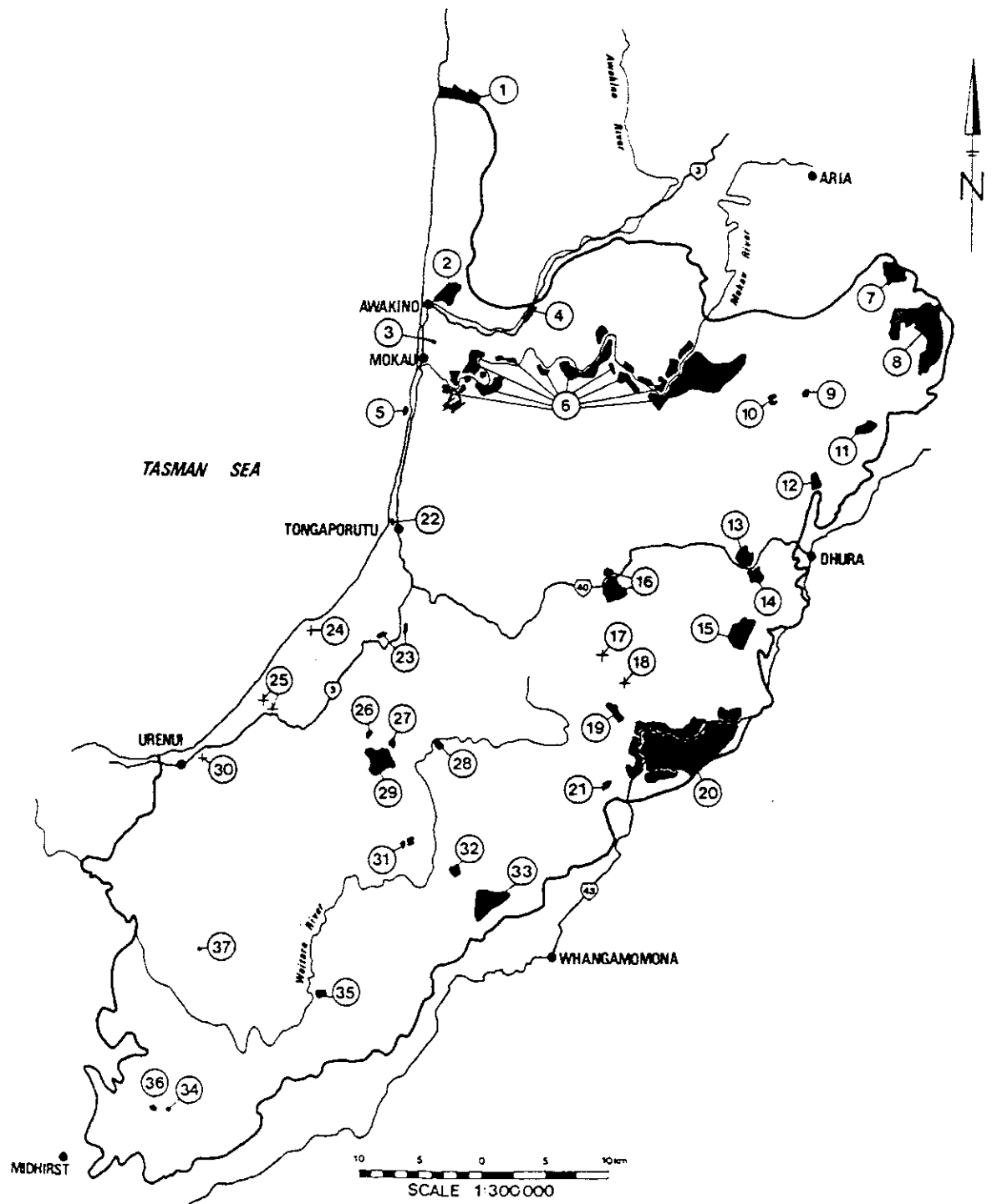


FIGURE 5A

Table 2:

**EXISTING PROTECTED NATURAL AREAS OF NORTH TARANAKI
ECOLOGICAL DISTRICT - STEWARDSHIP AREAS**

1	Mohakatino Swamp
2	Addition Mokau Scenic Reserve 1
3	Addition Mokau Scenic Reserve 2
4	Mokau Riverbank
5	Purupuru
6	Panirau
7	Waitewhena
8	Tongaporutu
9	Hutiwai-Mohakatino-Mt Roa
10	Waitaanga
11	Mangakara
12	Kara
13	Whitecliffs
14	Uruti
15	Mt Messenger
16	Papakino
17	Moki Slopes
18	Rata
19	Makino-Moki
20	Rerekino
21	Okoki
22	Pouiatoa
23	Taramouku
24	Matau
25	Mangaone
26	Marco
27	Matirangi
28	Matau 2
29	Matau 3
30	Tarata
31	Tuihu
32	Autawa
33	Douglas North
34	Huiroa
35	Mahoenui

NORTH TARANAKI ECOLOGICAL DISTRICT EXISTING PROTECTED NATURAL AREAS STEWARDSHIP AREAS

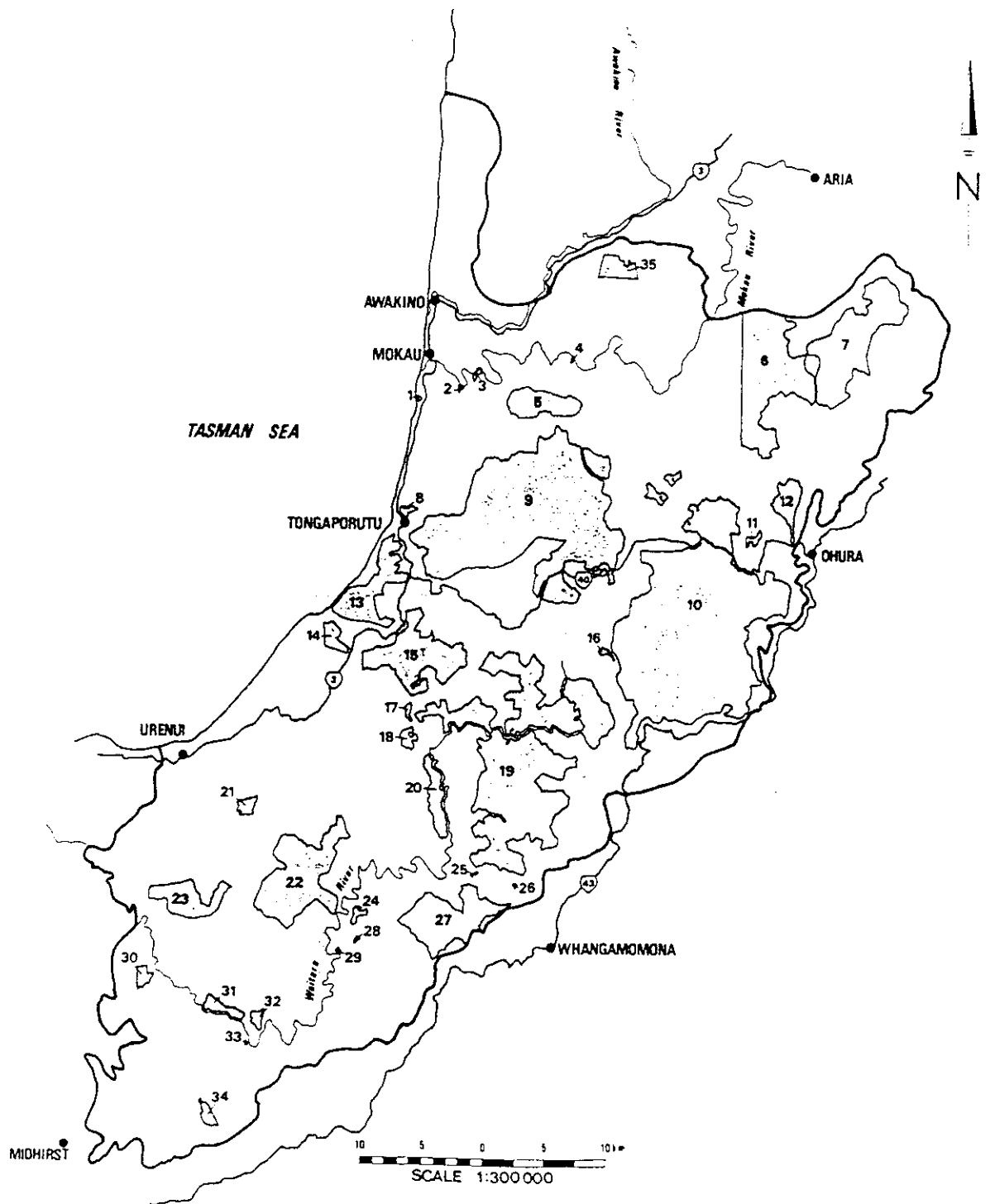


FIGURE 5B

Table 3:

TOTAL AREA PROTECTED OF BIOCLIMATIC ZONES AND LAND SYSTEMS IN NORTH ECOLOGICAL DISTRICT

	<u>UPLIFTED MARINE TERRACE</u>		<u>DISSECTED HILL COUNTRY</u>		<u>DISTRICT TOTAL</u>	
COASTAL	<u>Total Area (ha)</u>	<u>Area Protected (ha)</u>	<u>Total Area (ha)</u>	<u>Area Protected (ha)</u>	<u>Total Area (ha)</u>	<u>Area Protected (ha)</u>
	3,134ha (1.2%)	Reserves Only 4.4ha (0.1%)	3,762ha (1.4%)	Reserves Only 28.9ha (0.8%)	6,860ha (2.6%)	Reserves Only 33.3ha (0.5%)
		Including Stewardship Areas 4.4ha (0.1%)		Including Stewardship Areas 386ha (10.3%)		Including Stewardship Areas 390ha (5.7%)
SEMI-COASTAL	<u>Total Area (ha)</u>	<u>Area Protected (ha)</u>	<u>Total Area (ha)</u>	<u>Area Protected (ha)</u>	<u>Total Area (ha)</u>	<u>Area Protected (ha)</u>
	2,611ha (1.0%)	Reserves Only 9.0ha (0.3%)	24,111ha (9.3%)	Reserves Only 1,019ha (0.04%)	26,722ha (10.3%)	Reserves Only 1,028ha (3.8%)
		Including Stewardship Areas 9.0ha (0.3%)		Including Stewardship Areas 2,008ha (8.3%)		Including Stewardship Areas 1,762ha (6.6%)
LOWLAND	<u>Total Area (ha)</u>	<u>Area Protected (ha)</u>	<u>Total Area (ha)</u>	<u>Area Protected (ha)</u>	<u>Total Area (ha)</u>	<u>Area Protected (ha)</u>
	0 ha	Reserves Only -	226,168ha (87.1%)	Reserves Only 8178.2ha (0.04%)	226,168ha (87.1%)	Reserves Only 8,178.2ha (0.04%)
		Including Stewardship Areas -		Including Stewardship Areas 54,097ha (23.9%)		Including Stewardship Areas 54,097ha (23.9%)

TOTAL DISTRICT	<u>Total Area</u> <u>(ha)</u>	<u>Area Pro-</u> <u>ected (ha)</u>	<u>Total Area</u> <u>(ha)</u>	<u>Area Pro-</u> <u>ected (ha)</u>	<u>Total Area</u> <u>(ha)</u>	<u>Area Pro-</u> <u>ected (ha)</u>
		Reserves Only		Reserves Only		Reserves Only
	5,745ha (2.2%)	13.4ha (0.2%)	254,005ha (97.8%)	9,226.1ha (3.6%)	259,750ha (100%)	9,239.5ha (3.6%)
		Including Stewardship Areas		Including Stewardship Areas		Including Stewardship Areas
		13.4ha (0.2%)		55,161ha (21.7%)		55,174ha (21.2%)

5.0 STEWARDSHIP AREAS RECOMMENDED FOR UPGRADING OF PROTECTIVE STATUS

Areas within stewardship lands recommended for upgrading of protective status to reflect their biological importance are listed in Table 4 and shown in Figure 6A. These areas are described in the following pages, with details of vegetation types and areas included in Appendix 1.

While, in some cases, an entire stewardship area does not have high biological importance, boundaries for upgrading of protective status have not been totally defined in this report to allow for consideration of other values i.e. scenic, recreational, historic, soil and water conservation, and costs (survey, fencing). However, some marginal areas of lesser biological value may be useful in consideration of land exchange for a Recommended Area for Protection on private land.

Table 4:

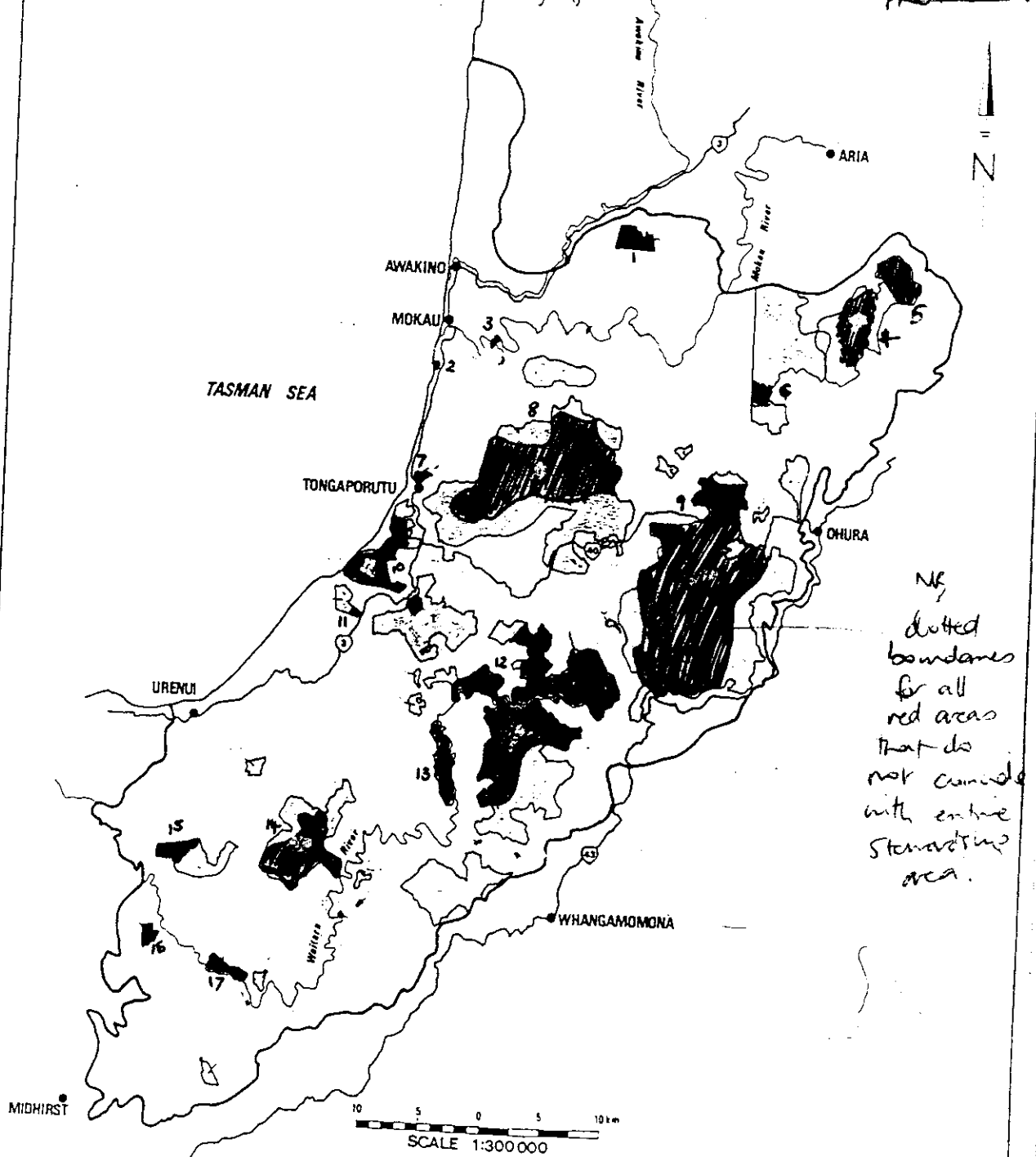
STEWARDSHIP AREAS IN NORTH TARANAKI RECOMMENDED FOR UPGRADING OF PROTECTION

1. Mahoenui
2. Mohakatino Swamp
3. Kahikatea Bend
4. Waitewhena A
5. Waitewhena B
6. Panirau
7. Tongaporutu
8. Hutiwai-Mohakatino
9. Waitaanga
10. Whitecliffs - Mt Messenger
11. Uruti
12. Moki-Makino
13. Rerekino
14. Pouiatua
15. Taramoukou
16. Tarata
17. Tuihu

NORTH TARANAKI ECOLOGICAL DISTRICT EXISTING PROTECTED NATURAL AREAS STEWARDSHIP AREAS

Recommended for Upgrading of Protective Status

~~REQUIRE~~
~~GREATER~~
~~PROTECTION~~



6A
FIGURE 6A

1. MAHOENUI

Grid Reference N91 330445

Description

Mainly primary forest on dipslopes and steep ridges.

Features

- A large dipslope with primary forest containing an exceptionally high occurrence of emergent rimu (Rimu/kamahi forest).
- High wildlife values : kiwi, falcon, kaka and long-tailed bat are present.
- The northern limit of the North Island robin for the west coast of the North Island (O'Donnell 1983; Bull et al., 1985).

2. MOHAKATINO SWAMP

Grid Reference N91 154321

Description

An extensive wetland on a broad alluvial terrace north of the Mohakatino river mouth, backed by a steep hillslope of secondary coastal forest.

Features

- Coastal wetland in excellent condition, dominated by a mosaic of harakeke, raupo, Cyperus ustulatus and Isolepis prolifer.
- Spotless crane and Australasian bittern, both uncommon in the district.
- Karaka - dominant forest with coastal associates including tainui, an endangered species (Wilson and Given, 1989) which is at its southern limit here.

Comment

Previously recommended for protection (Clarkson et al., 1981).

3. KAHIKATEA BEND

Grid Reference N91 207347

Description

Secondary alluvial forest and adjoining semi coastal hillslope forest on a broad bend on the south bank of the Mokau River, and connecting Mokau River Scenic Reserves 3 and 4.

Features

- The largest remaining area of kahikatea - dominant forest in the district. Although it is secondary, it is excellent condition and has a high species diversity.
- Semi coastal tawa-karaka-nikau forest.
- Connects two scenic reserves, providing a continuous riparian strip.

Comment

Previously recommended for protection (Clarkson et al., 1981).

4. WAITEWHENA A

Grid Reference N91 525375

Description

A large area of primary hard beech - dominant forest on dissected, sandstone hill country around the headwaters of the Waitewhena Stream.

Features

An outlier of extensive pure hard beech forest, being the north-eastern most in the district, and part of a northeast-southwest trending series of pure hard beech forests centred behind Tongaporutu, and around the headwaters of Hutuwai, Mangaore, Mohakatino and Tikoputa respectively. This type contrasts markedly with the adjacent tawa - and kamahi - dominant forests on the sandstones and mudstones of the Waitewhena and Mokau catchments.

5. WAITEWHENA B

Grid Reference N91 570420

Description

An area of primary, secondary and induced forest straddling the watershed between the Mokau and Wanganui catchment, being the north-eastern most forest in the district.

Features

- A series of palustrine forest types on a broad alluvial terrace which includes primary kahikatea forest, and one of four known occurrences of swamp maire - dominant forest in the district (none of which are presently reserved). Both kahikatea and swamp maire forests, which were once common on the poorly drained alluvial terraces throughout the district, are now very rare. Only fragmented, mainly secondary forests of these types remain.
- Well-drained, induced tanekaha-dominant forest with a distinctive assemblage of associates including Olearia townsonii (which occurs only on cliffs elsewhere), Gaultheria paniculata, Lepidosperma australe, Lycopodium deuterodensum and Schoenus tendo. This type is not known elsewhere in the district.
- Secondary, podocarp-rich forest (matai, miro, tanekaha, rimu), along Pirere Stream; a rare forest type in the district.
- Connects Mangatehi and Waitaka Scenic Reserves

6. **PANIRAU** *Grid Reference N91 455315*
- Description**
- Primary forest on part of a series of dipslopes and steep hillslopes above the Mangamamaku Stream (tributary of the Mokau River).
- Features**
- A complex of dipslopes and steeply incised gullies supporting a mosaic of vegetation types (of lesser extent and lower biological value than those in Recommended Area For Protection 7: Mangaawakino).
7. **TONGAPORUTU** *Grid Reference N100 143222*
- Description and Features**
- A small catchment of vigorously regenerating secondary coastal and semi-coastal forest and scrub adjoining the Tongaporutu River and Pou Tehia Scenic Reserve.
8. **HUTIWAI-MOHAKATINO** *Grid Reference N100 230220*
- Description**
- Large forested area incorporating most of the hillslope forests and alluvial terrace vegetation of the Hutiwai Catchment, Mangaone Stream and middle reaches of the Mohakatino River.
- Catchment covering almost all the altitudinal range of North Taranaki hill country.
 - Extensive tracts of hard beech and tawa forests, these being representative types of much of the district.
 - The mosaic of hard beech and tawa in the lower third of the catchment is the most extensive in the district.
 - The largest area of primary alluvial terrace vegetation in North Taranaki comprising a mosaic of palustrine forest, treeland, scrub and tussockland, including one of four known areas of forest remaining in the district where swamp maire is an important component.
 - Small stands of very large, mature kanuka, rare elsewhere in the district,.
 - Intact catchment of mangaone stream, of pure hard beech forest surrounding a riparin tongue of podocarp rich pukatea/kamahi-tawa forest.
 - Part of continuous tract of forest from near the coast to the Waitaanga Plateau.
- Proposed as a Scientific Reserve (Nicholls 1980).

9. WAITAANGA

Grid Reference N100 400135

Description

Large area of mainly primary hill country forest stretching from the Waitaanga plateau down to the Tangarakau River gorge, encompassing the Waitaanga and Mataru Streams and the headwaters of the Tangarakau River and Huhatahi Stream.

Features

- An extensive area of silver beech-dominant forest on broad interfluves and alluvial terraces of Waitaanga plateau. The Waitaanga silver beech is an isolated population - one of the few on the western side of the North Island - and appears to be a relic of a former, more widespread distribution in the Taranaki Region (McGlone 1980). In this respect it is regionally and nationally unique (Nicholls, 1968).
- A large tract of primary forest supporting a range of types representative of North Taranaki.
- Exceptional wildlife habitat, with a concentration of fauna which are rare both regionally and nationally.
 - (a) One of the largest populations of North Island kokako in the Taranaki - King Country regions comprising at least 15 birds mainly in the northern part of the area of primary forest with a high density of rimu emergent over tawa (O'Donnell, 1982).
 - (b) The only known population of short-tailed bats in the district (Fauna Survey Unit).
 - (c) High numbers of fernbird in a manuka/sphagnum moss-shrubland bog unique to the district.
 - (d) Kaka, falcon and kiwi present.
 - (e) The endangered (Gill, 1986) forest skink (Leiopisma striatum) is recorded here (B Thomas, pers. comm.).
 - (f) The only known North Island locality of the gall-forming Apion weevil of silver beech forests (Dugdale, 1982).
 - (g) A number of other insects which are either (i) restricted to silver beech forests, (ii) nationally rare and/or (iii) at their distributional limits, occur here (Dugdale 1982; Fox pers. comm.).
- The only known location in the district of Callitriche petriei, Phymatosorus novae-zelandiae, and the mistletoes Alepis flavida (Priestly - Thompson, 1979), and Peraxilla tetrapetala. These mistletoes are now very rare in the North Island.
- Other species found here that are rare elsewhere in the district include Astelia grandis, Coprosma tenuifolia, C. colensoi, Brachyglottis kirkii (kohurangi), Pittosporum kirkii, Melicytus lanceolatus, mountain cabbage tree, Pseudopanax anomalus, P. laetus, pokaka, raukawa, sundew (Drosera binata), and tangle fern (Gleichenia microphylla).
- Primary alluvial kahikatea-rimu/tawa forest along Matau Stream and Tangarakau River.

- A good example of cliff and colluvial hillslope landforms and associated vegetation as a result of large-scale slumping.
- An extensive outlier of pure hard beech forest, more typical of the forests further north.
- Connects Tangarakau, NG Tucker, Mangaroa, Kotare, and Waiaraia Scenic Reserves.

Comments

- The silver beech forest area has been proposed as a scientific reserve (Nicholls, 1968).
- Kaka, falcon, kokako and bats all need large areas of unmodified forest for long term survival.
- Blue duck are possibly present in the upper Tangarakau River.
- The area has a high recreation potential.
- The stands/areas of pine forest along Waitaanga Road have been excluded.

10. WHITECLIFFS - MT MESSENGER

Grid Reference N100 110137
N100 120181

Description

A large tract of mainly primary forest centred around the Waipingau Stream catchment, and stretching over three bioclimatic zones from the Whitecliffs coastal escarpment to the remnant dipslopes at the headwaters of the Mimi River.

Features

- A continuous forest sequence through coastal, semi-coastal and lowland bioclimatic zones.
- The best remaining example of primary coastal hardwood and podocarp-hardwood forests on the west coast of the North Island (Nicholls, 1980). Puriri, karaka and tawa are the dominant species with occasional rimu, mangeao, kohekohe, hinau and rewarewa.
- Extensive coastal cliffs and associated vegetation.
- Dune system at the mouth of the Waipingau Stream supports the only population of pingao in the district - a nationally local species (Given 1990).
- The only North Island record of Hebe townsonii (Simpson 1945), a species otherwise restricted to north Westland and North West Nelson.
- Southern limit of the native forget-me-not, Myosotis petiolata var. pansa.

- A total of at least 40 other species either rare elsewhere in the district, or known in the district from this area only, including - Adiantum viridescens, Asplenium terrestre ssp. maritimum, Lindsaea viridis, king fern, Lastreopsis velutina, Gaultheria oppositifolia, Lophomyrtus obcordata, Pittosporum cornifolium, Parahebe catarractae spp. diffusa, Arthropodium candidum, Tetragonia tetragonioides.
- High entomological value, this area being -
 - (a) The type locality for a number of insects, including Odontria velutina, a sarab beetle endemic to Mt Messenger (Fox, pers. comm).
 - (b) The 'meeting zone' for insects with largely northern or southern distributions, consequently resulting in a very diverse insect fauna (McColl 1985, Dugdale, 1985).
 - (c) One of the few North Island localities for a group of otherwise South Island insects (McColl 1985).
- Secondary kahikatea-dominant forest on valley floors and tawa forest at the Mimi River headwaters.
- One of the few remaining forested dipslopes of the Kotare-Okau-Mimi dipslope system.
- Surrounds part of Mount Messenger Scenic Reserve.

Comments

- Waipingau catchment has been proposed as a Scientific Reserve (Nicholls, 1980).
- The New Plymouth - Auckland natural gas pipeline traverses the western part of this area.
- The Whitecliffs Walkway runs along the coastal boundary and gives this area a high recreational value.

11. URUTI

Grid Reference N99 095095

Description

A small wetland and surrounding hillslope on the margin of Mimi river alluvial terrace. Supports a secondary, but highly natural reed-shrubland with vigorous regeneration of kahikatea. Spotless crane, which are uncommon in the district, are present here (NZ Wildlife Service 1980).

12. MOKI - MAKINO

Grid Reference N100 240010

Description

A very large area of mainly primary forest on dissected hill country centred around the headwaters of the Waitara River and the Makino Stream Catchment (tributary of the Waitara River).

Features

- An extensive tract of rimu-rich tawa forest which provides habitat for four small populations of North Island kokako. These are probably the southernmost extant populations of kokako in the North Island (O'Donnell 1982) and numbers may be as high as those in Waitaanga Stewardship Area.
- Kaka, falcon and kiwi are present.
- Intact catchment of primary forest adjoining the Waitara river with an exceptional abundance of maire species (especially Nestegis cunninghamii and N. montana) and frequent kahikatea, matai, and rimu on the broad alluvial terraces of the Mairunui Stream and along the Waitaka River.

13. REREKINO

Grid Reference N110 175965

Description

A riparian strip of largely primary forest on the western side of the south flowing middle reaches of the Waitara river.

Features

- Tawa-kamahi-hinau forest with an exceptionally high stocking of rimu. Miro and thin-barked totara are common on ridges, and rimu is a frequent emergent of the small enclaves of alluvial terrace forest adjoining the Waitara River.
- The eastern bank of the Waitara River here is one of the few known localities of Brachyglottis turneri, a herbaceous daisy restricted to the Taranaki and King Country Regions, and which is at present inadequately protected within reserves.
- Notable plants bordering the river include Ourisia macrophylla, Senecio rufiglandulosus, Anaphalis keriensis, and Euphrasia cuneata.

14. POUIATOA

Grid Reference N109 065865

Description

A large area of primary and induced forest types over a range of landforms, which encompasses the headwaters of the Urenui River and minor sub-catchments of the Waitara River.

Features

- Outlying occurrences of both black and hard beech forest representing the transition zones between the large tracts of hard beech forest further north, and the black beech forest of the Matemateaonga Ecological District further south.
- The largest concentration of black beech in the district, and one of the southernmost stands of hard beech in North Taranaki, marking the northern boundary of a hard beech 'gap' between Taranaki and the western foothills of the Tararua Ranges.
- Good representation of the Urenui Siltstone steepplands, and associated dry ridge forest type where tawa and rimu are secondary in importance to kamahi, hinau, rewarewa, miro and thin-barked totara. This type provides a marked contrast to the adjacent beech forest ridges.
- Well-advanced stands of induced kanuka forest, an uncommon forest type in the district, and rare on such a large scale. These stands are alongside an extensive tract of primary forest and are invaluable for monitoring succession and comparing other ecological processes.
- Pukatea-dominant forest and a semi-coastal outlier of tawa-kohekohe forest both on gentle dipslopes.
- Extensive cliff vegetation.
- The southern limit in the North Island of Lycopodium deuterodensum.

Comment

- Also proposed as a Scientific Reserve (Nicholls 1980).

15. TARAMOUKOU

Grid Reference N109 930876

Description

An area of largely primary forest adjoining the upper reaches of the Onaero River, and which includes a variety of landforms and associated vegetation types.

Features

- An out-lying semi-coastal area of pukatea- and kohekohe-dominant forest, with frequent emergent rimu, and abundant nikau and kawakawa in the understorey, on a broad, flat, radially-drained interfluve. The kohekohe forest type is important in that most primary coastal and semi-coastal podocarp-hardwood forest is now nationally rare. Kohekohe-dominant forest is uncommon in the district, this being the most extensive remaining tract. The land form is also uncommon in the district, having been retained as a broad interfluve by an overlying, resistant bed of conglomerate. In contrast, fluvial erosion of the surrounding siltstones has resulted in a steep, highly dissected landscape.
- Small areas of mainly secondary pukatea forest with emergent khaikatea, on the alluvial flats of the Onaero River. These remnants have retained a high degree of naturalness as the river provides a natural buffer preventing stock access.
- A small enclave of primary kahikatea forest represents a type now very rare in North Taranaki.
- Fernbirds are present in the rush-tussockland swamp of the Upper Onaero River flats. They are rare in North Taranaki, this population being the furthest south and west in the district. (They are absent from the Taranaki ring plain).
- Notable species: *Botrychium biforme*, puriri near its southern limit (rare at this latitude and at this distance from the coast).

Comment

- Final definition of the southern boundary of this area should be dependant upon fernbird distribution through the tussockland of the Upper Onaero flats, the extent of which is yet unknown.

16. **TARATA**

Grid Reference N109 918795

Description and Features

- Primary and secondary forest on a variety of landforms, including secondary, pukatea-dominant forest on broad colluvial hillslopes.
- One of the few primary forests remaining in the southern part of the district, the rimu/tawa forest being representative of the lowland forests which once covered the lower stretches of the Waitara River.
- Unusual occurrence of kohekohe at such a distance from the coast (24km).

17. **TUIHU** *Grid Reference N109 990767*

Description and Features

- A riparian strip of podocarp-hardwood forest adjoining the Waitara River, and representative of the lowland forest of the lower Waitara catchment.
- One of the few areas of primary forest remaining in the southern part of the district.

18. **TUIPAKE** *Grid Reference N109 080855*

Description

A small area of secondary and induced forest types between the Waitara River and Pouiatua Stewardship Area.

Features

- Well advanced stands of kanuka, an uncommon forest type in the district, and rare on such a large scale. These stands are alongside an extensive tract of primary forest and are valuable for monitoring succession and comparing other ecological processes.
- Connects Pouiatua Stewardship Area which has been recommended for greater protection, and the Waitara River forming a natural boundary.

Comment

Part of a proposed scientific reserve (1).

Ecological Units

Kanuka forest on hillslope and ridge
Manuka scrub on hillslope, ridge and cliff
Developed land

Area	45ha
Altitudinal range	60-220 m asl
Bioclimatic zone	lowland
Land system	dissected hill country
Geology	Urenui siltstone
Tenure	private
Study areas	23: Tuipake, 32: Pehu
Reference	(1) Nicholls (1980)

6.0 RECOMMENDED AREAS FOR PROTECTION

Twenty-eight areas have been recommended for protection to complement the existing network of scenic reserves, stewardship lands and conservation covenants. These are listed in Table 5 and shown in Figure 6B. All areas are described with accompanying maps and text following the stewardship lands recommended for upgrading of protective status.

The Recommended Areas for Protection are listed in geographic sequence and not a priority ranking. It is difficult to assess the relative significance of different recommended areas for protection as they contain different ecological units and features that are not possible to compare in value. However, some of the areas recommended for protection are known to be vulnerable to specific threats of modification or development or contain particularly vulnerable species or communities. These are listed in Table 6 as a guide to assist in priority setting during the implementation phase of the Protected Natural Areas Programme in North Taranaki. No other specific threats to recommended areas are known at present. In general terms the larger areas are less vulnerable as they have a greater inherent ability for buffering. Smaller areas with smaller area: boundary ratios are to a greater extent subject to pressures of grazing and wind damage.

Table 5:

**RECOMMENDED AREAS FOR PROTECTION IN NORTH TARANAKI
ECOLOGICAL DISTRICT**

- *1 Ounutae
- 2 Manganui
- 3 Awakino Lagoon
- 4 Awakino Dunes
- 5 Titirangi
- 6 Pahaoa
- 7 Mangaawakino
- 8 Mokau River Scenic Reserve Extensions
 - 8A Mokau River to Mohakatino River Coastline
 - 8B Tuhingakakapo
 - 8C Tauwhare
 - 8D Inanaga
 - 8E Maire Tawake
- 9 Totara Stream
- 10 Tikoputa
- 11 Hapurua Swamp
- 12 Te Puia
- 13 Kuwhatahi
- 14 Rapanui
- 15 Mangaone
- 16 Kahu
- 17 Waitaanga
- 18 Waikiekie
- 19 Pukatea
- 20 Okoki
- 21 Urenui River Mouth
- 22 Uruti Flat
- 23 Waikekeho
- 24 Makino
- 25 Okau Scenic Reserve Extension
- 26 Taramoukou
- 27 Junction Road
- 28 Tuipake

* Now protected

NORTH TARANAKI ECOLOGICAL DISTRICT RECOMMENDED AREAS FOR PROTECTION

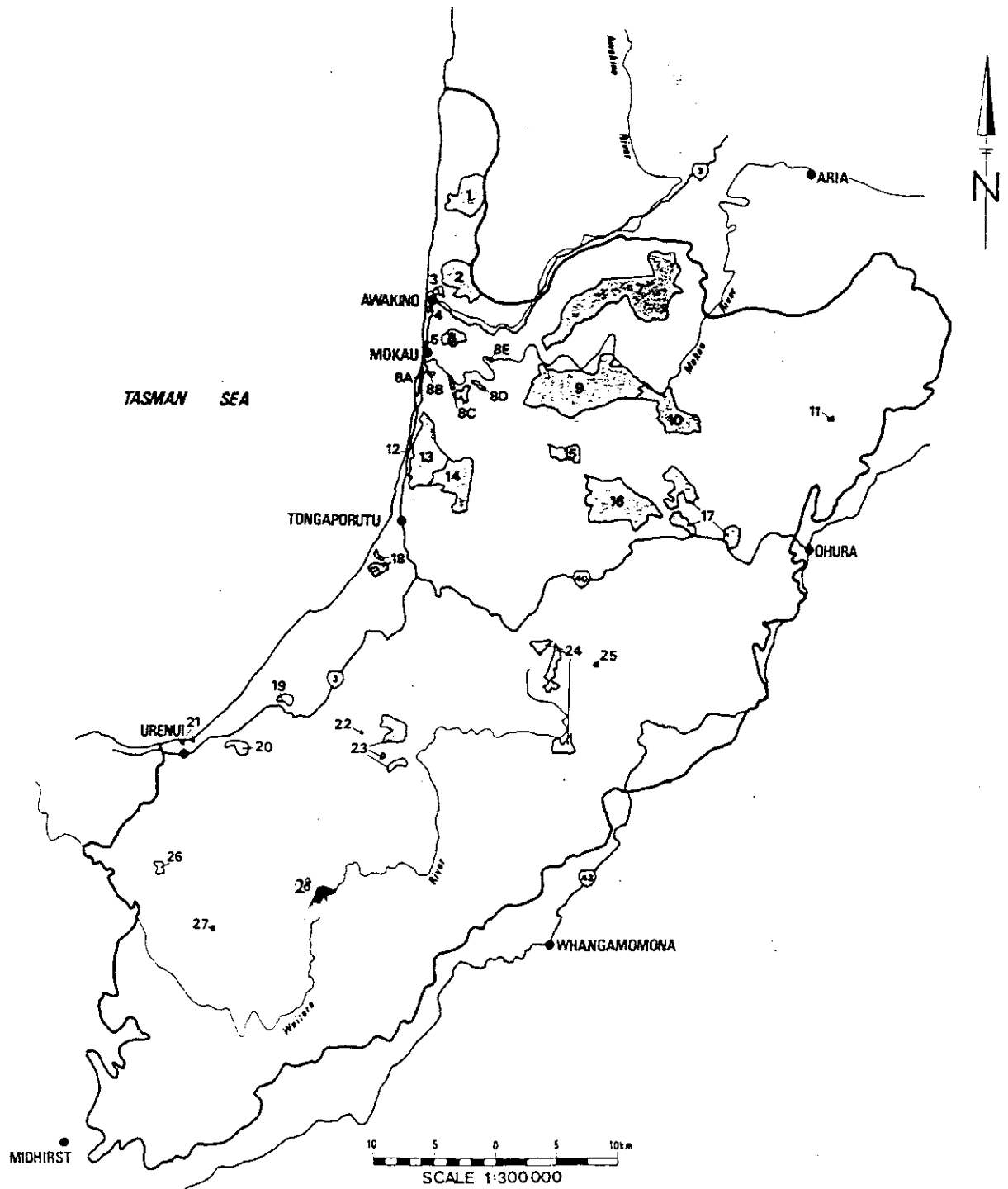


FIGURE 63

Table 6

KNOWN THREATS OF MODIFICATION OR VULNERABILITY OF SPECIES/COMMUNITIES INFLUENCING PRIORITY FOR PROTECTION OF RECOMMENDED AREAS.

<u>NO:</u>	<u>NAME:</u>	<u>REASON FOR PRIORITY:</u>
16	Kahu	Logging, proposed development.
7	Mangaawakino	Degradation of forest structure due to large populations of goats and possums.
8D	Inanga	Cattle grazing banks on which whitebait eggs are laid.
14	Hapurua Swamp	Willows may be spreading at expense of native vegetation and altering habitat of 3 rare bird species present.
5	Titirangi	Small population of vulnerable species - Hebe speciosa.
17	Waitaanga	Extraction of Sphagnum moss for smallscale commercial venture.
25	Okau Scenic Reserve Extension	Possible drainage and development for pasture.
22	Uruti Flat	Fencing is vital - undergrowth is confined to gully sides due to stock damage.

Table 7:

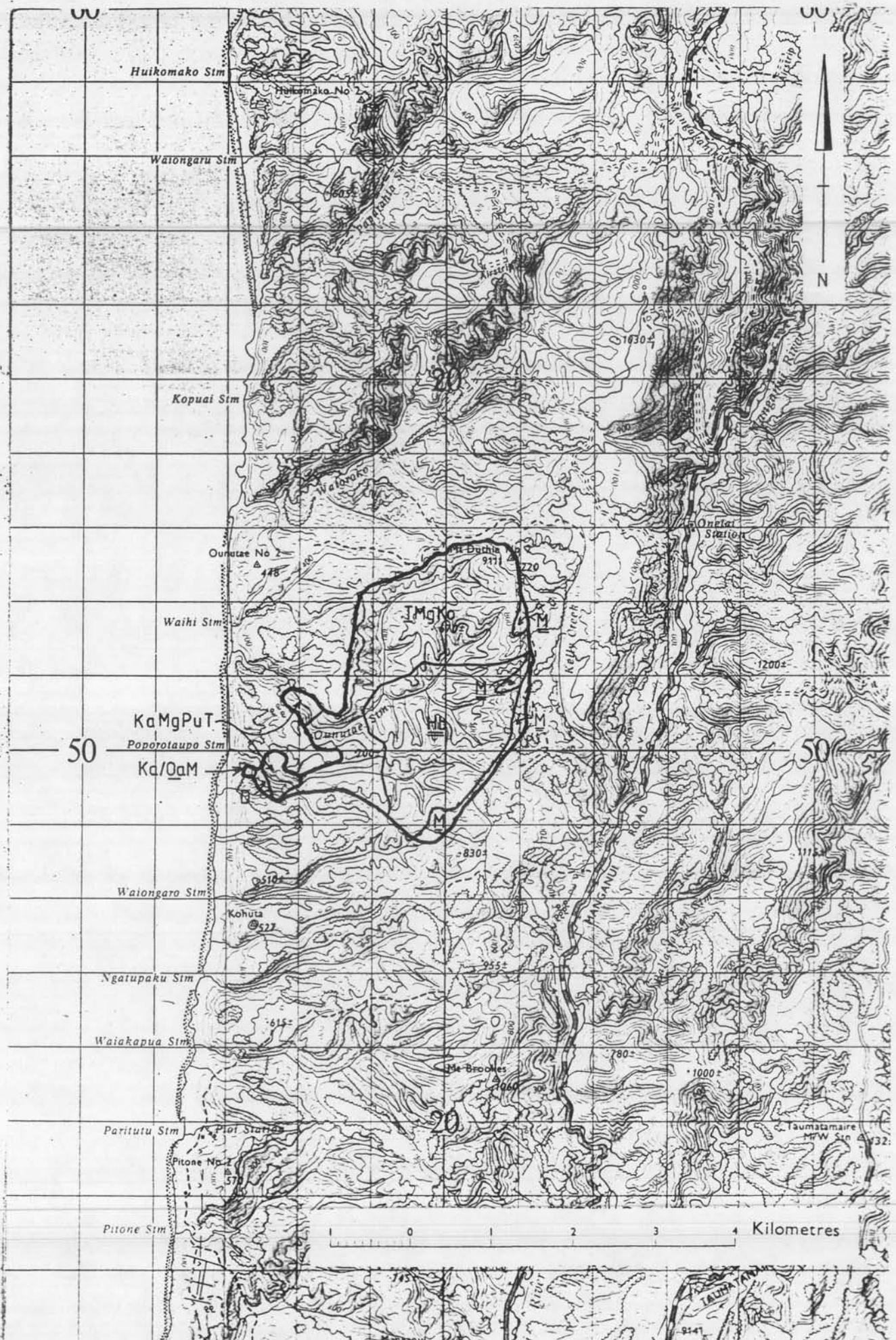
NOTATION FOR MAPS OF RECOMMENDED AREAS FOR PROTECTION

Ak	Ake ake
B	Bracken
Br	Baumea rubiginosa
Bb	Black beech
Bx	Boxthorn
C	Cliff shrubland/flaxland/sedgeland
Cb	Coprosma robusta (Karamu)
Cd	Cyathea dealbata (ponga)
Co	Cordyline australis (cabbage tree)
Cp	Coprosma propinqua
Cr	Coprosma repens (taupata)
Cs	Cyathea smithii
Ct	Coprosma tenuicaulis
Cv	Carex virgata
Cy	Cyperus ustulatus
D	Developed land/land without vegetatio
E	Eleocharis spp
F	Flax (harakeke, wharariki)
Ff	Five-finger
G	Gahnia xanthocarpa
H	Hinau
Ha	Hangehange
Hb	Hard beech
He	Heketara
I	Isachne globosa (swamp millet)
J	Juncus spp
Jm	Juncus maritimus
K	Kamahi
Ka	Karaka
Kh	Kahikatea
Kn	Kanuka
Ko	Kohekohe
Kw	Kawakawa
La	Lancewood
Lg	Lagoon
Lf	Leucopogon fasciculatus (mingimingi)
Ls	Leptocarpus similis (jointed rush)
Lu	Lupin
M	Manuka
Ma	Mahoe
Mg	Mangeao
Mi	Miro
Mr	Marram
Mm	Mamaku
Mp	Mapou
Mt	Matai
Nc	Nestegis cunninghamii (black maire)
Ni	Nikau
Nl	Nestegis lanceolata (white maire)
Nm	Nestegis montana (narrow-leaved maire)
Oa	Olearia albida
Os	Olearia solandri (coastal tree daisy)
Pa	Pampas
Pc	Pittosporum crassifolium (karo)
Pi	Pigeonwood

Pg	Pingao
Pl	Plagianthus divaricatus (marsh ribbonwood)
Pk	Pukatea
Pu	Puriri
Q	Quintinia serrata (tawheowheo)
R	Rimu
Ra	Rata
Re	Rewarewa
Rm	Ramarama
Rp	Raupo
Rv	River
S	Sphagnum
Sb	Silver beech
Sc	Scirpus inundatus (Isolepis inundata)
Sf	Sandfield
Sj	Supplejack
So	Sophora microphylla (kowhai)
Sm	Swamp maire
Sp	Spinifex sericeus
T	Tawa
Ta	Tarata
Tai	Tainui
Tf	Treefern species (Cyathea medullaris, C. smithii, Dicksonia squarrosa)
Tn	Tanekaha
To	Totara
Tr	Toro
Tt	Toetoe
Tu	Tutu
U	Ulex europaeus (gorse)
W	Wheki
Wa	Brush wattle
Wi	willow
Z	Treefern spp. and manuka
	Exotic pine plantation

* Cliff vegetation most commonly comprises combinations of manuka, wharariki, harakeke, tutu, kiokio, Machaerina sinclairii, Hebe stricta, Olearia townsonii, Gaultheria spp, kiekie, parataniwha.

slash between symbols /	= emergent over
brackets around symbols ()	= < 5% canopy cover
no underlining of symbols	= 5-20% canopy cover
underlining of symbols	= 20-50% canopy cover
double underlining of symbols =	= 50-100% canopy cover
addition sign joining symbols +	= a mosaic of two vegetation types
	= the boundary separating two gradating vegetation types
	= vegetation type boundary
	= recommended area for protection boundary
	= protected natural area (eg, Scenic Reserve)



1. OUNUTAE

Grid reference N91 195507

Description

Two small, forested, west-draining catchments in the far north of the district.

Features

- A semi-coastal outlier of hard beech forest, being the main northern-most stand on the west coast of the North Island.
- One of the few remaining pockets of coastal Olearia albida-dominant vegetation in the district.
- The only example remaining of semi-coastal tawa-mangeao-kohekohe forest, a type representative of the semi-coastal forest of the northern part of the district.
- Scattered outliers of toatoa and its hybrids with tanekaha. This population, and the larger population within Recommended Area 2:Manganui, are the only known locations of toatoa for the western North Island outside Northland (1).

Comment

- Already proposed as a reserve by Botany Division, DSIR

Ecological Units

Hard beech forest on hillslope and ridge

Tawa-mangeao-kohekohe forest on hillslope and ridge

Karaka-mangeao-puriri-tawa forest and treeland on hillslope

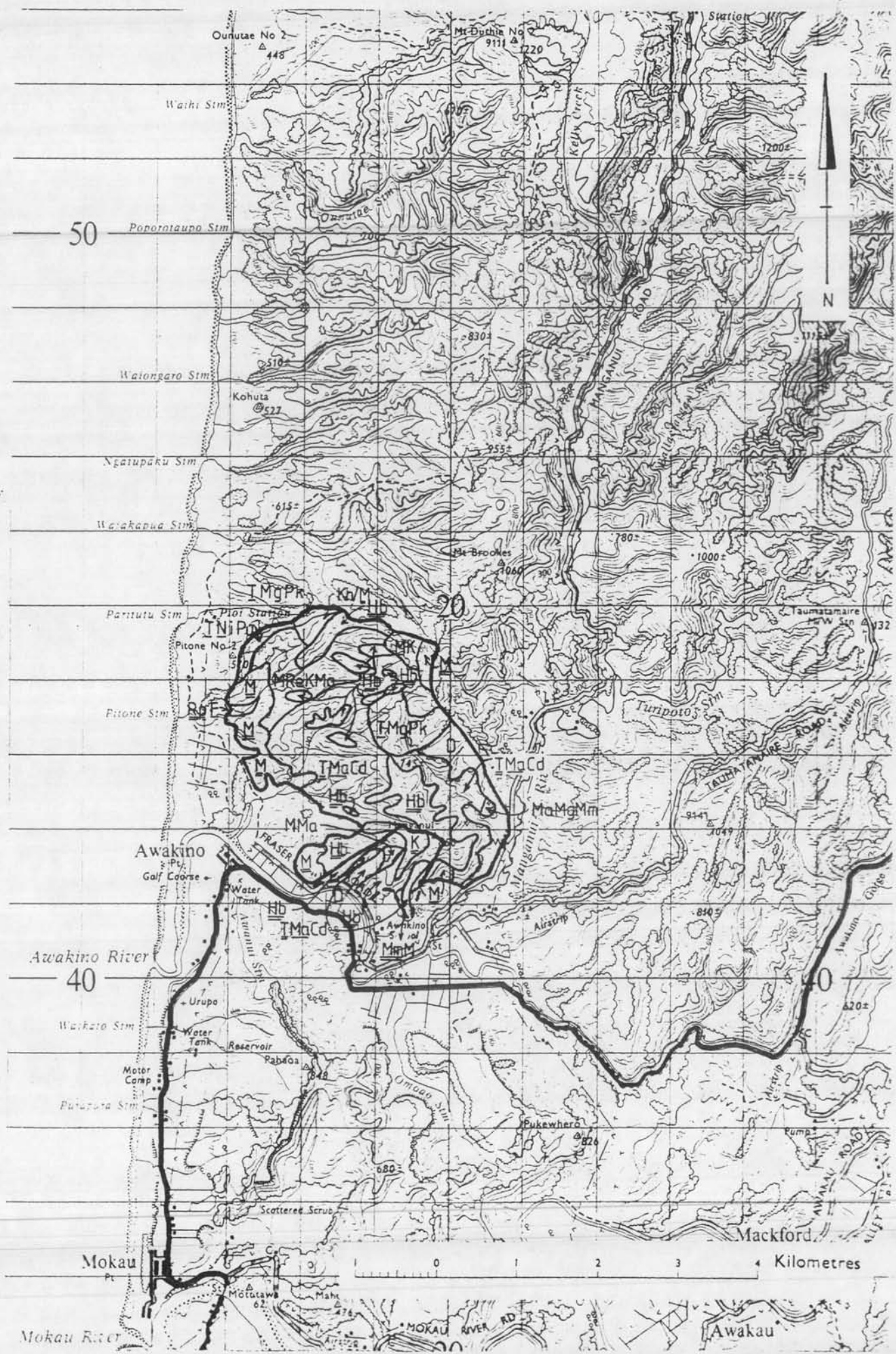
Karaka/Olearia albida-manuka shrubland on hillslope

Manuka scrub on hillslope

Developed land

Area	730 ha
Altitudinal Range	5-375 m asl
Bioclimatic Zone	Coastal
Land system	Dissected hill country
Geology	Mokau Group, Mokahatino Group
Tenure	Private Study Area : 2: Mt Duthie
Reference	(1) Clarkson 1985

* Now protected



2. MANGANUI

Grid reference N91 185435

Description

Two small catchments, largely forested, draining semi-coastal hill country and adjoining Awakino Scenic Reserve.

Features

- Semi-coastal hard beech forest with a prominent tanekaha component. This hard beech type is typical of sandstone ridges in the northern part of the district (1).
- Semi-coastal tawa forest with common associates of mangearo, puriri, pukatea and nikau. It includes the only occurrence of tawa-mangearo-pukatea forest in the district.
- The southern limit of toatoa for western New Zealand, being one of only two known western populations outside Northland. Present in hard beech-dominant forest on sandstone ridges.
- The raupo-harakeke flax-reedland is one of the few remaining freshwater wetlands in the coastal zone of the district.

Ecological Units

Tawa-mahoe-ponga forest on hillslope and ridge

Tawa-mangearo-pukatea forest on hillslope and ridge

Tawa-nikau-puriri forest on hillslope

Hard beech forest on ridge and hillslope

Mahoe-mangearo-mamaku scrub on hillslope

Manuka-rewarewa-kamahi-mahoe scrub on hillslope

Kahikatea/manuka scrub on hillslope

Manuka-kamahi scrub on hillslope and ridge

Manuka scrub on hillslope and ridge

Raupo-harakeke flax-reedland on alluvial flat

Cliff vegetation (not mappable)

Developed land

Area	720 ha
Altitudinal Range	5-260 m a.s.l.
Bioclimatic Zone	Coastal, semi-coastal
Land System	Dissected hill country
Geology	Mokau Group, Mohakatino Group, Alluvium
Tenure	Private
Study Area	3:Awakino
Reference	(1) Clarkson 1985

4

30



Re/MmKaPuMa

Awakino

Awakino River

40

Waikato Sim

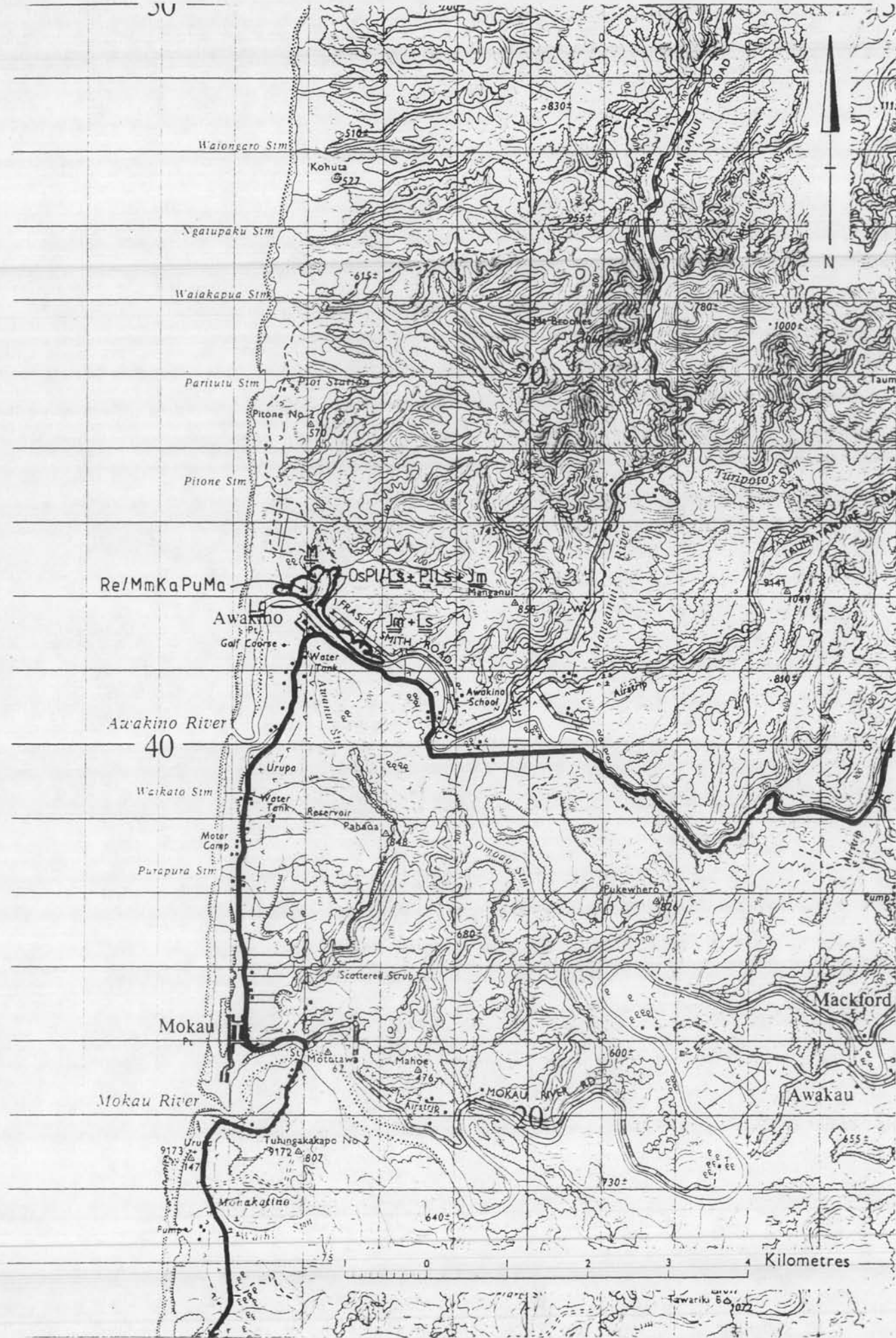
Purapura Sim

Mokau

Mokau River

Munakafina

0 1 2 3 4 Kilometres



4 AWAKINO DUNES

Grid Reference N91 162412

Description

A two kilometre long spit of 10 metre high dunes north of the Awakino River mouth, behind which the Awakino River is channelled.

Features

- This is the most extensive and well-developed dune system in the district. The importance of this area is due to its landform rather than its mainly adventive vegetation.
- Colonies of Spinifex sericeus covering the seaward faces are the most extensive in the district.
- Midden sites are scattered throughout the dunes.
- Notable species: the coastal form of Carex flagellifera.
- Adjoins recommended area for protection 3:Awakino Lagoon (via a riparian strip of developed land).

Ecological Units

Spinifex grassland on sand dune

Marram grassland on sand dune

Boxthorn-lupin shrubland on sand dune

Sandfield

Developed land

Area	30 ha
Altitudinal Range	0-10 m a.s.l.
Bioclimatic Zone	Coastal
Land System	Uplifted marine terrace
Geology	Alluvium, sand dunes and beach sand
Tenure	Private, Crown land
Study Area	3:Awakino



3 AWAKINO LAGOON

Grid Reference N91 173423
and 177413

Description

A riparian strip of coastal estuarine and terrestrial vegetation adjoining the northern bank of the Awakino River and its associated tidal lagoon.

Features

- A range of intact estuarine vegetation types mainly comprising Juncus maritimus, jointed rush, marsh ribbonwood and coastal tree daisy. These types are well-developed elsewhere only along the lower reaches of the Mokau River. They provide good wildlife habitat and exhibit zonation patterns which reflect the degree and frequency of inundation by salt water.
- Notable species: Baumea articulata and B. juncea.
- A small adjacent area of coastal hillslope forest which is continuous with lagoon vegetation. Despite its poor quality this forest is important because of its continuity with the lagoon vegetation and because coastal forest is now uncommon in the district.
- Adjoins recommended area for protection 4:Awakino Dunes (via a riparian strip of developed land).

Ecological Units

Juncus maritimus rushland on alluvial flat

Jointed rush rushland on alluvial flat

Coastal tree daisy - marsh ribbonwood/jointed rush rushland on alluvial flat

Marsh ribbonwood-jointed rush rush-shrubland on alluvial flat

Rewarewa/mamaku-karaka-puriri-mahoe forest on hillslope

Manuka scrub on hillslope

Lagoon

Area	20 ha
Altitudinal Range	0-70 m a.s.l.
Bioclimatic Zone	Coastal
Land System	Dissected hill country
Geology	Alluvium, Mokau Group
Tenure	Private, Crown Land
Study Area	3:Awakino



5 TITIRANGI

Grid Reference N91 159364

Description and Features

A small area of vigorously regenerating secondary scrub on a coastal cliff near Mokau township within which occurs a population of Hebe speciosa (c.30 individuals). This is a vulnerable species (1) which is now known to be found in only a handful of localities. Although previously known elsewhere in the district, it could be relocated only at this site during the survey.

Ecological Unit

Karo-kawakawa-taupata-harakeke scrub on cliff.

Area	2 ha
Altitudinal Range	10-30 m a.s.l.
Bioclimatic Zone	Coastal
Land System	Uplifted marine terrace
Geology	Uplifted Marine Terrace (Rapanui Formation)
Tenure	Crown land
Study Area	27:Pahaoa
Reference	(1) Wilson and Given (in prep.)



6. PAHAOA

Grid Reference N91 185380

Description

A small area of secondary forest on a variety of landforms between the Awakino and Mokau rivers.

Features

- High quality semi-coastal forest mainly comprised of mosaics of tawa, pukatea, puriri and abundant mikau, on hillslope, interfluve, dipslope and alluvial terrace.
- Small pockets of semi-coastal hard beech forest.
- Small stand of mangeao-pukatea forest on interfluve - unique in the district, but would have been more common prior to forest clearance on gentle terrain in the north of the district.

Ecological Units

Tawa-nikau-mamaku-puriri forest on hillslope and ridge

Tawa-pukatea forest on dipslope

(Puriri)-kohekohe-pukatea-nikau-tawa-mahoe forest on interfluve

Pukatea-tawa-nikau forest on alluvial terrace and colluvial hillslope

Mangeao-pukatea forest on interfluve

Hard beech forest on ridge

Kamahi-mingimingi-rewarewa forest on ridge

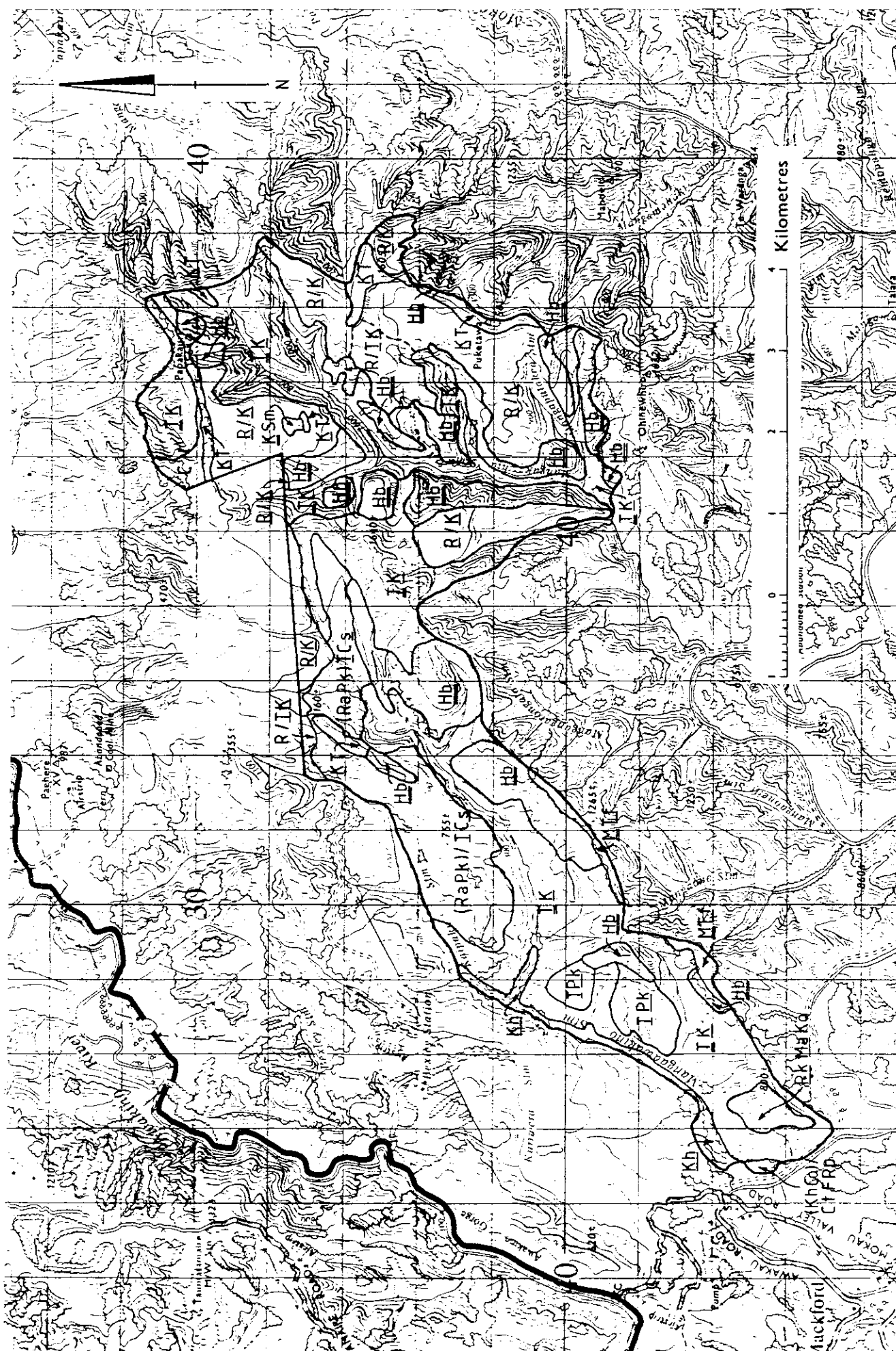
Manuka-treefern scrub on hillslope

Manuka-bracken scrub on hillslope and ridge

Bracken fernland on interfluve

Developed land

Area	330 ha
Altitudinal Range	5-245 m a.s.l.
Bioclimatic Zones	Semi-coastal
Land System	Dissected hill country
Geology	Mohakatino Group
Tenure	Private
Study area	27:Pahaoa



7. MANGAAWAKINO

Grid Reference N91 347425

Description

A large area of mainly primary forest on an extensive system of south-tilting dipslopes and drained by two south-flowing subcatchments of the lower Mokau River.

Features

- A large area encompassing a range of representative primary forest types on the most extensive dipslopes in the district. These dipslope types include extensive kamahi and tawa-kamahi forests with an exceptionally high occurrence of emergent rimu, a semi-coastal outlier of pukatea-mahoe-kohekohe forest, and a small area of kamahi- swamp maire forest.
- A mosaic of podocarp-hardwood forest on gentle dipslopes and hard beech forest on steep hillslopes. The hard beech here marks the southern boundary of the major beech gap area to the north (Tainui Ecological Region).
- A rare example of alluvial kahikatea-dominant forest along the Mangaawakino Stream.
- Extensive bluffs at the head of the dipslopes with well developed cliff vegetation.
- High wildlife values: kiwi, falcon, kaka and long-tailed bat are present.
- The wetland near the Mokau-Mangaawakino confluence is an important vegetation type and provides a habitat for fernbird and spotless crane; both species are rare in the district.
- The southern limit of *Blechnum fraseri* for the North Island. This population extends its range south from the Mamaku Plateau.
- Notable species: Mountain cabbage tree (the only other record in the district is from Waitaanga), *Blechnum nigrum*, *Trichomanes elongatum*, *T. strictum*, *Nertera* aff. *dichondrifolia*, kohurangi, pokaka (all uncommon elsewhere in the district).

Comments

- A tongue of secondary (logged) (rata-pukatea)/tawa-Cyathea smithii forest is included within the recommended area. This is designed to improve the long-term viability of the surrounding features for which the area was proposed.
- Goat browsing is serious on some of the dipslopes, and in places is causing gradual deterioration of forest structure. An effective and continuous animal control programme is necessary to ensure long-term viability of the area's natural features.
- There are unconfirmed records of kokako, and the endangered Mahoenui giant weta Deinacrida sp. on the upper dipslopes (1).
- This area covers part of the proposed Mokau coalfield (2).

- Dipslopes elsewhere in the district have been largely logged or cleared of vegetation, because of their suitability for farming, high merchantable timber volume, and relative ease of clearance.

Ecological Units

Rimu/tawa-kamahi forest on dipslope

Rimu/kamahi forest on dipslope

Tawa-kamahi forest on hillslope and ridge

Kamahi-tawa forest on ridge

Kamahi-swamp maire forest on dipslope

Tawa-pukatea forest on dipslope

Hard beech forest on ridge and hillslope

Kahikatea forest on alluvial forest on dipslope

Pukatea-mahoe-kohekohe forest on dipslope

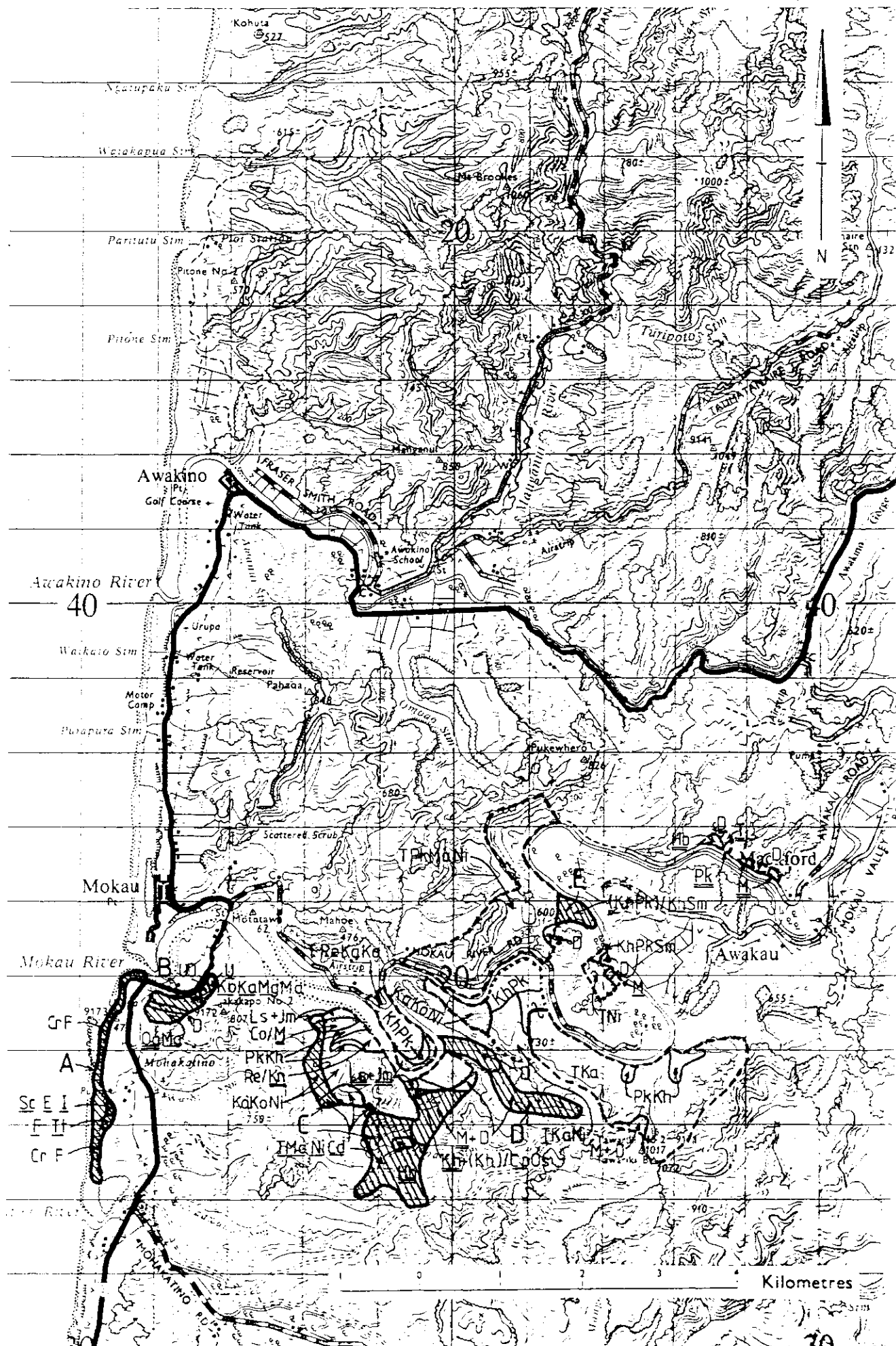
(Rata-pukatea)/tawa-Cyathea smithii forest on dipslope

(Kahikatea-cabbage tree)/Coprosma tenuicaulis-harakeke-raupo shrubland on alluvial terrace

Manuka-treefern scrub on hillslope and ridge

Cliff vegetation

Area	4000 ha
Altitudinal Range	10-490 m a.s.l.
Bioclimatic Zone	Semi-coastal, lowland
Land System	Dissected hill country
Geology	Mokau Group, Alluvium
Tenure	Private (Maori ownership)
Study Area	18:Mokau
Reference	(1) Molloy (pers. comm.) 1986 (2) Bayfield, 1986



8. **MOKAU RIVER SCENIC RESERVES EXTENSIONS**

The Mokau River is the only major river on the west coast of the North Island to retain significant areas of riparian vegetation from coastal to inland types. It has the reputation of being the most productive whitebait fishery in Taranaki (Taranaki Catchment Commission 1981), the coastal and semi-coastal riparian vegetation being important for inanga spawning. The Mokau River also has important spiritual and cultural significance to the local Maori people.

The existing reserve system is extensive and protects much of the natural diversity of the river. There are however significant gaps, especially in the coastal and semi-coastal zones. These are identified as the following.

Recommended Areas for Protection and shown on the adjoining map as the lined area A-E.

8A MOKAU RIVER TO MOHAKATINO RIVER COASTLINE

Grid Reference N91 153335

Description

Coastal cliffs of varying height, running south from the Mokau River mouth to near the Mohakatino River mouth.

Features

- Coastal cliff communities including coastal herbfield and tussock-shrubland, both in good condition and having high species diversity.
- A coastal wetland on adjacent marine terrace supporting a mosaic of Isolepis prolifer, Eleocharis gracilis, harakeke and Cortaderia toetoe. This community appears to be unique in the district and is one of the few remaining coastal wetlands in North Taranaki.
- Notable species: Juncus caespiticius found in swamp, is the only known record for the district.

Comment

- Already proposed as reserve by Botany Division DSIR (1)

Ecological Units

Cliff shrub-herfield on coastal cliff

Taupata-harakeke tussock-shrubland on coastal cliff

Isolepis prolifer-Eleocharis-swamp millet sedgeland on alluvial terrace

Harakeke-toetoe tussockland on marine terrace

Area	30 ha
Altitudinal Range	0-30 m a.s.l.
Bioclimatic Zone	Coastal
Land System	Uplifted Marine Terrace
Geology	Uplifted Marine Terrace Rapanui Formation - marine and dune sands, conglomerates
Tenure	Landcorp
Study Area	27:Pahaoa
Reference	(1) Clarkson et. al. (1981a)

8B TUHINGAKAKAPO

Grid Reference N91 164345

Description

Two strips of north and west-facing secondary, coastal, hillslope forest south of the Mokau River and adjacent to State Highway 3.

Features

- Coastal kohekohe-karaka dominant forest on steep slopes, with a good range of coastal species including whau, akeake, wharangi, titoki and mangeao. Within this type are small pockets of kowhai-lacebark forest, a very rare type in the district.
- A gully of Olearia albida-dominant forest, one of three such stands still known to occur in the district, The only known location of Corokia cotoneaster in the district.
- Other notable plants: Peperomia urvilleana, Metrosideros carminea.

Comment

- Already proposed as reserve by Botany Division DSIR (1)

Ecological Units

Kohekohe-karaka-mangeao-mahoe forest on hillslope
Kowhai-lacebark forest on hillslope (not mappable)
Olearia albida-mahoe forest on hillslope
Developed land

Area	20 ha
Altitudinal Range	15-129 m a.s.l.
Bioclimatic Zone	Coastal
Land System	Dissected hill country
Geology	Mohakatino Group
Tenure	Landcorp
Study Area	27:Pahaoa
Reference	(1) Clarkson et. al. (1981a)

8C TAUWHARE

Grid Reference N91 194328 and N91 182335

Description

Semi-coastal forest and estuarine wetland adjoining and connecting Mokau River Scenic Reserves 1 and 2.

Features

- Representative estuarine vegetation types. Similar vegetation of any extent occurs elsewhere only in the adjacent scenic reserve near the Awakino River mouth. This vegetation complements recommended area for protection 3 : Awakino Lagoon in that marsh ribbonwood, dominant in the Awakino vegetation, is only a minor component here.
- Supports the only Coprosma propinqua - coastal tree daisy scrub in the district.
- Important zonation patterns within the estuarine vegetation and between estuarine, palustrine and terrestrial vegetation ie. arrow grass, sea rush, jointed rush, various shrubland and scrub types, kahikatea forest, tawa-dominant hillslope forest.
- Notable species: Eleocharis sphacelata, Baumea juncea, three-square, Schoenoplectus validus, Deparia petersenii and Carex subdola.
- Fernbirds were found at N91 182344. This is one of six known fernbird habitats in the district, and is the only estuarine one.
- Semi-coastal forest including a small stand of hard beech.
- Connects two scenic reserves, providing a continuous riparian strip.
- Tauwhare Stream is an important spawning ground for inanga (adult whitebait) (1).

Ecological Units

Arrow grass herfield on alluvial flat (not mappable)

Sea rush rushland on alluvial flat

Jointed rush rushland on alluvial flat

(Cabbage tree)/manuka on alluvial terrace

(Cabbage tree)/manuka-gorse-Baumea rubiginosa rush-shrubland on alluvial terrace (not mappable)

(Kahikatea)/Coprosma propinqua - coastal tree daisy scrub on alluvial terrace

Kahikatea forest on alluvial terrace

Pukatea-kahikatea forest on alluvial terrace

Karaka-kohekohe-nikau forest on hillslope

Tawa-mahoe-nikau-ponga forest on hillslope

Rewarewa/kanuka forest on hillslope

Hard beech forest on ridge

Manuka shrubland on alluvial terrace and hillslope

Developed land

Area	150 ha
Altitudinal Range	5-245 m a.s.l.
Bioclimatic Zone	Semi-coastal
Land System	Dissected hill country
Geology	Mohakatino Group, Mt Messenger Sandstone, Alluvium
Tenure	Private (Maori Ownership)
Study Area	27:Pahaoa
Reference	(1) Hanchet (1986) pers. comm.

8D INANGA

Grid Reference N91 205338

Description

A riparian strip of approximately 20 m on both sides of a small tributary of the Mokau River, tidally influenced in its lower reaches.

Criterion

One of three tributaries of the Mokau which are known to provide important spawning grounds for an extremely large population of inanga (adult whitebait) (1).

Comments

- Present research indicates that inanga spawn within the zone of tidal influence (1). Spawning is therefore limited to the lowest reaches of the Mokau River which means that these lower tributaries are of vital importance to the maintenance of the present whitebait industry.
- The tributary needs fencing off from cattle, as the whitebait eggs are laid at high tide on banks which are presently grazed.

Ecological Units

Manuka scrub on alluvial terrace

Developed land

Area	5 ha
Altitudinal Range	0-50 m a.s.l.
Bioclimatic Zone	Semi-coastal
Land System	Dissected hill country
Geology	Alluvium
Tenure	Landcorp
Study Area	27:Pahaoao
Reference	(1) Hanchet (1986) pers. comm.

8E MAIRE TAWAKE

Grid Reference N91 217358

Description

A small area of secondary, semi-coastal alluvial forest on the north bank of the Mokau River, adjoining Scenic Reserve 10.

Features

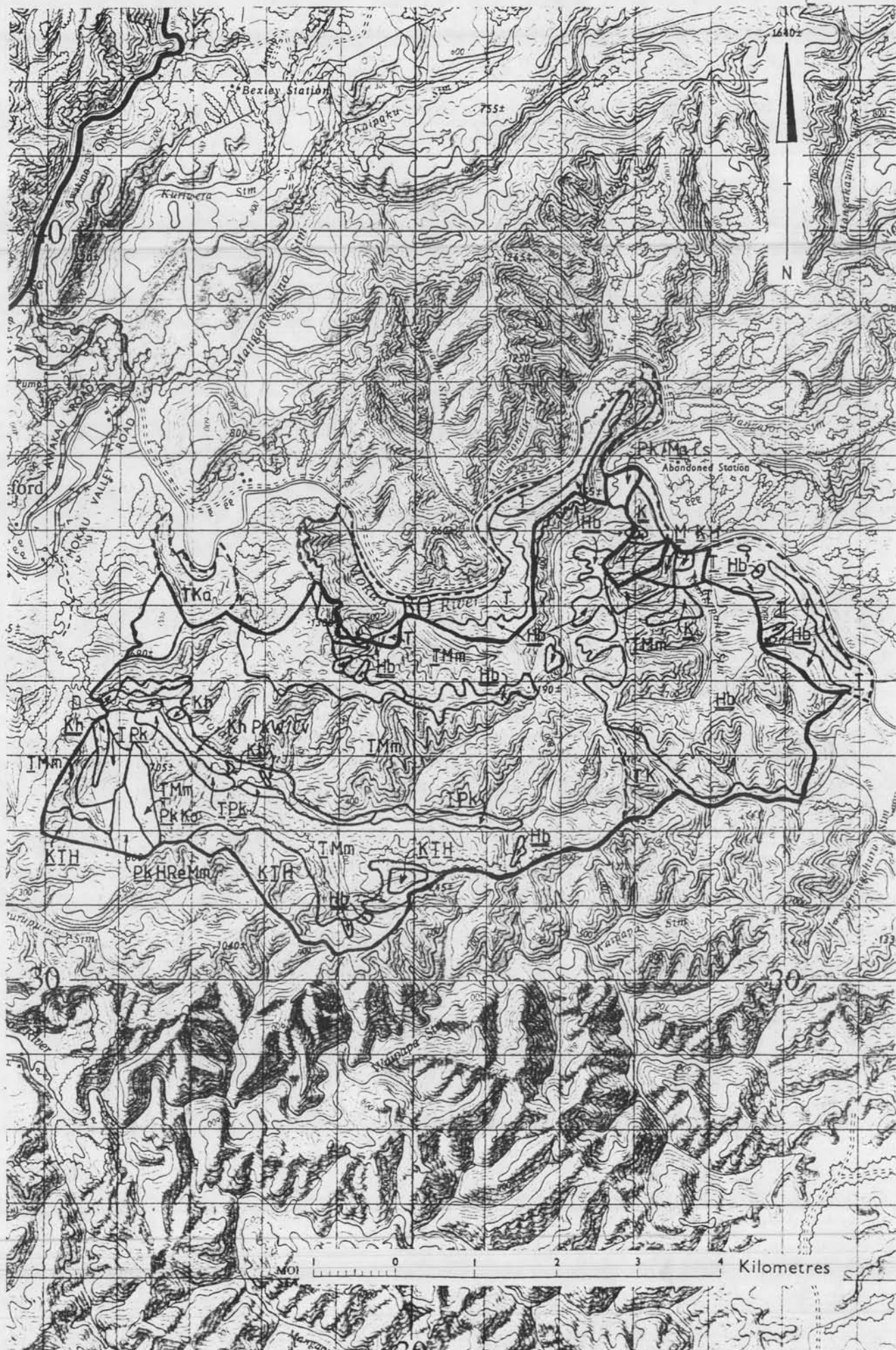
- One of four known areas of palustrine forest in the district where swamp maire is an important component. This type is not represented in any protected natural area in the district, and would complement the existing Mokau River reserves network.
- Small, scattered pockets of Coprosma tenuicaulis scrub in the wettest areas.

Ecological Units

(Kahikatea-pukatea)/kahikatea-swamp maire forest on alluvial terrace

(Kahikatea-pukatea)/Coprosma tenuicaulis scrub on alluvial terrace (not mappable).

Area	15 ha
Altitudinal Range	5-30 m a.s.l.
Bioclimatic Zone	Semi-coastal
Land System	Dissected hill country
Geology	Alluvium
Tenure	Private
Study Area	27:Pahaoa



9 TOTARA STREAM

Grid Reference N91 300335

Description

An area of forested hill country centred around the alluvial terrace of Totara Stream, adjoining parts of the Mokau River Scenic Reserve complex to the north and stewardship land to the south-west.

Features

- Poorly-drained alluvial terrace with a mosaic of kahikatea forest and treeland. One of the few valleys in the district where an extensive area of alluvial terrace vegetation remains, and where the surrounding catchment is still intact.
- Pukatea-dominant forests on dipslope landform.
- A population of 50+ plants of king fern on the northern dipslope.
- Transition from semi-coastal forest (kohekohe, mangeao, kowhai, nikau, kawakawa) at the bottom of the catchment to lowland forest at the headwaters, including a diverse range of vegetation types.
- Important wildlife habitat (1). Fernbird and Australasian bittern are present in alluvial vegetation and falcon, kaka, kiwi and robin have been recorded within the catchment.
- The extensions north and east of Totara Stream catchment connect Mokau River Scenic Reserve parts, 5, 6, 7, 8 and 9, and Recommended Area for Protection 10: Tikoputa, providing a continuous belt of riparian vegetation.

Comment

- The whole of the Totara Stream catchment is identified as a Recommended Area for Protection because of its excellent representative values and to ensure the long-term viability of the alluvial vegetation and the wildlife it supports.

Ecological Units

Kahikatea forest on alluvial terrace

Kahikatea-pukatea-wheki/*Carex virgata* treeland on alluvial terrace

Tawa forest on hillslope

Tawa-kamahi forest on hillslope and ridge

Tawa-mamaku forest on hillslope

Kamahi-tawa-hinau forest on hillslope and ridge

Tawa-pukatea forest on colluvial hillslope

Pukatea-tawa-mamaku forest on dipslope

Pukatea-kohekohe forest on dipslope

Pukatea-hinau-rewarewa-mamaku forest on dipslope

Pukatea/mahoe-Cyathea smithii forest on alluvial terrace

Pukatea/wheki on alluvial terrace (not mappable)

Hard beech forest on ridge

Kamahi forest on hillslope

Kamahi-hinau forest on hillslope

Manuka scrub on hillslope and cliff

Area	3090 ha
Altitudinal Range	25-400 m a.s.l.
Bioclimatic Zone	Semi-coastal, lowland
Land System	Dissected hill country
Geology	Mokau Group, Mohakatino Group, Alluvium
Tenure	Private
Study Area	19:Totara Stream, 21:Panirau
Reference	(1) Williams (1986)



10 TIKOPUTA

Grid Reference N91 375325

Description

An area of primary forest on part of a series of dipslopes and steep hillslopes above the Tikoputa Stream, (tributary of the Mokau River).

Features

- A complex of dipslopes and steeply incised gullies supporting a mosaic of associated vegetation types.
- Connects Mokau River Scenic Reserve parts 9, 10 and 11 and Recommended Area for Protection 9:Totara Stream to provide a continuous strip of riparian vegetation along the Mokau River.

Comment

- The dipslopes here are of lesser extent, and lower biological value than those in Recommended Area for Protection 7:Mangaawakino.

Ecological Units

Rimu-pukatea-rata/kamahi-tawa- Cyathea smithii forest on dipslope.

(Rata)/kamahi-miro-hinau forest on dipslope

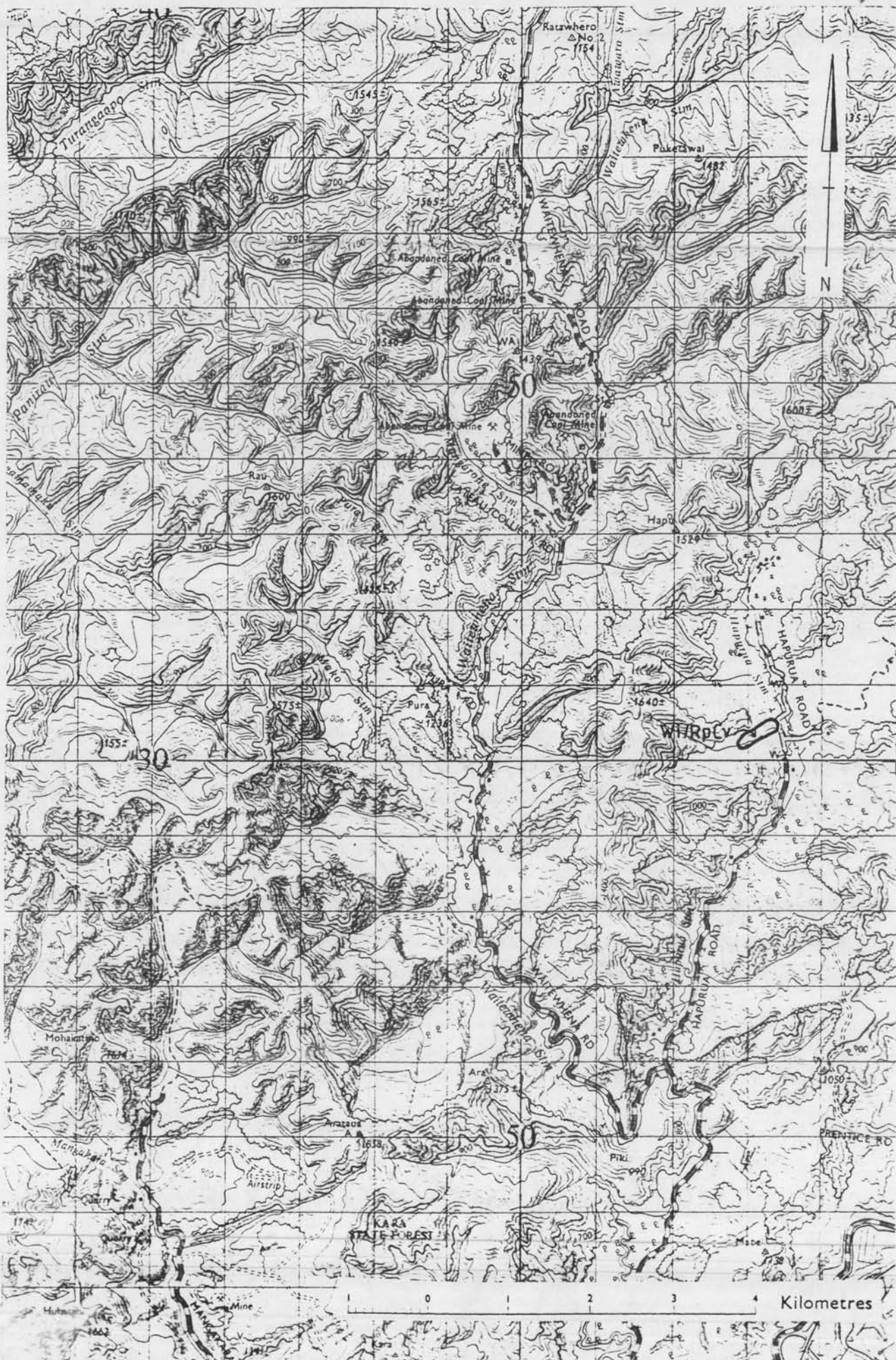
Kamahi-pukatea-tawa forest on colluvial hillslope

Tawa-kamahi forest on hillslope and ridge

Hard beech forest on ridge and hillslope

Cliff scrub (not mappable)

Area	750 ha
Altitudinal Range	30-490 m a.s.l.
Bioclimatic Zones	Lowland
Land System	Dissected hill country
Geology	Mokau Group, Mahoenui Group
Tenure	Private
Study area	15:Kara, 21:Panirau



11 HAPURUA SWAMP

Grid Reference N91 533304

Description

A wetland of largely induced vegetation covering the broad alluvial flats of a tributary of the Hapurua Stream.

Criterion

- Exceptional wildlife habitat. Australasian bittern, fernbird, and spotless crane are present; all are rare in the district.

Comment

- Smaller surrounding wetlands are probably also used by these birds (1). If so, they should be given priority for protection to ensure the long-term viability of these species in this district.

Ecological Unit

Willow/raupo-Carex virgata reed-tussockland on alluvial terrace.

Area	8 ha
Altitudinal Range	185-200 m a.s.l.
Bioclimatic Zone	Lowland
Land System	Dissected hill country
Geology	Alluvial
Tenure	Private
Study Area	13: Waitewhena
Reference	(1) New Zealand Wildlife Service (1980)



12 **TE PULA**

Grid Reference N100 145275

Description

A small promontory of secondary coastal scrub and forest adjacent to the mouth of the Kuwhatahi River and separated from Te Kawau Pa reserve by a narrow sea channel.

Criterion

- Vigorously regenerating coastal vegetation, being one of the few natural areas remaining on the 5700 ha Uplifted Marine Terrace land system.

Ecological Units

Karaka/mapou-hangehange-harakeke scrub on marine terrace
Karaka forest on marine terrace

Area	3 ha
Altitudinal Range	0-30 m a.s.l.
Bioclimatic Zone	Coastal, semi-coastal
Land System	Uplifted Marine Terrace
Geology	Uplifted Marine Terrace Rapanui Formation
Tenure	Private
Study Area	20:Kuwhatahi



13 KUWHATAHI

Grid Reference N100 160275

Description

An area of predominantly west-facing coastal and semi-coastal hillslope forest and scrub, centred around the Kuwhatahi catchment.

Features

- An intact catchment with a relatively large area of continuous coastal and semi-coastal forest, parts of which are in excellent condition. Vegetation includes hard beech forest with tanekaha and tawheowheo, and puriri-karaka.
- Tawa forest with mangeao, kohekohe, and frequent pukatea in the valley bottoms.
- The only truly coastal hard beech forest in the district, and one of few such stands in the North Island. This type is particularly rare on the west coast.
- Coastal scrub of which akeake is an important component.
- Notable species: king fern (a colony of 100+), whau, Metrosideros carminea and Olearia albida.

Comment

- Kuwhatahi catchment has been proposed by Forest Research Institute as a Scientific Reserve (1).

Ecological Units

Puriri-karaka-tawa forest on hillslope

Tawa-puriri forest on hillslope

Tawa-hinau-rewarewa-puriri forest on hillslope

Pukatea-puriri-karaka-tawa forest on alluvial terrace

Pukatea-nikau-karaka-tawa forest on alluvial terrace

Kamahi-hinau-rewarewa forest on ridge

Hard beech forest on ridge

Rewarewa/manuka-akeake-mamaku scrub on hillslope

Mamaku-heketara-mahoe scrub on hillslope

Manuka-mamaku scrub on hillslope

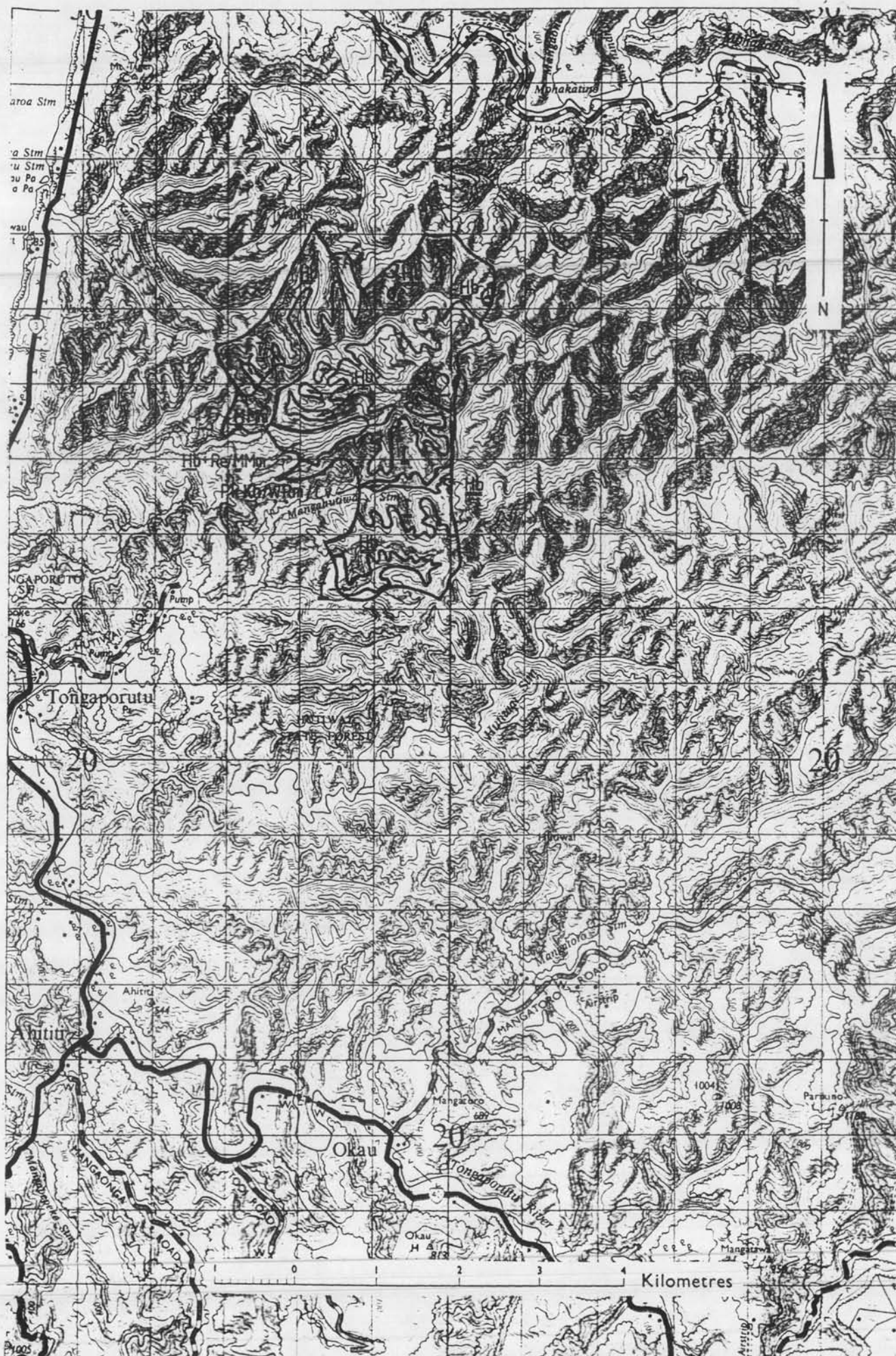
Manuka-mamaku scrub on hillslope

Manuka-mamaku scrub on hillslope

Manuka scrub on ridge and hillslope

Cliff vegetation (not mappable)

Area	1100 ha
Altitudinal Range	5-185 m a.s.l.
Bioclimatic Zone	Coastal and semi-coastal
Land System	Dissected hill country
Geology	Mt Messenger Sandstone, Mohakatino Group, Alluvium
Tenure	Private (includes Maori ownership)
Study Area	20:Kuwahatahi
Reference	(1) Nicholls (1980)



14 RAPANUI

Grid Reference N100 200250

Description

Primary, semi-coastal and lowland hillslope forest of the headwaters of the Rapanui and Mangahutiwai catchments.

Features

- Adjoins Recommended Area for Protection 13: Kuwhatahi and Hutiwai Stewardship Area - and is a vital link in the system of Recommended Areas for Protection stretching from near the coast to Waitaanga Plateau. This area bridges the gap between the coastal and semi-coastal forests of Kuwhatahi, and the lowland forests of Hutiwai, and thus provides a continuous gradation of types over all three bioclimatic zones and a range of landforms.

Ecological Units

Hard beech forest on ridge and hillslope

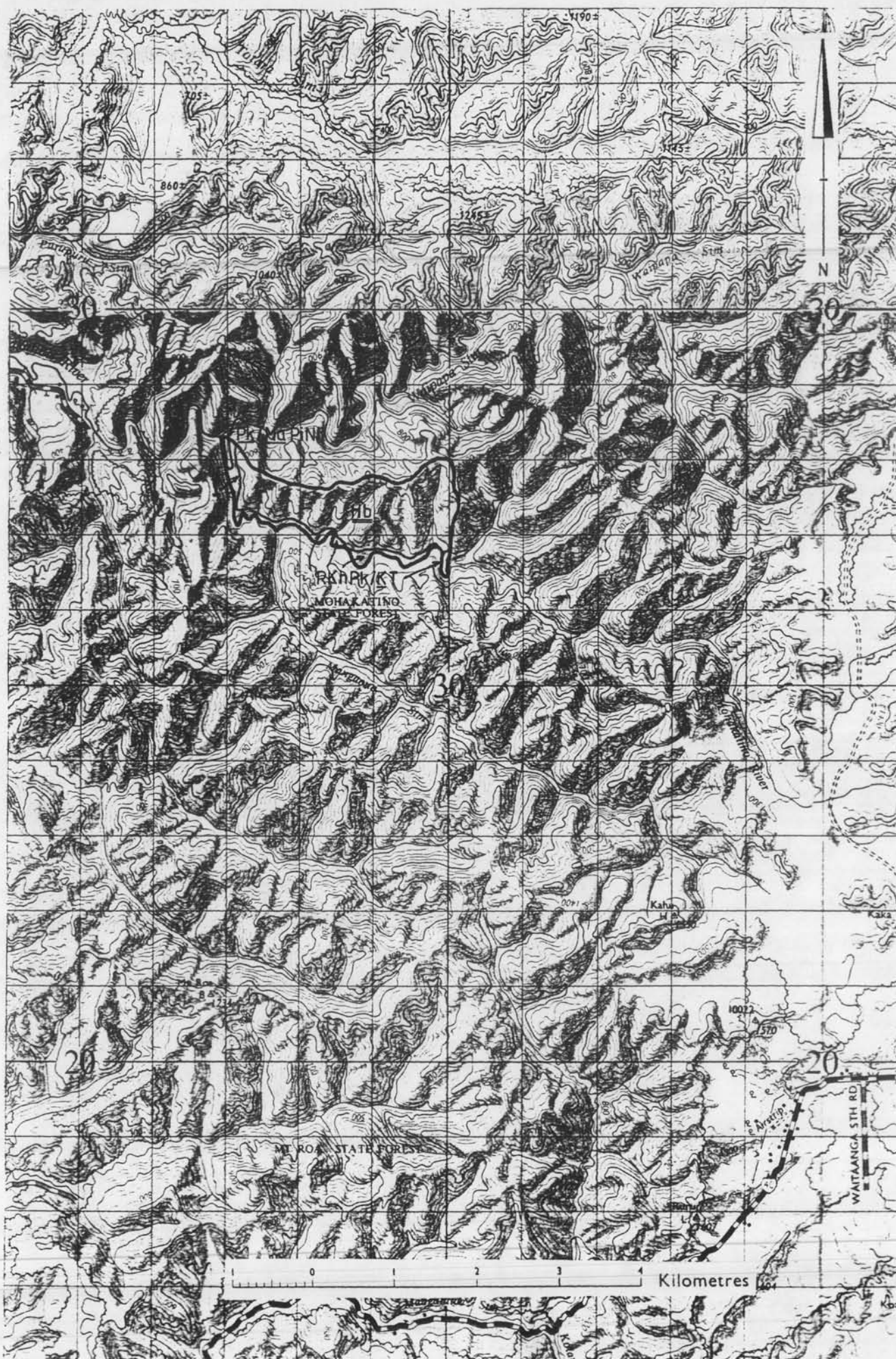
Tawa forest on hillslope and ridge

Pukatea-kahikatea/wheki-ramarama/Carex virgata tussock-treeland on alluvial terrace

Rewarewa/manuka-mamaku scrub on ridge and hillslope

Manuka-mamaku scrub on hillslope and ridge

Area	500 ha
Altitudinal Range	15-300 m a.s.l.
Bioclimatic Zone	Semi-coastal, lowland
Land System	Dissected hill country
Geology	Mohakatino Group, Mt Messenger Sandstone, Alluvium
Tenure	Private
Study Area	24:Hutiwai



15 **MANGAONE**

Grid Reference N100 290250

Description

A tract of primary hillslope forest and alluvial terrace forest within the forested middle reaches of the Mohakatino River, adjoining the Mohakatino Stewardship Area.

Features

- Pure hard beech forest adjoining a riparian tongue of podocarp-rich pukatea/kamahiti-tawa forest.
- One of the few unlogged alluvial terrace forests in North Taranaki.

Ecological Units

Hard beech forest on ridge and hillslope

Rimu-kahikatea-pukatea/kamahiti-tawa forest on alluvial terrace

Cliff scrub (not mappable)

Area	235 ha
Altitudinal Range	65-360 m a.s.l.
Bioclimatic Zone	Lowland
Land System	Dissected hill country
Geology	Mokau Group, Mohakatino Group, Alluvium
Tenure	Private (Maori ownership)
Study Area	22: Mohakatino River

Description

Primary and secondary forest and shrubland covering the broad crest of the Waitaanga Plateau and surrounding low hills.

Features

- A broad, flat plateau with radial drainage - a perched basin. Mount Damper Plateau is the only similar landform in the district.
- An extensive mire of induced kahikatea/manuka-~~Gahnia~~ xanthocarpa tussock-shrubland, and kamahi-quintinia-toro forest, both restricted to the plateau.
- Rimu-rich primary forest on gentle hillslope and interfluvial landforms.
- Hard beech forest on gentle terrain of broad interfluvial; unique in district.
- Remnant pockets of silver beech co-dominant forest on broad interfluvial and alluvial terraces, this being the northern limit of silver beech on the western side of the North Island. The Waitaanga population is a distant outlier from other stands and appears to be a relic of a former more widespread distribution in the Taranaki region (1). In this respect it is nationally important (2).
- Contrast of absence of silver beech on the Mohakatino side of the interfluvial.
- Headwaters of Mangaone Stream with pure hard beech forest links this. Recommended Area for Protection with the Mohakatino stewardship area.

Comments

- Logging of the remaining rimu-tawa-kamahi forest on gentle terrain is underway.
- Although the tussock-shrubland mire is induced, it does not detract from its scientific value. Also, fernbird presence is suspected.
- This is the highest and most inland part of a chain of Recommended Areas for Protection that stretches from near the coast to the Waitaanga Plateau. The corridor encompasses all the bioclimatic zones of the district and a wide range of vegetation types. The small break between this area and Waitaanga stewardship area is a result of farm development about State Highway 40.

Ecological Units

Kahikatea-rimu-kamahi-silver beech forest on planar interfluvial

Hard beech forest on ridge, hillslope and interfluvial

Rimu/tawa-kamahi forest on interfluve

(Rata)/kamahi-tawa forest on interfluve and alluvial terrace

Tawa-kamahi forest on hillslope and ridge

Tawa-kamahi-quintinia forest on hillslope and ridge

Kamahi-quintinia-toro forest on interfluve and alluvial terrace

Kamahi forest on ridge

(Kahikatea)/manuka-Gahnia xanthocarpa tussock-shrubland on interfluve

Developed land

Area	1480 ha
Altitudinal Range	245-500 m a.s.l.
Bioclimatic Zones	Lowland
Land System	Dissected hill country
Geology	Mohakatino Group, Mokau Group, Swamp deposits
Tenure	Private
Study area	17: Waitaanga North
References	(1) McGlone (1980) (2) Nicholls (1968)

62



17 WAITAANGA

Grid Reference N100 385 215

Description

Small areas adjoining the Waitaanga stewardship area in the north.

Features

- Extension of habitat for one of the largest known populations of the nationally rare North Island kokako in the Taranaki-King Country regions (1).
- High numbers of fernbird (regionally rare) in a manuka/sphagnum moss-shrubland unique to the district.
- Connects forest between Waitaanga stewardship area, Mangaroa Scenic Reserve and Kahu Recommended Area for Protection:16. Important to maintain large tracts of forest of varied habitat for kaka, falcon and kiwi which are now nationally rare and require such large areas for long-term survival.

Ecological Units

Rimu/tawa-kamahi forest on hillslope

Kamahi-silver beech-tawa forest on hillslope

Manuka/sphagnum moss shrubland swamp

Silver beech-kamahi-kahikatea forest on interfluve

Tawa-kamahi forest on hillslope, ridge and interfluve

Kamahi-rewarewa-hinau forest on ridge and hillslope

Area	650 ha
Altitudinal Range	300-600 m asl
Bioclimatic Zone	Lowland
Land System	Dissected hill country
Geology	Swamp deposits, Alluvium, Mohakatino Group
Tenure	Private
Study Area	17: Waitaanga North, 11: Waitaanga
References	(1) O'Donnell (1982)



18 WAIKIEKIE

*Grid Reference N100 120180
122168*

Description and Features

Two stands of coastal forest on the northern margin of Whitecliffs stewardship area. In conjunction with the stewardship area these are the best remaining examples of primary coastal hardwood and podocarp - hardwood forests on the west coast of the North Island (1). Puriri, tawa, mahoe and karaka are the dominant species with occasional mangeao, kohekohe, hinau and rewarewa.

Comments

- The Whitecliffs walkway runs along the coastal boundary giving this area high recreational value.

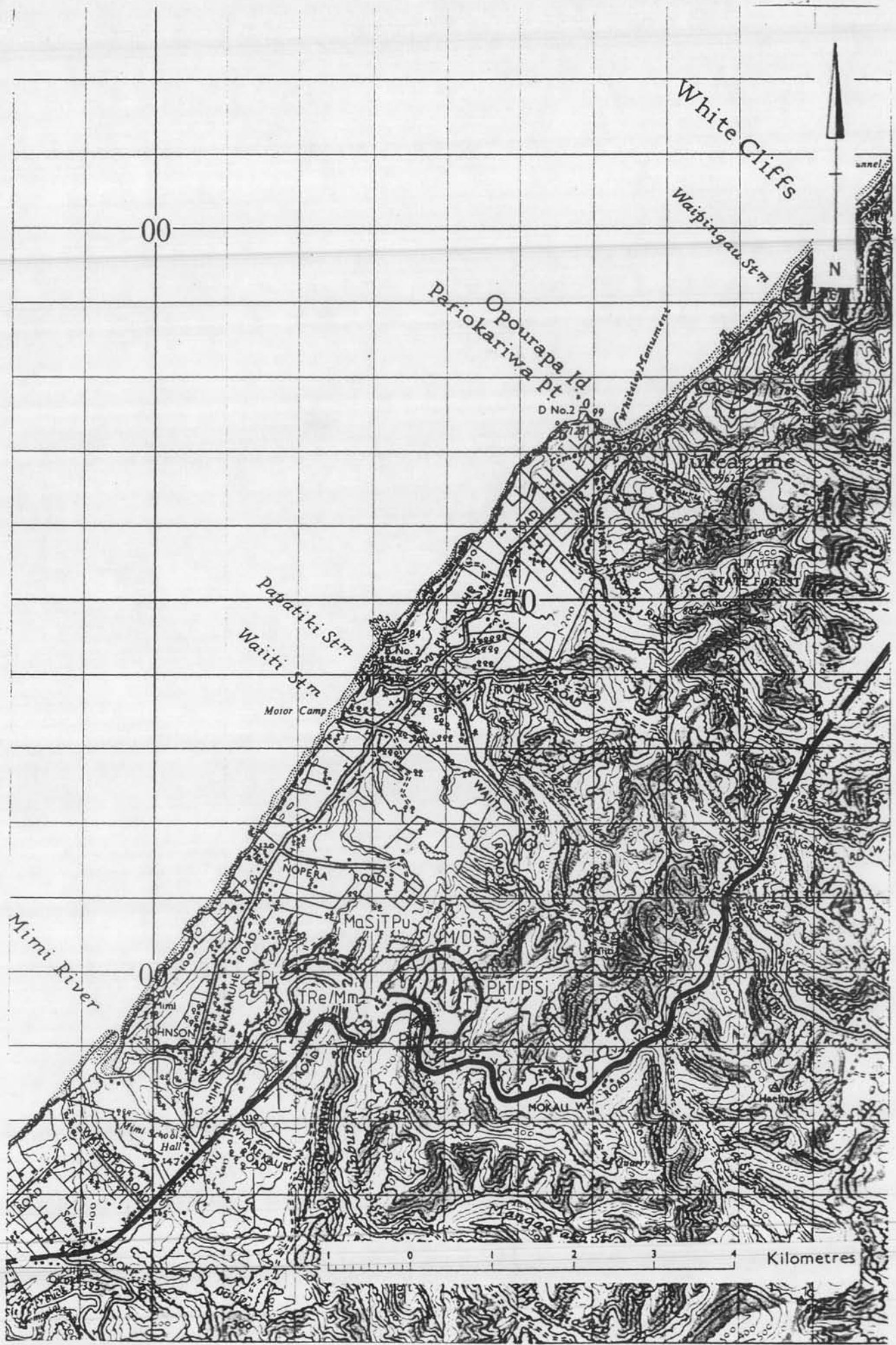
Ecological Units

Tawa-puriri-mahoe forest on hillslope

Mamaku-manuka on hillslope

Manuka scrub on hillslope

Area	165 ha
Altitudinal Range	30-200 m a.s.l.
Bioclimatic Zone	Coastal, semi-coastal
Land System	Dissected hill country
Geology	Mt Messenger Sandstone
Tenure	Private
Study Area	4:Whitecliffs North
Reference	(1) Nicholls (1980)



19 **PUKATEA**

Grid Reference N99 040045

Description

A small tract of semi-coastal vegetation on a variety of landforms, adjacent to the Mimi River and Mimi Scenic Reserve.

Features

- Gentle dipslope covered in pukatea-dominant forest and associated semi-coastal species including kohekohe, kawakawa, nikau and puriri.
- Alluvial terraces of pukatea-dominant semi-coastal forest.
- Well-developed cliff-vegetation which includes small populations of Brachyglottis turneri, a lowland species of local distribution (1) which is at present inadequately protected in reserves.
- The only known occurrence of Arthropteris tenella in the district, a fern of well-drained coastal sites.

Comment

- This area has high scenic value, being conspicuous from State Highway 3, and providing a backdrop to the Mimi River.

Ecological Units

Pukatea-tawa/pigeonwood-supplejack forest on dipslope

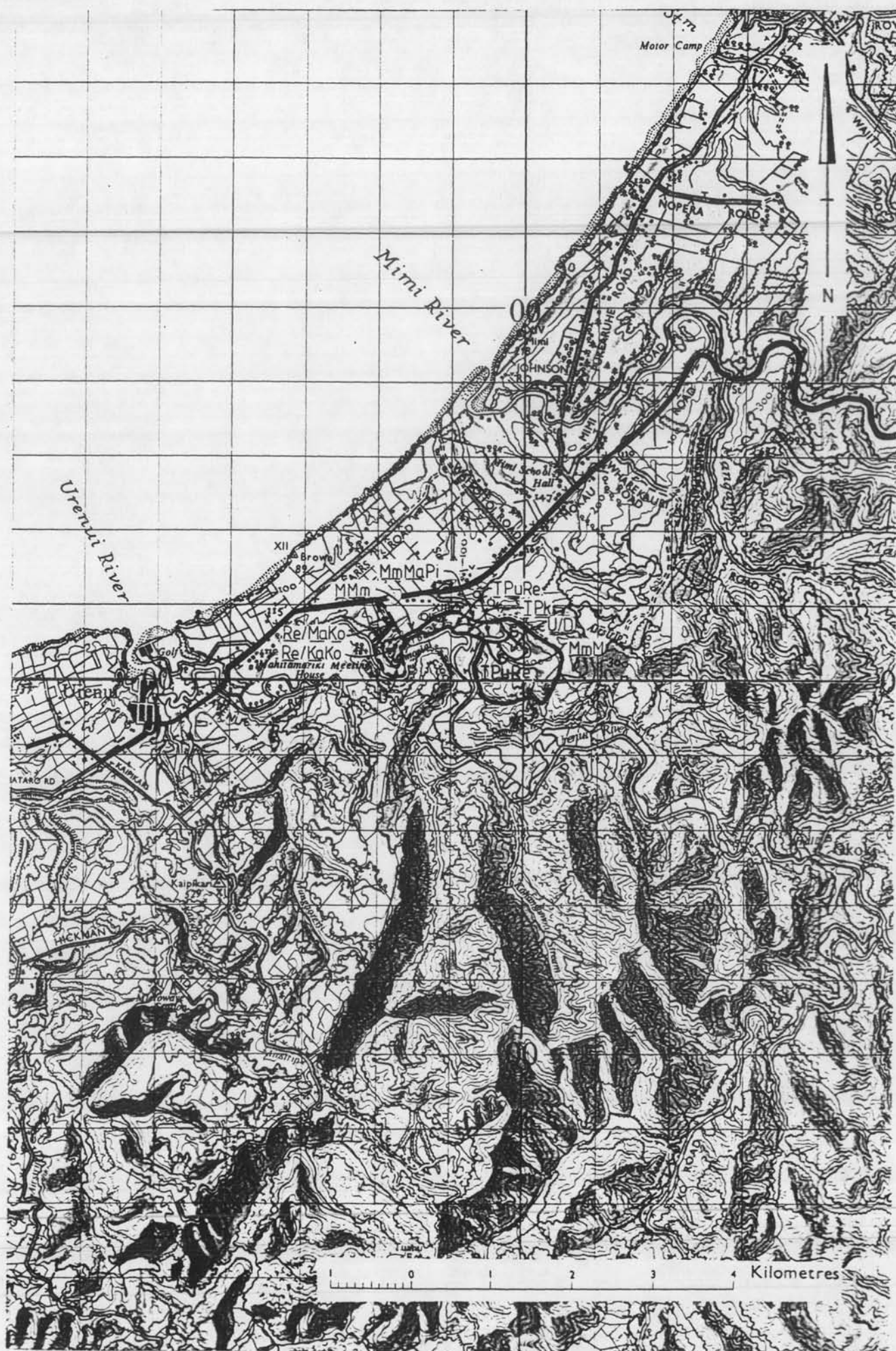
Pukatea forest on alluvial terrace

Mahoe-supplejack-tawa-puriri forest on hillslope

Tawa forest on hillslope

Manuka/developed land shrubland on dipslope

Area	80 ha
Altitudinal Range	25-155 m a.s.l.
Bioclimatic Zone	Semi-coastal
Land System	Dissected hill country
Geology	Alluvium, Urenui Siltstone
Tenure	Private
Study Area	7:Mimi
Reference	(1) Wilson and Given (in prep.)



Description and Criteria

- A small area of primary and secondary semi-coastal forest adjoining the lower reaches of the Urenui River.
- Includes a variety of forest types of high naturalness, with good regeneration and high species diversity.

Comments

- A tongue of manuka-mamaku scrub links this area with Okoki Pa Scenic and Historic Reserve, providing a continuous riparian strip of native vegetation.
- The area of gorse in the centre of the recommended area is included to allow for a more viable reserve. In time the gorse will be succeeded by native vegetation.

Ecological Units

Tawa-puriri-rewarewa forest on hillslope and ridge

Tawa-puriri-rewarewa forest on hillslope

Tawa-pukatea forest on colluvial hillslope and alluvial terrace

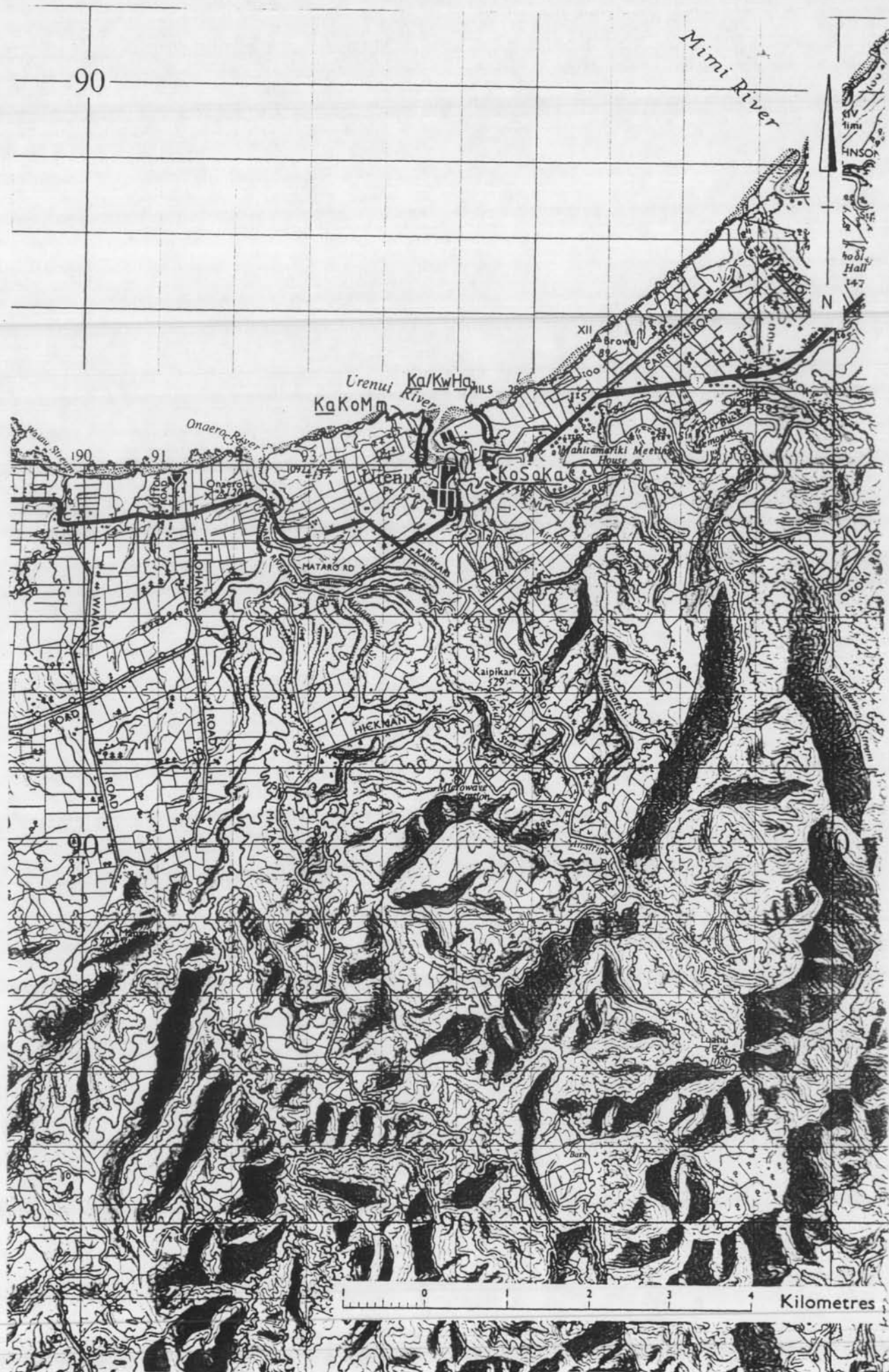
Puriri forest on hillslope (not mappable)

Mamaku-mahoe-pigeonwood forest on hillslope

Mamaku-manuka scrub on hillslope

Gorse/developed land on shrubland hillslope

Area	100 ha
Altitudinal Range	25-155 m a.s.l.
Bioclimatic Zone	Semi-coastal
Land System	Dissected hill country
Geology	Alluvium, Urenui siltstone and Lahars
Tenure	Private
Study Area	33:Mangamaio



21 URENUI RIVER MOUTH

*Grid Reference N99 946004
and N99 953005*

Description and Features

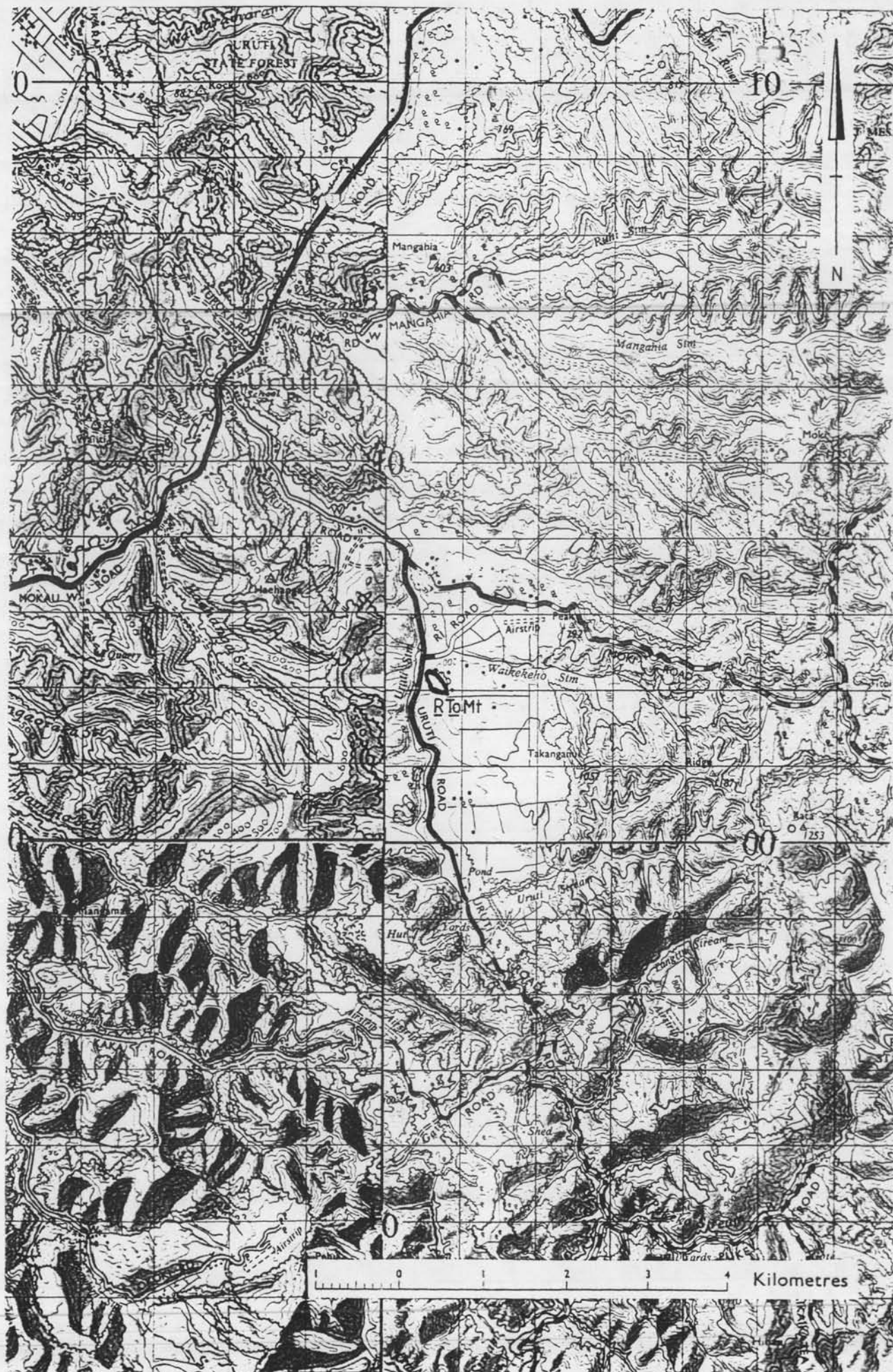
- Two small hillslope strips of secondary coastal forest, one riparian along the Urenui River and the other adjacent to the Urenui golf links. They are remnants of what has been almost completely cleared from the surrounding uplifted marine terrace.
- Notable species include wharangi, Fuchsia perscandens, kowhai, Gahnia lacera.

Ecological Units

Karaka-kohekohe-mamaku forest on hillslope

Karaka/kawakawa-hangehange forest on hillslope

Area	6 ha
Altitudinal Range	0-30 m a.s.l.
Bioclimatic Zone	Coastal
Land System	Uplifted marine terrace
Geology	Uplifted Marine Terrace Rapanui Formation - marine and dune sands, conglomerates
Tenure	Private
Study Area	34:Onaero



22 URUTI FLAT

Grid Reference N100 107022

Description and Features

- A small area of secondary, mixed podocarp-dominant forest on broad interfluve east of Urenui Stream.
- One of the few forests in the district where matai and totara are important canopy species.
- This is one of only two remnants left of forest that once covered the extensive Uruti Stream flats. Similar examples are rare elsewhere in the district owing to near complete clearance of alluvial terraces and interfluves throughout.
- Notable species: Fuchsia perscandens (rare in district)

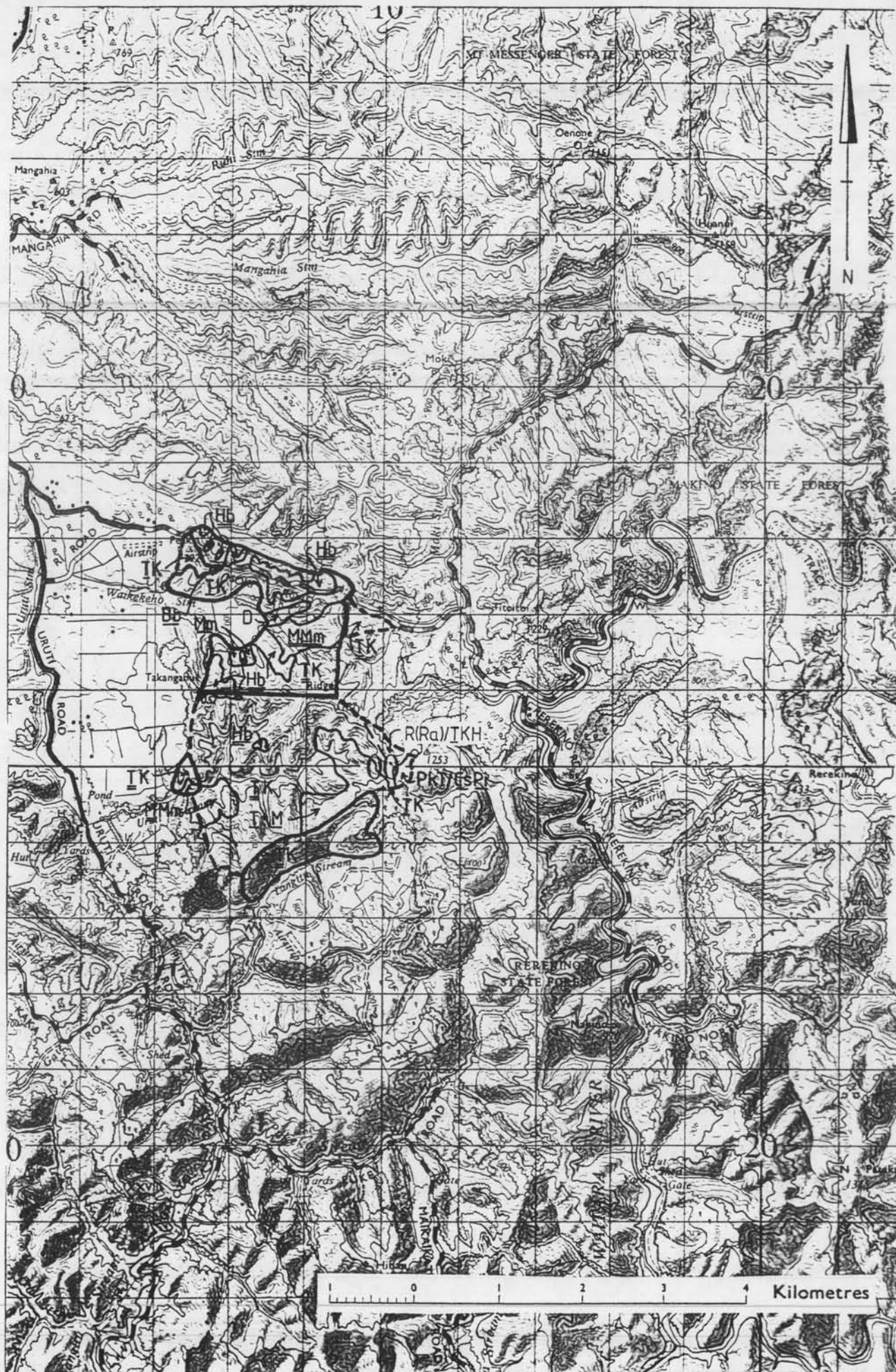
Comment

- To maintain forest fencing is vital as understorey disturbance by stock is serious. Most of the understorey species are confined to gully sides.

Ecological Units

Rimu-totara-matai forest on interfluve

Area	3.5 ha
Altitudinal Range	45-79 m a.s.l.
Bioclimatic Zone	Lowland
Land System	Dissected hill country
Geology	Mount Messenger Sandstone
Tenure	Private
Study Area	29:Rerekino



23 WAIKEKEHO

Grid Reference N100 138020
N100 124000
N110 140990

Description

Three areas of primary and secondary forest on hill country surrounding Waikekeho Stream and connecting Uruti, Moki, and Miro Scenic Reserves.

Features

- Includes hard beech forest and associates largely missing from the above reserves. Also hybrids of hard and black beech; Mida salicifolia (uncommon in district); Astelia trinervia and Lycopodium deuterodensum near their North Island southern limits; and Dracophyllum strictum-dominant cliff vegetation.
- The reserves themselves are important in having black beech (uncommon in district - one of several outliers from a wider distribution south of 39 latitude), Metrosideros carminea near its southern limit, a semi-coastal outlier of kohekohe forest, and mangeao at its southern limit. Connecting these reserves would increase chances of long-term viability (1).

Comment

- Already proposed as a reserve by Botany Division DSIR (2) and (1)

Ecological Units

Hard beech forest on ridge

Tawa-kamahi forest on hillslope and ridge

Tawa-kamahi forest on hillslope

Mamaku treefernland on hillslope

Manuka-mamaku scrub on hillslope and ridge

Dracophyllum strictum scrub on cliff (not mappable)

Developed land

Area	320 ha
Altitudinal Range	60-365 m a.s.l.
Bioclimatic Zone	Lowland
Land System	Dissected hill country
Geology	Mount Messenger Sandstone
Tenure	Private
Study Area	29:Rerekino
Reference	(1) Clarkson and Boase (1982) (2) Clarkson et al. (1981b)

24 MAKINO

Grid Reference N100 265 095
278 067
285 002

Description

Three small areas of mainly primary forest on dissected hill country adjoining the Makino stewardship area.

Features

- Tracts of rimu-rich tawa forest which with the adjoining Makino stewardship area provide habitat for a small population of North Island Kokako, concentrated around Skinner's Hill and Waitaraiti Stream (1).
- The nationally threatened species of kaka, falcon and kiwi are present

Comments

- The manuka and treefern scrub adjoining the Waitara River and Waitaraiti Stream are included to widen the small corridors of forest that would otherwise exist between the two kokako areas.
- The Rerekapa track, which passes through this area has high recreation use.

Ecological Units

Rimu/tawa-kamahi forest on hillslope and ridge

(Rimu)/tawa-kamahi forest on hillslope and ridge

Tawa forest on hillslope

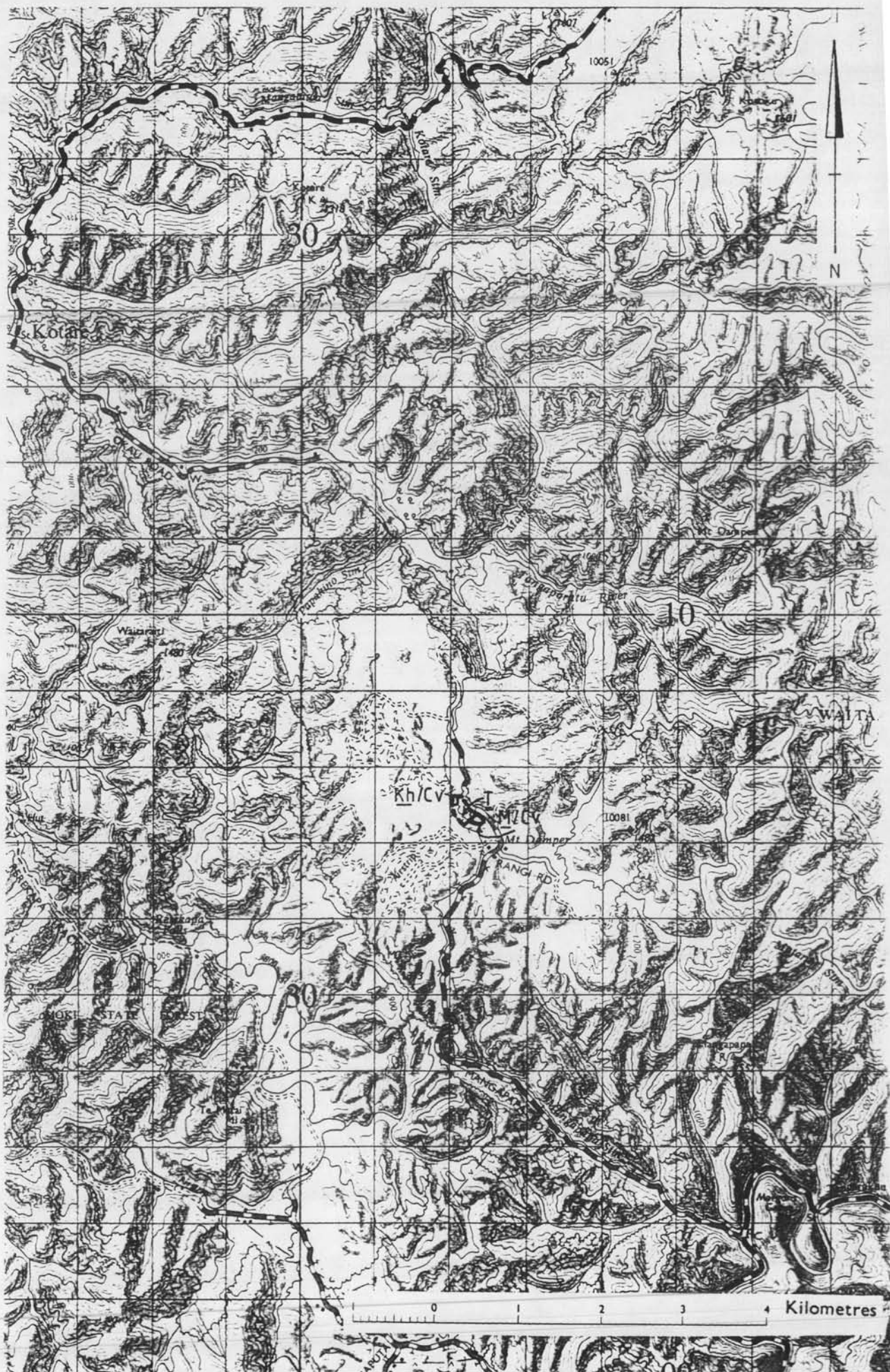
Kamahi forest on hillslope and ridge

Mamaku treefernland on hillslope

Manuka scrub on hillslope and alluvial terrace

Area	670 ha
Altitudinal Range	120-455 m asl
Bioclimatic Zone	Lowland
Land System	Dissected hill country
Geology	Mt Messenger Sandstone
Tenure	Private
Study Area	26: Makino, 28: Moki
References	(1) O'Donnell (1982)

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25 OKAU SCENIC RESERVE EXTENSION

Grid Reference N100 323073

Description and Features

- A small manuka wetland adjoining the hillslope tawa forest and palustrine kahikatea treeland within Okau Scenic Reserve. This would be a significant addition because Mount Damper Plateau, a regionally important landform, has been largely cleared of native vegetation.
- Notable species: Blechnum minus, Epilobium pallidiflorum, Lemna minor, Ranunculus amphotrichus, all rare or uncommon elsewhere in the district.
- Fernbird are present - uncommon in the district.

Ecological Unit

Manuka/Carex virgata tussock-shrubland on alluvial terrace

Area	c. 2 ha
Altitudinal Range	320 m asl
Bioclimatic Zone	Lowland
Land System	Dissected hill country
Geology	Swamp deposits
Tenure	Private
Study Area	28: Moki

This is a detailed topographic map of a mountainous region, likely in New Guinea. The map features contour lines indicating elevation, with major peaks reaching over 2000 meters. A network of roads is shown, including 'ROAD' and 'ROAD' labels. Settlements and locations are marked with dots and labels, including 'HICKMAN' at the top, 'Jaramba D' on the right, and 'Tarata' at the bottom center. A scale bar at the bottom indicates distances up to 4 Kilometres. A north arrow is visible in the upper right corner.

26 TARAMOUKOU

Grid Reference N109 925893

Description

An area of largely primary forest adjoining the Taramoukou stewardship area.

Features

- Small areas of mainly secondary pukatea forest with emergent kahikatea, on the alluvial flats of the Onaero River. These remnants have high naturalness as the river provides a natural buffer and has prevented stock access.
- A small enclave of primary kahikatea forest represents a type now very rare in North Taranaki.
- Fernbirds are present in the rush-tussockland swamp of the Upper Onaero River flats. They are rare in North Taranaki, this population being the furthest south and west in the district. (They are absent from the adjacent Egmont Ecological Region, with the exception of Potaema Bog in Egmont National Park).

Ecological Units

Tawa forest on interfluvium

Pukatea forest on alluvial terrace

Kahikatea/pukatea forest on alluvial terrace

Carex virgata-Juncus spp. rush-tussockland on alluvial terrace

(Rimu)/kohekohe - pukatea forest on interfluvium

Area	153 ha
Altitudinal Range	65-155 m asl
Bioclimatic Zone	Semicoastal and lowland
Land System	Dissected hill country
Geology	Urenui Siltstone
Tenure	Private
Study Area	34: Onaero

[illegible]

27 JUNCTION ROAD

Grid Reference N109 975835

Description and Features

- A small forest remnant within a large bend of the Taramoukou River, typical of the forests that would once have covered the gentle hill country and broad alluvial flats of the southern part of the district.
- One of the few natural areas of mixed podocarp forest left in North Taranaki.
- Complements the nearby rimu-dominant forest of Oapui Forest Sanctuary (1.3 ha).

Ecological Units

Kahikatea-matai-rimu forest on alluvial terrace

Tawa-rewarewa-mamaku forest on hillslope

Area	5 ha
Altitudinal Range	120-185 m a.s.l.
Bioclimatic Zone	Lowland
Land System	Dissected hill country
Geology	Urenui Siltstone
Tenure	Private
Study Area	35:Huiroa-Purangi

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EXISTING PROTECTED AREAS

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO-CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS (* denotes a significant species occurrence)	AREA (HA)	CONDITION
<u>UPLIFTED MARINE TERRACE LAND SYSTEM</u>							
SCENIC AND ALLIED RESERVES							
Kawau Pa Historic Reserve (14A)	1.0	N100 145277	C	Flat topped steep-sided island very close to mainland	Karaka/mapou-hangehange - flax scrub Coastal herbs on cliff	0.7 0.3	Good
Mimi Scenic Reserve (47A)	9.0	N99 025052	SC	Steep river cliffs	Tawa-rewarewa/mamaku forest <u>Pukatea</u> forest <u>Gorse</u> - manuka scrub	8.3 0.6 0.1	Good
					* <i>Brachyglottis turneri</i>	+	
Pukearuhe Scenic Reserve (47)	3.4	N99 063115	C	Steep stream bank and cliff	Tawa-rewarewa/mahoe-karaka-mamaku forest Wattle - mamaku scrub Machaerina-parataniwha Cliff vegetation Pasture	2.5 0.3 + 0.5	Fair
					* <i>Marattia salicina</i>		
<u>DISSECTED HILL COUNTRY LAND SYSTEM</u>							
Arorangi Scenic Reserve (part) (111)	108.0	N91 252400	SC	Steep hill country	(Rimu-rata)/tawa-kohekohe - kamahi forest	108	Fair
Awakino Scenic Reserve (294)	92.7	N91 192415	SC	Steep hill country	<u>Hard beech forest</u> <u>Cliff vegetation</u> Pasture	88 + 4	

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
Hapu Scenic Reserve (12)	16.4	N91 509331	L	Steep hill slopes mostly north-west facing	<u>Tawa forest</u> <u>Hard beech forest</u>	11.2 5.2	Fair
Huikomako Scenic Reserve (part) (295)	241	N91 595200	C-SC		(Rimu)/ <u>tawa-karaka-puriri forest</u> (Rimu)/ <u>tawa forest</u>	25 216	
Kotare Scenic Reserve (40)	450.2	N100 325165	L	Very steel hill country	Rimu-rata/tawa forest Kamahahi forest Hard beech forest Bluff-Machaerina, flax, toetoe Regenerating slips	397 39 4 + 10	Good
Magnus Forbes Scenic Reserve (101)	6.0	N119 934686	L	An undulating plateau deeply dissected on the south and west boundaries by the Makino Stream	Tawa/wheki forest Lancewood/bracken-toetoe-Himalayan honeysuckle fernland Cliffs-Kiofio, Machaerina	5.3 0.7 +	Fair
Mangapoka Scenic Reserve (105)	184.0	N110 255875	L	Steep hill country	<u>Tawa forest</u> <u>Manuka</u> - mamaku scrub	179 5	Good
Mangapapa Scenic Reserve (111)	82.2	N100 335035	L	Steep west-facing hill slope	Tawa forest Kamahahi forest Kaikomako-putaputaweta-manuka shrubland Carex-raupo/pasture Pasture	49 26 7 + +	Good
Mangaora Scenic Reserve (23)	207.8	N100 447178	L	Steep hill country being the upper catchment of a tributary to the Huhatahi Stream	<u>Tawa</u> - kamahahi forest <u>Mamaku</u> - kamahahi forest <u>Bracken/browntop fernland</u> <u>Kamahahi forest</u> Pasture	151 48 5 1 3	Good
Mataru Scenic Reserve (112)	13.9	N100 335062	L	Mt Damper Plateau poorly drained alluvial flats	<u>Kahikatea forest and treeland</u> <u>Pseudopanax-Coprosma-Gahnia tussock-scrubland</u> <u>Tawa-Kamahahi forest</u> <u>Manuka shrubland</u>	6.6 5.9 0.6 0.8	Fair (Goat-willow infestation spreading)

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
Miro Scenic Reserve (43)	14.6	N100 145018	L	Steep hill country	<u>Tawa forest</u> Manuka scrub on slip faces	14.3 0.3	Fair-poor (severe goat damage)
Mironui Scenic Reserve (42)	18.0	N100 188030	L	Steep ridge almost surrounded by a loop of the Waitara River	Matai/ <u>tawa</u> - black maire forest Kahikatea/ <u>putaputaweta</u> Cyathea <u>Smithii</u> scrub Manuka/ <u>pasture</u> Carex/ <u>tall pasture</u> Cliff	14.8 1.1 0.8 1.3 +	Good
Mokau Scenic Reserve (112)*	529.0	N91 195342- 395370	SC-L	Alluvial Terraces and steep slopes adjoining the Mokau River on the right bank. 11 parts.	Kahikatea-pukatea forest <u>Hard beech forest</u> <u>Kamahi forest</u> Kamahi-tawa forest Manuka scrub Juncus/ <u>pasture</u> <u>Leptocarpus similis</u> rushland <u>Cyperus ustulatus</u> - <u>Carex</u> tussockland Tawa-rewarewa-karaka kohekohe forest Tawa-pukatea-mahoe-nikau forest Tawa-nikau treeland <u>Tawa forest</u> Kahikatea-pukatea-swamp maire forest Pasture	12 105 10 150 5 1 2 + 25 140 5 70 2 2	Poor in semi coastal forest, but fair elsewhere. Abundant goats.
Mokau River Scenic Reserve (14)	2273.5	N91 182340- 445570	SC-L	Alluvial terraces and steep slopes adjoining the Mokau River on the left bank. 11 parts.	<u>Hard beech forest</u> <u>Karaka-kohekohe-nikau forest</u> Tawa-karaka forest Tawa forest Pukatea-kahikatea forest Rewarewa/ <u>kanuka</u> forest Cabbage tree/ <u>manuka</u> scrub <u>Cyperus ustulatus</u> - <u>Carex</u> tussockland <u>Leptocarpus similis</u> rushland <u>Manuka scrub</u> <u>Kamahi forest</u> <u>Lawsoniana</u> plantation Bluffs and slips	320 86 273 1464 86 5 7 + + 7 23 2 +	Poor in lower semi-coastal parts of reserve due to stock grazing, fair elsewhere.

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
Moki Scenic Reserve (44)	11.1	N100 125028	SC-L	Steep hillslopes and large bluff with colluvial slope	<u>Tawa forest</u> <u>Kohekohe forest</u> <u>Bluff-Machaerina, Wharariki</u> Pasture Black beech and hard beech * <i>Metrosideros carminea</i>	8.7 1.8 0.5 0.1 +	Fair, some goat damage. Colluvial slope very poor due to stock grazing
Mt Messenger Scenic Reserve (45)	53.7	N100 155125 135115	L	Two parts, steel hill country	<u>Tawa forest</u> <u>Manuka scrub</u> Cliff faces and slips Pasture	52.4 1.2 + 0.1	Fair-good
NG Tucker Scenic Reserve (23A)	97.0	N100 460170	L	Upper catchment of a tributary to the Huhatahi Stream	<u>Tawa-kamahi forest</u> <u>Bluff-Machaerina</u> Pasture	95 +	Good
Oapui Forest Sanctuary	1.3	N109 965832	L	Alluvial terrace	<u>Rimu forest</u>	1.3	Good
Okau Scenic Reserve (110)	5.3	N100 321075	L	Small hill and alluvial flats on Mt Damper Plateau	<u>Tawa forest</u> <u>Kamahi-putaputaweta forest</u> * swamp maire Kahikatea/Carex tussock-treeland <u>Carex tussockland</u> Pasture * Fernbird	2.9 0.1 0.5 1.0 0.8	Fair
Okoki Pa Scenic and Historic Reserve (48)	17.2	N99 982003	SC	Flat topped hill with river flats	Rewarewa/karaka-kohekohe forest Rewarewa/mahoe-kohekohe forest Pasture-grazed	6.1 0.5 10.6	Fair Poor
Pehu Scenic Reserve (70)	58.9	N110 160932	L	Very steep hillslope	<u>Tawa forest</u>	58.9	Fair

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
Piki Scenic Reserve (22)	80.1	N100 519251	L	Steep hill country with small area of alluvial terrace	<u>Tawa forest</u> <u>Kamahahi forest</u> Kahikatea-matai/tawa-kamahahi forest Pasture	57 13 8	Poor-fair (under-growth sparse and highly modified).
Pou Tehia Historic Reserve (45A)	0.8	N100 141216	C	Sharp sandstone knob. Maori burial ground and pa site	Rewarewa/karaka-kohekohe forest Mixed shrubs/perching lillies - <u>rengarenga</u> <u>Willow</u>	0.7 + +	Very good
Puketehi (5A)	239.2	N92 580440	L	Steep to broken hill country with bluffs	Rewarewa/manuka scrub <u>Rimu/tawa forest</u> <u>Hard beech forest</u> <u>Manuka/Juncus-Carex tussock-rushland</u> <u>Manuka/bracken fernland</u> <u>Machaerina sedgeland</u> Pasture - grazed	60 103 30 9 7 + 30	Fair
Pura Scenic Reserve (13)	21.7	N91 479323	L	Steep slopes with mainly easterly aspect draining into the Pura Stream	<u>Tawa forest</u>	21.7	Poor (canopy gaps, little undergrowth, slips).
Purangi Scenic Reserve (71)	37.1	N109 085796	L	Small, steep catchment which drains into the Waitara River	<u>Tawa forest</u> <u>Manuka scrub</u> <u>Juncus/creeping buttercup</u> <u>Willow/tall fescue</u> - <i>Carex geminata</i> Pasture	34.4 1.0 0.6 1.0 0.1	Good except cattle on river terrace

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
Tahora Scenic Reserve (37A)	11.1	N110 338974	L	Steep hill country with a disused road winding through the reserve. Present road and tunnel also pass through reserve	<u>Tawa-kamahi forest (2°)</u> <u>Kamahi-manuka scrub</u> <u>Kamahi/Kioio treeland (bluff)</u> <u>Manuka scrub</u> <u>Manuka/pasture shrubland</u> Pasture	5.8 1.5 1.2 0.9 1.4 0.4	Fair. Good regeneration in parts, some grazing
Tainui Scenic Reserve (111A)	6.7	N91 163374	C	Gentle hillslope	<u>Tainui forest</u> <u>Manuka-gorse-kawakawa shrubland</u> Pasture	4 2.7 +	Poor-fair sheep grazing and trampling, little undergrowth
Tangarakau Scenic Reserve (37)	2642.0	N100 390010	L	Very steep hill country many bluffs	<u>Rimu/tawa forest</u> <u>Hard beech forest (+ black beech)</u> <u>Rewarewa/kamahi-tawa forest</u> <u>Wheki/pasture</u> Bluffs and slips * <i>Brachyglottis turneri</i>	1828 676 138 + +	Good (some goat damage)
Uruti Domain Scenic and Recreation Reserve	2.5	N100 105034	L	Alluvial terrace	<u>Kahikatea-matai-rimu/tawa forest</u>	2.5	Improving
Uruti Scenic Reserve (43A)	388.1	N110 139998	L	Steep hill country, in catchment of the Uruti Stream	<u>Tawa forest</u> <u>Hard beech forest</u> <u>Manuka-mamaku scrub</u>	370.0 5.6 12.5	Fair
Waiarara Scenic Reserve (38)	405.8	N100 450110	L	Steeply sloped (mostly southeast), upper catchment of Heao Stream	<u>Tawa forest</u> <u>Kamahi-tawa forest (2°)</u> Pasture	170 232 4	Fair

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
Waikaka Scenic Reserve (19)	40.9	N92 576315	L	A ridge and alluvial terrace in a loop of Waikaka Stream	Tarata-kanuka tree-shrubland <u>Kahikatea</u> forest <u>Tawa</u> forest <u>Rewarewa/kamahahi</u> forest <u>Manuka-kanuka</u> scrub	7.0 4.5 19.2 9.0 1.2	Fair (some stock grazing)
Waitaka Scenic Reserve (11)	919.6	N92 620390	L	Steep hill country with alluvial terraces of Waitaka Stream	Matai-miro-tanekaha-rimu forest <u>Hard beech</u> forest <u>Rewarewa/kamahahi</u> forest (2°) <u>Tawa</u> forest <u>Kamahahi</u> forest (2°) <u>Manuka</u> scrub	154 46 381 247 + 82	Good (some stock damage on margins).
RC & BN & JC Wills Protected Private Land	1.3	N119 952684	L	Steep ridge (north-facing) in loop of river	<u>Tawa</u> forest <u>Carex</u> /pasture	1.3 +	

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
<u>STEWARDSHIP AREAS</u>							
1. Mohakatino Swamp	22.5	N91 155322	C	Estuarine flat with steep bank on northern side	Raupo/ <i>Scirpus inundatus</i> - <i>Cyperus ustulatus</i> sedgeland Karaka/kawakawa - mahoe forest * Developed * tainui	12 7 4	
2. Addition Mokau Scenic (1)	*see below	N91 195335	SC	Alluvial flat between 2 scenic reserves on lower Mokau River	Kahikatea forest Kahikatea/ <i>Coprosma propinqua</i> - <i>Olearia solandri</i> scrub Jointed rush + <i>Juncus maritimus</i> rushland	+ + +	
3. Addition Mokau Scenic Reserve (2)	46.7	N91 208349	SC	Alluvial flat on bend of lower Mokau River between 2 scenic reserves	Kahikatea - pukatea forest Tawa karaka-nikau forest	24 22	
4. Mokau Riverbank	1.1	N91 288364	L	Alluvial flat	Developed riverbank	1	
5. Purupuru	741.8	N91 250310	SC-L	Whole upper catchment of Purupuru Stream which drains southwards into the Mohakatino River	Tawa-kamahi forest Kamahi-tawa-hinai forest Pukatea-hinai-rewarewa-manuka forest Manuka + tree fern scrub	672 42 28 +	
6. Panirau	4063.0	N91 460370	L	Steep hill country adjoining the northern boundary of the district, draining westward into the Mokau River. Mahoenui and Mokau Group sandstones	Tawa forest Kamahi-tawa forest Tawa-kamahi forest Pukatea/pigeonwood-mahoe forest Rimu-pukatea-rata/kamahi-tawa Cyathea smithii forest Kamahi forest Kamahi-tawa forest (Rata)/tawa forest Hard beech forest Manuka scrub and tree fern scrub Developed	2235 577 713 44 96 146 10 21 18 60 143	

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
7 Waitewhena	3085.7	N91 530 360	L	Steep hill country in the north-east of the district draining westwards into the Waitewhena Stream	Hard beech forest <u>Tawa-kamahi forest</u> <u>Tawa forest</u> <u>Tawa-kamahi forest + kamahi-tawa forest</u> <u>Kamahi forest</u> <u>Kamahi-hard beech forest</u> Rewarewa/<u>kamahi forest</u> (Kahikatea)/<u>kamahi forest</u> <i>Cyathea smithii</i> Rimu/<u>tawa forest</u> Rewarewa/<u>kamahi-hinau forest</u> Rewarewa/<u>manuka-mingimingi scrub</u> Kahikatea-<u>swamp maire-kamahi forest</u> <i>Coprosma tenuicaulis/Carex virgata</i> Kahikatea/<u>tawa-kamahi forest</u> Kahikatea/<u>wheki/Carex virgata treeland</u> Tarekaha/<u>manuka - Olearia townsonii forest on hillslope</u>	1998 303 142 183 60 13 97 3 176 45 33 7 3 3	
8 Tongaporutu	162.9	N100 145225	C-SC	Steep dissected country adjoining the Rapanui Marine Terrace. Draining mostly southwards into the Tongaporutu River but also into the Rapanui Stream	Karaka-rewarewa-puriri forest <u>Five finger-karamu-mamaku scrub</u> Rewarewa/<u>kamahi-mingimingi forest</u> Rewarewa/<u>kamahi forest</u> <u>Hard beech forest</u> <u>Manuka-mamaku scrub</u> Gorse - pampas scrub <u>Tawa-puriri-hinau forest</u>	10 68 21 13 8 + 37 5	

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
9. Hutiwai- Mohakatino - Mt Roa	8803.7	N100 230220	SC-L	An extensive tract of steep dissected hill country including the poorly drained Hutiwai Stream Valley and associated catchment	Tawa forest and hard beech forest mosaic <u>Hard beech forest</u> <u>Tawa forest</u> <u>Tawa-kamahahi forest</u> <u>(Rata-rimu)/tawa-kamahahi forest</u> <u>Pukatea-kahikatea/wheki-ramarama/</u> <i>Carex virgata</i> shrubland <u>Swamp maire-pukatea-kahikatea forest</u> <u>(Kahikatea-rata)/pukatea forest</u> <u>Kanuka-kahikatea-rimu scrub</u> <u>Kahikatea forest</u> <u>Carex virgata sedgeland</u> <u>Manuka scrub (swamp)</u> <u>(Pukatea)/mahoe-wheki-Cyathea</u> <i>smithii/Carex virgata</i> scrub <u>Rimu-kahikatea-pukatea/kamahahi-tawa</u> <u>forest</u> <u>Rimu-pukatea/kamahahi forest</u> <u>Tawa-treefern forest</u> <u>Rewarewa/kamahahi forest + rewarewa/</u> <u>kamahahi forest</u> <u>Rewarewa/manuka-wheki scrub</u> <u>(Rata-rimu)/tawa-kamahahi forest</u> <u>(Rimu)/tawa-kamahahi forest</u> <u>Kamahahi-quintinia-rewarewa forest</u> <u>Mamaku-tawa forest</u> <u>Kamahahi-tawa-rewarewa forest</u> <u>Manuka-treefern scrub + kamahahi-manuka</u> <u>treefern scrub</u> Developed	2956 1145 1854 812 897 159 11 105 + + + + 31 52 32 89 189 13 109 44 19 97 66 52 16	

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
10. Waitaanga	15933.7	N100 400130	L	Part of the Waitaanga Plateau with the meandering swampy Waitaanga Stream, and steep dissected hill country	Tawa forest Rimu/tawa forest Rimu/tawa-kamahi forest (Rimu-kahikatea)/tawa-kamahi forest Hard beech forest Tawa-kamahi forest (ridge type) Tawa-kamahi forest (hummock type) Silver beech-kamahi forest Kamahi-rewarewa-hinau forest Kamahi-tawa forest Kamahi forest Kamahi-mamaku forest Rewarewa/kamahi forest Kamahi-tawheowheo-toro forest (Rata)/kamahi-tawa forest Cyathea smithii-mahoe-pukatea forest Manuka scrub Cliff vegetation Developed - pines Developed - pasture	7125 1852 1540 117 2186 495 957 423 344 270 209 40 59 36 63 9 4 9 161 34	
11. Mangakara	88.2	N100 452195	L	Steep hill country adjoining the northern boundary of Mangaroa Scenic Reserve	Rimu/tawa-kamahi forest Kamahi-rewarewa-hinau forest Mamaku scrub	53 32 3	
12. Kara	537.8	N100 490230	L	Steep hill country draining south-eastwards; near the boundary of the district with the Taumarunui Ecological District	Tawa-kamahi forest Rimu/tawa-kamahi forest Kamahi forest Hard beech forest Rewarewa-hinau-tawheowheo forest Developed	493 20 12 10 + +	

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
13. Whitecliffs	1855.7	N100 110140	C-SC	Steep dissected catchment of Waipungau Stream and also southern catchment of the Waikorora Stream. High Coastal cliffs	(Rimu)/tawa forest <u>Tawa-puriri</u> forest <u>Tawa-puriri-mahoe</u> forest <u>Karaka-puriri</u> forest Pingao sedgeland <u>Karaka/wharariki-toetoe</u> flaxland <u>Rewarewa-manuka-five finger</u> scrub <u>Kamahi-hinaiu-rewarewa</u> forest <u>Kamahi</u> forest <u>Tawa</u> forest <u>Manuka</u> Scrub <u>Hard beech</u> forest <u>Mamaku</u> scrub <u>Rewarewa-hinaiu</u> forest <u>Manuka-mamaku</u> scrub <u>Tawa-kamahi</u> forest <u>Developed (pipeline)</u>	1294 168 5 32 + 6 61 74 + + 6 51 7 41 + 72 32	
14. Ututi	252.9	N99 080100	SC	Steep country - part within the Waikaramarama Stream Catchment draining westwards and part draining eastwards to a small swampy flat of the Mimi River catchment. Mt Messenger sandstone, alluvium	<u>Tawa</u> forest <u>Tawa-puriri</u> forest <u>Mahoe-pukatea</u> forest <u>Manaku-manuka</u> scrub <u>Manuka</u> scrub <u>Kahikatea/raupo-Coprosma tenuicaulis</u> shrub-sedgeland Developed	161 46 21 11 4 2 7	
15. Mt Messenger	2783	N100 160090	L	Steep dissected hill country Mt Messenger sandstone	<u>Tawa-kamahi</u> <u>Hard beech</u> forest <u>Tawa</u> forest <u>Pukatea-rimu/tawa-pukatea-rewarewa</u> forest <u>Pukatea-mahoe-pigeonwood</u> forest <u>Tawa-pukatea-treefern</u> forest <u>Ramarama-kahikatea</u> shrubland <u>Kahikatea</u> forest <u>Kahikatea</u> treeland Developed	2190 229 132 34 53 84 29 14 3 15	

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
16. Papakino	63.6	N100 312103	L	Steep hillslope. Mt Messenger sandstone.	<u>Tawa forest</u>	63	
17. Moki slopes	75.0	N100 150035	L	Steep eastward facing hill-slopes. Mt Messenger sandstone.	Tawa-kamahahi forest Mamaku-manuka scrub	70 5	
18. Rata	120.0	N100 150010	L	Steep hill country between Miro and Uruti Scenic Reserve Mt Messenger sandstone.	Tawa - <i>Cyathea smithii</i> - kamahahi forest Rimu-(rata)/tawa-kamahahi-hinau forest Tawa-kamahahi forest <u>Mamaku scrub</u> Developed	45 59 16 + +	
19. Makino-Moki	9355.4	N100 240010 & N110 23095	L	Mostly steep hill country with alluvial flats around the headwaters of the Waitara River on the Mt Damper Plateau. Mt Messenger sandstone, alluvium	Rimu/tawa-kamahahi forest Tawa forest + <u>Manuka</u> -mamaku scrub (Rimu)/tawa-kamahahi-hinau forest Tawa-kamahahi-hinau forest Tawa-kamahahi-rewarewa forest Rimu/tawa forest Tawa forest Tawa-pukatea/wheki forest Rata-rimu/tawa-pukatea forest Tawa-kamahahi-hinau/wheki- <i>Cyathea smithii</i> forest Tawa-kamahahi-hinau-white maire-black maire-narrowleaved maire forest <u>Kamahahi forest</u> Kamahahi(rimu) forest Rimu/kamahahi forest Kamahahi-kahikatea forest Kamahahi-tawheowheo forest (Rimu-kahikatea)/tawa-hinau forest Tawa- <i>Cyathea smithii</i> forest Tawa-narrowleaved maire forest	4721 2491 743 140 23 23 11 203 37 83 138 50 28 + 3 8 16 24 2	

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
19. continued					<u>Kahikatea-black maire-tawa forest</u> (Kahikatea-rimu)/ <u>narrowleaved maire</u> <u>Kamahih-black maire-tawa forest</u> <u>Kahikatea/kamahih-black maire-matai forest</u> <u>Tree fern-kamahih/wheki scrub</u> <u>Tree fern-manuka scrub</u> <u>Manuka scrub</u> Developed	+ 22 + 17 414 78 88	
20. Rerekino	523.7	N110 1755965	L	Eastward draining hillslopes adjoining the Waitara River. Mt Messenger sandstone	<u>Rimu/tawa-kamahih-hinau forest</u> <u>Rimu/kamahih-tawa-hinau forest</u> <u>Tawa-kamahih forest</u> <u>Tawa-mamaku forest</u> <u>Pukatea-tawa/Cyathea smithii-pigeonwood forest</u> <u>Wheki scrub</u>	280 3 139 86 10	
21. Okoki	112.6	N109 005955	L	Part of steep upper catchment of Kohangamoa Stream. Urenui siltstone	<u>Tawa forest + manuka scrub</u> <u>Tawa forest + developed</u> <u>Manaku-manuka scrub</u> <u>Manuka scrub</u>	48 40 12 13	
22. Pouiatua	3612.0	N109 060880	L	Steep dissected country forming the divide between the Waitara River catchment and the Urenui River catchment Urenui siltstone	<u>Tawa forest + Manuka-treefern scrub</u> <u>Tawa-kamahih-hinau-rewarewa forest</u> (Rimu)/ <u>kamahih-tawa-rewarewa forest</u> <u>Hard beech forest</u> <u>Black beech forest</u> <u>Pukatea-tawa forest</u> <u>Pukatea/pasture treeland</u> <u>Kahikatea/pukatea-tawa forest</u> <u>Tawa-mahoe-pukatea forest</u> <u>Tawa-treefern forest</u> <u>Rewarewa/manuka scrub</u> <u>Manuka scrub</u> <u>Manuka-treefern scrub</u> <u>Kanuka scrub</u> <u>Kanuka-treefern-manuka scrub</u> Developed	1700 1352 99 160 5 61 32 + 6 12 5 72 33 11 64 +	

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
23. Taramouku	1457.6	N109 955870	L with SC outlier	Steep dissected country with some ash deposits. Upper catchment of the Onaero River draining mostly westwards. Urenui Siltstone	<u>Tawa-kamahi forest</u> <u>Tawa forests</u> <u>Pukatea forest</u> <u>(Rimu)/kohekohe-pukatea forest</u> <u>(Rimu)/tawa-kohekohe forest</u> <u>Tawa-rewarewa forest + developed</u> <u>Carex virgata-Juncus spp. sedge-</u> <u>rushland</u> <u>Rimu-kahikatea forest</u> <u>Manuka scrub</u>	977 340 23 36 17 58	
24. Matau 1	84.1	N110 105850	L	Steep dissected hill country Urenui siltstone	<u>Tawa-kamahi forest</u> <u>Tawa-hinau-rewarewa forest + kanuka</u> <u>-manuka scrub</u>	31 53	
25. Mangaone	13.9	N110 215893	L	Steep hill country. In two parts.	<u>Tawa forest + Manuka-mamaku scrub</u>	9	
26. Marco	1.5	N110 568335	L	Steep hill country	<u>Tawa forest + Manuka-mamaku scrub</u>	10	
27. Matirangi	1981	N110 520300	L	Steep hill country draining north-westwards. Adjoining the eastern boundary of the district with Matemateaonga Ecological District	<u>Tawa forest + Mamaku-manuka scrub</u> <u>Treefern-manuka + Manuka-treefern</u> <u>scrub</u> <u>Kahikatea-(rimu)/tawa-kamahi forest</u> <u>Black beech forest</u> <u>Developed</u>	1880 38 18 7 38	
28. Matau 2	12.7	N109 090825	L	Steep slopes adjoining the Waitara River. Urenui Siltstone.	<u>(Rimu)/tawa forest</u>	12	
29. Matau 3	11.9	N109 086827	L	Steep slopes adjoining the Waitara River. Urenui Siltstone	<u>Tawa forest</u>	11	

NAME AND NO.	AREA (HA)	GRID REFERENCE	BIO- CLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS	AREA	CONDITION
30. Tarata	133.5	N109 917795	L	Steep country predominantly draining eastwards. Close to district boundary with Egmont Ecological Region. Matemateaonga sandstone.	(Rimu)/ <u>tawa</u> -rewarewa forest <u>Tawa</u> -rewarewa forest <u>Pukatea</u> forest	82 36 15	
31. Tuihu	254.9	N109 985768	L	Hillslopes adjoining and draining into the Waitara River.	(Rimu)/ <u>tawa</u> -kamahi-hinau forest	254	
32. Autawa	178.9	N109 020765	L	Main catchment of the Huia Stream, adjoins the Waitara River	<u>Tawa</u> -kamahi-rewarewa forest <u>Manuka</u> -treefern scrub	107 72	
33. Douglas Nth	6.1	N109 007742	L	Steep ridge and hillslopes between Makino Stream and Waitara River near their confluence	<u>Tawa</u> -mamaku forest Developed	4	
34. Huiroa	295.4	N119 990698	L	Moderately steep hill country in the south of the district. Matemateaonga sandstone.	Rimu/ <u>tawa</u> -rewarewa forest Kahikatea treeland + developed Kahikatea-(rimu)/ <u>kahikatea</u> -wheki forest <u>Tawa</u> -rewarewa forest <u>Rewarewa</u> forest <u>Manuka</u> scrub	265 7 6 2 2 3	
35. Mahoenui	901.0	N91 330445	L		Rimu/ <u>tawa</u> -kamahi forest Rimu/ <u>kamahi</u> forest <u>Hardbeech</u> forest <u>Kamahi</u> forest <u>Tawa</u> -kamahi forest <u>Manuka</u> -treefern scrub	120 265 30 250 210 15	

CHECKLIST OF ECOLOGICAL CLASSES

The ecological classes listed are those of natural areas only, taking no account of developed land such as exotic grassland, scrub and forest. Ecological class names comprise the bioclimatic zone, hydrological class and land system of each structural class. The conservation value of each ecological class is indicated by (a) its present frequency in the district, (b) ecological significance, i.e. that it is representative of the original character of the district and/or provides important habitat (e.g. wetlands), (c) whether it was formerly common. The protected area status enumerates the extent and number of each class within existing protected natural area, and, combining conservation value criteria, indicates whether or not each class is sufficiently protected.

DHC = Dissected Hill Country
UMT = Uplifted Marine Terrace

Bio-Climatic Zone	Hydrological Class	Land System	Vegetation Structural Class	Frequency in District	Significant Ecological Class (Yes/No)	Ecological, Class formerly common, now rare and substantially modified (Yes/No)	Total Area (ha)	Number of Areas	Adequacy of Protection	Additional area in Stewardship (ha)
COASTAL	estuarine	UMT	reedland	rare	yes	no	0	0	nil	12
	estuarine	DHC	rushland	rare	yes	no	0	0	nil	
	estuarine	DHC	rush-shrubland	rare	yes	no	0	0	nil	
	palustrine	UMT	reedland	rare	yes	no	0	0	nil	
	palustrine	UMT	reed-rushland	rare	yes	no	0	0	nil	
	palustrine	UMT	grass-rushland	rare	yes	no	0	0	nil	
	palustrine	UMT	flax-tussockland	rare	yes	no	0	0	nil	
	palustrine	DHC	flax-reedland	rare	yes	no	0	0	nil	
	terrestrial	UMT	forest	rare	yes	yes	2.5	1	inadequate	
	terrestrial	UMT	treefernland	rare	no	no	1.0	2	adequate	
	terrestrial	UMT	scrub	rare	yes	no	0.7	1	nil	
	terrestrial	UMT	shrubland	rare	no	no	0	0	inadequate	
	terrestrial	UMT	flax-chrubland	uncommon	yes	yes	0	0	inadequate	
	terrestrial	UMT	shrub-flaxland							
	terrestrial	UMT	vine-tussockland	rare	no	no	0	0	adequate	
	terrestrial	UMT	grassland	uncommon	yes	yes	0	0	nil	
	terrestrial	UMT	shrub-herbfield	yes	yes	no	0.3	1	inadequate	
	terrestrial	UMT	rockland	uncommon	yes	yes	+	2	inadequate	
	terrestrial	DHC	forest	uncommon	yes	yes	6.1	0	inadequate	320
	terrestrial	DHC	treeland	uncommon	no	no	0	0	adequate	
	terrestrial	DHC	scrub	uncommon	yes	no	0	0	nil	10
	terrestrial	DHC	shrubland	uncommon	yes	yes	2.7	1	adequate	
	terrestrial	DHC	flax-shrubland				0	0	inadequate	6
	terrestrial	DHC	shrub-flaxland							
	terrestrial	DHC	tussock-vineland	rare	no	no	0	0	adequate	
	terrestrial	DHC	sedgeland	rare	yes	no	0	0	nil	+
	terrestrial	DHC	rockland	uncommon	yes	no	0	0	nil	

CHECKLIST OF ECOLOGICAL UNITS

Bio-Climatic Zone	Hydro-logical Class	Land Sys-tem ¹	Vegetation Structural Class	Vegetation Type ²	Landform
COASTAL	Estuarine	DHC	rushland	<i>Juncus maritimus</i>	alluvial flat
		DHC	rushland	coastal tree daisy - marsh ribbonwood/jointed rush	alluvial flat
		DHC	rush-shrubland	marsh ribbonwood/jointed rush	alluvial flat
	Palustrine	DHC	flax-reedland	raupo-harakeke	alluvial flat
		UMT	reedland	raupo	alluvial terrace
		DHC	reed-rushland	raupo/ <i>Scirpus prolifer-Cyperus ustulatus</i>	alluvial terrace
		UMT	grass-rushland	<i>Scirpus prolifer-Elbocharis gracilis</i> -swamp millet	marine terrace
		UMT	flax-tussockland	toetoe-harakeke	marine terrace
	Terrestrial	DHC	forest	<i>Olearia albida</i> -mahoe	hillslope
		DHC	forest	hard beech	ridge
		UMT	forest	karaka/kawakawa-hangehange	hillslope
		DHC	forest	karaka/kawakawa-mahoe	hillslope
		UMT	forest	karaka-kohekohe-mamaku	hillslope
		UMT	forest	karaka-kohekohe-mamaku-mahoe	hillslope
		DHC	forest	karaka-mamaku-wattle	hillslope
		DHC	forest	karaka-mangeao-puriri-tawa	hillslope
		DHC	treeland	karaka-mangeao-puriri-tawa	hillslope
		DHC	forest	karaka-puriri	hillslope
		DHC	forest	karaka-puriri-nikau	hillslope
		DHC	forest	karaka-puriri-rewarewa	hillslope
		DHC	forest	karaka-rewarewa-puriri	hillslope
		DHC	forest	kohekohe-karaka-mangeao-mahoe	hillslope
		UMT	forest	kohekohe-kowhai-karaka	hillslope
		DHC	forest	kowhai-lacebark	hillslope
		UMT	forest	pukatea	hillslope
		DHC	forest	pukatea-puriri-karaka-tawa	alluvial terrace
		DHC	forest	puriri-karaka-tawa	alluvial terrace
		DHC	forest	(puriri)-karaka- <i>Olearia albida</i>	hillslope
		DHC	scrub	rewarewa/kamahi-mingimingi	hillslope
		DHC	forest	rewarewa/karaka-kohekohe	hillslope
		UMT	forest	rewarewa/karaka-kowhai	hillslope
		DHC	forest	rewarewa/mamaku-karaka-puriri-mahoe	hillslope
		DHC	forest	tainui	hillslope
		DHC	forest	tawa-karaka-kowhai	hillslope
		UMT	forest		hillslope
		UMT	forest		hillslope

1. DHC Dissected Hill Country
UMT Uplifted Marine Terrace

2. / = emergency over
() = < 5% cover
· = connects species of the same tier

Bio-Climatic Zone	Hydro-logical Class	Land Sys-tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	forest	tawa-nikau-mamaku-puriri	hillslope
		DHC	forest	tawa-puriri	hillslope
		DHC	forest	tawa-puriri-mahoe	hillslope
		DHC	forest	tawa-rewarewa/mahoe-karaka-mamaku	hillslope
		UMT	shrubland	boxthorn-lupin	sand dune
		UMT	flax-shrubland	taupata-wharariki	cliff
		DHC	flax-shrubland	taupata-wharariki	cliff
		UMT	scrub	five-finger - karamu - mamaku	hillslope
		DHC	tussock-shrubland	gorse-pampas	hillslope
		UMT	scrub	karaka/mapou-hangehange-harakeke	marine terrace
				karaka/ <i>Olearia albida</i> -manuka	(island)
		DHC	shrubland	mamaku	hillslope
		UMT	treefermland	mamaku-heketara-mahoe	hillslope
		DHC	scrub	mamaku-mahoe	hillslope
		UMT	scrub	mamaku-manuka-lancewood	hillslope
		DHC	scrub	mamaku-rangiora-mahoe	hillslope
		DHC	scrub	manuka	hillslope
		DHC	scrub	manuka	ridge
		DHC	scrub	manuka	hillslope
		DHC	flax-shrubland	manuka-karamu-wharariki/rengarenga	alluvial terrace
		DHC	shrubland	manuka-gorse-kawakawa	cliff
		UMT	scrub	karo-kawakawa-taupata-harakeke	hillslope
		UMT	scrub	karo-kawakawa-taupata-harakeke	marine terrace
		DHC	scrub	rewarewa/manuka-akeake-mamaku	cliff
		DHC	scrub	rewarewa/mingimingi-kamahi	hillslope
		DHC	scrub	wattle-mamaku	hillslope
		UMT	shrub-herbfield	<i>Hebe stricta</i> Var. <i>macroura</i> -tutu- <i>Disphyma australe</i>	
				<i>Tetragonia trigyna</i> -sea primrose	cliff
		UMT	shrub-flaxland	harakeke-taupata-kawakawa	cliff
		DHC	shrub-flaxland	karaka/wharariki	cliff
		UMT	shrub-flaxland	wharariki-kawakawa-boxthorn	cliff
		UMT	vine-tussockland	<i>Cyperus ustulatus</i> -pohuehue	marine terrace
		DHC	tussock-vineland	kiekie-toetoe-wharariki	hillslope
		DHC	sedgeland	pingao	sand dune
		DHC	grassland	marram	sand dune
		UMT	grassland	spinifex	sand dune
		UMT	rockland	<i>Machaerina sinclairii</i> -parataniwha	cliff
		DHC	rockland	<i>Machaerina sinclairii</i> -parataniwha	cliff
		UMT	rockland	(sea primrose-sea celery)	cliff
		UMT	sandfield		sand plain

Bio-Climatic Zone	Hydro-logical Class	Land System ¹	Vegetation Structural Class	Vegetation Type	Landform
SEMI-COASTAL	Estuarine	DHC	rushland	<i>Juncus maritimus</i>	alluvial flat
		DHC	rushland	jointed rush	alluvial flat
Palustrine		DHC	herbfield	arrowgrass	alluvial flat
		DHC	forest	(kahikatea-pukatea)/kahikatea-swamp maire	alluvial terrace
		DHC	forest	kahikatea-pukatea-swamp maire	alluvial terrace
		DHC	scrub	cabbage tree/manuka	alluvial terrace
		DHC	rush-scrubland		alluvial terrace
		DHC	scrub	cabbage tree/mauka-gorse- <i>Baumea rubiginosa</i>	alluvial terrace
		DHC	scrub	(kahikatea)/ <i>Coprosma propinqua</i> -Coastal tree daisy	alluvial terrace
		DHC	scrub	(kahikatea-pukatea)/ <i>Coprosma tenuicaulis</i>	alluvial terrace
		DHC	reed-shrubland	kahikatea/raupo- <i>Coprosma tenuicaulis</i>	alluvial terrace
		UMT	reedland	raupo	marine terrace
Terrestrial		DHC	forest	hard beech	hillslope
		DHC	forest	hard beech	ridge
		DHC	forest	kahikatea	alluvial terrace
		DHC	forest	kahikatea-pukatea	alluvial terrace
		UMT	forest	kahikatea-pukatea	alluvial terrace
		DHC	forest	kamahi-hinau-rewarewa	ridge
		UMT	forest	kamahi-mamaku-kohekohe-wattle	hillslope
		DHC	forest	kamahi-mingimingi-rewarewa	ridge
		DHC	forest	karaka-kohekohe-nikau	hillslope
		UMT	forest	kohekohe	hillslope
		DHC	forest	kohekohe-mamaku	hillslope
		UMT	forest	kohekohe-pukatea	hillslope
		DHC	forest	kohekohe-tawa-supplejack	hillslope
		DHC	forest	mahoe-pukatea	colluvial hillslope
		DHC	forest	mahoe-supplejack-tawa-puriri	hillslope
		UMT	forest	mamaku-kamahi-pukatea-wattle	hillslope
		UMT	forest	mamaku-mahoe-pigeonwood	hillslope
		DHC	forest	mangeao-pukatea	interfluvial
		DHC	forest	pukatea	interfluvial
		DHC	forest	pukatea	alluvial terrace
		UMT	forest	pukatea	alluvial terrace
		DHC	forest	pukatea-kohekohe	dipslope
		DHC	forest	pukatea-mahoe-kohekohe	dipslope
		DHC	forest	pukatea-nikau-mahoe-tawa	dipslope
		DHC	forest	pukatea-rimu/tawa-pukatea-rewarewa	dipslope
		DHC	forest	pukatea-tawa-nikau	alluvial terrace

Bio-Climatic Zone	Hydro-logical Class	Land Sys-tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	forest	pukatea-tawa-nikau	colluvial hillslope
		DHC	forest	pukatea-tawa/pigeonwood-supplejack	dipslope
		DHC	forest	puriri	hillslope
		DHC	forest	(puriri)-kohekohe-pukatea-nikau-tawa-mahoe	interfluve
		DHC	forest	puriri-tawa-karaka	hillslope
		DHC	forest	rewarewa-hinaiu	hillslope
		DHC	forest	rewarewa/kamahii	hillslope
		DHC	forest	rewarewa/kamahii - five finger	hillslope
		DHC	forest	rewarewa/karaka-kohekohe	hillslope
		DHC	forest	rewarewa/mahoe-kohekohe	hillslope
		UMT	forest	rimu	hillslope
		DHC	forest	(rimu)/kohekohe-pukatea	interfluve
		DHC	forest	(rimu-rata)/tawa-kohekohe-kamahii	hillslope
		DHC	forest	rimu/tawa	hillslope
		DHC	forest	rimu/tawa	ridge
		DHC	forest	(rimu)/tawa-kohekohe	hillslope
		DHC	forest	(rimu)/tawa-kohekohe	interfluve
		DHC	forest	tanekaha-hard beech	hillslope
		DHC	forest	tawa	hillslope
		DHC	forest	tawa	ridge
		DHC	forest	tawa-hinaiu	hillslope
		DHC	forest	tawa-hinaiu-rewarewa	hillslope
		DHC	forest	tawa-hinaiu-rewarewa-pukatea	hillslope
		DHC	forest	tawa-hinaiu-rewarewa-puriri	hillslope
		DHC	forest	tawa-kamahii	hillslope
		DHC	forest	tawa-kamahii	ridge
		DHC	forest	tawa-karaka	hillslope
		DHC	forest	tawa-karaka	ridge
		DHC	forest	tawa-karaka-nikau	hillslope
		UMT	forest	tawa-kohekohe	hillslope
		DHC	forest	tawa-kohekohe	hillslope
		DHC	forest	tawa-kohekohe	hillslope
		UMT	forest	tawa-(kohekohe)	dipslope
		DHC	forest	tawa-(kohekohe)	hillslope
		UMT	forest	tawa-kohekohe-mamaku	dipslope
		DHC	forest	tawa-(kohekohe)-mamaku	hillslope
		DHC	forest	tawa-kohekohe-rewarewa	hillslope
		DHC	forest	tawa-mahoe-nikau-ponga	hillslope
		DHC	forest	tawa-mahoe-ponga	hillslope

Bio- Climatic Zone	Hydro- logical Class	Land Sys- tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	forest	tawa-mahoe-ponga	ridge
		DHC	forest	tawa-mahoe-puriri	hillslope
		DHC	forest	tawa-mangeao-kohekohe	hillslope
		DHC	forest	tawa-mangeao-kohekohe	ridge
		DHC	forest	tawa-mangeao-pukatea	ridge
		DHC	forest	tawa-mangeao-pukatea	hillslope
		DHC	treeland	tawa-nikau	hillslope
		DHC	forest	tawa-nikau-mamaku-puriri	hillslope
		DHC	forest	tawa-nikau-mamaku-puriri	hillslope
		DHC	forest	tawa-nikau-puriri	ridge
		UMT	forest	tawa-pukatea	hillslope
		DHC	forest	tawa-pukatea	hillslope
		DHC	forest	tawa-pukatea	hillslope
		DHC	forest	tawa-pukatea	hillslope
		DHC	forest	tawa-pukatea	hillslope
		DHC	forest	tawa-pukatea-mahoe-nikau	colluvial hillslope
		DHC	forest	tawa-puriri	dipslope
		DHC	forest	tawa-puriri	alluvial terrace
		UMT	forest	tawa-puriri	hillslope
		DHC	forest	tawa-puriri-hinai	hillslope
		DHC	forest	tawa-puriri-karaka	hillslope
		UMT	forest	tawa-puriri-rewarewa	hillslope
		DHC	forest	tawa-puriri-rewarewa	hillslope
		DHC	forest	tawa-puriri-rewarewa	hillslope
		DHC	forest	tawa-puriri-rewarewa	hillslope
		UMT	forest	tawa-rewarewa	ridge
		DHC	forest	tawa-rewarewa	hillslope
		DHC	forest	tawa-rewarewa	hillslope
		DHC	forest	tawa-rewarewa-karaka-kohekohe	hillslope
		DHC	forest	tawa-rewarewa-kohekohe-pukatea	hillslope
		UMT	forest	tawa-rewarewa-mamaku	hillslope
		DHC	forest	tawa-rewarewa-mamaku	hillslope
		UMT	forest	tawa-rewarewa-pukatea	hillslope
		DHC	forest	tawa-rewarewa-puriri	hillslope
		UMT	scrub	gorse-mamaku	hillslope
		DHC	scrub	gorse-manuka	hillslope
		DHC	scrub	kahikatea/manuka	hillslope
		DHC	scrub	kamahi	ridge
		DHC	scrub	kieke-nikau-mahoe-ponga	hillslope
		DHC	scrub	mahoe-mangeao-mamaku	hillslope
		DHC	treefernland	mamaku	hillslope
		UMT	scrub	mamaku-mahoe-wattle	hillslope

Bio- Climatic Zone	Hydro- logical Class	Land Sys- tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	scrub	mamaku-manuka	hillslope
		DHC	scrub	mamaku/manuka	hillslope
		DHC	scrub	mamaku-manuka-lancewood	hillslope
		DHC	scrub	mamaku-rangiora-mahoe	hillslope
		DHC	scrub	manuka	hillslope
		DHC	scrub	manuka	ridge
		UMT	scrub	manuka	hillslope
		DHC	scrub	manuka-bracken	hillslope
		DHC	scrub	manuka-bracken	ridge
		DHC	shrubland	manuka	hillslope
		DHC	shrubland	manuka/developed land	hillslope
		DHC	shrubland	manuka/developed land	dipslope
		DHC	shrubland	manuka/developed land	alluvial terrace
		DHC	scrub	manuka-kamahi	hillslope
		DHC	scrub	manuka-kamahi	hillslope
		DHC	scrub	manuka-mamaku	ridge
		DHC	scrub	manuka-rewarewa-kamahi-mahoe	hillslope
		DHC	scrub	manuka-rewarewa-kamahi-mahoe	hillslope
		DHC	scrub	manuka-treefern	ridge
		DHC	scrub	rewarewa/manuka	hillslope
		DHC	scrub	rewarewa/manuka-mamaku	hillslope
		DHC	scrub	rewarewa/manuka-mamaku-five finger	hillslope
		DHC	scrub	bracken	interfluv
		DHC	fernland	kiekie	cliff
		DHC	vineland	(<i>Olearia townsonii</i>)	cliff
		DHC	rockland		
		DHC	tussock-treeland	kahikatea/ <i>Carex virgata</i>	alluvial terrace
		DHC	treeland	kahikatea-pukatea-wheki/ <i>Carex virgata</i>	alluvial terrace
		DHC	forest	kahikatea-rata/pukatea	alluvial terrace
		DHC	forest	kamahi-swamp maire	dipslope
		DHC	treeland	kahikatea- swamp maire - kamahi - <i>Coprosma tenuicaulis/Carex virgata</i>	
		DHC	tussock-treeland	pukatea-kahikatea/wheki-ramarama/ <i>Carex virgata</i>	alluvial terrace
		DHC	forest	swamp maire-pukatea-kahikatea	alluvial terrace
		DHC	tussock-shrubland	<i>Coprosma tenuicaulis-Gahnia xanthocarpa</i>	alluvial terrace
		DHC	shrubland	(kahikatea-cabbage tree) <i>Coprosma tenuicaulis-harakeke-raupo</i>	alluvial terrace
		DHC	tussock-shrubland	kahikatea/manuka- <i>Gahnia xanthocarpa</i>	interfluv
		DHC	tussock-shrubland	manuka/ <i>Carex virgata</i>	alluvial terrace

Bio-Climatic Zone	Hydro-logical Class	Land Sys-tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	tussock-shrubland	<i>Pseudopanax anomalous-Coprosma tenuicaulis-Gahnia xanthocarpa</i>	alluvial terrace
		DHC	moss-shrubland	manuka/sphagnum	interfluvial
		DHC	tussockland	<i>Carex virgata</i>	alluvial terrace
		DHC	rush-tussockland	<i>Carex virgata</i> -Juncus spp	alluvial terrace
		DHC	tussock-rushland	manuka/Juncus spp - <i>Carex</i> spp	alluvial terrace
		DHC	reed-tussockland	(willow)/raupo- <i>Carex virgata</i>	alluvial terrace
		DHC	reedland	raupo	alluvial terrace
		DHC	forest	black beech	ridge
		DHC	forest	black beech-kamahi-rewarewa	ridge
		DHC	forest	<i>Cyathea smithii</i> -mahoe-puykatea	alluvial terrace
		DHC	forest	hard beech	ridge
		DHC	forest	hard beech	hillslope
		DHC	forest	hard beech	interfluvial
		DHC	forest	hard beech - black beech	ridge
		DHC	forest	kahikatea	alluvial terrace
		DHC	treeland	kahikatea	alluvial terrace
		DHC	forest	kahikatea/kamahi - black maire - matai	alluvial terrace
		DHC	forest	(kahikatea)kamahi- <i>Cyathea smithii</i>	alluvial terrace
		DHC	forest	kahikatea - black maire - kamahi	alluvial terrace
		DHC	forest	kahikatea/black maire - tawa	alluvial terrace
		DHC	forest	kahikatea-matai-rimu	alluvial terrace
		DHC	forest	kahikatea-matai-rimu/tawa	interfluvial
		DHC	forest	kahikatea-mata/tawa-kamahi	alluvial terrace
		DHC	forest	kahikatea-pukatea	alluvial terrace
		DHC	forest	kahikatea/pukatea-tawa	alluvial terrace
		DHC	treeland	kahikatea-pukatea-whetki/ <i>Carex virgata</i>	alluvial terrace
		DHC	forest	kahikatea-(rimu)/kahikatea-whetki	alluvial terrace
		DHC	forest	kahikatea-rimu-kamahi-silver beech	alluvial terrace
		DHC	forest	kahikatea-rimu/kamahi-tawa-hinau	interfluvial
		DHC	forest	kahikatea-rimu/narrow leaved maire - kamahi - black maire	alluvial terrace
		DHC	forest	(kahikatea-rimu)/tawa	alluvial terrace
		DHC	forest	kahikatea(rimu)/tawa-kamahi	alluvial terrace
		DHC	forest	kahikatea/tawa-kamahi	alluvial terrace
		DHC	forest	kahikatea-totara-rimu-matai	alluvial terrace
		DHC	treeland	kahikatea/whetki-kamahi/ <i>Carex virgata</i>	alluvial terrace
		DHC	forest	kamahi	hillslope
		DHC	forest	kamahi	ridge
		DHC	forest	kamahi-hinau	alluvial terrace
		DHC	forest		hillslope

Bio-Climatic Zone	Hydro-logical Class	Land Sys-tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	forest	kamahi-hinau-rewarewa	hillslope
		DHC	treeland	kamahi/kiokio	cliff
		DHC	forest	kamahi-kahikatea	alluvial terrace
		DHC	forest	kamahi/mahoe-treefern	hillslope
		DHC	forest	kamahi-mamaku	hillslope
		DHC	forest	kamahi-mamaku-manuka	hillslope
		DHC	forest	kamahi-pukatea-mamaku	hillslope
		DHC	forest	kamahi-pukatea-tawa	colluvial hillslope
		DHC	forest	kamahi-pukatea-tawa	dipslope
		DHC	forest	kamahi-putaputaweta	alluvial terrace
		DHC	forest	kamahi-putaputaweta-wheki- <i>Cyathea smithii</i>	alluvial terrace
		DHC	forest	kamahi-tawheowheo	hillslope
		DHC	forest	kamahi-tawheowheo	ridge
		DHC	forest	kamahi-tawheowheo	alluvial terrace
		DHC	forest	kamahi-tawheowheo-toro	interfluv
		DHC	forest	kamahi-tawheowheo-toro	alluvial terrace
		DHC	forest	kamahi-tawheowheo-toro	alluvial terrace
		DHC	tussock-treeland	kamahi/ramarama-kanuka/ <i>Carex virgata</i>	hillslope
		DHC	forest	kamahi-rewarewa	ridge
		DHC	forest	kamahi-rewarewa-hinau	hillslope
		DHC	forest	kamahi-rewarewa-hinau	hillslope
		DHC	forest	kamahi-rewarewa-kanuka	hillslope
		DHC	forest	kamahi-rewarewa-tawa	hillslope
		DHC	forest	kamahi-(rimu)	alluvial terrace
		DHC	forest	kamahi-silver beech-tawa	hillslope
		DHC	forest	kamahi-tawa	ridge
		DHC	forest	kamahi-tawa	hillslope
		DHC	forest	kamahi-tawa	alluvial terrace
		DHC	forest	kamahi-tawa-hinau	hillslope
		DHC	forest	kamahi-tawa-hinau	ridge
		DHC	forest	kamahi-tawa-rewarewa	hillslope
		DHC	forest	kamahi-totara	hillslope
		DHC	forest	kanuka	ridge
		DHC	forest	kanuka	hillslope
		DHC	forest	kanuka	hillslope
		DHC	forest	kanuka-kahikatea-rimu	hillslope
		DHC	forest	kanuka-manuka-mamaku	alluvial terrace
		DHC	forest	kanuka-manuka-treefern	hillslope
		DHC	forest	kanuka-totara-rimu	hillslope
		DHC	forest	mahoe-mamaku	hillslope

Bio-Climatic Zone	Hydro-logical Class	Land Sys-tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	forest	mahoe-mamaku	ridge
		DHC	forest	mamaku-kamahi	hillslope
		DHC	forest	mamaku-kamahi-manuka	hillslope
		DHC	forest	mamaku-rewarewa-tawa	hillslope
		DHC	forest	mamaku-tawa	hillslope
		DHC	forest	matal-miro-tanekaha-rimu	alluvial terrace
		DHC	forest	matal-rimu	hillslope
		DHC	forest	matal/tawa-black maire	hillslope
		DHC	forest	pukatea	alluvial terrace
		DHC	forest	pukatea	colluvial hillslope
		DHC	forest	pukatea-hinaiu-rewarewa-mamaku	dipslope
		DHC	forest	pukatea-kahikatea	alluvial terrace
		DHC	forest	pukatea/mahoe-Cyathea smithii	alluvial terrace
		DHC	forest	pukatea-mahoe-kohekohe	dipslope
		DHC	forest	pukatea-mahoe-pigeonwood	hillslope
		DHC	forest	pukatea-mahoe-pigeonwood	colluvial hillslope
		DHC	forest	pukatea-mahoe-pigeonwood	alluvial terrace
		DHC	forest	pukatea-mahoe-pigeonwood	colluvial hillslope
		DHC	forest	pukatea-mahoe-pigeonwood-nikau	alluvial terrace
		DHC	forest	(pukatea)/mahoe-wheki-Cyathea smithii-Carex virgata	colluvial hillslope
		DHC	treeland	pukatea/pigeonwood-mahoe	dipslope
		DHC	forest	pukatea-tawa	interfluv
		DHC	forest	pukatea-tawa/Cyathea smithii-pigeonwood	hillslope
		DHC	forest	pukatea-tawa/Cyathea smithii-pigeonwood	alluvial terrace
		DHC	forest	pukatea-tawa-mahoe	dipslope
		DHC	forest	pukatea-tawa-mamaku	interfluv
		DHC	forest	pukatea-tawa-pigeonwood	alluvial terrace
		DHC	forest	pukatea/wheki	hillslope
		DHC	forest	ramarama-kahikatea	interfluv
		DHC	forest	rata/kamahi-miro-hinaiu	alluvial terrace
		DHC	forest	(rata)/kamahi-tawa	hillslope
		DHC	forest	(rata)/kamahi-tawa	interfluv
		DHC	forest	(rata-pukatea)/tawa-Cyathea smithii	alluvial terrace
		DHC	forest	rata-pukatea-tawa/ponga-wheki	dipslope
		DHC	forest	(rata-rimu)/tawa-kamahi	dipslope
		DHC	forest	(rata-rimu)/tawa-kamahi	ridge
		DHC	forest	(rata-rimu)/tawa-pukatea	dipslope

Bio-Climatic Zone	Hydro-logical Class	Land Sys-tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	forest	(rata)/tawa	dipslope
		DHC	forest	rewarewa	interfluv
		DHC	forest	rewarewa/kamahi	hillslope
		DHC	forest	rewarewa/kamahi-kanuka	hillslope
		DHC	forest	rewarewa/kamahi-tawa	hillslope
		DHC	forest	rimu	alluvial terrace
		DHC	forest	rimu-kahikatea-pukatea/kamahi-tawa	alluvial terrace
		DHC	forest	(rimu-kahikatea)/tawa-hinai	alluvial terrace
		DHC	forest	(rimu-kahikatea)/tawa-hinai	colluvial hillslope
		DHC	forest	rimu-(kahikatea)/tawa-hinai	colluvial hillslope
		DHC	forest	rimu-(kahikatea)/tawa-hinai	alluvial terrace
		DHC	forest	(rimu-kahikatea)/tawa-kamahi	alluvial terrace
		DHC	forest	(rimu-kahikatea)/tawa-kamahi	colluvial hillslope
		DHC	forest	rimu/kamahi	dipslope
		DHC	forest	rimu/kamahi	alluvial terrace
		DHC	forest	rimu/kamahi-tawa-hinai	alluvial terrace
		DHC	forest	rimu/kamahi-tawa-hinai	hillslope
		DHC	forest	(rimu)/kamahi-tawa-tawheowheo	hillslope
		DHC	forest	(rimu)/kamahi-tawa-rewarewa	hillslope
		DHC	forest	rimu-pukatea/kamahi	hillslope
		DHC	forest	rimu-pukatea-rata/kamahi-tawa-Cyathea smithii	dipslope
		DHC	forest	rimu-rata/tawa	hillslope
		DHC	forest	rimu-rata/tawa	ridge
		DHC	forest	rimu-pukatea-(rata)/kamahi	hillslope
		DHC	forest	rimu-(rata)/tawa-kamahi-hinai	hillslope
		DHC	forest	rimu/tawa	hillslope
		DHC	forest	rimu/tawa	ridge
		DHC	forest	(rimu)/tawa	hillslope
		DHC	forest	(rimu)/tawa	ridge
		DHC	forest	rimu/tawa-hinai	hillslope
		DHC	forest	rimu/tawa-hinai	ridge
		DHC	forest	rimu/tawa-kamahi	hillslope
		DHC	forest	rimu/tawa-kamahi	ridge
		DHC	forest	rimu/tawa-kamahi	hillslope
		DHC	forest	rimu/tawa-kamahi	ridge
		DHC	forest	(rimu)/tawa-kamahi	interfluv
		DHC	forest	(rimu)/tawa-kamahi	dipslope
		DHC	forest	(rimu)/tawa-kamahi	hillslope
		DHC	forest	(rimu)/tawa-kamahi	ridge

Bio-Climatic Zone	Hydro-logical Class	Land Sys-tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	forest	rimu/tawa-kamahahi-hinaiu	hillslope
		DHC	forest	(rimu)/tawa-kamahahi-hinaiu	hillslope
		DHC	forest	(rimu)/tawa-kamahahi-hinaiu	ridge
		DHC	forest	(rimu)/tawa-rewarewa	hillslope
		DHC	forest	(rimu)/tawa-rewarewa	ridge
		DHC	forest	rimu-totara-matal	interfluve
		DHC	forest	silver beech-kamahahi	alluvial terrace
		DHC	forest	silver beech-kamahahi	interfluve
		DHC	forest	silver beech-kamahahi-kahikatea	interfluve
		DHC	forest	tanekaha/manuka-Olearia townsonii	hillslope
		DHC	forest	tawa	hillslope
		DHC	forest	tawa	ridge
		DHC	forest	tawa	alluvial terrace
		DHC	forest	tawa	colluvial hillslope
		DHC	forest	tawa	interfluve
		DHC	forest	tawa-Cyathea smithii	hillslope
		DHC	forest	tawa-Cyathea smithii-kamahahi	hillslope
		DHC	forest	tawa-hinaiu-rewarewa	hillslope
		DHC	forest	tawa-hinaiu-rewarewa	hillslope
		DHC	forest	tawa-kamahahi	ridge
		DHC	forest	tawa-kamahahi	hillslope
		DHC	forest	tawa-kamahahi	ridge
		DHC	forest	tawa-kamahahi-black maire	interfluve
		DHC	forest	tawa-kamahahi-hinaiu	hillslope
		DHC	forest	tawa-kamahahi-hinaiu	hillslope
		DHC	forest	tawa-kamahahi-hinaiu-rewarewa	ridge
		DHC	forest	tawa-kamahahi-hinaiu-rewarewa	hillslope
		DHC	forest	tawa-kamahahi-hinaiu-whetiki-Cyathea smithii	ridge
		DHC	forest	tawa-kamahahi-hinaiu-whetiki-Cyathea smithii	hillslope
		DHC	forest	tawa-kamahahi-hinaiu-white maire-black maire-narrow leaved maire	ridge
		DHC	forest	tawa-kamahahi-hinaiu-white maire-black maire-narrow leaved maire	alluvial terrace
		DHC	forest	tawa-kamahahi-mamaku	hillslope
		DHC	forest	tawa-kamahahi-pukatea	hillslope
		DHC	forest	tawa-kamahahi-pukatea	hillslope
		DHC	forest	tawa-kamahahi-pukatea/Histiopteris incisa	alluvial terrace
		DHC	forest	tawa-kamahahi-pukatea-mamaku	alluvial terrace
		DHC	forest	tawa-kamahahi-tawheowheo	hillslope
		DHC	forest	tawa-kamahahi-tawheowheo	hillslope
		DHC	forest	tawa-kamahahi-rewarewa	ridge
		DHC	forest	tawa-kamahahi-rewarewa	hillslope

Bio- Climatic Zone	Hydro- logical Class	Land Sys- tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	forest	tawa-kamahi-totara	hillslope
		DHC	forest	tawa-mahoe-mamaku	hillslope
		DHC	forest	tawa-mahoe-pigeonwood	interfluvial
		DHC	forest	tawa-mamaku	hillslope
		DHC	forest	tawa-narrow leaved maire	alluvial terrace
		DHC	forest	tawa-pukatea	hillslope
		DHC	forest	tawa-pukatea	interfluvial
		DHC	forest	tawa-pukatea	alluvial terrace
		DHC	forest	tawa-pukatea	colluvial hillslope
		DHC	forest	tawa-pukatea	dipslope
		DHC	forest	tawa-pukatea-hinai	interfluvial
		DHC	forest	tawa-pukatea-(hinai)	dipslope
		DHC	forest	tawa-pukatea-mahoe-nikau	hillslope
		DHC	forest	tawa-pukatea-treefern	hillslope
		DHC	forest	tawa-pukatea-treefern	hillslope
		DHC	forest	tawa-pukatea/whetki	ridge
		DHC	forest	tawa-rewarewa	dipslope
		DHC	forest	tawa-rewarewa-mamaku	hillslope
		DHC	forest	tawa-rewarewa-pukatea	hillslope
		DHC	forest	tawa-totara	hillslope
		DHC	forest	tawa-treefern	hillslope
		DHC	forest	tawa-whetki	hillslope
		DHC	forest	tawheowheo-kamahi-hinai/whetki	hillslope
		DHC	forest	thin barked totara-miro-kamahi	hillslope
		DHC	forest	totara	ridge
		DHC	forest	totara	interfluvial
		DHC	treefernland	<i>Cyathea smithii</i>	alluvial terrace
		DHC	scrub	<i>Dracophyllum strictum</i>	hillslope
		DHC	scrub	gorse-manuka-hangehange	cliff
		DHC	scrub	kahikatea/putaputaweta- <i>Cyathea smithii</i>	hillslope
		DHC	shrubland	kalkomako-putaputaweta-mamaku	alluvial terrace
		DHC	scrub	kamahi	hillslope
		DHC	scrub	kamahi-mahoe-mamaku-manuka	hillslope
		DHC	scrub	kamahi/tutu-karamu-five-finger-mahoe	hillslope
		DHC	scrub	kanuka-manuka	hillslope
		DHC	treefernland	mamaku	hillslope
		DHC	scrub	mamaku-mahoe	hillslope
		DHC	scrub	mamaku-manuka	hillslope
		DHC	scrub	mamaku-manuka	ridge

Bio- Climatic Zone	Hydro- logical Class	Land Sys- tem ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	scrub	mamaku/manuka	hillslope
		DHC	scrub	mamaku-wheki-Cyathea smithii-manuka	hillslope
		DHC	scrub	mamaku-wheki-manuka	hillslope
		DHC	scrub	manuka	hillslope
		DHC	scrub	manuka	interfluvial
		DHC	scrub	manuka	alluvial terrace
		DHC	shrubland	manuka	cliff
		DHC	scrub	manuka/developed	hillslope
		DHC	flax-shrubland	manuka-Gaithria paniculata-wharariki	cliff
		DHC	scrub	manuka-kamahia-treefern	hillslope
		DHC	scrub	manuka-kanuka	hillslope
		DHC	scrub	manuka-kanuka	ridge
		DHC	scrub	manuka-mamaku	hillslope
		DHC	scrub	manuka-mamaku	ridge
		DHC	scrub	manuka-mamaku-Cyathea smithii	hillslope
		DHC	scrub	manuka-mamaku-five-finger	hillslope
		DHC	scrub	manuka-mamaku-wheki	hillslope
		DHC	scrub	manuka-treefern	hillslope
		DHC	scrub	manuka-treefern	ridge
		DHC	scrub	manuka-treefern	dipslope
		DHC	scrub	manuka-treefern-mahoe-five-finger	hillslope
		DHC	sedge-flax-shrubland	manuka-wharariki-Machaetris sinclairii	cliff
		DHC	scrub	manuka-wheki	hillslope
		DHC	scrub	rewarewa-mamaku-manuka	hillslope
		DHC	scrub	rewarewa-manuka	hillslope
		DHC	scrub	rewarewa-manuka-mingimingi-heketara	hillslope
		DHC	scrub	rewarewa/manuka-mamaku	hillslope
		DHC	scrub	rewarewa/manuka-mamaku	ridge
		DHC	scrub	rewarewa/manuka-mamaku-kanuka	hillslope
		DHC	scrub	rewarewa/manuka-wheki	hillslope
		DHC	scrub	tarata-kanuka	hillslope
		DHC	tree-shrubland	treefern	alluvial terrace
		DHC	treefernland	treefern/developed	hillslope
		DHC	treefernland	treefern-mahoe	hillslope
		DHC	scrub	treefern-manuka	hillslope
		DHC	scrub	wheki	hillslope
		DHC	treefernland	wheki	dipslope
		DHC	treefernland	wheki-manuka	hillslope
		DHC	scrub	wheki/developed	hillslope
		DHC	treefernland		

Bio-Climatic Zone	Hydro-logical Class	Land System ¹	Vegetation Structural Class	Vegetation Type	Landform
		DHC	fernland	bracken	hillslope
		DHC	fernland	lancewood/bracken-toetoe-Himalayan honeysuckle	hillslope
		DHC	fernland	manuka/bracken	hillslope
		DHC	fernland	<i>Paesia scaberula</i>	hillslope
		DHC	sedgeland	<i>(Hebe stricta var. macroura-tutu)-Machaerina sinclairii</i>	cliff
		DHC	rockland	<i>(Machaerina sinclairii)</i>	cliff
		DHC	rockland	<i>(Olearia townsonii)</i>	cliff

APPENDIX IV

VEGETATION TYPES OF NORTH TARANAKI ECOLOGICAL DISTRICT

- (1) Juncus maritimus rushland
Associates include sea primrose, arrowgrass and Baumea spp. (mainly B. juncea). Confined to estuarine alluvial flats adjacent to channels of Awakino and Mokau rivers.
- (2) Leptocarpus similis rushland
Leptocarpus mono-dominant. Occurs on estuarine alluvial flats adjacent to Juncus maritimus rushland.
- (3) Marsh ribbonwood scrubland
Marsh ribbonwood, usually co-dominant with jointed rush. Other associates include Baumea spp, coastal tree daisy, Juncus maritimus and Cyperus ustulatus. Confined to estuarine alluvial flats, and most developed along lower reaches of Awakino River.
- (4) Cabbage tree treeland
Wetland with occasional cabbage tree emergent over harakeke and sometimes Baumea rubiginosa manuka, Gahnia xanthocarpa and often with scattered emergent kahikatea. When adjacent to estuarine types, coastal tree daisy, marsh ribbonwood and Coprosma propinqua are associates. Occurs in coastal and semi-coastal zones on alluvial and marine terraces.
- (5) Scirpus prolifer-Eleocharis gracilis-swamp millet grass-rushland
Coastal wetland adjacent to raupo reedland on alluvial terrace. E. acuta and Polygonum spp. are common associates.
- (6) Raupo reedland
Most common wetland type in district, and most frequent in coastal and semi-coastal zones. Associates are harakeke, toetoe, Scirpus prolifer and Coprosma tenuicaulis. Occurs mainly on alluvial terraces and flats. In most cases probably induced after clearance of swamp forest.
- (7) Manuka shrubland
Wetland with frequent manuka emergent over rushes (Juncus effusus, J. sarophorus) and sedges (Carex virgata, Eleocharis acuta), or as occurs on the Waitaanga Plateau, over sphagnum moss. Occurs in the lowland zone on interfluvies and alluvial terraces.
- (8) Coprosma tenuicaulis Gahnia xanthocarpa tussock-shrubland
Induced wetland with occasional emergent kahikatea and manuka over Coprosma tenuicaulis and Gahnia xanthocarpa. Associates may include Pseudopanax anomalus, Carex secta, and on the Waitaanga Plateau young silver beech. Occurs in the lowland zone on interfluvies and alluvial terraces.
- (9) Carex spp-Juncus spp rush-tussockland
Wetland with varying dominance of Carex spp. (mainly Carex virgata, sometimes Carex geminata) and Juncus spp. (Juncus effusus, J. gregiflorus and J. sarophorus). Is induced and often contains a number of introduced weeds such as creeping buttercup, dock and Polygonum spp. Occurs in the lowland zone on alluvial terraces.
- (10) Swamp maire forest
Swamp maire present in canopy in varying degrees of dominance. Most commonly co-dominant with kahikatea on alluvial terrace, where pukatea, kamahi and putaputaweta are associates.
Common middle tier species include wheki, Coprosma tenuicaulis, mahoe, ramarama, kamahi and swamp maire.
Ground tier species include bush rice grass, hooked sedge, Carex spp Blechnum fluviatile.
Occurs in semi-coastal and lowland zones and is palustrine.
- (11) Kahikatea-pukatea treeland
Treeland generally with kahikatea and pukatea co-dominant. Frequent canopy associates include wheki, ramarama, Cyathea smithii and Carex virgata. Manuka, mahoe and putaputaweta may also be present as may occasional emergents of rata, pukatea and kahikatea.
Species common in the sparse middle tier include wheki, Cyathea smithii mahoe and ramarama, raurekau, Coprosma tenuicaulis and C. rotundifolia. Kamahi may also occur. Ground tier species commonly include ferns such as Blechnum fluviatile, Diplazium australe, hooked sedge, bush rice grass and Carex spp. Introduced weeds such as Lotus pedunculatus are occasionally present.
Occurs on alluvial terrace within lowland zone and is often palustrine and secondary.

(12) Kahikatea-pukatea forest

Canopy dominated by varying amounts of kahikatea and pukatea, although generally kahikatea is most abundant. In some instances ramarama may be co-dominant. Occasional associates include pigeon wood, putaputaweta, mahoe, wheki, and primary emergents of rata and kahikatea.

Common middle tier species include wheki, mahoe, raureka, putaputaweta, ramarama, pukatea, kamahi and nikau, while occasionally Paratrophis microphylla, kaikomako, Coprosma tenuicaulis, C. areolata and saplings of rimu and kahikatea occur.

Common ground tier species include bush rice grass, hooked sedge, Blechnum fluviatile, B. filiforme, hen and chicken fern, Oplismenus imbecillus and Carex spp. Where the understorey is highly modified by animal grazing introduced weeds are usually present.

Occurs on alluvial terraces within the lowland and semi-coastal zones. Mainly secondary forest.

(13) (Kahikatea-rimu)/tawa-kamahi forest

Scattered emergents of kahikatea, rimu and pukatea over a canopy with varying dominance of tawa and kamahi. Common associates include hinau, wheki and pigeonwood while occasionally white, black and narrow-leaved mairies and kaikomako are present.

Common middle tier species include wheki, Cyathea smithii, pigeonwood, mahoe, kamahi, tawa and ramarama. When mairies are present in canopy, understorey species may also include matai, kaikomako, Coprosma rotundifolia, thin-barked totara and Pseudopanax anomalus.

Common ground tier species include bush rice grass, crown fern, Blechnum fluviatile, Pteris macilenta, Histiopteris incisa, filmy ferns and mosses.

(14) Karaka-puriri forest

Karaka and puriri generally co-dominant in canopy. Common associates include mahoe, mikau, mamaku and tawa. Pukatea, rewarewa, kohekohe and mangeao may also be present.

Common middle tier species include nikau, kohekohe, mahoe, kawakawa, pigeonwood, karaka and ponga.

Common ground tier species include Blechnum filiforme, B. chambersii, Pteris macilenta, Oplismenus imbecillus, parataniwha, and where modification by animal grazing is high introduced pasture grasses are common.

Advanced secondary forest occurring in coastal and semi-coastal zones mainly on hillslopes.

(15) Karaka-kohekohe forest

Varying amounts of karaka and kohekohe dominant in canopy, with frequent associated of kawakawa, hangehange, mamaku, mahoe and emergent rewarewa. Also present may be mangeao, tawa, puriri, nikau, wharangī, kowhai and lacebark.

Common middle tier species include kawakawa, hangehange, karaka, kohekohe, mahoe, nikau and rangiora.

Common ground tier species include hooked sedge, Blechnum filiforme, B. chambersii, Pteris macilenta and Gahnia lacera.

Usually secondary forest, occurring in coastal and semi-coastal zones on hillslopes.

(16) Tawa-puriri forest

Tawa and puriri co-dominant in canopy with common associates of mahoe, rewarewa, hina and nikau. Rimu, karaka, kamahi and pukatea may also be present.

Middle tier species commonly include kawakawa, kohekohe, hangehange, rangiora, ponga, nikau, pigeonwood, supplejack and occasionally mangeao.

Common ground tier species include Blechnum filiforme, B. chambersii, bush rice grass, hooked sedge, Pteris macilenta, hen and chicken fern and Metrosideros spp.

Largely primary forest occurring on hillslopes in semi-coastal and coastal zones.

(17) Tawa-kohekohe forest

Variable amounts of tawa and kohekohe in canopy with common associates of pukatea, mamaku, rewarewa and mahoe. Pigeonwood, puriri and kamahi are sometimes present, and emergents of rimu and rata may also be present where forest is primary.

Middle tier species include kohekohe, kawakawa, mahoe, hangehange, ponga, wheki, nikau and pigeonwood.

Ground tier species include Pteris macilenta, Blechnum filiforme, B. chambersii, bush rice grass, and seedlings.

Usually secondary forest, occurring in semi-coastal zone on hillslopes, colluvial hillslopes, dipslopes and interfluvies.

(18) Kohekohe-pukatea forest

Kohekohe and pukatea generally co-dominant in canopy, with mahoe commonly present. Occasional associates include tawa, pigeonwood, emergent rewarewa and emergent rimu (primary forest).

Common middle tier species include kawakawa, kohekohe, pukatea, pigeonwood, mahoe, nikau, rewarewa and ponga.

Common ground tier species include bush rice grass, Blechnum filiforme, Lastreopsis spp and Metrosideros spp.

Usually secondary forest, occurring on dipslopes and interfluvies in the semi-coastal zone.

(19) Pukatea forest

Pukatea in canopy often co-dominant with mahoe and pigeonwood. Common associates of nikau, wheki, Cyathea smithii and supplejack.

Common middle tier species include mamaku, Cyathea smithii, pigeonwood, mahoe, nikau and supplejack. Towards coast kohekohe and kawakawa are present.

Common ground species include Blechnum filiforme, B. fluviatile, Pteris macilenta, bush rice grass and hooked sedge.

Usually advanced secondary forest, occurring in semi-coastal and lowland zones on alluvial terraces and colluvial hillslopes.

(20) Tawa-pukatea forest

Tawa and pukatea co-dominant in canopy, with common associates of mamaku, wheki, nikau and mahoe. Rewarewa, pigeonwood, hinu and supplejack may be present. Mangeao and emergents of rimu and rata are associates when forest is primary.

Common middle tier species include wheki, nikau, ponga, mahoe, ramarama, pigeonwood, raurekau, and supplejack. Towards coast kawakawa and kohekohe are present.

Common ground tier species include bush rice grass, Blechnum filiforme, B. discolor, Pteris macilenta, hen and chicken fern, hooked sedge and Metrosideros spp.

Occurs in semi-coastal and lowland zones on hillslopes, colluvial hillslopes, alluvial terraces, dipslopes and interfluvies.

(21) Tawa forest

Tawa dominant in canopy with frequent associates of kamahi, hinu, rewarewa, pukatea and mamaku. Kamahi may be co-dominant. Occasional associates include mahoe, pigeonwood, supplejack, mangeao towards the coast and tawheowheo on steep sites. Occasional emergents of rimu, rata and miro usually occur throughout.

Common middle tier species include ponga, raurekau, tawa, kamahi, Cyathea smithii, wheki, hangehange, rangiora, nikau, mahoe, pigeonwood and supplejack. Kohekohe, kawakawa and mangeao may be present in areas with coastal influence. On lowland plateaux and alluvial terraces (eg. Waitaanga Plateau, and Waitara headwaters) toro occurs with Pseudowintera axillaris and tawheowheo.

Common ground tier species include bush rice grass, hooked sedge, Blechnum filiforme, B. discolor, B. chambersii, kiekie, Metrosideros spp, filmy ferns and mosses.

Mostly primary forest, occurring in semi-coastal and lowland zones mainly on hillslopes, but also on ridges, dipslopes, interfluvies, colluvial hillslopes and alluvial terraces.

(22) Kamahi-tawa forest

Scattered podocarps of rimu, miro and thin-barked totara often emergent over a canopy with variable amounts of tawa and kamahi. Frequent associates include tawheowheo, hinu and rewarewa. Tanekaha, pigeonwood and emergent rata are occasionally present.

Common middle tier species include tawa, kamahi, pigeonwood, tawheowheo, ponga, heketara and rewarewa.

Common ground tier species include hooked sedge, kiekie, umbrella fern, Blechnum discolor, Metrosideros spp, filmy ferns and mosses.

Primary forest occurring in lowland zone on dry ridges and steep hillslopes.

(23) Rimu/kamahi forest

Frequent emergent rimu and on damper sites, pukatea, over a canopy of kamahi and frequent associates of hinu, pigeonwood and tawa. Occasional pukatea, Cyathea smithii and emergent rata also present.

Common middle tier species include Cyathea smithii, ponga, wheki, pigeonwood, supplejack, raurekau, mahoe, kamahi and kiekie.

Common ground tier species include Blechnum filiforme, B. discolor, bush rice grass, hooked sedge, Metrosideros spp and filmy ferns.

Primary forest, occurring in lowland zone on dipslopes, being most extensive on dipslopes of proposed Mokau coalfield.

(24) Kamahi forest

Kamahi dominant in canopy with frequent associates of tawheowheo, hinau, emergent rewarewa and in early secondary forest, manuka. Occasional associates include ponga, mingimingi and pigeonwood.

Common middle tier species include mingimingi, heketara, rangiora, kamahi, rewarewa, thin-barked totara, hangehange and ponga.

Common ground tier species include bush rice grass, hooked sedge, *Blechnum discolor*, filmy ferns, *Metrosideros* spp., *Lycopodium* spp. and mosses.

Secondary forest, occurring in semi-coastal and lowland zones on hillslopes and ridges.

(25) Silver beech-kamahi forest

Silver beech generally dominant in canopy, with frequent kamahi. Other associates include occasional tawa, kahikatea, rimu and toro.

Common middle tier species include kamahi, tawa, wheki, toro, miro and silver beech with occasional *Alseuosmia macrophylla*, *Pseudowintera colorata* and rare divaricates of *Pseudopanax anomalus*, rohutu, and juvenile pokaka.

Common ground tier species include bush rice grass, *Blechnum filiforme*, *Astelia* spp., filmy ferns and moss.

Occurs only in lowland zone on interfluvial and alluvial terraces of Waitaanga Plateau - areas with impeded drainage. Almost entirely secondary forest.

(26) Hard beech forest

Hard beech dominant in canopy with occasional associates of kamahi, tawheowheo, rewarewa, miro, rimu, and in the north of the district tanekaha and rarely toatoa.

Common middle tier species include kamahi, tawheowheo, mingimingi, ponga, and in the north of the district neinei. Occasional associates are young hard beech, tanekaha, heketara and prickly mingimingi.

Common ground tier species include *Blechnum discolor*, kiekie, kidney fern and *Metrosideros* spp., with occasional umbrella fern, turutu and *Astelia trinervia*.

Mostly primary forest, occurring on sandstone in lowland and semi-coastal zones mainly on ridges and steep hillslopes. Rarely coastal.

(27) Black beech forest

Black beech dominant in canopy with occasional associates of hard beech, kamahi and rewarewa. Understorey is similar to hard beech forest. Primary forest, occurring sporadically on ridges mainly in the south of the district.

(28) Tainui forest

Mono-dominant coastal forest of tainui, forming a low canopy over a sparse understorey of kawakawa and hangehange. Ground is largely bare, with patches of *Microlaena stipoides*.

(29) Olearia albida forest, scrub, and shrubland

Olearia albida dominant or co-dominant in canopy with frequent associations of mahoe, manuka, and emergent karaka. Puriri, rewarewa, ponga and nikau occur where type is less modified.

Middle tier species when present, include kawakawa, hangehange, kiekie, mingimingi and *Metrosideros perforata*.

Ground tier species include *Blechnum chambersii*, hooked sedge, *Pteris macilentia* and where highly modified by animal grazing bracken, *Paesia*, *Metrosideros perforata* and introduced grasses.

Occurs in coastal zone on hillslope; secondary.

(30) Rimu-matai-totara forest

Canopy with varying amounts of rimu, matai, totara, and kahikatea. Occurs on interfluvial and alluvial terraces near Uruti in the south of the district, and on alluvial terraces of Waikaka Stream in the north of the district where tanekaha and miro are canopy associates.

Beside Waikaka Stream condition is very good with middle tier species including kamahi, rohutu, ramarama and young podocarps (mainly matai). Ground tier species include *Blechnum fluviatile*, *B. chambersii*, single crepe fern and hooked sedges.

On flats in the south of the district modification by animal grazing is generally high. Middle tier species include occasional kahikatea, matai, totara, *Coprosma rotundifolia* and *Paratrophis microphylla*. Ground tier species include *Microlaena stipoides*, *Blechnum filiforme*, *Pteris tremula* and moss.

Type rare in district and only secondary forest remaining.

(31) Kanuka forest and scrub

Kanuka dominant in hillslope forest with associates of rewarewa, ponga, hinau, mahoe, wheki and heketara. Common middle tier species include ponga, wheki, ramarama, kanuka and putaputaweta. Ground tier species include Blechnum fluviatile, B. discolor, bush rice grass, hooked sedge and umbrella fern.

Kanuka co-dominant with kahikatea (and tarata in the northeast of the district) on alluvial terrace. Associates may include rimu, treefern species (excluding mamaku), Coprosma rotundifolia and totara. Middle tier species may include ramarama, wheki, Cyathea smithii, and in northeast of the district wheki, ponga and Coprosma rotundifolia. Ground tier species include bush rice grass, hooked sedge, Blechnum fluviatile and Diplazium australe.

Kanuka co-dominant with manuka forming scrub on hillslopes and ridges. Middle tier absent. Ground tier species include bracken, Paesia, and Lycopodium spp.

Induced type, restricted to the more fertile sites within the lowland zone.

(32) Manuka-mamaku scrub

Canopy with manuka and mamaku in varying amounts. Common associates are mahoe, rangiora, karamu, five-finger, and scattered emergent rewarewa. Occasional associates are lancewood, kamahi, heketara, and towards the coast akekae.

Species commonly occurring in middle tier, when present, include mingimingi, ponga, rangiora, heketara, rewarewa, and towards the coast, kawakawa.

Common ground tier species include Blechnum discolor, kiokio, bracken, Paesia, hooked sedge, Pteris macilenta, Metrosideros spp., and Lycopodium spp.

Seral scrub, occurring in lowland, semi-coastal and coastal zones on hillslopes and ridges.

(33) Manuka scrub

Manuka forming mono-dominant canopy. Middle tier absent. Common ground tier species include bracken, Paesia, Blechnum discolor, Microlaena stipoides and Lycopodium spp.

Induced scrub in coastal, semi-coastal and lowland zones mainly on hillslopes and ridges, but also on alluvial terraces, dipslopes and interfluvies. Maintained by grazing, likely to succeed to forest if grazing stopped.

(34) Paesia and bracken fernland

Paesia mono-dominant or associated with rank grassland. Bracken mono-dominant or rarely associated with manuka (emergent), Lycopodium volubile and bush lawyer.

Seral type, occurring in lowland zone on hillslopes and ridges.

(35) Cliff vegetation

Coastal cliff vegetation consists of low herb-dominated types, and shrub-flaxland. Herfields mainly consist of sea primrose, sea celery, Disphyma australe, Tetragonia trigyna and Blechnum banksii. Species common to flax shrublands include wharariki, harakeke, kawakawa, taupata, karamu, manuka, boxthorn, Hebe stricta var. macroura, and rarely titirangi and emergent karaka.

A range of vegetation types occur on cliffs within the semi-coastal and lowland zones, this being dependent on substrate, slope and stability. Very steep slopes are largely bare with a sparse covering of Machaerina sinclairii, wharariki, and/or kiokio. On less steep cliffs shrub-flaxlands are common and provide a greater vegetation cover. Species include wharariki, manuka, Gaultheria paniculata, Olearia townsonii, Hebe stricta var. stricta, tutu, and Dracophyllum strictum, often emergent over Machaerina sinclairii and kiokio. Brachyglottis turneri is largely confined to this type. Kiekie and parataniwha are common species of gully cliffs, especially in the semi-coastal zone.

(36) Sand dune vegetation

Unmodified dunes support Spinifex grassland and pingao sedgeland. Rare associates are shore bindweed, sand sedge, and Carex flagellifera. Modified dunes support boxthorn, lupin, marram, and pohuehue.

APPENDIX V

CHECK LIST OF INDIGENOUS VASCULAR PLANTS OF NORTH TARANAKI ECOLOGICAL DISTRICT

The species are arranged in five groups: ferns and allies, gymnosperms, woody angiosperms, dicot herbs, and monocot herbs. Nomenclature follows that of the New Zealand floras (Allan 1961, Moore and Edgar 1976, Webb, Sykes and Garnock-Jones 1989) and the three nomina nova papers (Edgar 1971, Edgar and Connor 1978, 1983).

= Uncommon in district

FERNS AND ALLIES

Adiantum cunninghamii
A. fulvum U
A. viridescens U
Anarthropteris lanceolata
Arthropteris tenella U
Asplenium bulbiferum ssp. *bulbiferum*
A. bulbiferum ssp. *gracillimum*
A. flaccidum ssp. *flaccidum*
A. hookerianum
A. lyallii U
A. oblongifolium
A. polyodon
A. terrestre ssp. *maritimum* U
Azolla filiculoides U
Blechnum banksii
B. chambersii
B. colensoi
B. discolor
B. filiforme
B. fluviale
B. fraseri U
B. membranaceum
B. minus
B. nigrum U
B. penna-marina
B. sp. (*B. capense* agg. common sp., lower pinnae reduced)
B. sp. (*B. capense* agg. cliff sp., lower pinnae not reduced)
B. vulcanicum U
B. chambersii x *membranaceum*
Botrychium bifforme U
Cardiomanes reniforme
Ctenopteris heterophylla
Cyathea cunninghamii
C. dealbata
C. medullaris
C. smithii
Deparia petersenii U
Dicksonia fibrosa
D. squarrosa
Diplazium australe
Doodia media ssp. *australis* U
Gleichenia microphylla U
Grammitis billardierei
G. ciliata
Histiopteris incisa
Hymenophyllum bivalve U
H. demissum
H. dilatatum
H. ferrugineum
H. flabellatum
H. flexuosum
H. lyallii U
H. multifidum
H. rarum
H. revolutum
H. sanguinolentum
H. scabrum
Hypolepis ambiguum
H. distans
H. lactea (Druce & Ogle 1972) U
H. rufobarbata
Lastreopsis glabella
L. hispida
L. velutina U
Leptolepia novae-zelandiae
Leptopteris hymenophylloides
L. superba U
L. x intermedia U
Lindsaea trichomanoides
L. viridis U

Lycopodium cernuum
L. deuterodensum
L. scariosum
L. varium
L. volubile
Marattia salicina
Paesia scaberula
Pellaea rotundifolia U
Phymatosorus diversifolius
P. novae-zelandiae UC. *banksii*
P. scandens
Pneumatopteris pennigera
Polystichum richardii
P. silvaticum
P. vestitum
Pteridium esculentum
Pteris macilenta (of NZ authors)
P. saxatilis
P. tremula
Pyrrosia serpens
Rumohra adiantiformis
Sticherus cunninghamii
Trichomanes elongatum U
T. endlicherianum U
T. strictum
T. venosum
Tmesipteris elongata
T. lanceolata U
T. tannensis

GYMNOSPERMS

Dacrydium cupressinum
Dacrycarpus dacrydioides
Phyllocladus glaucus U
P. trichomanoides
Podocarpus hallii
P. totara
Prumnopitys ferruginea
P. taxifolia

WOODY ANGIOSPERMS

Alectryon excelsus
Alepis flavida (Thompson) U
Alseuosmia macrophylla
Aristotelia serrata
Beilschmiedia tawa
Brachyglottis kirkii
B. repanda
B. repanda x *B. rotundifolia* spp. *elaeagnifolia* (RO Green) U
Calystegia sepium
C. tuguriorum
C. soldanella
Carmichaelia arborea var. (includes *C. aligera*)
Carpodetus serratus
Cassinia leptophylla
Clematis foetida
C. forsteri
C. paniculata
Coprosma acerosa U
C. areolata
c. colensoi
C. foetidissima
C. grandifolia
C. lucida
C. propinqua ssp. *propinqua*
C. repens
C. rhamnoides
c. robusta
C. rotundifolia
C. tenuicaulis
C. tenuifolia U
C. propinqua x *C. robusta*
C. tenuifolia x *C. sp.* (Waitaanga)
Cordyline australis
C. banksii
C. indivisa U
Coriaria arborea
Corokia cotoneaster U
Corynocarpus laevigata
Cyathodes juniperina
Dodonaea viscosa
Dracophyllum latifolium
D. strictum
Dysoxylum spectabile
Elaeocarpus dentatus
E. hookerianus
Entelea arborescens U
Freyinetia baueriana ssp. *banksii*
Fuchsia excorticata
F. perscandens U
Gaultheria antipoda

G. oppositifolia U
G. paniculata
G. antipoda x *paniculata*
Geniostoma rupestre var. *ligustrifolium*
Griselinia littoralis
G. lucida
Hebe macrocarpa var. (*H. corriganii*)
H. speciosa U
H. stricta var. *macroura*
H. stricta var. *stricta*
H. townsonii (Allan 1961) U
Hedycarya arborea
Helichrysum aggregatum U
Hoheria populnea var. *lanceolata*
Knightia excelsa
Kunzea ericoides
Laurelia novae-zelandiae
Leptospermum scoparium
Leucopogon fasciculatus
L. fraseri
Litsea calicaris
Lophomyrtus bullata
L. obcordata U
L. bullata x *obcordata* U
Macropiper excelsum
Melicope simplex U
M. ternata
Melicytus lanceolatus
M. ramiflorus
Metrosideros carminea U
M. colensoi
M. diffusa
M. excelsa
M. fulgens
M. perforata
M. robusta
Mida salicifolia U
Muehlenbeckia australis
M. complexa
Myoporum laetum
Myrsine australis
M. salicina
Neomyrtus pedunculata
Nestegis cunninghamii
N. lanceolata
N. montana
Nothofagus solandri var. *solandri*
N. truncata
N. menziesii
N. solandri x *N. truncata*
Olearia albida
O. rani
O. solandri
O. townsonii (includes *O. thompsonii*)
Paratrophis microphylla (*Streblus heterophyllus*)
Parsonia capsularis
P. heterophylla
Passiflora tetrandra
Pennantia corymbosa
Peraxilla tetrapetala U
Pimelea prostrata U
Pimelea urvilleana U
Pittosporum cornifolium U
P. crassifolium U
P. eugenioides U
P. kirkii U
P. tenuifolium ssp. *colensoi*
P. tenuifolium ssp. *tenuifolium*
Plagianthus divaricatus
Pomaderris apetala U
Pseudopanax anomalus
P. arboreus
P. crassifolius
P. edgerleyi
P. laetus
P. lessonii U
Pseudowintera axillaris
P. colarata
Quintinia serrata (incl. *Q. acutifolia*, *Q. elliptica*)
Rhabdothamnus solandri
Rhopalostylis sapida
Ripogonum scandens
Rubus australis
R. cissoides
R. schmidelioides
Schefflera digitata
Solanum aviculare var. *aviculare*
Sophora microphylla
Syzygium maire
Tetragonia trigyna
T. tetragonioides U
Urtica ferox
Vitex lucens
Weinmannia racemosa

DICOT HERBS

Acaena anserinifolia
Anaphalis spp. (see *Gnaphalium*)
Apium prostratum ssp. *prostratum*
Brachyglottis turneri U
Callitriche petriei ssp. *petriei* U
C. muelleri
Cardamine sp. "narrow petal"
Centella uniflora
Chenopodium glaucum
Craspedia minor U
Cotula coronopifolia
Dichondra repens
Disphyma australe
Drosera peltata ssp. *auriculata*
D. binata U
Elatostema rugosum
Epilobium alsinoides U
E. billardiereanum ss.
E. brunescens ss U
E. insulare U
E. minutiflorum U
E. nerteroides
E. nummulariifolium
E. pallidiflorum U.
E. rotundifolium
Euphorbia glauca (Druce and Ogle 1972) U
Euphrasia cuneata
Galium propinquum
G. sp. (Waitaanga) U
Gnaphalium audax
G. gymnocephalum
G. involucreatum
G. kerianse (*Anaphalis kerianse*)
G. limosum U
G. sphaericum
G. subrigidum (*Anaphalis subrigida*)
G. trinerve U (*A. trinervis*)
G. sp (cf *G. limosum*) U
Gonocarpus micranthus ssp. *micranthus* U
Gunnera monoica
Haloragis erecta ssp. *erecta*
Hydrocotyle dissecta
H. elongata
H. heteromeria
H. microphylla
H. moschata
H. novae-zelandiae U
Hypericum japonicum
Jovellana repens U
Lagenifera pumila
Leptinella squalida ssp. *squalida*
Lilaeopsis ruthiana
Linum monogynum
Lobelia anceps
Myosotis petiolata var. *pansa* U
Nertera depressa
N. sp. (aff. *N. dichondrifolia*) U
N. setulosa U
Oxalis exilis
O. magellanica
Ourisia macrophylla ssp. *robusta*
Parahebe cataractae ssp. *diffusa* U
Peperomia urvilleana U
Plantago raoulii
Polygonum decipiens U
Pratia angulata
Pseudognaphalium luteo-album agg (leaves linear-acute)
P. luteo-album agg. (leaves oblong-rounded)
Ranunculus acaulis
R. amphitrichus U
R. reflexus
Rorippa divaricata (Druce and Ogle 1972) U
Samolus repens
Sarcocornia quinqueflora
Selliera radicans
Senecio lautus ssp. *lautus*
S. minimus
S. rufiglandulosus U
Sonchus kirkii U
Solanum nodiflorum U
Stellaria parviflora
Urtica incisa
Viola filicaulis
Wahlenbergia albomarginata
W. sp. (flowers white) (Druce & Ogle 1972)

MONOCOT HERBS

Aciathus sinclairii
Arthropodium candidum (Druce and Ogle 1972) U
A. cirratum
Astelia fragrans
A. grandis
A. solandri
A. trinervia
Baumea articulata
B. juncea
B. rubiginosa
B. tenax U
Bolboschoenus caldwellii
B. medianus
Bulbophyllum pygmaeum
Caladenia catenata
Carex dissita
C. flagellifera (coastal form)
C. forsteri
C. lessoniana
C. maorica
C. pumila
C. secta
C. solandri
C. subdola U
C. testacea
C. virgata
C. sp. (c.f. *C. geminata*, wide leaves)
Chiloglottis cornuta
Collospermum hastatum
C. microspermum
Cortaderia fulvida
C. toetoe
Corybas acuminatus
C. macranthus
C. oblongus
C. rivularis agg.
C. trilobus agg.
Cyperus ustulatus
Dendrobium cunninghamii
Desmoschoenus spiralis U
Deyeuxia billardierei
Dianella nigra
Dichelachne crinita
Drymoanthus adversus
Earina autumnalis
E. mucronata
Echinopogon ovatus
Eleocharis acuta
E. gracilis
E. sphacelata
Elymus multiflorus
E. sp. (aff. *E. rectisetus*)
Gahnia lacera
G. pauciflora
G. setifolia
G. xanthocarpa
Juncus australis (Druce & Ogle 1972)
J. caespiticius U
J. gregiflorus
J. maritimus ssp. *australiensis*
J. pallidus
J. planifolius
J. prismatocarpus
J. sarophorus
Isachne globosa
Isolepis cernua (*Scirpus cernuus*)
I. habra (*S. habrus*)
I. inundata (*S. inundatus*)
I. nodosa (*S. nodosus*)
I. prolifer (*S. prolifer*)
I. reticularis (*S. reticularis*)
Lachnagrostis sp. (= *L. filiformis* var. *littoralis*) U
Lemna minor U
Lepidosperma australe U
Leptocarpus similis
Libertia grandiflora
L. ixoides
L. pulchella
Luzula picta var. *picta*
Machaerina sinclairii
Microlaena avenacea
M. stipoides
Microtis unifolia
Oplismenus imbecillus
Orthoceras strictum

Phormium cookianum ssp. cookianum
P. tenax
P. cookianum x P. tenax
Poa anceps var. anceps
Potamogeton cheesemanii
P. suboblongus U
Prasophyllum colensoi
Pterostylis banksii
P. trullifolia
P. sp. (aff. P. graminea and P. montana)
Rytidosperma gracile
R. unarede
R. viride
Schoenoplectus pungens U
S. validus U
Schoenus apogon (Cheeseman 1925)
S. maschalinus U
S. tendo
Sparganium subglobosum
Spinifex sericeus
Triglochin striata
Typha orientalis
Uncinia banksii
U. clavata
U. ferruginea
U. gracilentia
U. rupestris
U. uncinata
U. zotovii
Zostera muelleri

APPENDIX VI CHECKLIST OF VERTEBRATE FAUNA OF NORTH TARANAKI ECOLOGICAL DISTRICT

Common Name	Scientific Name	Habitat in District	Abundance in District
Lamprey	<i>Geotria australis</i>	fresh water streams and rivers	indeterminate
Long-finned eel	<i>Anguilla dieffenbachii</i>	fresh water streams and rivers	common
Short-finned eel	<i>Anguilla australis</i>	fresh water streams and rivers	common
Giant kokopu	<i>Galaxias argenteus</i>	fresh water streams and rivers	rare
Banded kokopu	<i>Galaxias fasciatus</i>	fresh water streams and rivers	common
Short-jawed kokopu	<i>Galaxias postvectis</i>	fresh water streams and rivers	rare
Koara	<i>Galaxias brevipinnis</i>	fresh water streams and rivers	common
Inanga	<i>Galaxias maculatus</i>	fresh water streams and rivers	common
Torrent fish	<i>Chelmannichthys fosteri</i>	fresh water streams and rivers	indeterminate
Red-finned bully	<i>Gobiomorphus huttoni</i>	fresh water streams and rivers	indeterminate
Yellow-eyed mullet	<i>Aldrichetta forsteri</i>	fresh water streams and rivers	indeterminate
Flounder	<i>Rhombosolea retelliana</i>	estuarine	locally common
Brown trout *	<i>Salmo trutta</i>	fresh water streams and rivers	indeterminate
Golden bell frog *	<i>Litoria raniformis</i>	wetland	locally common
Green frog *	<i>Litoria aurea</i>	wetland	locally common
Forest skink	<i>Leiopispisma striatum</i>	forest	rare
Brown skink ?	<i>Leiopispisma zelandicum</i>	-	indeterminate
Common skink ?	<i>Leiopispisma nigripantare</i>	-	indeterminate
Copper skink	<i>Cyclodina aenea</i>	open or shaded areas with adequate ground cover	indeterminate
Ornate skink	<i>Cyclodina ornata</i>	adequate ground cover	indeterminate
Common gecko ?	<i>Hoplodactylus maculatus</i>	forest, scrub, grassland	indeterminate
Pacific gecko	<i>Hoplodactylus pacificus</i>	forest	indeterminate
Forest gecko	<i>Hoplodactylus granulatus</i>	forest and scrub	indeterminate
Green gecko	<i>Naultinus elegans elegans</i>	large tracts of forest, scrub	indeterminate
North Island brown kiwi	<i>Apteryx australis mantelli</i>		locally common
North little blue penguin ,			
korora	<i>Eudyptula minor</i>	coastal	locally
Giant petrel, black molly	<i>Macronectes giganteus</i>	coastal	vagrant
Grey-faced petrel, ol	<i>Pterodroma macroptera gouletti</i>	coastal	vagrant
Australasian gannet, takapu	<i>Morus serrator</i>	coastal	vagrant

Common Name	Scientific Name	Habitat in District	Abundance in District
Black shag, kawau	<i>Phalacrocorax carbo novaehollandiae</i>	inland and coastal waters	locally common
Pied shag?	<i>Phalacrocorax varius</i>	-	-
Little shag, kawaupaka	<i>Phalacrocorax melanoleucos</i>	inland and coastal waters	locally common
Peafowl *	<i>Pavo cristatus</i>	pasture	local
Turkey *	<i>Meleagris gallopavo</i>	pasture	local
White-faced heron	<i>Ardea novaehollandiae</i>	rivermouth	locally common
Cattle egret	<i>Bubulcus ibis</i>	pasture	vagrant
Reef heron, matuku moana	<i>Egretta sacra</i>	rivermouth	uncommon
Australasian bittern	<i>Botaurus stellaris polioptilus</i>	wetland	rare
Black swan *	<i>Cygnus atratus</i>	lagoon	rare
Paradise shelduck, putangitangi	<i>Tadorna variegata</i>	lagoon, pastureland	locally common
Mallard *	<i>Anas platyrhynchos</i>	inland waters, ponds	locally common
Grey duck, parera	<i>Anas superciliosa</i>	inland waters	widespread
Grey teal, tote	<i>Anas gibberifrons</i>	lagoon, ponds	uncommon
New Zealand shoveler	<i>Anas rhynchos</i>	river	rare
Blue duck, whio	<i>Hymenolaimus malacophrynchos</i>	turbulent streams in unmodified	rare
Australasian harrier, hawk, kahū	<i>Circus approximans gouldi</i>	pasture, scrub	widespread
New Zealand falcon, bush hawk, karearea	<i>Falco novaeseelandiae</i>	forest, scrub	rare
Brown quail *	<i>Synalcus ypsilophorus</i>	scrub	rare
California quail *	<i>Lophortyx californica</i>	scrub	locally common
Pheasant *	<i>Phasianus colchicus</i>	scrub	locally common
Spotless crane, putoto, puweto	<i>Porzana tabuensis</i>	wetland	rare
Pukeko, swamp-hen	<i>Porphyrio porphyrio melanotus</i>	wetland	widespread
South Island pied oystercatcher	<i>Haematopus ostralegus finschi</i>	rivermouth	locally common
Variable oystercatcher	<i>Haematopus unicolor</i>	rivermouth	uncommon
Spur-winged plover	<i>Vanellus miles novaehollandiae</i>	pasture, rivermouth	uncommon
Banded dotterel, turirihatu, phawera	<i>Charadrius bicinctus</i>	coastal	uncommon
Eastern bar-tailed godwit	<i>Limosa lapponica</i>	rivermouth	rare migrant
Knot	<i>Calidris canutus</i>	rivermouth	rare migrant
Pied stilt, poaka	<i>Himantopus himantopus leucocephalus</i>	rivermouth	locally common
Arctic skua	<i>Stercorarius parasiticus</i>	coastal	vagrant
Southern black-backed gull, karoro, ngoiro	<i>Larus dominicanus</i>	rivermouth, coastal	widespread
Red-billed gull, tarapunga	<i>Larus novaehollandiae scopulinus</i>	rivermouth, coastal	widespread
Black-billed gull	<i>Larus bulleri</i>	rivermouth	uncommon
Whitefronted tern	<i>Sterna striata</i>	coastal	uncommon
Caspian tern, taranui	<i>Hydroprogne caspia</i>	rivermouth, coastal	rare
New Zealand pigeon, kereru	<i>Hemiphaea novaeseelandiae</i>	forest	widespread
North Island kaka	<i>Nestor meridionalis septentrionalis</i>	large forest tracts	uncommon

Common Name	Scientific Name	Habitat in District	Abundance in District
Yellow-crowned parakeet, kakariki	<i>Cyanoramphus auriceps</i>	large forest tracts	rare
Shining cuckoo, pipiwharauroa	<i>Chrysococcyx lucidus</i>	forest	widespread, migrant
Long-tailed cuckoo, koekoeko, kawekawea, kohoperoa	<i>Eudynamys taitensis</i>	forest	locally common, migrant
Moreport, ruru	<i>Ninox novaeseelandiae</i>	forest	widespread
New Zealand kingfisher, kotare	<i>Halcyon sancta vagans</i>	forest, scrub, pasture (near)	widespread
North Island Rifleman, titipounamu Skylark *	<i>Acanthisitta chloris granti</i>	forest	waterways)
Welcome swallow	<i>Alauda arvensis</i>	pasture	locally common
New Zealand pipit, pihohoi	<i>Hirunda tahitica neoxena</i>	river, pasture (near waterways)	widespread
Hedgesparrow *, dunnock	<i>Anthus novaeseelandiae</i>	scrub, pasture	widespread
North Island fernbird	<i>Prunella modularis</i>	forest, scrub, pasture	locally common
Whitehead, popokatea	<i>Bowdleria punctata vealeae</i>	forest, scrub, pasture	widespread
Grey warbler, tiororo	<i>Mohoua albigilla</i>	wetland	rare
North Island fantail, pīwakawaka	<i>Gerygone igata</i>	forest	locally common
North Island pied tit, tomiti	<i>Rhipidura fuliginosa</i>	forest, scrub	widespread
North Island robin, toutowai	<i>Petroica macrocephala totoi</i>	forest, scrub	widespread
Song thrush *	<i>Petroica australis placabilis</i>	forest	locally common
Blackbird *	<i>Turdus philomelos</i>	forest, scrub	widespread
Silvereye, waxeye, white-eye, tauhou	<i>Turdus merula</i>	forest, scrub	widespread
Bellbird, korimako, makomako	<i>Zosterops lateralis</i>	forest	widespread
Tui	<i>Anthornis melanura</i>	forest	widespread
Yellowhammer *	<i>Prosthemadera novaeseelandiae</i>	forest	widespread
Chaffinch *	<i>Emberiza citrinella</i>	scrub, pasture	widespread
Greenfinch *	<i>Fringilla coelebs</i>	forest, scrub, pasture	widespread
Goldfinch *	<i>Carduelis chloris</i>	scrub, pasture	widespread
Redpoll	<i>Carduelis carduelis</i>	scrub, pasture	widespread
House sparrow *	<i>Carduelis flammæa</i>	scrub	present
Starling *	<i>Passer domesticus</i>	scrub, pasture	widespread
Indian myna *	<i>Sturnus vulgaris</i>	scrub, pasture	widespread
North Island kokako	<i>Acridotheres tristis</i>	pasture, roadsides	widespread
Australian magpie *	<i>Callaeas cinerea wilsoni</i>	large forest gtracts	widespread
Brush-tailed possum *	<i>Gymnorhina tibicen</i>	scrub, pasture	rare
Lesser short-tailed bat	<i>Trichosurus vulpecula</i>	forest, scrub	widespread
Long-tailed bat	<i>Mystacina tuberculata tuberculata</i>	forest	abundant
Ship rat *, black rat	<i>Chalinobius tuberculatus</i>	forest	indeterminate
Norwegian rat *, brown rat	<i>Rattus rattus</i>	forest	indeterminate
Mouse *	<i>Rattus norvegicus</i>	scrub, forest	common
Stoat *	<i>Mus musculus</i>	waterways	common
Weasel *	<i>Mustela erminea</i>	pasture, scrub, forest	common
	<i>Mustela nivalis</i>	pasture, forest	common
		pasture	indeterminate

Common Name	Scientific Name	Habitat in District	Abundance in District
Ferret *	<i>Mustela putorius</i>	open country and forest	common
Rabbit *	<i>Oryctolagus cuniculus</i>	pasture	locally common
Hare *	<i>Lepus europaeus</i>	grassland, scrub, forest	common
Hedgehog *	<i>Erinaceus europaeus</i>	scrub, pasture	common
Red deer *	<i>Cervus elaphus</i>	forest	rare
Goat *	<i>Capra hircus</i>	scrub, forest	abundant
Sheep *	<i>Ovis aries</i>	forest	occasional
Cattle *	<i>Bos taurus</i>	forest	occasional
Pig *	<i>Sus scrofa</i>	scrub, forest	common
Cat *	<i>Felis catus</i>	pasture, scrub, forest	occasional

Sources:

Wildlife Service Fauna Survey, Wildlife Service
 Fisheries Research Division, Ministry of Agriculture and Fisheries
 Bruce Thomas, DSIR, Nelson (pers. comm.)
 Gill (1986)

APPENDIX VII

GLOSSARY OF TERMS

alluvial terrace	refer to landform						
alluvial flat	refer to landform						
bioclimatic zone	an area where the effect of climatic vegetation and landforms is similar throughout, climate being largely determined by maritime influence and altitude. The North Taranaki Ecological District has been divided into 3 zones: <table border="0"> <tr> <td>Coastal</td><td>that area within one kilometre of the coastline; exposed to a maritime climate.</td></tr> <tr> <td>Semicoastal</td><td>extending from the coastal zone to approximately 10 km inland; kohekohe is an important component of the vegetation.</td></tr> <tr> <td>Lowland</td><td>inland of the semicoastal zone, and constitutes the remainder of the district. Tawa is the indicator species of this zone.</td></tr> </table>	Coastal	that area within one kilometre of the coastline; exposed to a maritime climate.	Semicoastal	extending from the coastal zone to approximately 10 km inland; kohekohe is an important component of the vegetation.	Lowland	inland of the semicoastal zone, and constitutes the remainder of the district. Tawa is the indicator species of this zone.
Coastal	that area within one kilometre of the coastline; exposed to a maritime climate.						
Semicoastal	extending from the coastal zone to approximately 10 km inland; kohekohe is an important component of the vegetation.						
Lowland	inland of the semicoastal zone, and constitutes the remainder of the district. Tawa is the indicator species of this zone.						
buffer	a zone surrounding a natural area which reduces the effect of external influences upon the features within the natural area eg. vegetation such as modified forest/scrub or a stream.						
cliff	refer to landform						
coastal zone	refer to bioclimatic zone						
colluvial hillslope	refer to landform						
community	a collection of populations of animals and plants that occur naturally together in a common environment of any size.						
conservation value	the relative merit of a natural feature within a regional and national context.						
dissected hill country (DHC)	the major land system of the district; sedimentary rocks subject to active fluvial erosion have formed a highly dissected landscape of steep and narrow valleys.						
dipslope	refer to landform.						
diversity	the range of the natural physical and biotic components in the landscape including species, communities, ecosystems, landforms, soils sequences, and dynamic systems and processes.						
ecological character	the distinguishing features of a particular place, definable in terms of biotic composition, climatic, edaphic, and topographical information.						
ecological class	a category which describes the broad ecological patterns within an ecological district in terms of bioclimatic zone, hydrological class, vegetation structural class, and land system eg. a coastal palustrine reedland on uplifted marine terrace.						
ecological district (ED)	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. New Zealand has been subdivided into 268 such districts. It represents the level for assessing the representativeness of major ecosystem types in the national network of protected natural areas.						
ecological region	a group of adjacent districts with very closely related ecological characteristics, or, in some cases, a single very distinctive ecological district. New Zealand has been subdivided into 84 such regions.						
ecological unit	incorporates vegetation type and the landform or substrate which supports it eg a coastal palustrine raupo reedland on an alluvial flat. It is the basic unit for rapid field survey of individual study areas to determine their biological and physical composition, and for vegetation and landform typing.						
ecosystem	any interrelated and functioning group of organisms and substrates (including water and air), on any scale, including the processes of energy flow and productivity.						
endangered	refer to rarity.						
endemic	occurring naturally in, and restricted to, a particular country, region or locality. Refer to indigenous.						
estuarine	refer to hydrological class.						
habitat	the part of an environment in which a plant or animal lives.						

hillslope	refer to landform.
hydrologic class	A category used in classifying the influence of water on the character of the biotic elements. The four categories relevant to the North Taranaki Ecological District are: estuarine habitat with salt or brackish water, partially enclosed but permanently open to the sea with diurnal or less frequent inundation. palustrine wetland community/habitat which may or may not have free standing water present. riverine a system of flowing freshwater. terrestrial habitat in which free water is not a significant influence.
indigenous	native to, occurring naturally in, characteristic of, a particular country, region or locality. All the indigenous features of New Zealand give it its' own distinctive character. Indigenous features are important at the regional and district level and are distinct from endemic features in that they may occur naturally in more than one country.
induced	native vegetation which established after destruction or disturbance of the previous cover, and which may dominate for many decades, but is essentially different from the original vegetation eg raupo reedland.
interfluve	refer to landform.
landform	a part of the land's surface which can be identified as having a similar genesis and inherent characteristics namely topography, soils, and vegetation. In the North Taranaki Ecological District the following landforms occur: alluvial flat flood adjacent to the main bed of the river community estuarine and adjacent to alluvial terraces; frequently flooded. alluvial terrace flat to gently sloping area of alluvium of variable height above river level. May be periodically flooded. cliff very steeply sloping to vertical rock face. colluvial concave zone of debris accumulation hillslope on lower hillslope. dipslope a hillslope parallel to the tilted layers of strata of sedimentary rocks. interfluve a broad interstream area, forming a divide of higher terrain between two drainage ways. hillslope slope unit along which drainage lines are predominantly parallel. marine terrace a gently sloping platform originally forming the floor, subsequently raised above sea level by uplift. ridge the top (often acute angled) of a divide between two drainage ways. sand dune a landform resulting from the deposition of loose sand by the wind. sand plain flat to gently sloping expanse of sand commonly associated with dune systems.
land system	an area or group of areas throughout which there is a recurring pattern of soils, vegetation and topography. A change in the pattern indicates a boundary to a land system. The units which make up the pattern have either a climatic, geological, or geomorphic feature in common. The North Taranaki Ecological District includes two land systems: dissected hill country (DHC) which comprises most of the district, and a narrow zone of uplifted marine terraces (UMT) along the coastline.
local	refer to rarity
lowland zone	refer to bioclimatic zone
marine terrace	refer to landform
natural area	a tract of land which supports vegetation and landforms considered to be in a predominantly natural state; identified as a suitable unit for evaluation of ecological quality and representativeness and has potential to be recommended for protection.

naturalness	degree to which ecological units/communities/ecosystems retain their original character. Refer to original natural ecosystem.
original natural ecosystem	original natural landscape - the original state of an ecosystem and the landscape is that which prevailed before the arrival of humans in New Zealand with their domesticated and commensal animals and plants. A major objective of most nature conservation strategies in New Zealand is to protect indigenous ecosystems and landscapes that most closely approximate this state. In North Taranaki Ecological District, it applies to areas where the landscape has remained in, returned to, or is returning to its probable original state (ie. mature or steady - state forest) of the pre-Polynesian period.
palustrine	refer to hydrological class.
primary	native vegetation which has never been logged or cleared in any part.
protected natural area (PNA)	a natural area which has a measure of legal protection that provides sufficient security from modification/development, and in which the principal purpose of management is retention of the indigenous character and component elements.
rare	refer to rarity.
rarity	the relative uncommonness of a species, community or ecosystem on a district, regional, and/or national basis.
endangered	species in danger of extinction and whose survival is unlikely if the causal factors continue operating.
vulnerable	species likely to become endangered in the near future if the causal factors continue operating.
rare	a species or habitat that is not at present endangered, but is at risk - usually localised within geographical areas or habitats or are thinly scattered over a more extensive range.
indeterminate	is used for species thought to be extinct, endangered, vulnerable, or rare, but for which there is insufficient information to allow allocation to a category.
local	in New Zealand a category additional to those used by IUCN has been found useful. This is local, used to include species not under threat but potentially threatened, and hence deserving some level of monitoring and possibly protection. Included are regional endemics, species of potentially vulnerable habitats, and species occurring as frequent but small populations.
riverine	refer to hydrologic class.
representativeness	the extent to which an area represents the components of the natural diversity of a larger reference area eg. representation in reserves of the natural diversity of an ecological district.
sanddune	refer to landform.
sandplain	refer to landform.
secondary	secondary native vegetation, seral regrowth after destruction or disturbance.
semicoastal	refer to bioclimatic zone.
study area	a tract of land with at least some natural features which is suitable for rapid field inventory, in order to identify the ecological patterns and natural diversity of an ecological district.
succession	the process of change in the appearance, composition and structure of a community, usually over a number of years. Change may be due to biotic factors, or abiotic factors, or both.
taha wairua -	a traditional Maori concept relating to the spirituality of all things.
terrestrial -	refer to hydrologic class.
uplifted marine terrace (UMT)	refer to land system.
vegetation structural class	vegetation classification based on the type of plant which is dominant in the canopy eg. forest, reedland. These are based on Atkinson (1964), with the following abbreviated definitions:
forest	more than 80% trees in the canopy

treeland	less than or equal to 80% trees in the canopy										
scrub -	more than 80% shrubs in the canopy										
shrubland	less than or equal to 80% shrubs in the canopy										
tussockland	herbaceous plants, including grasses, land sedges and rushes, with leaves densely bunched at the base. This includes flax.										
grass/sedge/ rushland	herbaceous monocotyledons with narrow linear leaves not densely bunched rush at the base.										
reedland	tall herbaceous monocotyledons with linear leaves containing spongy mesophyll tissue.										
fernland	dominated by ferns										
herbfield	small herbaceous plants not included in the above category.										
vegetation type	a term which includes the dominant canopy species and structural class of an area of vegetation eg. rimu/tawa-kamahi forest, toupata-harakeke tussock shrubland. In addition, cover values and tiers are included ie: <table> <tr> <td>tawa</td><td>more than 50% cover of underlined species.</td></tr> <tr> <td>tawa</td><td>more than 20% cover of underlined species .</td></tr> <tr> <td>tawa</td><td>5-20% cover of species</td></tr> <tr> <td>rimu/tawa</td><td>indicates 5-20% cover of rimu emergent over a canopy of more than 50% tawa.</td></tr> <tr> <td>tawa-hinau</td><td>indicates more than 20% tawa and 5-20% hinau occur in the same tier.</td></tr> </table>	tawa	more than 50% cover of underlined species.	tawa	more than 20% cover of underlined species .	tawa	5-20% cover of species	rimu/tawa	indicates 5-20% cover of rimu emergent over a canopy of more than 50% tawa.	tawa-hinau	indicates more than 20% tawa and 5-20% hinau occur in the same tier.
tawa	more than 50% cover of underlined species.										
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rimu/tawa	indicates 5-20% cover of rimu emergent over a canopy of more than 50% tawa.										
tawa-hinau	indicates more than 20% tawa and 5-20% hinau occur in the same tier.										
viability	the ability of a natural area to maintain its inherent characteristics and to resist direct and indirect human effects. Important factors are size, diversity and sensitivity of ecological units.										
vulnerable	see rarity.										
recommended area for protection (RAP)	an area recommended for protection on the grounds that it is the best (or among best) example of its type or class of natural ecological features, ecosystems, sequence of communities or landscape in an ecological district. An RAP is intended to be the basis of a proposal for a protected natural area that would supplement the existing system of Protected Natural Areas to make the system more fully representative of the district's and New Zealand's ecological diversity.										

APPENDIX VIII COMMON PLANT NAMES USED IN TEXT

* denotes adventive species

akeake	<i>Dodonaea viscosa</i>
arrowgrass	<i>Triglochin striata</i>
black beech	<i>Nothofagus solandri</i> var. <i>solandri</i>
black maire	<i>Nestegis cunninghamii</i>
boxthorn	<i>Lycium ferocissimum</i> *
bracken	<i>Pteridium esculentum</i>
brush wattle	<i>Paraserianthes lophantha</i> *
bush lawyer	<i>Rubus cissoides</i>
bush rice grass	<i>Microlaena avenacea</i>
cabbage tree	<i>Cordyline australis</i>
coastal tree daisy	<i>Olearia solandri</i>
creeping buttercup	<i>Ranunculus repens</i> *
crown fern	<i>Blechnum discolor</i>
dock	<i>Rumex obtusifolius</i> *
filmy fern	<i>Hymenophyllum demissum</i>
five-finger	<i>Pseudopanax arboreus</i>
fragrant fern	<i>Phymatosorus scandens</i>
gorse	<i>Ulex europaeus</i> *
hangehange	<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>
harakeke	<i>Phormium tenax</i>
hard beech	<i>Nothofagus truncata</i>
heketara	<i>Olearia rani</i>
hen and chicken fern	<i>Asplenium bulbiferum</i>
Himalayan honeysuckle	<i>Leycesteria formosa</i> *
hinau	<i>Elaeocarpus dentatus</i>
hooked sedge	<i>Uncinia uncinata</i>
houpara	<i>Pseudopanax lessonii</i>
jointed rush	<i>Leptocarpus similis</i>
kahikatea	<i>Dacrydium dacrydioides</i>
kalkomako	<i>Pennantia corymbosa</i>
kamahi	<i>Weinmannia racemosa</i>
kanuka	<i>Kunzea ericoides</i>
karaka	<i>Corynocarpus laevigatus</i>
karamu	<i>Coprosma robusta</i>
karo	<i>Pittosporum crassifolium</i>
kawakawa	<i>Macropiper excelsum</i>
kiekie	<i>Freyinetia baueriana</i> ssp. <i>banksii</i>
king fern	<i>Marattia salicina</i>
kiokio	<i>Blechnum capense</i> agg.
kohekohe	<i>Dysoxylum spectabile</i>
kohurangi	<i>Brachyglottis kirkii</i>
kowhai	<i>Sophora microphylla</i>
lacebark	<i>Hoheria populnea</i> var. <i>lanceolata</i>
lancewood	<i>Pseudopanax crassifolius</i>
lupin	<i>Lupinus arboreus</i> *
mahoe	<i>Melicytus ramiflorus</i>
mamaku	<i>Cyathea medullaris</i>
mangeao	<i>Litsea calicaris</i>
manuka	<i>Leptospermum scoparium</i>
mapou	<i>Myrsine australis</i>
marram	<i>Ammophila arenaria</i> *
marsh ribbon wood	<i>Plagianthus divaricatus</i>
matai	<i>Prumnopitys taxifolia</i>
mingimingi	<i>Leucopogon fasciculatus</i>
miro	<i>Prumnopitys ferruginea</i>
mountain cabbage tree	<i>Cordyline indivisa</i>
narrow-leaved maire	<i>Nestegis montana</i>
neinei	<i>Dracophyllum latifolium</i>
nikau	<i>Rhopalostylis sapida</i>
pampas	<i>Cortaderia selloana</i> *
parantaniwha	<i>Elatostema rugosum</i>
pigeonwood	<i>Hedycarya arborea</i>
pingao	<i>Desmoschoenus spiralis</i>
pohuehue	<i>Muehlenbeckia complexa</i>
pokaka	<i>Elaeocarpus hookerianus</i>
ponga	<i>Cyathea dealbata</i>
prickly mingimingi	<i>Cyathodes juniperina</i>
pukatea	<i>Laurelia novae-zelandiae</i>
puriri	<i>Vitex lucens</i>
putaputaweta	<i>Carpodetus serratus</i>
ramarama	<i>Lophomyrtus bullata</i>
rangiora	<i>Brachyglottis repanda</i>
rata	<i>Metrosideros robusta</i>
raurekau	<i>Coprosma grandifolia</i>
raupo	<i>Typha orientalis</i>
rengarenga	<i>Arthropodium cirratum</i>
rewarewa	<i>Knightia excelsa</i>
rimu	<i>Dacrydium cupressinum</i>
rohutu	<i>Neomyrtus pendunculata</i>
sand sedge	<i>Carex pumila</i>
sea celery	<i>Apium prostratum</i>
sea primrose	<i>Samolus repens</i>
shore bindweed	<i>Calystegia soldanella</i>
silver beech	<i>Nothofagus menziesii</i>

single crepe fern
sphagnum
supplejack
swamp maire
swamp millet
tainui
tanekaha
tarata
taupata
tawa
tawheowheo
thin-barked totara
three square
titirangi
toatoa
toetoe
toro
totara
treefern
turutu
tutu
umbrella fern
wharangi
wharariki
whau
wheki
wheki ponga
white maire
willow

Leptopteris hymenophylloides
Sphagnum cristatum
Ripogonum scandens
Syzygium maire
Isachne globosa
Pomaderris apetala
Phyllocladus trichomanoides
Pittosporum eugenioides
Coprosma repens
Beilschmiedia tawa
Quintinia serrata
Podocarpus hallii
Schoenoplectus pungens
Hebe speciosa
Phyllocladus glaucus
Cortaderia toetoe
Myrsine salicina
Podocarpus totara
any of Cyathea medullaris, Dicksonia squarrosa C. smithii, and rarely D. fibrosa
Dianella nigra
Coriaria arborea
Sticherus cunninghamii
Melicope ternata
Phormium cookianum ssp. cookianum
Entelea arborescens
Dicksonia squarrosa
Dicksonia fibrosa
Nestegis lanceolata
Salix spp. *