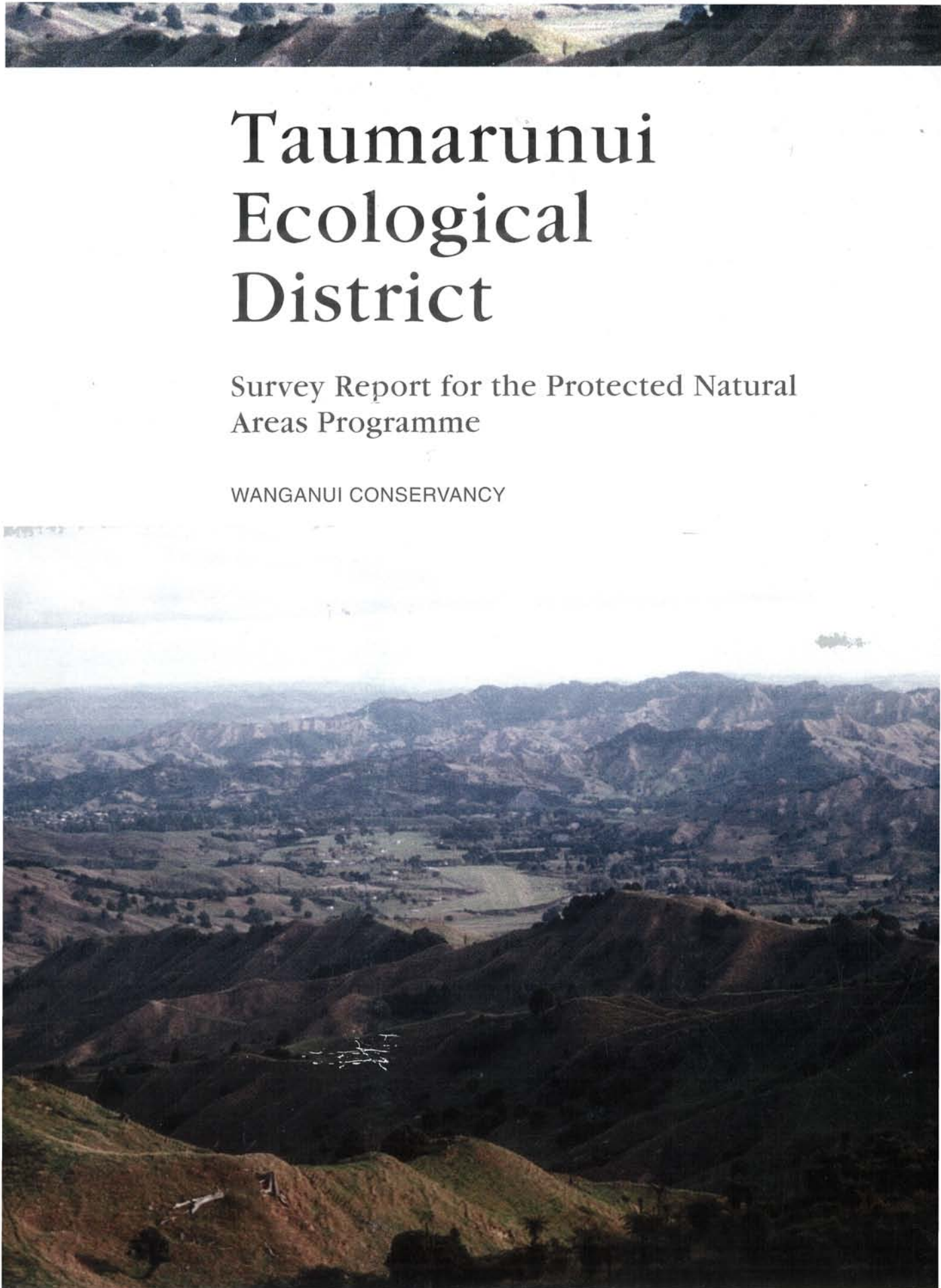




Taumarunui Ecological District

Survey Report for the Protected Natural
Areas Programme

WANGANUI CONSERVANCY



Department of Conservation
Te Papa Atawhai

Taumarunui Ecological District

Survey Report for the Protected Natural Areas Programme

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*Looking south over the
Taumarunui Ecological
District from the
Hikurangi Scenic Reserve.
Photo Department of
Conservation,
Taumarunui Field Centre*

Contract Report No. 272

Published by
Department of Conservation
Wanganui Conservancy
Wanganui, New Zealand
June 2000
Printed on recycled paper

Published by
Department of Conservation
Wanganui Conservancy
Private Bag 3016
74 Ingestre Street
Wanganui
New Zealand
ISSN 0112-9252
ISBN 0-478-21981-4
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Foreword

This report is one of the Protected Natural Areas Programme (PNAP) series. It describes the natural features of Taumarunui Ecological District, focussing on priorities for conservation that are identified as Recommended Areas for Protection (RAPs). The report has been prepared for the Department of Conservation by Wildland Consultants, Rotorua, who also did the field survey.

Taumarunui Ecological District in the central North Island is covered by three conservancies of the Department of Conservation, namely Wanganui, Waikato and Tongariro/Taupo. The district is largely hill country of marine origin, uplifted and then sculptured by rivers that formed terraces in the floors of the larger valleys. The district is bordered by the volcanic plateau to the east and is flanked elsewhere by steep to rolling hill country. Influences of the neighbouring volcanic centres upon Taumarunui Ecological District can be seen in features like the layers of tephra ("volcanic ash") over all but the steepest hills, pumice river terraces and a massive lahar that entered the district from near Raurimu and headed north towards Taumarunui township. Forest once covered the district, apart from some natural shrublands and small areas of wetlands, mostly on valley floors, and tussockland. About 1.8% of the district is above 800 metres in altitude and classed as submontane. Over 90% of this retains a native vegetation cover. The remainder of the district is lowland, less than a third of which still has indigenous vegetation.

Five species of nationally threatened and uncommon plants are known from the ecological district, including the parasitic pua o te reinga (*Dactylanthus taylorii*) and a mistletoe, *Ileostylus micranthus*. Among the indigenous fauna, four species of the district (North Island brown kiwi, striped skink, short-tailed bat and a native fish, short-jawed kokopu) are classed as Category A threatened species by the Department of Conservation, and six species are Category B priorities for conservation management.

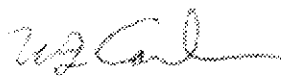
Much of the remaining indigenous vegetation is under some threat. Browsing animals such as possums, goats, deer, wild pigs and uncontrolled domestic stock inhibit regeneration and damage or destroy elements of the forest. Weeds with well-known capacities to completely alter native vegetation, such as old man's beard, privets, Japanese honeysuckle and climbing spindleberry, are still advancing in the district and more species are likely to arrive. The district is one of the major sources in the North Island of native timber from privately-owned forest. There is continuing clearing of forest, especially young regeneration, for farming and exotic plantations, and wetlands are being drained.

Although existing protected areas cover some 14% of the district, these are concentrated in hill country. There is poor representation of valley flats and gentle slopes in protected natural areas. This report recommends 36 currently unprotected natural areas for protection, out of a total of almost 125 that were surveyed. If these can be protected and managed from a conservation perspective they will complement natural areas already formally protected. In total, these represent the range of natural features that make the Taumarunui Ecological District unique. The 36 Recommended Areas for Protection (RAPs) total about 5,600 ha or about 2% of the total land area of the district. Several of these are quite large tracts of hill country forest but many, especially wetlands, are less than 10 ha and as small as 1 ha. The median size of an RAP is 10.7 ha

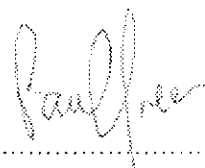
RAPs are the beginning of the implementation phase of the PNA Programme that will involve discussion and consultation, particularly with landowners as nearly all of the 36 RAPs are on privately-owned land. The Department of Conservation is committed to this process. The recommendation to protect an area provides the basis for discussion with the landowner on protection options. What finally results can range from no alteration in land use, to improved fencing or pest control, through to the Department and other agencies accepting responsibility for management. The recommendation that an area be protected lets a landowner know the conservation value of the land and also alerts others to the area's significance, including the Department of Conservation and local and regional authorities.

Current protected lands and the RAPs make up only a small percentage of land with native vegetation. The rest is also important for maintaining plant and animal populations, soil and water values and the district's landscapes.

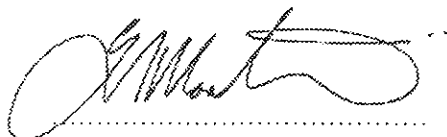
This report has a great deal of information on the ecological values and history of the Taumarunui District and is a substantial reference work, as well as a guide to conservation priorities. It should be of wide interest to landholders, conservation managers, iwi, scientists, conservation groups and the public, who will appreciate the efforts of those who produced this report and those who allowed their properties to be surveyed.



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Conservator
Wanganui



Paul Green
Conservator
Tongariro/Taupo



Greg Martin
Conservator
Waikato

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Summary

Taumarunui Ecological District is one of two ecological districts in the King Country Ecological Region. It comprises over 270,000 ha of hill country in the upper Whanganui River System and is situated immediately west of the volcanic ring plain. Its moderately steep to steep mudstone and sandstone hills are almost entirely in the lowland bioclimatic zone. Soils derived from a mantle of Taupo ash and riparian pumice terraces are widespread. The climate is generally temperate with mild humid summers and wet cool winters. Before the arrival of humans, Taumarunui Ecological District would have been almost entirely forested with rimu-northern rata/tawa forest, podocarp-rich forests and widely occurring hard beech forest in the north-west and southern parts of the ecological district.

European settlement began in the early 1880s but it was not until the completion of the main trunk railway in 1908 that forest clearance began in earnest. Many indigenous ecosystems have been replaced with pasture and, to a lesser extent, plantation forest, and a suite of invasive animal pests and plants have been introduced. However, there are still substantial areas of indigenous forest scattered throughout the ecological district, particularly on the steeper hill country and in the submontane bioclimatic zone.

Taumarunui Ecological District was surveyed as part of the New Zealand Protected Natural Areas Programme (PNAP) during the winter and spring of 1999. Taumarunui Ecological District spans three Department of Conservation conservancies: Wanganui, Waikato and Tongariro/Taupo.

The ecological district was divided into two bioclimatic zones (lowland and submontane) on the basis of altitude. It was further subdivided into five landform units, based on topography and underlying geology. These frameworks were used in combination with a set of standard PNAP criteria to select Recommended Areas for Protection. The criteria were: present versus past extent, diversity and pattern, naturalness, size, shape of area, representativeness, rarity and special features, buffering and connectivity, viability, and fragility and threat. The landcover database was used for present day vegetation cover. A map of indigenous vegetation c. 1840 was also produced, for use as a comparative baseline.

The spatial information was digitised and analysed using a geographic information system to determine the extent of indigenous vegetation remaining on each landform unit within the lowland and submontane bioclimatic zones. Relatively little indigenous vegetation and habitat remains on the flatter land in the ecological district. As land becomes steeper there is typically an increase in the relative proportion of indigenous forest. Wetlands have been heavily reduced in area.

Thirty-six areas have been recommended for protection, comprising c. 5,600 ha or 2% of the Taumarunui Ecological District. There are numerous areas of indigenous vegetation/ habitat that have not been identified as RAPs, of which many are of significant conservation value. However the emphasis in this survey was placed on selecting the best remaining examples of vegetation and habitat classes and landform units inadequately protected in the existing reserve network.

The highest priorities for active management relate to remaining natural areas on flatter land and wetlands. Specific management requirements will need to be assessed for each site. Fencing, retirement from grazing, and wild animal control are the highest priorities for many natural areas. These will require the development of a programme of co-operative works with landowners. There are opportunities also to restore degraded ecosystems and habitats.

Acknowledgments

We gratefully acknowledge the assistance of the following during the survey:

- Landowners of the Taumarunui Ecological District for granting access to study areas and providing assistance and valuable information.
- Colin Ogle (Wanganui Conservancy, Department of Conservation) initiated the project and was the contract supervisor. He provided considerable support and assistance throughout the project, participated in the selection of and contributed information on study sites, and provided useful comments on a draft of the flora section of this document.
- Avi Holzapfel (Waikato Conservancy, Department of Conservation) and Nick Singers (Tongariro Conservancy, Department of Conservation) were the primary contacts within those conservancies and provided considerable assistance throughout the project, participated in the selection of and contributed information on study sites, and provided useful comments on a draft of the flora and fauna sections of this document.
- Phil Bradfield (Maniapoto Area Office, Department of Conservation) provided invaluable information on wildlife and landowners in the north of the ecological district, participated in the selection of study sites, contributed information on study sites, and provided useful comments on a draft of the fauna section of this document.
- Adrian de Groot (Department of Conservation) carried out the phase one reconnaissance survey, describing and mapping potential sites for survey.
- Cam Speedy (Tongariro/Taupo Conservancy, Department of Conservation) participated in the selection of study sites, provided information on the fauna of the ecological district, and comments on a draft of the fauna section of this document.
- Chris Smuts-Kennedy (Waikato Conservancy, Department of Conservation) and Tim Holmes (Wanganui Conservancy, Department of Conservation) provided information on the fauna of the ecological district and comments on a draft of the fauna section of this document.
- Dave West (Waikato Conservancy, Department of Conservation) and Rosemary Miller (Wanganui Conservancy, Department of Conservation) provided information on the freshwater fisheries of the ecological district and comments on the draft of the fauna section of this document.
- John Spence, Peter Lock, Sue Jones and Sue Gowan (Wanganui Conservancy, Department of Conservation) provided aerial photographs, cadastral maps for the Wanganui part of the ecological district, and draughting of the RAP maps.
- Richard Cocks (Waikato Conservancy, Department of Conservation) provided aerial photographs for the Waikato part of the ecological district.
- Graeme Bell (Taumarunui Field Centre, Department of Conservation) provided invaluable logistical support, information on study sites and liaised with local Iwi.
- Dave Jane (Wanganui Conservancy, Department of Conservation) for initial project liaison.

- W.B. Shaw (Wildland Consultants Ltd) for technical advice, field assistance, useful discussion, logistical support, and comments on various parts of the draft report.
- Jo Priestley (Wanganui Conservancy, Department of Conservation) liaised with the local media to promote the survey and organised letters and pamphlets to be given to landowners.
- Jo Erasmuson (Environment Waikato) loaned aerial photographs for part of the ecological district in the Waikato region.
- Trevor Glass (Ruapehu District Council) provided access to the LCDB information from which the current vegetation cover was derived and assisted in translating the data into ArcView format.
- Dave Rothschild (Whakapapa Field Centre, Department of Conservation) provided reports and information on survey sites.
- Dave Stowers and Hugh (Ted) Dorrian (Taumarunui Field Centre, Department of Conservation) provided contact information for landowners and accommodated the field survey team within their quarters.
- Martin Suchma and Peter Rihia (Taumarunui Field Centre, Department of Conservation) provided logistical support, information on study sites and contact information for landowners.
- Sean Husheer (Tongariro/Taupo Conservancy, Department of Conservation) provided information on the vegetation of Tongariro Conservation Area.
- Hemi Kingi (Tongariro/Taupo Conservancy, Department of Conservation) helped with contacting Maori land owners.
- David Bragg (Carter Holt Harvey) for access and information on plantation forests.
- Mike Mohi for information on Nga Whenua Rahui covenants.
- Ross Bishop (Regional Representative, QEII National Trust) for information and maps of QEII covenants.
- Brian Smith (NIWA, Hamilton) for information on the freshwater invertebrate fauna of the ecological district.
- Barbara Knowles (Wildland Consultants Ltd) for editing.
- Amber Bill (Wildland Consultants Ltd) for help in collating the document.
- Margaret Honey (Wildland Consultants Ltd) for word processing and report preparation.

Thanks to all the other people who have made information available and helped during this survey.

1. Introduction

The Protected Natural Areas Programme (PNAP) was established in 1983 to survey New Zealand in its entirety, systematically, to ensure that representative examples of all indigenous ecosystems are represented adequately in the Protected Natural Areas (PNA) network. The catalyst for this programme was the 1977 Reserves Act which called for:

...the preservation of representative samples of all classes of natural ecosystems and landscapes which in the aggregate originally gave New Zealand its own recognisable character. (s.3(1)(b))

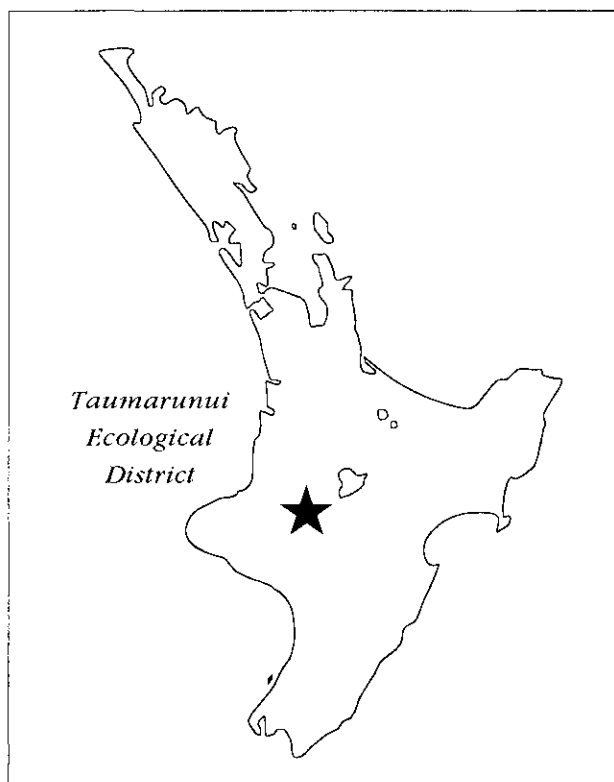
A framework of 68 ecological regions, sub-divided into 268 ecological districts, was defined and delineated to enable the systematic survey of New Zealand. The 268 ecological districts form the basis of the PNAP, with each ecological district being the subject of a survey. During the survey an assessment of the current protected areas network is carried out to assess how well the range of ecosystems naturally occurring within an ecological district is represented. If it is found that there are ecosystems which are not protected, or not adequately protected, then areas are recommended for protection to correct this imbalance. Existing protected natural areas include land administered by the Department of Conservation (DOC) and private land with covenants (for example Nga Whenua Rahui and QEII covenants). District and regional councils also can administer land for conservation purposes or allocate resources to assist conservation projects.

Taumarunui Ecological District is within the boundaries of three DOC conservancies, Wanganui, Waikato and Tongariro/Taupo (refer to Figure 1). Prior to this report, little was known on the representativeness of the current protected areas network. This led the Wanganui Conservancy (DOC) to rate the need for a PNAP survey of the Taumarunui Ecological District as “high”.

This report provides a synopsis of the physical and ecological character of the Taumarunui Ecological District, an overview of the survey methods used, a summary of the remaining indigenous vegetation, features currently protected and areas that warrant protection (Recommended Areas for Protection: RAPs). Descriptions and site maps are provided for all RAPs.

2. Ecological Character of Taumarunui Ecological District

2.1 LOCATION AND SETTING



Taumarunui Ecological District covers approximately 276,133 ha of hill country in the upper Whanganui River system. It is one of two ecological districts in the King Country Ecological Region and is situated immediately west of the volcanic ring plain. The ecological district boundary, as defined by McEwen (1987), has been refined (see section 3.1). To the south, the ecological district boundary generally follows the southern catchment boundary of the Retaruke River. From the confluence of the Retaruke and Whanganui Rivers, the western boundary generally follows the Figure 1 western catchment boundary of the Ohura River to Tapuiwahine. Just north of Tapuiwahine, the ecological district narrows to follow the catchment boundaries of western tributaries of the Ongarue River. Around Benneydale, the ecological district again expands to take in the headwater catchments of the Mokau River and several of its tributaries.

Located over 35 km inland, the Taumarunui Ecological District is dominated by hill country that is generally steep and highly dissected, rising frequently up to 600 m a.s.l., with minor areas over 800 m a.s.l. Hauhungaroa at

1,078 m a.s.l. is the highest point in the district, closely followed by Taurewa to the south at 1,076 m a.s.l.. Rivers are a characteristic feature of the ecological district, and the Whanganui River, which flows through the middle of the ecological district, is the most prominent.

Originally the ecological district was covered almost entirely in podocarp-broadleaved forest. However, extensive milling operations over the past century, followed by farming, has resulted in the loss of forest cover over much of the ecological district. Nowadays forest is mostly absent from valley floors and gently sloping areas. However, forest remnants are common throughout the hill country, with extensive tracts being present along the eastern border of the ecological district.

2.2 GEOLOGY AND PHYSIOGRAPHY

The following concise account is based on information available in Froggart *et al.* (1981), Froggart and Lowe (1990), Grindley (1980), Hay (1967a & b), Department of Lands and Survey (1977), and Pullar (1972).

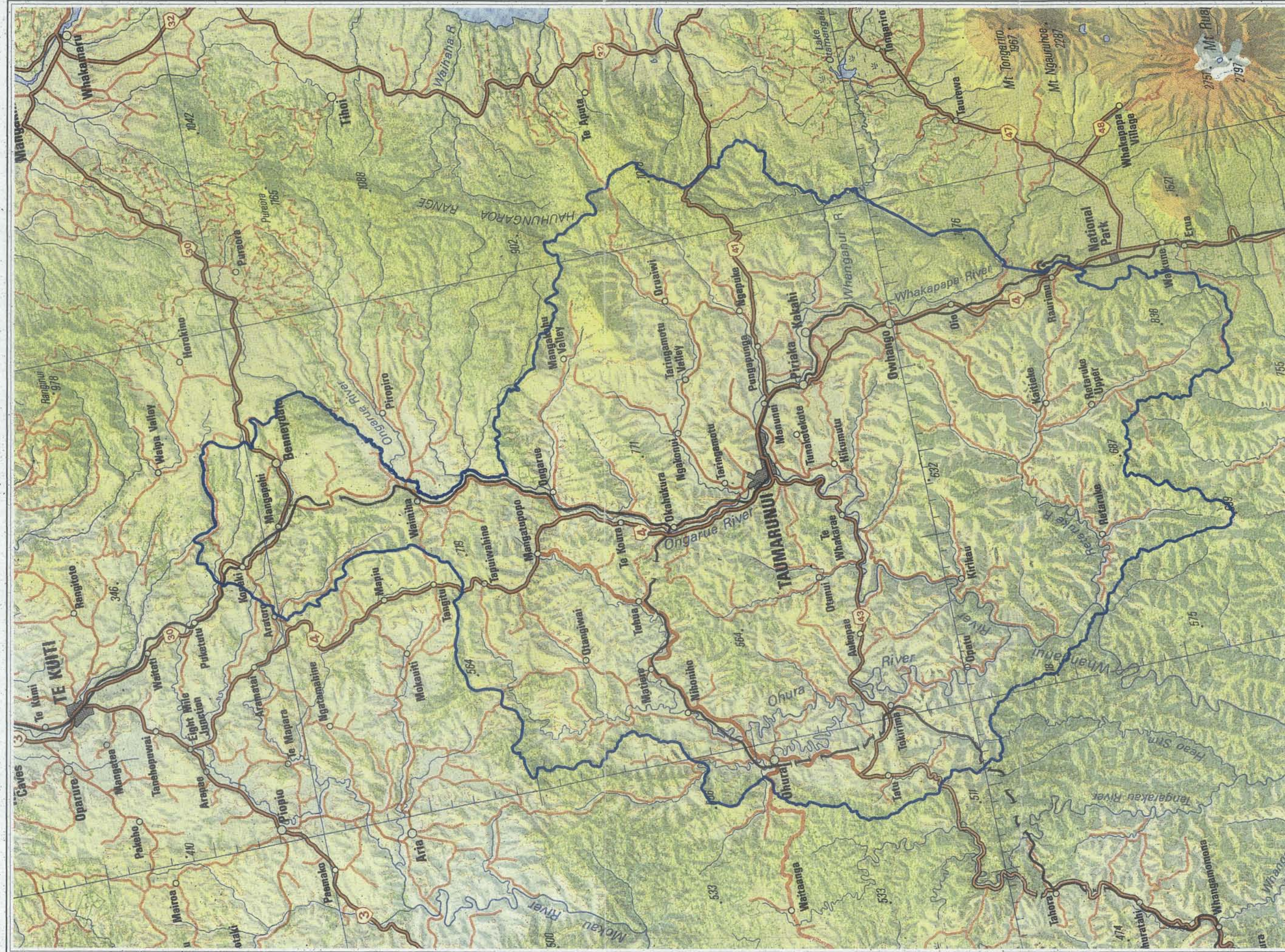


Figure 1. Taumarunui Ecological District

Key — Taumarunui Ecological District boundary



Scale 1:300,000



November 1999



WILDLAND
CONSULTANTS LTD

Most of the ecological district is very hilly, with long and usually very narrow valleys. This is the outcome of the deep dissection of an uplifted block of tertiary marine sedimentary strata by the Whanganui River and tributaries. A minor extension of the ecological district in the north lies within the Mokau River catchment. Here the prevalent rock types are massive siltstones and sandstones and generally unstable mudstones. Local variations include calcareous sandstones (for example between the Whanganui and Whakapapa Rivers) and minor coal seams (for example near Benneydale and Retaruke).

The hillslopes are moderately steep to steep ridge crests 500 to 800 m a.s.l. The many invariably meandering streams and minor rivers are some 200 to 300 m a.s.l. at source, and the Whanganui River is 100 m a.s.l. where it leaves the district.

Outcrops of older (Jurassic) marine sedimentary rock, comprising very hard, fractured greywacke, argillite, and conglomerate, occur along much of the bounding Hauhungaroa Range in the east. This terrain is often very steep, culminating in the Taurewa (Blue Hill) salient between the Whanganui and Whakapapa rivers, where the highest point (Taurewa Trig) is 1,076 m a.s.l. Relatively minor greywacke outcrops occur in the hill country just south of Benneydale and in the lower Taringamotu Valley.

This district has been affected considerably by its closeness to central North Island volcanic centres. Remnants of early Pleistocene, welded ignimbrite sheets form extensive caps on hills around Benneydale and southward to about Ongarue. More fragmentary but fairly frequent remains occur further southward, to the vicinity of the Whanganui River upstream from Taumarunui. The near flat ignimbrite cover of Tuhua ridge in the upper Taringamotu Valley gives it an exceptionally high summit (1,042 m a.s.l.).

A distinctive feature in the south-east quarter is the 3-4 km wide andesitic laharic of Pleistocene are bordering the Whakapapa River. It slopes down from c.700 m a.s.l. near Raurimu to c.300 m at its endpoint between Piriaka and Kakahi. With a mantle of rhyolitic and andesitic tephra, the surface is a flat to undulating plain, except for some deep stream entrenchments at the head. From Piriaka the flow swept westward to fill a long valley (up till then followed by the Whanganui River), but has long since been eroded to form hilly terrain. A relatively minor lahar remnant occurs at high altitude above the source of the Pungapunga river, on the Taupo divide. The highest point, at Hauhungaroa trig, is 1,078 m a.s.l.

Rhyolitic and andesitic tephra and loess, deposited from 15,000 to 75,000 years ago, remain throughout the hill country wherever it was not eroded during the harsh Late Pleistocene climate. That cover has been overlaid or replaced by a nearly complete district-wide mantle of rhyolitic tephra erupted from the north-east quarter of Lake Taupo c.1,850 years ago. Collapse of an eruption column, about 5,000 metres high, resulted in an extraordinarily powerful and hot, gas-charged avalanche of pumice ash, gravel, and blocks which swept at enormous speed for 80 km in all directions before coming to a halt. Over the first 50 km everything in its path was utterly incinerated and destroyed but over the remaining distance forest survived. On passing over the Hauhungaroa Range, the flow became strongly valley-controlled, lost impetus and did not cross the hills between the Ongarue and Ohura Rivers. However, accompanying voluminous clouds of fine ash settled over the entire ecological district.

Alluvial terraces of pumice silt, sand, and gravel to a maximum height of c.30 m, now border all the rivers and many tributaries in the eastern and southern sectors. Such terraces are largely absent from the Ohura catchment, where riparian flats are termed

“undifferentiated alluvium” by geologists. The mean thickness of fine ash on the hill country is c.60 cm in the east and 20-30 cm west of Ongarue and Taumarunui. To the south-east of Taumarunui there are comparatively thin layers of andesitic ash, derived from periodic eruptions of Mts. Ruapehu and Ngauruhoe.

2.3 SOILS

The following summary is based on comprehensive accounts in Cowie (1978) and Molloy (1998).

Yellow-brown pumice soils have developed on coarse to sandy-textured deposits of Taupo pumice over 50 cm thick, from direct air fall on the least steep hillslopes or from alluvial redeposition (terraces). They are structurally ideal for cultivation and, with top-dressing, to overcome various mineral deficiencies, they become high class pastoral soils. Recent, still accumulating, alluvial soils on flood plains of mixed-origin alluvium also have a very high pastoral production potential.

Of good farming value are the widespread composite soils derived from a relatively thin (usually c.20 cm) cover of Taupo ash on yellow-brown loams derived from the much older tephra and loess “brown ash beds”. These soils are free draining, yet highly moisture retentive and are fertile deep down. They are typical of moderately steep hill soils in the western and southern quarters.

Steepland soils, mainly derived from country rock, occur on slopes over 30° and are widespread over 750 m a.s.l. Thin, strongly leached, and often containing rock fragments, they are very infertile, especially on sandstone ridges, and if cleared of native forest they become very prone to erosion and reversion to scrub.

2.4 SPECIAL GEOLOGICAL FEATURES

Kenny and Hayward (1996) identified five important sites or landforms in the Taumarunui Ecological District (refer to Table 1). Four of the sites are of national importance while the remaining site is of regional importance. Kenny and Hayward ranked all of the sites as unlikely to be damaged by humans.

TABLE 1: IMPORTANT GEOLOGICAL SITES AND LANDFORMS IN TAUMARUNUI ECOLOGICAL DISTRICT (FROM KENNY AND HAYWARD, 1996)

IMPORTANCE ¹ & VULNERABILITY ²	NAME	GRID REFERENCE	PROTECTED AREA (CONSERVATION UNIT NO.) ³
B3	Mangaokewa ignimbrite section C	S17 092013	-
B3	Mangaokewa ignimbrite section D	S17 087000	-
B3	Ongarue rail disaster site	S18 080735	-
C3	Taurewa Fault scarp	S19 220350	Tongariro Conservation Area (60042)
B3	Upper Wanganui Valley Oligocene limestone	S19 178425	Tongariro Conservation Area (60042)

¹ Importance rankings:

- A international scientific importance;
- B national scientific, educational or aesthetic importance;
- C regional scientific, educational or aesthetic importance.

² Vulnerability rankings:

- 1 highly vulnerable to complete destruction or major modification by humans;
- 2 moderately vulnerable to modification by humans;
- 3 unlikely to be damaged by humans;
- 4 could be improved by human activity;
- 5 site already destroyed (not necessarily by human activity).

³ Only part of the geological site or landform may occur in the RAP or protected area listed.

2.5 CLIMATE

The following account is based on Thompson (1984).

The climate of the Taumarunui Ecological District is temperate generally with mild humid summers and wet cool winters. Westerly winds prevail, and while there is little variation in wind speeds throughout the year, spring and summer tend to be slightly windier than autumn and winter. Taumarunui township is among the least windy areas in New Zealand, based on mean monthly wind speed measurements.

Rainfall varies from 1,400 mm per annum to around 2,400 mm p.a. and shows a close relationship with topography, higher areas being wetter. The rainfall at Taumarunui township averages 1,460 mm p.a. and much of the ecological district receives between 1,400-1,600 mm p.a. Seasonal variation in rainfall is apparent, with 35-40% of the total rainfall occurring in late autumn and winter. Summer and autumn are the driest times of the year. Records of rainfall variation from year to year show that summer rains are highly variable in comparison to winter rains. Taumarunui township experiences an average of 1,699 sunshine hours per annum. January has the highest average sunshine hours and June the lowest.

Lowland areas are characterised by warm (c. 22°-23°C) afternoon temperatures in summer and relatively cold (c. 0°-2°C) night time temperatures during winter. At higher altitudes, conditions are much cooler and temperatures often fall below freezing, especially during winter. Daily variation in temperature (12°-13°C in summer and 9°-10°C in winter) is quite wide for New Zealand. Cloudiness and elevation are key factors controlling daily temperature variations, smaller temperature ranges being associated with increasing elevation and cloudiness. The warmest monthly mean temperature at Taumarunui township occurs in February and the coolest in July. Soil temperatures follow a similar pattern, being highest in January or February and lowest in July or August.

An average of 64 ground frosts and 35 air frosts are recorded per annum at Taumarunui township (ground frost occurs when a grass minimum temperature is -1.0°C or below, and an air frost occurs when the air temperature recorded in a climatological screen is below freezing). The majority of ground frosts are recorded during the months May to September, although they can occur throughout the year. Around 80% of air frosts are recorded during the winter months. Frosts are more common and intense at higher altitudes. Snowfalls to low levels are rare.

2.6 VEGETATION HISTORY

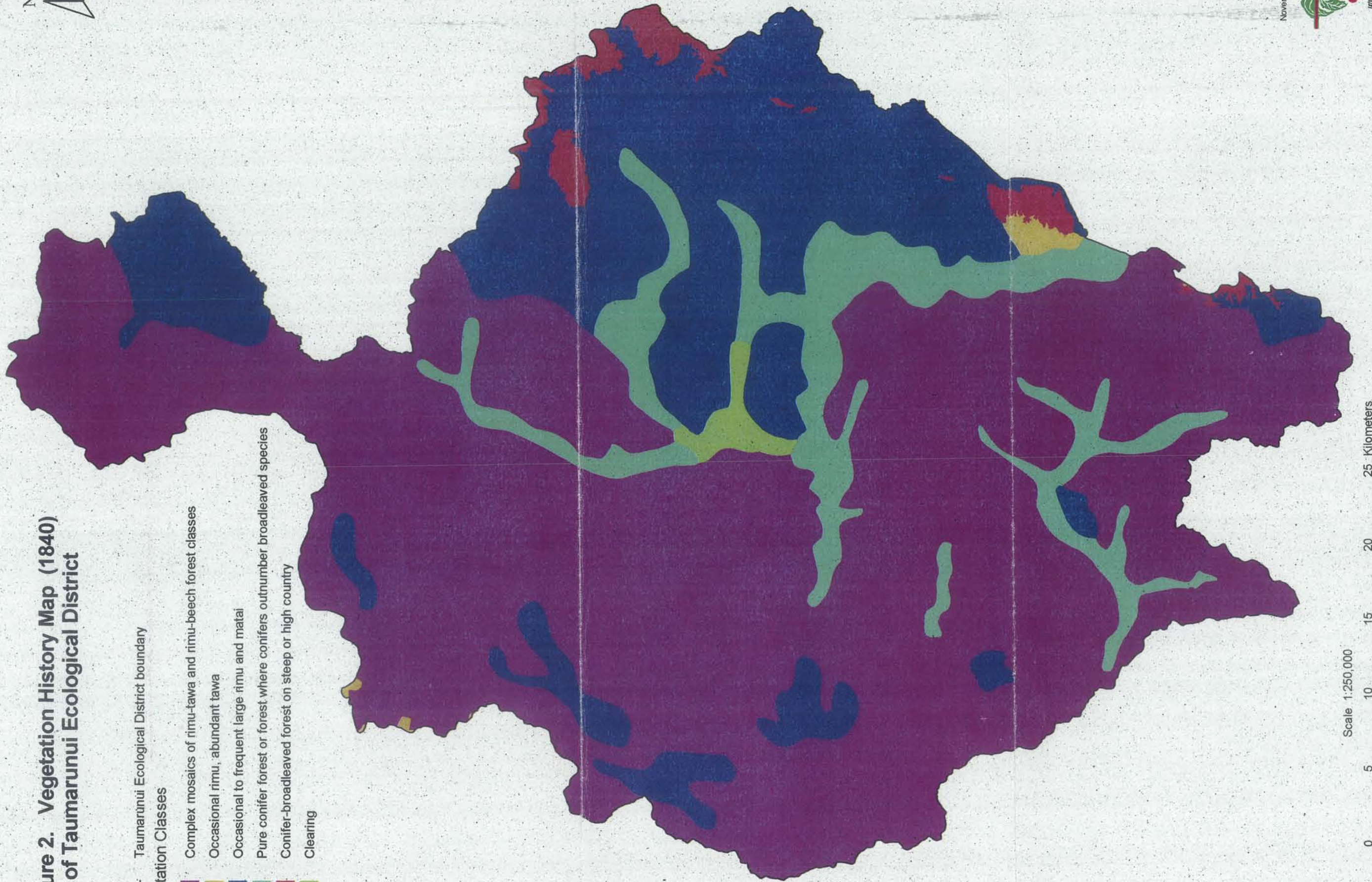
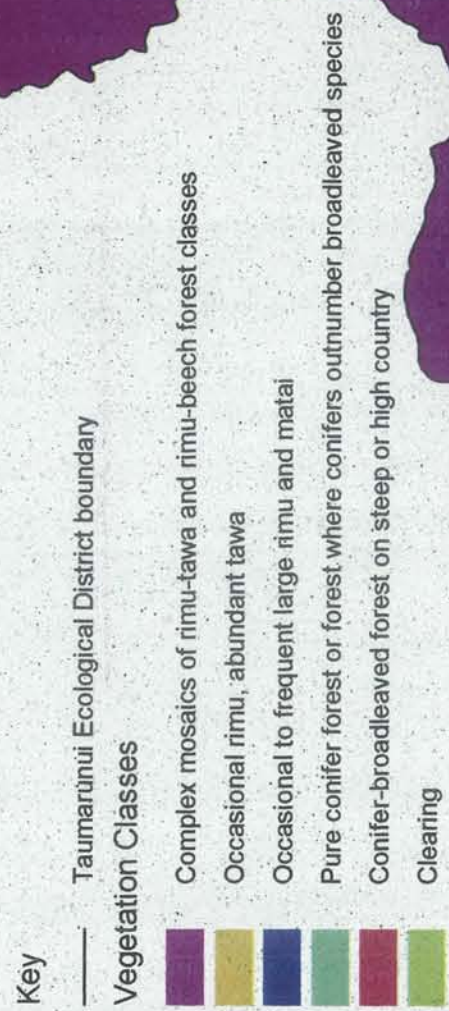
This section has been compiled with recourse to information in Clarkson *et al.* (1986), Cooke (1981), Department of Lands and Survey (1977), Grace (1959), Kelly (1949), McKelvey (1963), Nicholls (1990, 1991), and Soar (1986).

Before humans came to New Zealand, Taumarunui Ecological District had been covered entirely by native forest since the end of the cold Pleistocene climate regime c. 15,000 years ago. Whatever local destruction was caused by the Taupo volcanic avalanche, analysis of pollen in mires on the Hauhungaroa Range has shown that forest was becoming well re-established 400-500 years later. Maori had become permanent inhabitants at least as early as AD1500, but they lived only in scattered small clearings on tillable river flats and terraces. Probably 90 percent of the forest remained intact until near the end of the 19th century. Before then, very few Europeans had entered the district (with only one known to have become a resident).

A little more than a century ago, the forest was composed of a number of different unmodified forest types (refer to Figure 2). On the hills west of Benneydale and, in most of the Ohura and Retaruke catchments, was a very uniform association of occasional large rimu and northern rata emergent over abundant tawa and frequent hinau, rewarewa, kamahi. In gullies, there was pukatea at the lowest altitudes. On ridge tops, kamahi was more prominent, with some miro and Hall's totara. On the very minor areas of colluvial and alluvial soils, matai, totara, kahikatea, and maire (*Nestegis* spp.) occurred, with distinctive understoreys of houhere, lacebark, mahoe, manatu, and titoki. Mosaics of the above rimu-tawa type in gullies, and hard beech, with very local black beech, predominating on steep, infertile ridges, occurred very widely north-west and south of Matiere and about the Ohura and Retaruke river confluences with the Whanganui River.

Podocarps were far more common in the forest than today, reaching from more or less the line of the present main trunk railway eastward to the crest of the Hauhungaroa Range. Very dense mixtures of large and very tall rimu, miro, matai, totara, and kahikatea occurred on alluvial pumice terraces, on thickly pumice-veneered adjacent

**Figure 2. Vegetation History Map (1840)
of Taumarunui Ecological District**



hillsides and shallow valleys and on the lahar plain. Terraces predominantly composed of coarse pumice are drought prone, and would have been dominated by totara and/or kanuka. However, many of the coarse pumice terraces have been overlain by fine alluvial pumice and are not drought prone. Beyond this were moderately dense podocarp stands with variously common northern rata, tawa, hinau, rewarewa, black maire, white maire, and kamahi and significantly fewer kahikatea. Totara and rewarewa became absent above about 650 m, the former replaced by Hall's totara. Tawa and hinau became small and rare nearing a maximum upper limit of 800 m a.s.l., whereas kamahi became concomitantly more prominent. Above that altitude was submontane forest of occasional to locally frequent Hall's totara and scarcer miro over abundant short kamahi, kapuka, kotukutuku, fuchsia, horopito, toro, and locally abundant tawheowheo.

Construction of the North Island Main Trunk Railway reached this district from the north about 1890. The first train arrived at the then hamlet of Taumarunui in 1903 and the line reached Raurimu in 1906. From then on conversion of land from forest to pasture proceeded rapidly. By the early 1920s, most of the present roads had been constructed and a branch railway from Okahukura had reached Tokirima. Indigenous forest in the Ohura and Retaruke catchments had been cleared to the present extent, but the heavily timbered tracts east of the main trunk railway only marginally.

Some forest was simply burnt. However, sawmilling was very common and, in the earliest pioneering years, was often carried out by settlers as a step before clearing on their holdings. Between 1906 and 1910 there were 10 sawmills within 5 kilometres of Piriaka. The eastern podocarp-rich forest was logged by mainly large businesses which had the resources to build long tramways, bridge the Whanganui and Whakapapa Rivers and, finally, to log some steep and broken country in the main tributary headwaters. However, milling of native timber petered out in the 1970s, when most of the eastern hill country was being farmed.

Dieback of Hall's totara, northern rata, and kamahi has become common during the last 40 years. Kamahi mortality has been extensive about the source of a tributary of the Retaruke River, a few kilometres west of National Park township.

2.7 HUMAN HISTORY, LAND USE AND PRESENT VEGETATION

This section has been compiled with reference to Department of Conservation (1987) and Department of Lands and Survey (1978a).

By AD 1500 or even earlier, Maori had established a permanent presence within Taumarunui Ecological District. They occupied clearings on tillable river flats and terraces, predominantly centered around the Whanganui River and did not penetrate far inland mainly because of the inaccessibility and ruggedness of the region. At the time of European arrival almost all of the forest cover was intact.

The first Europeans to arrive were missionaries around 140 years ago, but it was not until the early 1880s that European settlement began and settlers cleared land for sheep and cattle farming. Following the completion of the main trunk railway in 1908, European settlement of the area increased dramatically as a large scale timber industry developed and milling towns along the railway grew. Agricultural development of the area began in earnest following logging, the forest remnants being burnt and seed

sown in the ashes to establish pasture. However, grass establishment in the steeper hill country of low natural fertility was unsuccessful and without the use of artificial fertilisers, these areas soon reverted to fern and scrub.

Indigenous forestry remained a predominant land use throughout most of this century, and only petered out in the 1970s. Exotic forestry, while still a minor land use, continues to increase in the ecological district with large tracts of land having been purchased for forestry developments over recent years.

The first use of fertilisers in the 1920s saw an intensification of farming, with the revolutionary use of cobalt to combat bush sickness adding impetus to the development of farms following the second world war. However, following changes to the economy over the past decades, farm amalgamation has seen a marked decrease in the number of holdings and a decrease in the rural population. Sheep and cattle farming remains the predominant land use of the ecological district.

Threatening processes

The major threats to indigenous vegetation, habitats and fauna in the Taumarunui Ecological District are:

- Habitat destruction and fragmentation caused mainly by agricultural development and forestry (logging and plantation establishment).
- Livestock grazing and browsing by exotic ungulates, particularly goats, depleting the diversity and abundance of understorey species in forests and inhibiting regeneration. Cattle cause additional damage to wetlands through trampling and pugging.
- Predation of indigenous fauna by introduced mammals.
- Invasion by environmental pest plant species that threaten to alter the structure and/or composition of indigenous vegetation.

Other threats include fire, water pollution and soil erosion.

Present vegetation

This section has been compiled with recourse to information in Clarkson *et al.* (1986), Cooke (1981), Department of Lands and Survey (1977), Grace (1959), Kelly (1949), McKelvey (1963), Nicholls (1990, 1991), and Soar (1986).

At the present time, substantial areas of native forest remain scattered throughout this ecological district, though many have been slightly or greatly modified by logging or fire. Appreciable unaffected forest tracts are rimu-rata-tawa and rimu-kamahi forest on the lower and mid-slopes of Taurewa (Blue Hill), peripherally modified rimu-tawa/hard beech forest on rugged hill country north-west and south of Matiere and in the lower Retaruke Valley, and the sub-montane forest above 800 m along the Hauhungaroa Range and the spine of Taurewa. Heavily logged, originally podocarp-rich forest remains uncleared east of Taumarunui township over the headwaters of the Taringamotu, Waituhi, and Waipari rivers and streams, and between the Whanganui and Waipapa Rivers eastward of Owhango. The highest and steepest hills in the Retaruke catchment are widely covered by residual tawa dominated stands or second growth forest of kamahi and some kanuka and rewarewa.

Pockets of riparian and foothill matai-totara-kahikatea forest occur in the Ohura catchment, with a probably unique secondary forest of pole rimu, miro, matai,

kahikatea, and tanekaha alongside a northern reach of Waikaka Stream. Tanekaha is confined to land below 300 m in only the northern-most section of this district, and mainly in hard beech stands. Totara has shown an exceptional regeneration capacity where young trees appear in open long-established farmland, especially conspicuous around Taumarunui township.

With great improvement in farmland management since World War II, scrub and shrublands of any significant extent are very uncommon. The only major areas are the tracts of heavily logged forest in the east, where treeland is interspersed with dense associations of whauwhaupaku, kotukutuku, kohuhu, rangiora, and treeferns. Manuka, horoeaka, (lancewood), scrub occurs on formerly burnt-over hill faces and ridges in the Benneydale area.

Exceptional occurrences of three tree species are fortuitously confined to unlogged forest: a ridge top stand of silver beech in the Taringamotu River headwaters; manaoa (silver pine) about the source of the Pungapunga; and (kaikawaka) on a poorly drained site in the unlogged forest on the western slopes of Taurewa.

Exotic plantation forest has been established on a small scale only, most often in marginal farmland. Less productive pasture often has a scattering of totara (regenerating despite grazing pressure). Establishing pine plantations results, in the loss of this indigenous character in farm landscapes.

The present vegetation pattern is represented in Figure 3, and is derived from the Land Cover Database which is compiled from SPOT satellite data. It clearly illustrates the predominance of pastoral farming in the ecological district and the widespread, quite substantial, area of remnant forest, particularly in the east of the ecological district where a large tract of forest remains.

2.8 F L O R A

Indigenous

Approximately 390 indigenous species have been recorded in the Taumarunui Ecological District. A comprehensive list is provided in Appendix 1. This is not complete because of the rapid survey technique used and the limited time available. Further survey would result in additional flora being found.

Threatened and local plants

Three threatened and two local plant species are present, or have been recorded previously in the Taumarunui Ecological District (see Table 2 below).

Wilson and Given (1989) describe Pua o te reinga (*Dactylanthus taylorii*) as a root parasite most commonly found in second-growth forest and on the outer fringes of montane forest in the North Island. However, widespread clearance of forest, depletion by collectors and inhibition of regeneration by possum and rat browsing of flowers have led to a reduction in its abundance and distribution. Pua o te reinga is known from Motutara Scenic Reserve, near Okahukura Scenic Reserve, Raurimu Spiral Scenic Reserve and RAP 11-Mount Tuhua (de Groot 1997; Whaley and Holzapfel 1996). It is also known from those parts of Pureora Conservation Park and Erua Stewardship Area occurring within the ecological district (Department of Conservation 1994; de Groot 1997).

TABLE 2: THREATENED AND UNCOMMON PLANT TAXA IN TAUMARUNUI ECOLOGICAL DISTRICT

SPECIES	NATIONALLY UNCOMMON ¹	NATIONAL PRIORITY FOR CONSERVATION MANAGEMENT ²
<i>Dactylanthus taylorii</i>	Recovering <i>conservation dependent</i>	A
<i>Ileostylus micranthus</i>	Declining	-
<i>Pittosporum turneri</i>	Declining	B
<i>Teucrium parvifolium</i> ³	Declining	C
<i>Tbismia rodwayi</i>	Naturally uncommon <i>sparse</i>	-

- 1 The national status follows de Lange et al. (1999). The terms used have the following definitions:

Declining: Taxa that are numerically abundant but which are either under threat from serious adverse factors throughout their range, or occur as widely scattered, typically small populations, many of which are undergoing declines through loss of reproductive ability, recruitment failure, predation, or through other processes of often subtle habitat change.

Recovering: Taxa whose populations are either: (1) naturally restricted to susceptible habitats (e.g., offshore islands), where their survival is utterly dependent on continual rigid conservation measures (e.g., rodent control), or (2) taxa whose populations were once under serious threat and, as a result of past conservation intervention (e.g., goat eradication), have shown the capacity to recover naturally without further management measures.

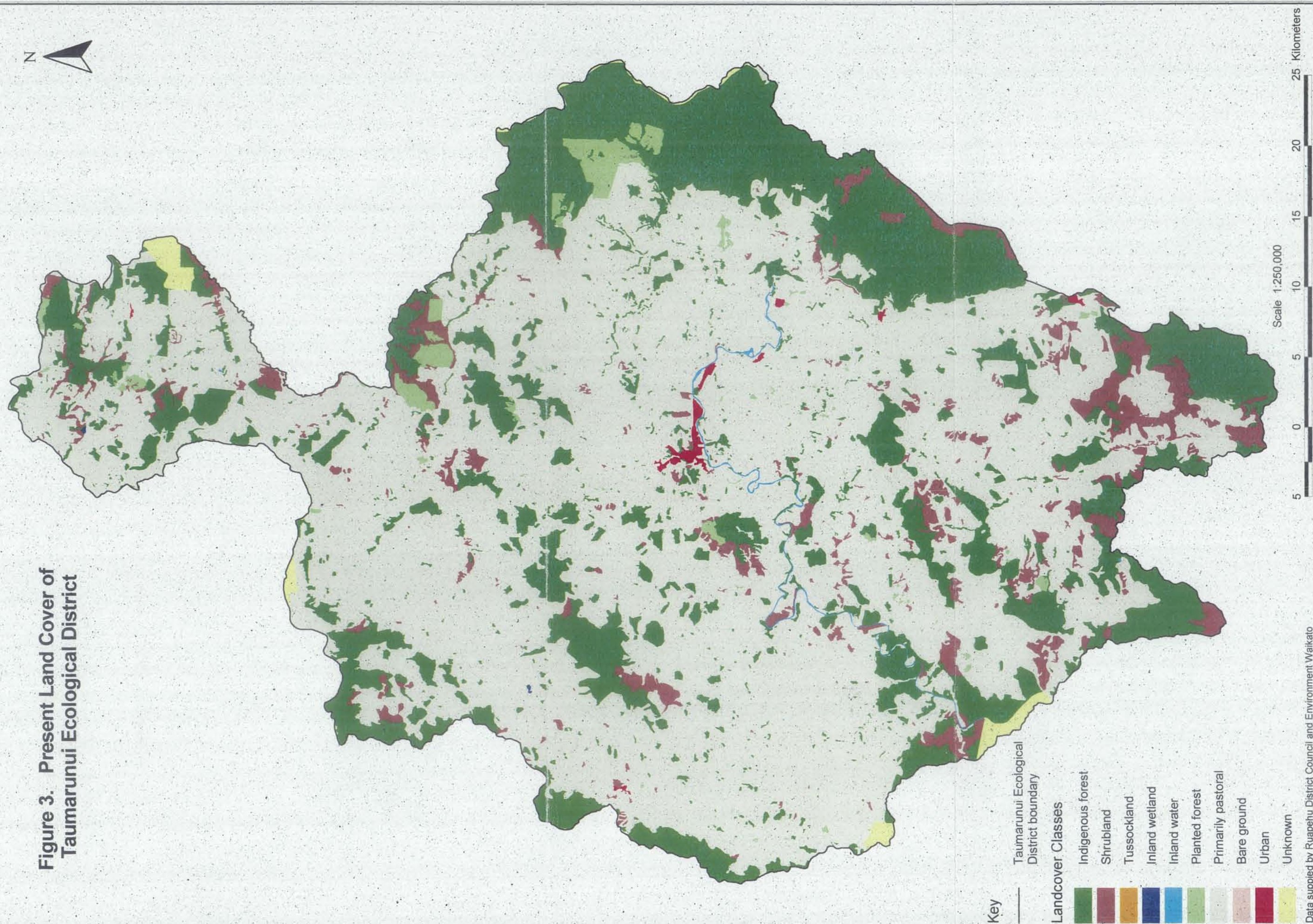
Conservation dependent: Taxa whose survival is now dependent on the continuation of existing conservation measures.

Naturally uncommon: Taxa that are not considered under immediate or obvious threat but which, for varying reasons, have the potential to become threatened. Three subheadings are recognised to accommodate the different situations whereby taxa can be naturally uncommon.

Sparse: Taxa that, for largely undetermined reasons, occur within typically small and widely scattered populations. The distribution appears wholly natural and is not considered the result of past or recent anthropogenic disturbance. However, as the candidate taxa usually occur in small numbers at any given site, they are naturally susceptible to extirpation within parts of their range.

- 2 National priorities for conservation management were determined by Molloy and Davis (1994). The terms used have the following definitions:
Category A: Highest priority threatened species.
Category B: Second priority threatened species.
Category C: Third priority threatened species.
Category I: Species about which little information exists, but based on existing evidence, are considered to be threatened.
Category O: Species which are threatened in New Zealand but which are known to be secure in other parts of their range outside New Zealand.
- 3 Not recorded since the early 1900s.

**Figure 3. Present Land Cover of
Taumarunui Ecological District**



Pittosporum turneri is a columnar, divaricating tree in its juvenile stage, and develops a spreading form as an adult (Dopson *et al.*, 1999). It is of very local distribution, and is endemic to the central volcanic region and mountains north-west of Lake Taupo, and south to the north-west Ruahine Range (Wilson and Galloway 1993). It occurs on alluvial flood plains, generally in frost hollows with a high water table (Dopson *et al.*, 1999). There is only one previous record, from 1992, of this species in the Taumarunui Ecological District, 2-3 km south-west of Ongarue (Ecroyd 1994). However, the vegetation in the area has been burnt since the original report and *P. turneri* was not located during a search of the site during the current survey. An extensive *P. turneri* population is present in the Erua Stewardship Area immediately south of the ecological district (Ecroyd 1994).

Wilson and Galloway (1993) describe *Teucrium parvifolium* as an untidily branched or straggling shrub up to c. 1.5 m tall. It is present in both the North and South Islands from latitude 35° to 46° 30' and occurs in coastal to lowland forests and shrublands (Allen 1961). It is found mostly on river terraces and riparian flats, and also forest margins (Wilson and Galloway 1993). Fuller and Edwards (1989) note that there are historical records from 1909 of *T. parvifolium* on a river flat of the Whakapapa River at Kakahi, and that some plants may still be present. Kakahi Conservation Area and Whakapapa Island Scenic Reserve both cover river flats adjacent to the Whakapapa River immediately east of Kakahi, and it is likely that the plants recorded in 1909 were growing in what is now reserve. In the early 1980s *T. parvifolium* was recorded in Mapara S.R. approximately 10 km north of the ecological district (Bayfield *et al.* 1986).

Thibismia rodwayi is a non-photosynthetic, subterranean species. It is of local distribution in the central North Island. Within Taumarunui Ecological District, *T. rodwayi* is present in Ngamoturiki Scenic Reserve, Te Maire Scientific Reserve and Ohinetonga Scenic Reserve (Buckley and McLuckie, 1995).

Ileostylus micranthus is the most widely distributed mistletoe species, occurring throughout mainland New Zealand and Stewart Island, and is predominantly a lowland species. It is well known to occur in the regenerating scrub and forest associated with the Taupo eruption (de Lange, Norton and Molloy 1997). Host specificity is low and it has been recorded from 114 different indigenous host species, and a further 92 exotic species (Norton 1997). Mangataranga Stream (RAP 5) contains the only known population of *I. micranthus* within the Taumarunui Ecological District.

Distribution limits

Six species reach limits of distribution within the Taumarunui Ecological District:

- (a) *Astelia trinervia* reaches its southern limit of distribution within the North Island, in Rotokahu Scenic Reserve (approx. 39° 09' S; C. Ogle, Wanganui Conservancy, Department of Conservation pers. comm. 1999).
- (b) *Coprosma rubra* occurs at a few sites including Manunui, which is one of the most northern records of the species in the central North Island (approx. 38° 53' S; Fuller and Edwards 1989).
- (c) *Dracophyllum traversii* reaches its southern distribution limit within the North Island in Rotokahu Scenic Reserve (approx. 39° 10' S; Barkla 1992).
- (d) *Lycopodium deuterodensum* reaches its southern limit of distribution within the North Island in Kauhanganaroa Scenic Reserve (approx. 39° 09' S; Fuller and

Edwards 1986). It also occurs at two other locations at approximately the same latitude in the North Island (just north of Pipiriki and just inland of Waverley), and at D'Urville Island (C. Ogle, Wanganui Conservancy, Department of Conservation pers. comm. 1999).

- (e) *Pseudopanax laetus* nears its southern limit in the ecological district and is present in Erua Stewardship Area (within Taumarunui Ecological District) (approx. 39° 10' S; C. Ogle, Wanganui Conservancy, Department of Conservation pers. comm. 1999).
- (f) *Schoenus tendo* reaches its southern limit of distribution around Kaitieke (approx. 39° 05' S).

Adventive Species

Around 180 adventive vascular species have been recorded from the ecological district. However, these are only the prominent or common weeds generally occurring around natural areas, and the total adventive flora is likely to comprise more than twice that number. Most of the recorded species are well established and all are naturally reproducing in the ecological district. However, only a very few are species which actually or potentially threaten the conservation values of a particular area and could be classed as environmental pest plants. Adventive species are most abundant on the margins of natural areas, in canopy gaps of remnant podocarp and tawa forest that has been modified, and in small lowland wetlands. During the current survey, the most commonly identified environmental pest plants were willows in wetlands and along waterways, Japanese honeysuckle in forests and scrub, and gorse, Spanish heath, buddleia, cotoneaster, pines and wattles on bluffs. Old man's beard, selaginella, tree privet and ivy were locally present.

Environmental pest plants of particular concern are *Schoenoplectus californicus* and alligator weed; C. Ogle, Wanganui Conservancy, Department of Conservation pers. comm. 1999). *S. californicus* was mistakenly thought to be *S. tabernaemontani* (a native *Schoenoplectus*) and was introduced into the Taumarunui township sewerage ponds during wetland plantings in 1997 or 1998. Alligator weed was introduced accidentally at the same time as the *S. californicus*. Total control of the alligator weed is being undertaken. Total control of *S. californicus* should be undertaken also, as elimination of both these species should be a high conservation priority.

Other species of concern include climbing spindle berry in Ohinetonga Scenic Reserve (currently being controlled) and in Manunui (RAP19), Chilean flame creeper which has been identified recently around Raurimu and may also be present in other areas (N. Singers, Tongariro/Taupo Conservancy, Department of Conservation pers. comm. 1999), and Japanese walnut which occurs locally along the Whanganui River (currently being controlled). Old man's beard is being controlled throughout the part of the ecological district in the Wanganui Conservancy. Tradescantia is known from the Te Maire part of the Whanganui National Park (N. Singers, Tongariro/Taupo Conservancy, Department of Conservation pers. comm. 1999) and has been recorded previously in Oruru Scenic Reserve (Fuller and Edwards 1989). Darwin's barberry (*Berberis darwinii*) is present just outside of the ecological district, on the eastern side of the Ongarue River near Waimiha in the north (P. Rihia, Taumarunui Field Centre, Department of Conservation pers. comm. 2000).

2.9 FAUNA

A diverse array of indigenous vertebrate fauna occurs in the Taumarunui Ecological District; a total of 56 indigenous mammal, bird, reptile, and fish species has been recorded.

Birds

Of the 59 bird species recorded in the Taumarunui Ecological District, 40 species are indigenous and 19 species are introduced (Appendix 3). Nine of the indigenous species are identified in Molloy and Davis (1994) as a priority for conservation management (Table 3).

TABLE 3: THREATENED INDIGENOUS BIRD SPECIES OCCURRING IN TAUMARUNUI ECOLOGICAL DISTRICT

SPECIES	NATIONAL PRIORITY FOR CONSERVATION MANAGEMENT ⁴
North Island brown kiwi	A
North Island kokako	B
Karearea (New Zealand falcon)	B
Kereru (NZ pigeon)	B
Whio (blue duck)	B
North Island kaka	B
Yellow-crowned kakariki	C
Wewia (New Zealand dabchick)	C
Matuku (Australasian bittern)	O

⁴ National priorities for conservation management were determined by Molloy and Davis (1994). The terms used have the following definitions:
Category A: Highest priority threatened species.
Category B: Second priority threatened species.
Category C: Third priority threatened species.
Category I: Species about which little information exists, but based on existing evidence, are considered to be threatened.
Category O: Species which are threatened in New Zealand but which are known to be secure in other parts of their range outside New Zealand.

North Island brown kiwi is the highest priority threatened species in the Taumarunui Ecological District. In pre-European times these kiwi were widespread throughout mainland New Zealand, but have since declined markedly (Heather and Robertson 1996). Call surveys conducted over a number of areas in the Tongariro/Taupo Conservancy, including Tongariro Conservation Area, suggest North Island brown kiwi have declined substantially (Miles *et al.* 1997). The decline appears similar in

extent to that observed in Hawke's Bay, where evidence suggests a 75% decline in the population since the 1930s (Miles *et al.* 1997). Habitat loss and predator pressure are major contributing factors to this decline. The largest known populations of North Island brown kiwi within the Taumarunui Ecological District occur in Erua Stewardship Area and Tongariro Conservation Area, the Tongariro population being one of the largest known in the central North Island. Both of these areas are only partially within the Taumarunui Ecological District. Information from Sites of Special Biological Interest surveys (unpub. data Department of Conservation Wanganui) and O'Donnell (1983) indicate that in the early 1980s, North Island brown kiwi were present in a number of reserves and private forest remnants, particularly around the Otunui Stream catchment west of Taumarunui. Many landowners spoken to during the current survey indicated that kiwi numbers in this area have declined substantially over the intervening period.

Since the arrival of Europeans, the range of North Island kokako has contracted, concurrent with the destruction of forest habitat and the introduction of predators (Innes and Flux 1999). In 1978, kokako were known to occur to the west and south-west of the district but there have been no sightings in this area for many years (Fuller and Edwards 1989). Within the Taumarunui Ecological District, Mapara Wildlife Management Reserve is a stronghold of kokako, the population numbering around 100, 49 of them female (P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 1999). Kokako are found mostly in tawa dominant, mixed podocarp-broadleaved forest, but are also present in shrubland and regenerating forest (Innes and Flux 1999). Mapara Wildlife Management Reserve is one of 23 key management sites, identified in the North Island Kokako Recovery Plan 1999-2009, necessary to improve the status of kokako by 2020 (Innes and Flux 1999). Kokako are known to be present or have been present in several privately owned forest remnants contiguous with or adjacent to the reserve (P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 1999).

Whio (blue duck) is a river species that was once widespread in rivers throughout both of the main islands. Its decline has been associated with the introduction of predators, loss of habitat through clearance, a change in the water quality or the altering of water flows by hydro-electric dams, and, possibly, competition for food with trout (Heather and Robertson 1996). Whio are found generally in fast flowing and turbulent sections of rivers of high water quality, with a low sediment loading, with stable banks generally dominated by indigenous riparian scrub or treeland and where there is a high diversity and abundance of aquatic invertebrates (Adams *et al.* 1997). They are known from a number of rivers in the ecological district including the Pungapunga, Retaruke, Taringamotu, Waione, Whanganui and Whakapapa Rivers (de Groot 1997).

Kereru are found throughout mainland New Zealand and are one of the most important seed dispersing bird species. Since European settlement, kereru have declined in numbers as a result of habitat loss, the introduction of browsing and predatory mammals, and hunting. Anecdotal evidence suggests that kereru are continuing to decline (Mander *et al.* 1998). Within the Taumarunui Ecological District, kereru are still widespread but nowhere are they abundant.

Karearea (New Zealand falcon) are widespread but rare and are present in the North Island mainly south of a line from northern Taranaki to Whakatane (Heather and Robertson 1996). They were probably never common but habitat loss has reduced their range and selective logging has reduced available nesting sites in the North Island (Heather and Robertson 1996). Information from the atlas of bird distribution in New

Zealand (Bull *et al.* 1985) shows falcon to be widespread in the north and south of the ecological district, but of more sporadic occurrence in the middle. Fuller and Edwards (1989) noted that falcon are uncommon, but nonetheless present in many reserves.

Heather and Robertson (1996) noted that in pre-European times, North Island kaka were abundant and common throughout the North Island. However, the arrival of Europeans heralded their decline, and by the early 1900s only localised flocks remained. Major factors associated with their decline include habitat loss, competition for food with introduced species and predation. Today they are present in very small numbers in large forest tracts, from the Coromandel Peninsula to the Aorangi Range in the southern Wairarapa. The Tongariro Conservation Management Strategy (1994) reports North Island kaka present in the Tongariro Conservation Area and Erua Stewardship Area but these reserves are only partially within the Taumarunui Ecological District. North Island kaka have also been reported from forest several kilometres west of Rotokahu Scenic Reserve (Fuller and Edwards 1989).

Yellow-crowned kakariki, so common last century that they were a serious pest of crops and orchards in some areas, have declined in abundance since the introduction of predators and are now uncommon. The present day populations are mainly in forested areas south of line from about Opotiki to Taranaki (Heather and Robertson 1996). Kakariki are known to be present in Tongariro Conservation Area, Erua Stewardship Area and Purcora Conservation Park (Department of Conservation 1994 and 1996) but only parts of these reserves are in the Taumarunui Ecological District.

Wewea (New Zealand dabchick) are widely distributed in the North Island with an estimated population of 1700-1800, c.500 of which occur around the Volcanic Plateau (Heather and Robertson, 1996). Little suitable habitat is present in the Taumarunui Ecological District and there are very few records. Wewea are known from Haitana Swamp (RAP 12), c.12 km north-east of Taumarunui and from a farm pond off Takiri Road immediately west of Waimiha (P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 1999).

Matuku (Australasian bittern) are uncommon, and while they are widely distributed throughout mainland New Zealand, the estimated population in 1980 was only 580-725 individuals (Heather and Robertson 1996). Their decline has resulted from habitat loss (drainage and reclamation of wetlands) and damage to breeding cover by cattle grazing (Heather and Robertson 1996). Matuku have been reported from only two sites in the Taumarunui Ecological District, and it is unlikely that they still occur at one of these sites. The only confirmed report of bittern is for Sturgeon Wetland (RAP 32), where one individual was seen four years ago.

There is a high overall diversity of indigenous forest birds throughout the district. Fantail, grey warbler, tui, bellbird, shining cuckoo, kingfisher and Australasian harrier are common in reserves and privately owned forest remnants. Less common species include long-tailed cuckoo, whitehead, pied tit, rifleman and North Island robin.

Fernbird and spotless crane are of limited distribution in the Taumarunui Ecological District. Spotless crane have been identified in several RAPs including Picket Ridge Wetland (RAP 14), Fife Forest (RAP 16), Sturgeon wetland (RAP 32) and Percy wetland (RAP 22), but are known from only two areas administered by DOC, Mangapehi-Ruapehu Forest Stewardship Lands at the northern tip of the ecological district (Department of Conservation 1996), and Hawkins wetland in the south (C. Ogle, Wanganui Conservancy, Department of Conservation pers. comm. 1999). Fernbird are less common and are known to be present in those parts of Erua

Stewardship Area and Tongariro Conservation Area occurring within the ecological district, south of Whakahoro on the south-west edge of the ecological district and at Mapara Wildlife Management Reserve (Bradfield and Flux 1996; Department of Conservation 1994; Fuller and Edwards 1989). The single largest population of fernbird within the ecological district occurs in the Ruapehu Fernbird Ecological Area, at the northern tip of the ecological district (Department of Conservation 1996). Fernbird have been confirmed present in one RAP, Karakia Swamp (RAP 18), and have been reported from two others, Haitana Swamp (RAP 12) and Picket Ridge Wetland (RAP 14).

Reptiles

Of the five species of reptile known to be present in Taumarunui Ecological District, the striped skink, is a category 'A' priority species for conservation management (Molloy and Davis 1994). It inhabits rotting logs in native forest or logs remaining in pasture following forest clearance it is also found in epiphytes in the forest canopy and dead standing trees (Gill and Whitaker, 1996). Whitaker (1993) lists 38 localities in the North Island from which striped skinks have been collected or reported but they are reliably known from only the northern and central North Island. Within the Taumarunui Ecological District, there are four listed localities: Benneydale, Ohura, Tuhua and Waitea Stream. Of these, the Benneydale and Ohura localities are general and the exact locations for the records, which date from the 1970s, are unknown. At Tuhua, one striped skink was found on the hillside immediately to the rear of the school in February 1969. At the time the area was characterised by rough pasture with numerous logs and stumps, and regenerating manuka. At Waitea Stream, one striped skink was collected in January 1948. It was found dead on the end of a wooden bridge, in an area recently cleared for pastoral farmland. The site was visited in 1969 and no striped skinks were located. The most recent record of striped skink dates from 1996 at Pureora just outside of the ecological district boundary (de Groot 1997).

There is very little information on the distribution of the remaining four species. The common skink reaches its northern limit near Mangakahu (McEwen 1987). Ogle (1983) in his survey of Erua State Forest (now Erua Stewardship Area) notes two local, unconfirmed, reports of lizards, most probably forest gecko. He also notes a confirmed report of forest gecko in Manga Te Puhi Scenic Reserve, in the south of the ecological district. O'Donnell (1983) notes reports of forest gecko and common green gecko in Waitewhena Forest Stewardship Land in the west of the ecological district. Common green gecko are also present in Mapara Wildlife Management Reserve (P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 1999).

Fish

The catchments of Taumarunui Ecological District can be generally characterised as headwater catchments. They are all a relatively long distance from the sea, which limits migration, and is reflected in the low diversity of indigenous fish (R. Miller, Wanganui Conservancy, Department of Conservation pers. comm. 1999). This has been exacerbated in the north of the ecological district, where the damming of the Mokau River has placed further limits on migration and resulted in an even poorer fishery than that of the Whanganui catchment.

Rivers and streams are a prominent feature of the Taumarunui Ecological District, and river margins, or more specifically riparian vegetation, plays an important role in maintaining water quality. Riparian vegetation acts as a buffer and reduces nutrient

and sediment runoff from surrounding land. The maintenance of high water quality is important in protecting the diversity of invertebrates and fisheries within streams and rivers.

Nine indigenous fish have been recorded in the Taumarunui Ecological District. One short-jawed kokopu was recorded in 1982 from Makokomiko Stream, c. 5 km south of Taumarunui and another three in 1997 from Heao Stream (tributary of the Tangaraku River; NIWA Freshwater Fish Database). Short-jawed kokopu are a category 'A' priority species for conservation management (Molloy and Davis 1994). Of the remaining eight species, short-finned eel, long-finned eel, Cran's bully and common bully are distributed relatively widely but upland bully, torrent fish, koaro and common smelt have a limited distribution (NIWA Freshwater Fish Database).

Three introduced fish species are present. Brown and rainbow trout are widespread, while catfish are of limited distribution (NIWA Freshwater Fish Database).

Mammals

Indigenous

Two indigenous bat species, of priority for conservation management, short-tailed bat (category 'A'; Molloy and Davis 1994) and long-tailed bat (category 'B'; Molloy and Davis 1994) occur in the Taumarunui Ecological District.

Bat numbers have been reduced dramatically since the arrival of Europeans. Factors associated with the decline in bat numbers include predation, habitat loss and competition, but the relative impact of each factor is unknown (Molloy *et al.* 1995). There are reports, both from the threatened fauna database maintained by the Wanganui Conservancy (DOC) and from landowners during this survey, of infrequent sightings of bats throughout most of the ecological district.

Long-tailed bats are widespread in mainland New Zealand, but have a very patchy distribution. They inhabit indigenous forest and primarily roost in hollow trees and tree roots, but are also known to roost in caves and rock crevices, and in buildings or under bridges (Daniel and Williams 1984). They are insectivorous and commonly feed around forest margins and out into farmland (R. Buckingham, Nelson pers. comm. 1999). Long-tailed bats are known from those parts of Tongariro Conservation Area, Erua Stewardship Area, and Pureora Conservation Park occurring within the ecological district, Raurimu Scenic Reserve, and Mapara Wildlife Management Reserve (Bradfield and Flux 1996; Department of Conservation 1994 & 1996). They are also likely to be present in several other areas including Manga Te Puhi Scenic Reserve and in the south-west of the ecological district near Whakahoro (Department of Conservation 1994, 1996).

Molloy and Davis (1994) recognise three sub-species of short-tailed bat (northern, volcanic plateau and southern; all category 'A') but the exact taxonomic status of short-tailed bats, including the Volcanic Plateau short-tailed bat, is yet to be finalised (Winnington and Lambert 1998).

Short-tailed bats are also widespread in mainland New Zealand, but have an even more patchy distribution than long-tailed bats. They are more specific in their habitat requirements, inhabiting indigenous forest and roosting in hollow trees and tree roots. They feed on insects and also extensively on nectar, pollen and perhaps even fruit within the forest (A. Holzapfel, Waikato Conservancy, Department of Conservation pers. comm. 2000). In the Taumarunui Ecological District, short-tailed bats are known

only from Raurimu Scenic Reserve and Tongariro Conservation Area (Department of Conservation 1994).

Introduced

Introduced mammals are widely distributed through the Taumarunui Ecological District. Possum were liberated around 1920 from Owhango and Raurimu and then in 1931 from Ongarue, while at Taumarunui township red deer were released yearly from 1913 to 1918 (McKelvey, 1963). The negative impact of these introduced species essentially falls into two categories; browsing damage and predation. Fuller and Edwards (1989) in their survey of reserves noted that browsing damage “... *has caused considerable damage to parts of every reserve surveyed. Over the years selective browsing has completely altered the vegetation composition and structure of the forests. Once common, highly palatable species such as five finger, Pseudopanax lactus, fuchsia, and asteliads are now localized and in some cases confined solely to inaccessible bluffs. Unpalatable or browse-resistant species [for example horopito] now assume dominant roles in the canopy, understorey and forest floor where once they were only minor components.*”

A similar pattern, exacerbated in many sites by stock grazing, was observed in most of the unprotected sites visited during the current survey. Browsing also has a negative effect on regeneration, and while seedlings of canopy species were often noted, saplings were generally uncommon. Feral goats, in particular, are a serious problem and, whilst they are being controlled in many reserves, they remain a serious threat to forest throughout the district. Deer and pig numbers appear to be considerably lower than goat numbers. Possums are being controlled by aerial and ground-based operations throughout much of the ecological district. However, the primary focus for many possum control operations has been the control of bovine tuberculosis, rather than ecological protection.

Predation has been identified as a serious threat to much of the indigenous fauna present in the Taumarunui Ecological District. Feral cats, rats and mustelids are well recognised predators but pigs are also known to be predators of kiwi, and possums are known to break eggs and kill chicks of nesting birds. Possums also compete with indigenous fauna for food and compete with kiwi for the use of burrows (Moynihan 1986).

Invertebrates

Very little is known about the indigenous invertebrate fauna of Taumarunui Ecological District. The most comprehensive records that exist are for koura, which are widespread in many rivers and streams (NIWA Freshwater Fish Database). No rare or uncommon freshwater invertebrate species were identified in a search of the NIWA Trichoptera Database (B. Smith, NIWA, Hamilton pers. comm. 1999). However, it is likely that small streams, tributaries and headwaters, particularly in native forest contain uncommon or rare species.

Mahoenui giant weta are present on the boundary of Waitaka Scenic Reserve (P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 1999) and are a category 'C' priority species for conservation management (Molloy and Davis 1994). This is one of only two known populations, the other population occurs to the west in Waitomo Ecological District at Mahoenui Giant Weta Scenic Reserve (P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 1999)

2.10 RELATIONSHIP TO ADJOINING DISTRICTS

Ecological districts have been recognised as unique ecological complexes on a large scale. That the Taumarunui Ecological District meets this criterion is evident from Table 4 which presents brief comparative accounts of its diagnostic features and those of the surrounding ecological districts.

TABLE 4: KEY CHARACTERISTICS OF TAUMARUNUI ECOLOGICAL DISTRICT AND ADJOINING ECOLOGICAL DISTRICTS

ECOLOGICAL REGION	KING COUNTRY	KING COUNTRY	TARANAKI
ECOLOGICAL DISTRICT	TAUMARUNUI	WAITOMO	NORTH TARANAKI
Main characteristic	Extensive hill country farming.	Exceptional, extensive karst landforms with some significant forest cover; otherwise widely farmed, rolling to moderately steep, hill country.	Mainly steep hill country with minor areas of logged forest and sustained farming, extensive hard beech and local silver beech.
Topography/Geology	Moderately steep to steep mudstone and sandstone hills.	Karst (limestone) terrain common in the northern half, otherwise a generally subdued terrain of lowhills, none over 500ma.s.l., and some rolling land.	Generally steep hills, deep dissection of mudstone and sandstone, very narrow valley floors except nearing the coast and the minor interior Waitaanga Valley.
Bioclimatic zone	Almost entirely lowland	Lowland bioclimatic zone	Mainly lowland bioclimatic zone but coastal and semi-coastal within a few kilometres of the coast.
Soils	Widely derived from mantling Taupo ash and riparian pumice terraces	Complex of soils from sedimentary rock types and ancient volcanic ash beds	Now chiefly steepland soils with variable accumulations of old volcanic ash.
Vegetation	Former rimu-tawa and podocarp-rich forest in eastern half, widely cleared since 1900, local hard beech forest.	Forest remnants mainly on limestone, rimu-tawa-mangeao and some of exceptional composition; otherwise much farmland.	Much unmodified rimu-tawa forest on Waitaanga "plateau" and to north and south of it.

TARANAKI	WESTERN VOLCANIC	CENTRAL VOLCANIC	TONGARIRO
MATEMATEAONGA	PUREORA	TAUPO	TONGARIRO
Extensive forest wilderness.	Extensive ignimbrite sheets and Mt. Pureora.	Lake Taupo and catchment, a major centre of rhyolitic volcanic activity.	Large andesite volcanoes and ring plains.
Almost totally rugged, very finely and deeply dissected mudstone and sandstone country, long summit accordant ridges.	A central (north-south) narrow, moderately high, greywacke range with protruding extinct volcanic cone, Mt. Pureora, surrounded by flattish to finely dissected ignimbrite sheets.	Contains Lake Taupo and most of its catchment (excluding part Kaimanawa Ranges); generally broken terrain of ignimbrite and pumice breccia.	Higher land, dominated by volcanic Mountains Ruapehu, Ngauruhoe, and Tongariro and surrounding agglomerate plains, with lesser, extinct, andesitic domes at north end.
Lowland bioclimatic zone, except where the land is just over 800 m a.s.l. in centre and near eastern boundary.	Lowland bioclimatic zone, except for minor extent submontane on range crest and the mountain.	Lowland bioclimatic zone, except for submontane on north-west and south-west peripheries.	Mainly sub-montane and montane bioclimatic zones.
Mainly thin steep-land soils except for contributing old andesitic ash on occasional broad ridges.	Taupo pumice and ash a significant soil former.	Common, very thick cover of Taupo pumice and ash and older rhyolitic tephras.	Taupo pumice major soil factor in northern half, andesitic ash beds in south.
Very extensive tracts unlogged rimu-tawa forest and frequent stands of black beech (some hard beech also in the very north); peripheral farmland but also cleared areas reverted to scrub and young forest.	Central third mainly logged but in places still virgin podocarp and rimu-tawa forest, notable local abundance of tanekaha and mountain toatoa; submontane podocarp-broad-leaved forest on Mt. Pureora and elevated easy terrain southward; eastern third in pine plantations and farmland, toward western periphery, much heavily logged forest and scrub, some farming.	Former dense podocarp forest on flank of Hauhungaroa Range widely (but not totally) logged; former tussock and scrub elsewhere widely cleared for pine plantations and farming, relatively recently.	Remnants of logged and of some virgin dense podocarp and podocarp-broad-leaved forest in north and west, otherwise on Mt Ruapehu submontane and montane beech forest (mountain beech, red beech, and silver beech) with kaikawaka and manaoa, subalpine vegetation above; tussock-shrubland on much of the ring plains; peripheral exotic pine plantations and farmlands.

3. Outline of survey methods

GENERAL

The boundary of the Taumarunui Ecological District was refined and the ecological district subdivided into landform units and bioclimatic zones to provide the basis for the evaluation of ecological data. Information on currently protected areas was compiled and assessed to identify any under represented vegetation and habitat types in each of the landform unit-bioclimatic zone combinations. Information in the reconnaissance phase report, Sites of Special Biological Interest database and other sources were considered to identify study areas that best redressed any gaps or imbalances in the existing protected natural areas network. Field survey of each study area was undertaken. The study areas were evaluated and recommended areas for protection identified.

3.1 ECOLOGICAL DISTRICT BOUNDARY

The ecological district boundary was drawn on 1:50,000 topographic maps (Infomap Series 260), following the very broad outline and description given in McEwen (1987), but considerably refined for the finer scale. It mainly follows catchment boundaries, with a few local allowances for intrusive landforms and vegetation patterns. For example, in the south-east, a narrow tongue of the Ruapehu ring plain is included; in the north-west, a minor part of the Ohura catchment with predominant hard beech forest typical of the adjacent North Taranaki Ecological District is excluded. The ecological district boundary was digitised from the 1:50,000 topographic maps using ArcView 3.1.

3.2 BIOCLIMATIC ZONES

Two bioclimatic zones (lowland and submontane) have been identified for the Taumarunui Ecological District (refer to Figure 4). The bioclimatic zones were mapped onto 1:50,000 topographic maps (Infomap Series 260), and the division between the zones follows the 800 m contour. Boundaries were subsequently digitised from the 1:50,000 topographic maps using ArcView 3.1.

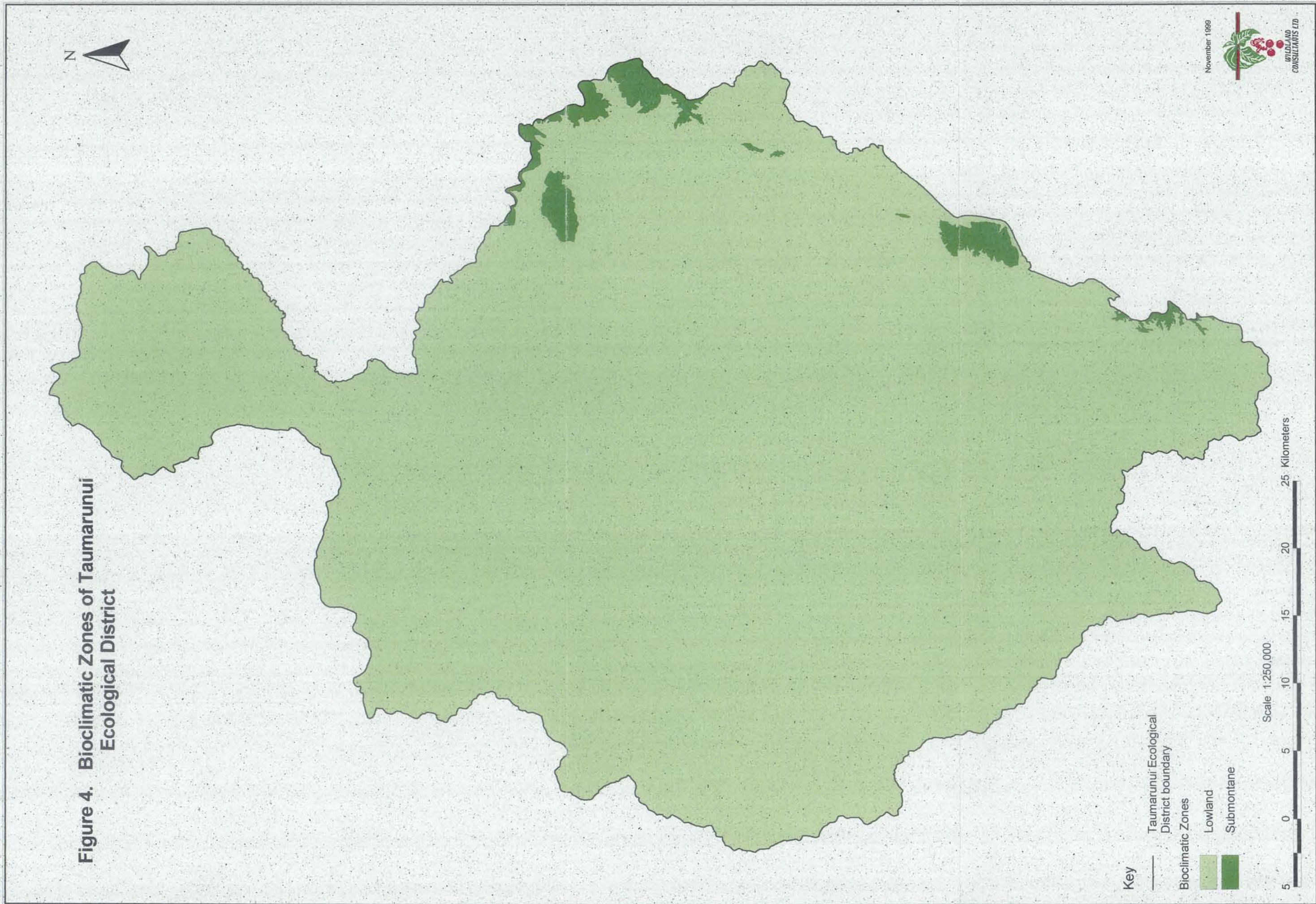
Lowland

Land below 800 m, the upper altitudinal limit of tawa. Almost all of the ecological district falls within this zone.

Submontane

Small areas present in the east of the ecological district, comprising land above 800 m. The lower edge of the zone is marked by low forest. Hall's totara is a feature of the low forest.

Figure 4. Bioclimatic Zones of Taumarunui Ecological District



3.3 LANDFORMS

The landforms have been distinguished by interpretation of contour patterns on 1:50,000 topographic maps (Infomap Series 260) and relevant geological information (see Section 2). Following their delineation they were digitised from the 1:50,000 topographic maps using ArcView 3.1 (refer to Figure 5).

1. Riparian Flats

Alluvial flood plains bordering rivers and streams, often reaching far up the narrowest valleys. Altitudinal range is very slight, 180-200 m a.s.l. (excepting 280-300 m in the Mokau River catchment), as reflected in the intensely meandering courses of all the waterways.

2. Terraces

Very thick deposits of Taupo Pumice Alluvium in all catchments south and east of the Ohura River system have, since AD1850, generally been dissected down to former stream level, with resultant terrace surfaces c.5-10 m above. Terraces are of greatest extent bordering the Ongarue, Taringamotu, Pungapunga, Whanganui, and Retaruke Rivers. They are commonly 0.5-1 km across, but are, in places, reduced to very narrow remnants.

3. Undulating Terrain

3a. Lahar Plain

A tongue, 2-4 km wide, of the Waimarino laharic ring plain, emanating from Mt Ruapehu, borders the Whakapapa River between Raurimu and Piriaka. A surface of flats and low ridges or rises, 400-700 m a.s.l., deeply dissected at the head.

3b. Minor Plateaus

Rare areas of elevated flats (possibly peneplain remnants) and comparatively gently rising, low hills. The largest example, c.460-560 m a.s.l. is 5 km south of Benneydale.

4. Hill Country

4a. Gently rising slopes

The only sizeable areas of this landform occur immediately south of Benneydale and east of Owango.

4b. Moderately Steep to Steep Slopes

The characteristic landform feature of the district, generally 400-850 m a.s.l., with exceptional higher ground: for example Tuhua 1,024 m, Taurewa 1,076 m, and up to c.1,000 m on the Hauhungaroa Range on the north eastern district boundary.

4c. Very Steep Slopes

Of more local occurrence, mainly on forest-covered land between the Ohura and Ongarue Rivers, between the lower Retaruke Valley and the Whanganui River, in the headwaters of the Taringamotu River, and the Taurewa fault scarp.

5. Gorge

The only appreciable example of this landform is the Whakapapa Gorge, incised in greywacke rock adjacent to the Waimarino lahar plain.

3.4 VEGETATION/HABITAT CLASSES

Indigenous vegetation and habitat classes used in the analysis (see Figure 3) are:

- indigenous forest
- scrub and shrublands
- inland water
- inland wetland

The landcover database (LCDB) held by Waikato Regional Council and horizons.mw (Manawatu-Wanganui Regional Council) was used for present day vegetation cover.

3.5 RECONNAISSANCE PHASE

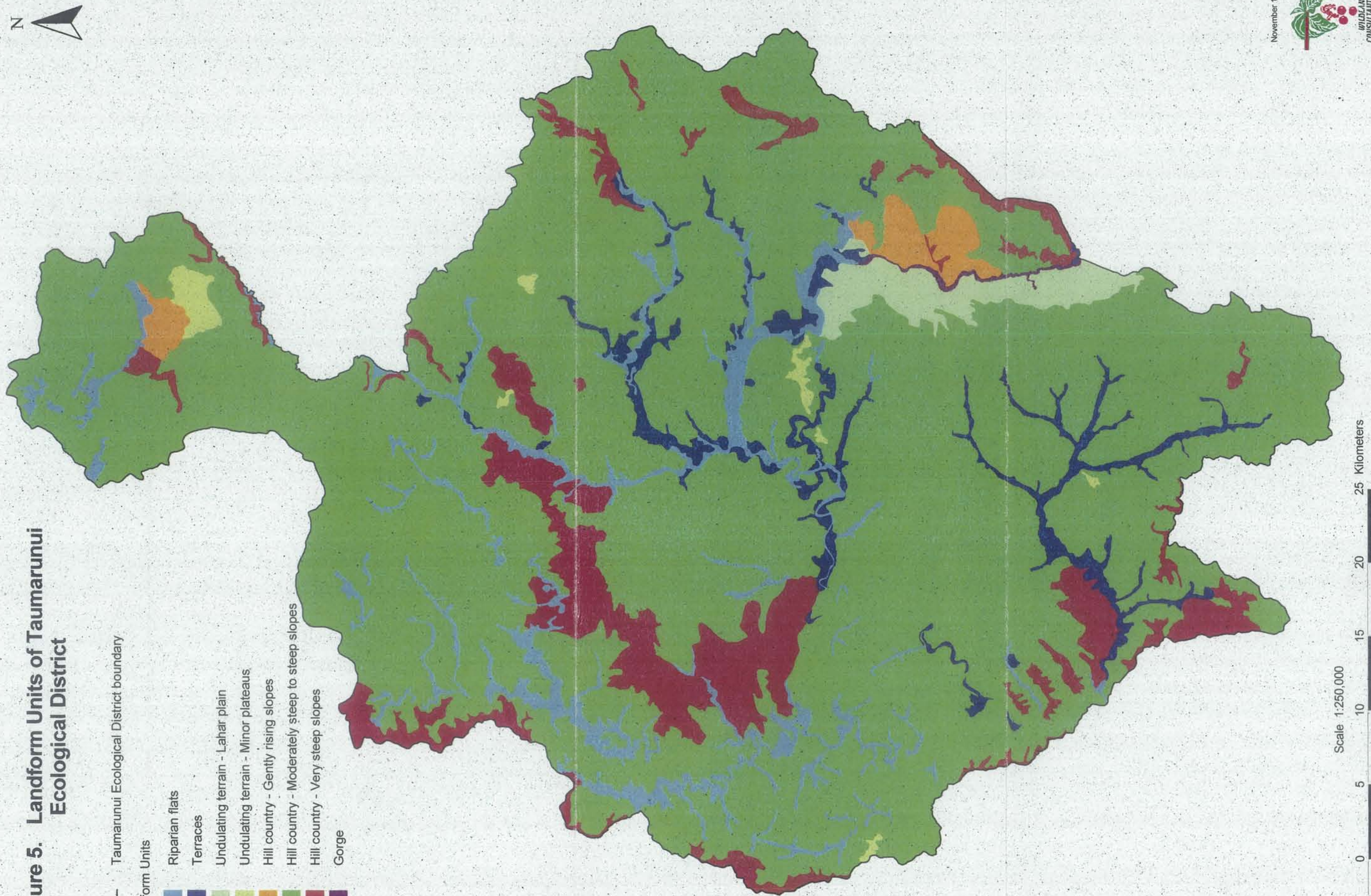
The reconnaissance phase, collating existing information and identifying potential areas for survey, was completed in 1997 (de Groot 1997) and was essentially undertaken as a desktop exercise focusing on the interpretation of aerial photographs with limited field checking. Extensive use was made of existing information, including Sites of Special Biological Interest (SSBI), Sites of Special Wildlife Importance (SSWI) and Wetlands of Ecological and Representative Importance (WERI) databases, reports and other relevant literature, and interviews with Department of Conservation staff to identify areas for potential survey. It appeared that there had been a greater loss of natural areas (or native vegetation) from gentle rather than on steep lands, and thus emphasis was placed on the identification of natural areas on valley bottoms and at lower altitudes, particularly wetlands and podocarp forests. Each recommended area for survey was briefly described, and boundaries were mapped on 1:50,000 scale topographical maps (Infomap Series 260).

The reconnaissance report also compiled information on the protected natural areas present within the ecological district. A brief description of each area was given and boundaries were mapped on 1:50,000 scale topographic maps alongside the recommended areas for survey.

3.6 SITES OF SPECIAL BIOLOGICAL INTEREST

Concurrent with the PNAP survey, 69 Sites of Special Biological Interest (SSBI) were re-surveyed in the Wanganui Conservancy part of the ecological district. The SSBI database covers selected sites identified by the NZ Wildlife Service in the early 1980s, including both protected and unprotected natural areas. Field survey of each SSBI site was undertaken where access by the landowner was granted. Information on the biological and cultural values, condition, and management of each site was updated, and this information is held by the Wanganui Conservancy. Information from the SSBI survey was used to assist in identifying sites for field survey for the PNAP survey. However, it was found that most of the SSBI sites that were not already protected occur in the hill country - moderately steep to steep slopes, which is a landform unit already well represented in the protected areas network.

Figure 5. Landform Units of Taumarunui Ecological District



3.7 IDENTIFICATION OF SITES FOR FIELD SURVEY

Data on existing protected natural areas, their extent, vegetation types, landform units and bioclimatic zones, were compiled from various sources including scenic reserve reports, conservation management strategies and the reconnaissance report. Existing protected natural areas include reserves administered by DOC and District Councils, QEII National Trust and Nga Whenua Rahui covenants, and any other area formally protected for conservation. Data on the extent of each bioclimatic zone-landform unit combination and the present extent of indigenous vegetation within them was extracted from the digital information and combined with the protected natural areas data for analysis using Microsoft Excel 97. Tables showing the extent of indigenous vegetation within each landform and bioclimatic zone, and the amount already protected were derived. This enabled the identification of ecological units (each unique vegetation/habitat-landform-bioclimatic zone combination) that are under-represented in the current protected areas network.

Sites for field survey were then identified using the data on ecological units, the reconnaissance report (de Groot 1997), SSBI database information, discussions with DOC staff and field observations. A total of 75 study areas were identified for survey.

3.8 COLLECTION OF FIELD DATA

Prior to the commencement of field survey work, a letter outlining the reasons for the survey was sent to all households in the ecological district (see Appendix 13) by DOC Wanganui. Field survey of each site was then undertaken, subject to approval by landowners. When landowners were approached for permission to undertake the survey, a more detailed pamphlet was handed out, detailing the reasons for the survey, the implications of having an RAP identified on their property and the Occupational Health and Safety requirements (see Appendix 14). Access was not granted for all sites, and for some sites, time constraints resulted in only the main landowners being contacted. For these sites a visual survey and checking of recent aerial photographs was used to determine RAP boundaries on surrounding land. Sites for which access to the entire site was denied are discussed in Section 3.9 (see also Appendix 8).

Field data were collected using the plot sheet in Appendix 12. Vegetation types were identified and described, then mapped in the field onto aerial photographs. Other information on fauna, significant features, condition, dynamics and threats was also collected. The plot sheets are held by DOC Wanganui.

3.9 EVALUATION

The relative ecological values of each area surveyed, were assessed using the following 'primary' criteria and a further set of 'secondary' criteria.

Primary Criteria

1. **Present *versus* past extent.** A comparison of the relative extent of indigenous vegetation remaining in an ecological district compared with that in an 1840 reconstruction.

2. **Diversity and pattern.** The diversity of ecological and physical features, and the patterns that exist within the area under consideration.
3. **Naturalness.** The degree to which the vegetation and habitats reflect likely natural character. Most mainland ecosystems are modified but the degree of naturalness is an important consideration.
4. **Size.** Areas which are relatively large (i.e. compared to the mean size of remaining areas of indigenous vegetation in an ecological district) are preferred to small areas. Larger areas are likely to be more viable in the long term.
5. **Shape of area.** Areas which are primarily compact are preferable to areas which are highly convoluted or discontinuous.
6. **Representativeness.** The primary criterion, based on an assessment of vegetation present vs past extent, diversity and pattern, naturalness, and size. Communities characteristic of particular landform units within an ecological district were identified as natural heritage sites.
7. **Rarity and special features.** The relative rarity of physical landscape features, vegetation, habitat and species within an ecological district and on a national basis.
8. **Buffering and connectivity.** The degree to which the area is protected/ buffered by the surrounding landscape or provides a buffer to other areas. A site may play an important role by connecting other areas of indigenous vegetation or habitat, or providing a riparian buffer.
9. **Viability.** The likelihood of an area remaining ecologically viable over time. Larger areas are generally more likely to remain viable (related to management requirements below).
10. **Fragility and threat.** The natural ecological resilience of the vegetation or habitat type present, the types of threats that they are exposed to, and their vulnerability to any known threats, for example grazing, trampling, drainage.

(cf. Diamond 1975; Myers *et al.* 1987; O'Connor *et al.* 1990; Ogle 1981; Shaw 1994; Whaley *et al.* 1995; Young and Mitchell 1994).

Other Criteria

The area's rating as a fauna habitat (if available from previous surveys) was also assessed. Refer to page 2 of the Ecological Assessment Sheet.

Potential study sites were identified and evaluated using an assessment form designed using these criteria (based on Whaley *et al.* 1995), with high, medium and low values defined for each criterion (see Appendix 10).

Selection of Recommended Areas for Protection

Recommended Areas for Protection (RAPs) were selected using the above criteria, to increase representation of those landform units and vegetation types within each bioclimatic zone which are greatly under represented in the existing protected areas. They contain some of the best quality, or only remaining examples of indigenous vegetation or wildlife habitat on those landform units, and include areas selected to maintain connectivity between existing ecologically significant protected areas.

It is important to note that there are many areas of indigenous vegetation/habitat that have not been identified as RAPs (see Appendix 8). These areas may also be of

significant conservation value but this survey has targetted the selection of the best remaining representative examples on flatter land and wetlands in particular.

The evaluation was confined to biological characteristics of sites, and other attributes, such as cultural or landscape values, were not assessed. There may be areas which deserve recognition/protection on the basis of cultural or landscape value, for example Mt Hikurangi.

Some areas were not surveyed as landowners were unwilling to grant the necessary access. Existing information, including aerial photographs, unpublished reports and observation from nearby roads suggest that these areas may be of significant conservation value. Areas to which the survey team was not granted access include:

- an extensive area of scrub and forest linking Tongariro Conservation Area, Waituhi-Kuratau Scenic Reserve and Puketapu 3A (RAP 17);
- a large area of scrub and forest in the headwaters of Hauwai Stream contiguous with Waituhi-Kuratau Scenic Reserve;
- a large area of forest linking Nihoniho Conservation Area and Rangi Scenic Reserve;
- and kahikatea forest remnants on riparian flats c. 2 km north-west of Mangapehi.

Advocation for the protection of these areas should not be discounted because of the lack of current information.

Presentation of Information

Recommended Areas for Protection (RAPs) are described using the following format and each is accompanied by a map (see below). Basic information on each RAP (RAP No., PNAP Survey No., grid reference, landform unit, area (ha), altitudinal range, survey methodology, bioclimatic zone, vegetation types and landforms) is followed by detailed descriptions of the landform, vegetation, flora and fauna (if known), threats/modification and justification for protection.

Brief information is provided on other sites of biological importance in the Taumarunui Ecological District (see Appendix 8): PNAP Survey No., grid reference, area (ha), SSBI No. (if applicable), information source, landform unit and a brief general description.

Threatened and uncommon plant species were identified using Cameron *et al.* (1995) during the field survey. However, following completion of the draft report, the client requested that the threatened and uncommon plant species be updated using de Lange *et al.* (1999).

RAP Maps

Boundaries of RAPs and their constituent vegetation types were mapped initially on c. 1:25,000 scale aerial photos. Boundaries were then hand drawn on Infomap 260 series topographic maps enlarged to 1:25,000 scale, before being sent to Wanganui Conservancy for drafting prior to publication.

4. Remaining natural vegetation

The approximate historical extent and proportions of the different vegetation/habitat classes on each landform unit within each bioclimatic zone were calculated with reference to the vegetation history (Section 2.6). Refer to Appendices 7.3 & 7.4. The baseline used was c. 1840 and comparisons have been made with the current extent.

Almost all of the vegetation in the ecological district remained intact following Polynesian settlement until the arrival of Europeans. However, following European settlement, the situation changed dramatically. Logging and development for agriculture has resulted in large scale losses of indigenous vegetation cover within the ecological district. However, the loss of vegetation cover has not been uniform across the ecological districts and there are marked differences between bioclimatic zones and landforms.

4.1 LOWLAND BIOCLIMATIC ZONE

The following summary is derived from Appendix 7.3.

The greatest loss of indigenous forest cover has occurred in the lowland bioclimatic zone where only 24.3% of the forest cover in 1840 remains. However, the relative extent of loss of indigenous forest cover varies in each landform unit. The biggest losses have occurred on the undulating terrain - minor plateaus, riparian flats, undulating terrain - lahar plain and terraces landform units, with only 2.6%, 5.8%, 9.1% and 9.4% respectively of the 1840 forest cover remaining. The gorge, and hill country - gently rising slopes landform units retain the greatest indigenous forest cover, with 66.1% and 65.5% of the 1840 forest cover remaining respectively. The hill country - moderately steep to steep slopes and - very steep slopes landform units are also relatively well protected, with 26.2% and 24.6% of the 1840 forest cover remaining respectively. The high loss of indigenous forest cover on the undulating terrain - minor plateaus and lahar plain, riparian flats, and terraces landforms - reflects the high agricultural value of these landforms, and the ease with which they can be developed. In comparison, the hill country and gorge landforms are less accessible and more difficult to develop.

In comparing the 1840 and current indigenous forest cover, it is important to note the limitations of the analysis. The LCDB data, from which the current indigenous vegetation cover was derived, do not differentiate between forest types and give only a figure for the total indigenous forest cover. In comparison, there are five distinct forest types recognised in the indigenous vegetation cover present in 1840 (see Figure 2). To enable a comparison it was necessary to amalgamate the five historical vegetation types in to one forest type, 'total indigenous forest'. However, such a simple comparison does not accurately represent the current situation. For instance Figure 2 shows that complex mosaics of rimu-tawa and rimu-beech forest classes dominated the 1840 forest cover. However, much of the current indigenous forest cover over the same area, see Section 2.7 (present vegetation), has been logged and the podocarps removed, resulting in tawa dominant forests. Thus, while appreciable areas of indigenous forest still remain, they are considerably different in composition to the forest present in 1840.

The total current indigenous vegetation cover comprises 29.8% of the vegetation cover present in 1840. Although scrub and shrubland is the second largest component of the current vegetation cover, 5.3%, it has almost all established following forest clearance, as there was no scrub or shrubland recorded in the 1840 vegetation cover. However, small areas of scrub and shrubland were probably present (for example on bluffs) but were too small to be mapped for analysis. Of the c.14,277 ha of scrub and shrubland currently present in the ecological district, c.11,255 ha (78.8%) occurs in the hill country - moderately steep to steep slopes landform unit and a further c.2,112 ha (14.8%) occurs in the hill country - very steep slopes landform unit. Scrub and shrubland is also present on all the other landform units, ranging from 5.1 ha on the undulating terrain - minor plateaus landform unit to 408.9 ha on the terraces landform unit.

Small areas of wetland were probably also present in 1840 but were not mapped. Inland wetlands currently occur on the hill country - moderately steep to steep slopes, riparian flats, terraces and undulating terrain - lahar plain landform units. Inland wetlands are a small component of all of these landforms, comprising less than 0.4% of the total land area of each landform unit.

Inland waters identified in the LCDB comprise the Whanganui River and some small lake areas. There has been no change in the extent of inland waters.

4.2 SUBMONTANE BIOCLIMATIC ZONE

The following summary is derived from Appendix 7.4.

Current indigenous forest cover represents approximately 90.9% of the 1840 cover in the submontane bioclimatic zone compared with 24.3% in the lowland bioclimatic zone. Scrub and shrubland are also present, and comprise 4.3% of the 1840 vegetation cover. The relatively small loss of cover in the submontane bioclimatic zone probably relates to it being less agriculturally productive in comparison to land in the lowland bioclimatic zone. The submontane bioclimatic zone is generally not suited for current commercial activities and is not under pressure to be developed.

5. Currently protected areas

Existing protected natural areas comprise 14.4% of the Taumarunui Ecological District and cover c.39,750 ha (Table 5). A list of protected natural areas, their name, area (ha), grid reference, conservation unit number and a brief description is provided in Appendix 6.

TABLE 5: INDIGENOUS VEGETATION IN EXISTING PROTECTED NATURAL AREAS IN TAUMARUNUI ECOLOGICAL DISTRICT

BIOCLIMATIC ZONE	AREA (HA)	PERCENTAGE OF TOTAL AREA OF ECOLOGICAL DISTRICT
Lowland	35,745.2	12.9
Submontane	4,006.2	1.5
TOTAL	39,751.4	14.4

The majority of protected natural areas are managed by the Department of Conservation, with only relatively small areas protected by QEII covenants, Nga Whenua Rahui covenants and district council reserves. Although the protected natural areas are widely distributed across the Ecological District, they are unevenly distributed across the landform units. For example, the three hill country landform units and the gorge landform unit are well represented but representation of riparian flats, terraces and both undulating terrain landform units is poor (see Tables 5 and 6 in Section 6). Most of the submontane bioclimatic zone is covered in indigenous forest and is protected.

Eleven protected natural areas are around 1,000 ha or more and they almost all occur in the hill country - moderately steep to steep slopes and very steep slopes landform units. Tongariro Conservation Area is the largest of these, covering c.7,660 ha in the south-east of the district. The other large areas include Mapara Wildlife Management Reserve, Mangapehi Scenic Reserve/Stewardship Land and Mangapehi-Ruapehu Forest Stewardship Lands near Benneydale in the far north of the ecological district; Waitaka Scenic Reserve in the north-east near Matiere; Nihoniho Conservation Area and Waireka Conservation Area in the west; Pureora Conservation Park in the east; and Erua Stewardship Area and Te Ruahine Scenic Reserve in the south. Whilst the total area of Whanganui National Park in the Taumarunui Ecological District is more than 1,000 ha, it comprises several parts spread along the margins of the Whanganui River.

6. Values needing protection

Thirty-six areas covering c.5,600 ha and comprising 2.0% of the Taumarunui Ecological District have been recommended for protection. The RAPs range in size from 1-2950 ha, with an average size of 155.6 ha and a median size of 10.7 ha. The location and extent of the RAPs is shown in Figure 6. Emphasis was placed on selecting vegetation and habitat classes and landforms inadequately protected in the existing reserve network in each of the bioclimatic zones.

6.1 LOWLAND BIOCLIMATIC ZONE

Currently 13.2% of the lowland bioclimatic zone is protected (Table 6) but representation across all of the landform units is not representative. Within the riparian flats, terraces and undulating terrain - lahar plain and minor plateaus landforms, only 2.2%, 3.1%, 2.9% and 0.6% respectively of the landform unit area is currently protected.

Increased protection of indigenous vegetation is warranted on riparian flats (for example Mangapehi Forest, Heayns Forest, Karakia Swamp and Piriaka Terrace Forest RAPs), terraces (for example Liley Wetland, Sturgeon Wetland, Mathieson Wetland, Hikumutu Stream and Gemmell Forest RAPs), undulating terrain - lahar plain (for example Percy Wetland, Kakahi Stream Forest, Owango Forest and Tepure Stream Forest RAPs) and undulating terrain - minor plateaus (for example Porootarao Forest, Mangapehi Scenic Reserve Extension, and Mangataranga Stream RAPs) to improve their representation in the protected natural area network.

A historical comparison with the current state and extent of wetlands was unable to be made as wetlands were too small to be delineated in the vegetation history map and most are not included in the LCDB, from which the current vegetation cover is derived. However, wetlands, whilst small in extent, are an important feature of the ecological district. Field observation indicates that their extent has been reduced substantially through drainage and development. The obvious significant decline in the extent of wetlands is justification for the protection of most that remain (for example Waipapa Stream Wetland, Haitana Swamp and Taringamotu Swamp RAPs).

TABLE 6: INDIGENOUS VEGETATION ON EACH LANDFORM IN EXISTING PROTECTED NATURAL AREAS IN THE LOWLAND BIOCLIMATIC ZONE, TAUMARUNUI ECOLOGICAL DISTRICT

LANDFORM UNIT	AREA OF LAND FORM UNIT (HA)	INDIGENOUS FOREST		VEGETATION INLAND WATER		AND HABITAT INLAND WETLAND		CLASSES SCRUB AND SHRUBLAND		TOTAL	
		HA	% ¹	HA	% ¹	HA	% ¹	HA	% ¹	HA	% ¹
Gorge	473.8	349.7	73.8							349.7	73.8
Hill country - Gently rising slopes	3699.2	2250.0	60.8					50.0	1.4	2300.0	62.2
Hill country - Moderately steep to steep slopes	209226.3	24846.6	11.9	2.5	<0.1			1488.2	0.7	26337.3	12.6
Hill country - Very steep slopes	25358.9	5859.8	23.1					95.8	0.4	5955.6	23.5
Riparian flats	15396.4	239.8	1.6					98.2	0.6	338.0	2.2
Terraces	9748.6	284.7	2.9			8.7	<0.1	4.3	<0.1	297.7	3.1
Undulating terrain - Lahar plain	5417	156.9	2.9							156.9	2.9
Undulating terrain - Minor plateaus	1760.9	10.0	0.6							10.0	0.6
TOTAL	271081.1	33997.5	12.5	2.5	<0.1	8.7	<0.1	1736.5	0.6	35745.2	13.2

¹ Percentage of area of landform

As part of the assessment to identify RAPs, the likelihood of an area remaining ecologically viable over time was assessed (see Section 3.9, primary criteria No. 9). Generally it can be said that larger areas are more likely to remain viable, which appears to contrast to the relatively small size of some wetland RAPs. However, only small areas of wetland remain and small wetland RAPs are now inevitable. Despite their small size, wetland RAPs can remain ecologically viable in the long term with appropriate management. Management requirements for these RAPs include:

- Retention of natural drainage patterns. Alteration to the natural drainage patterns, for instance by draining a wetland or altering inflows to a wetland, can cause considerable negative change.
- Fencing and exclusion of livestock. Cattle trampling in particular causes degradation of indigenous wetland vegetation, opening up the vegetation to provide opportunities for the establishment of exotic species. Pugging and

This is a detailed topographic map of the Taumaranui region in New Zealand. The map shows the Taumaranui River and its tributaries, including the Ohura River, the Mangahau River, and the Whakapapa River. The Taumaranui Dam is a prominent feature in the center of the map. The map includes numerous place names, such as Taumaranui, Ohura, Mangahau, and Whakapapa. Elevation contours are shown throughout the map, indicating the terrain's slope. A grid of numbered points (1-36) is overlaid on the map, marked with red dots. The map is oriented with North at the top.

compaction of the soil also alters the hydrology of the wetland and can lead to changes in species composition.

- Control of environmental pest plants. Grey willow invasion presents the greatest long term threat to the conservation values in most of the wetlands identified as RAPs. Grey willow infestations are generally small at present, and control would be relatively easily achieved if undertaken in the near future.

6.2 SUBMONTANE BIOCLIMATIC ZONE

The submontane bioclimatic zone is well represented with 79.3% of the total area currently protected (Table 7). Notwithstanding this, two substantial areas in the submontane bioclimatic zone are recommended for protection. Tuhua RAP contains the largest population of Pua o te reinga (classed as 'nationally uncommon', subcategory 'recovering-conservation dependent'; de Lange *et al.* 1999) within the ecological district and is a high priority for protection. Hauhungaroa RAP is part of an extensive tract of natural vegetation of outstanding conservation value. It bisects Purcora Conservation Park, and its long term protection would maintain the connection between these two areas.

TABLE 7: INDIGENOUS VEGETATION ON EACH LANDFORM IN EXISTING PROTECTED NATURAL AREAS IN THE SUBMONTANE BIOCLIMATIC ZONE, TAUMARUNUI ECOLOGICAL DISTRICT

LANDFORM UNIT	AREA OF LANDFORM UNIT (HA)	VEGETATION AND HABITAT CLASSES				TOTAL	
		INDIGENOUS HA	FOREST % ¹	SCRUB AND HA	SHRUBLAND % ¹	HA	% ¹
Hill country - Moderately steep to steep slopes	4853.5	3821.2	78.7	25.0	0.5	3846.2	79.2
Hill country - Very steep slopes	198.5	140.0	70.5	20.0	10.1	160.0	80.6
TOTAL	5052	3961.2	78.4	45.0	0.9	4006.2	79.3

6.3 PRIORITIES FOR PROTECTION

No distinction has been made between RAPs on the basis of relative significance. However, the highest priorities for protection management action generally relate to flatter land (i.e. riparian flats, terraces and both undulating terrain landforms), wetlands, and areas containing significant populations of threatened species (for example Tuhua).

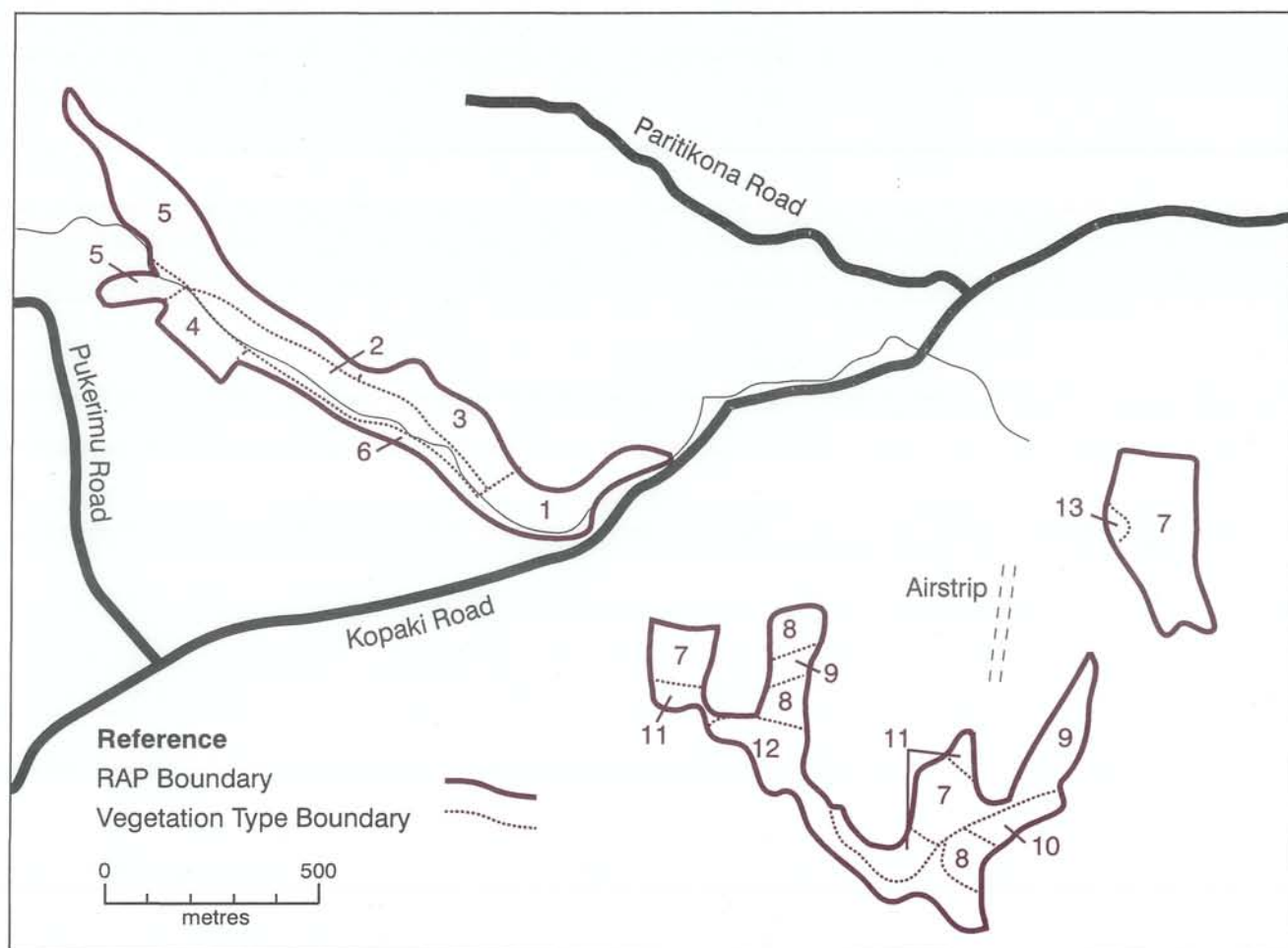
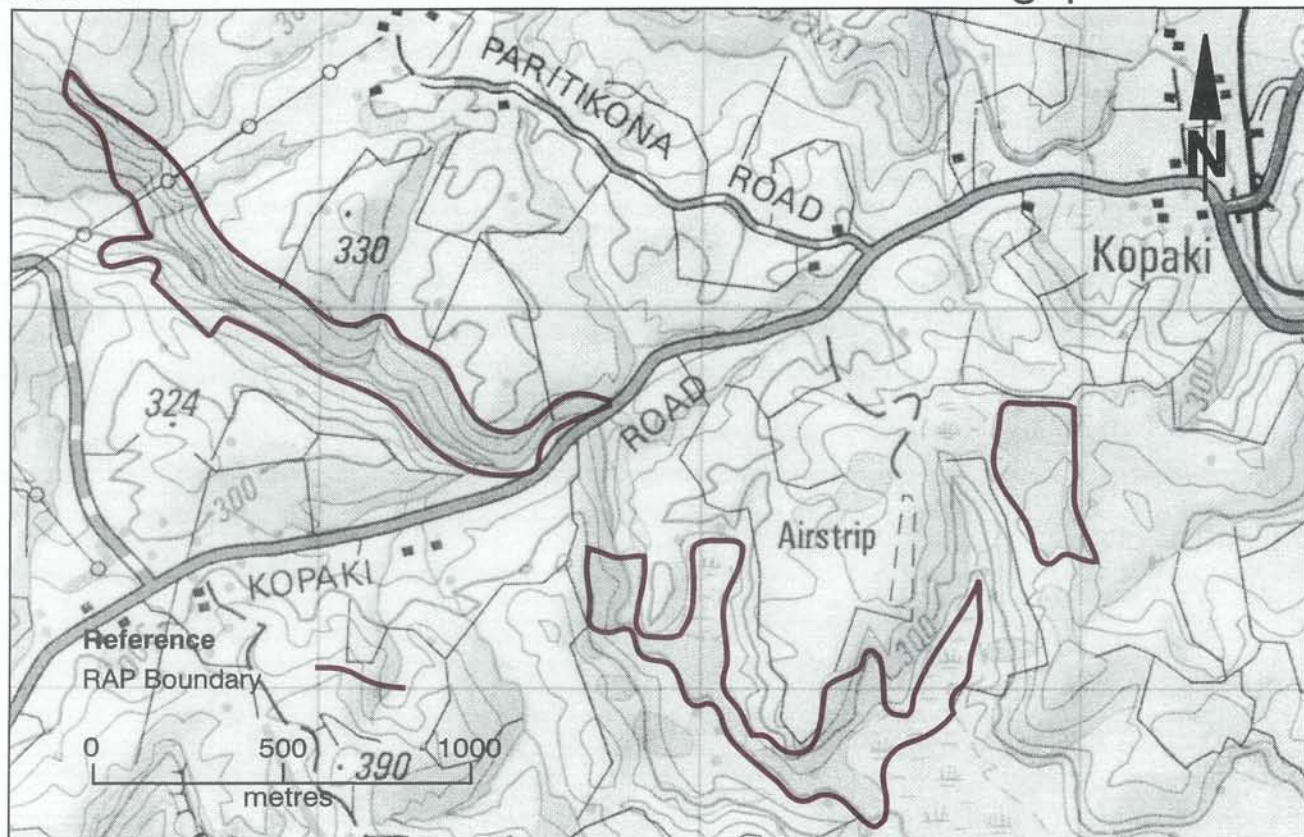
Natural areas of biotic value in Taumarunui Ecological District, as in other districts, are constantly under pressure from the activities of people, the ingress of weeds and the ravages of animal pests. Vegetation is cleared, wetlands are drained and domestic livestock have access to areas of biological significance. Commitment by both individual landowners and the wider community will be required to conserve and enhance remaining natural areas in this district.

Fencing, is essential to protect many of these areas, and weed and animal pest control may be required.

Ongoing monitoring of all natural areas is needed regardless of tenure and formal protection status as the effects of damaging agents such as weeds and goats can be insidious and early elimination can prevent subsequent uncontrollable spread. Prevention can often be a potent management tool. Ongoing control of possums, rats and mustelids is also needed to protect biological values. Natural ecosystems, once lost, are irreplaceable. The challenge facing landowners and associated agencies is to protect Taumarunui's special places and unique biodiversity for future generations to enjoy.

7. Recommended Areas for Protection

RAP 1:	Mangapehi Forest
RAP 2:	Mapara Wildlife Management Reserve Extensions
RAP 3:	Porootarao Forest
RAP 4:	Mangapehi Scenic Reserve Extension
RAP 5:	Mangataringa Stream
RAP 6:	Fife Forest
RAP 7:	Waipapa Stream Wetland
RAP 8:	Heayns Forest
RAP 9:	Gemmell Forest
RAP 10:	Mangakahu Stream
RAP 11:	Tuhua
RAP 12:	Haitana Swamp
RAP 13:	Taringamotu Swamp
RAP 14:	Picket Ridge Wetland
RAP 15:	Taringamotu River
RAP 16:	Hauhungaroa
RAP 17:	Puketapu 3A
RAP 18:	Karakia Swamp
RAP 19:	Manunui
RAP 20:	Hikumutu Stream
RAP 21:	Piriaka Lookout Forest
RAP 22:	Percy Wetland
RAP 23:	Kakahi Stream Forest
RAP 24:	Whakapapa Gorge Scenic Reserve Extension
RAP 25:	Owhango Forest
RAP 26:	Oio Road Wetland
RAP 27:	Retaruke River Terrace Forest
RAP 28:	Liley Wetland
RAP 29:	Kawautahi Stream Forest
RAP 30:	Rotokahu Scenic Reserve Extension
RAP 31:	Oio No. 1 Road Forest
RAP 32:	Sturgeon Wetland
RAP 33:	Te Rimu Station Forest
RAP 34:	Mathieson Wetland
RAP 35:	Todd Wetland
RAP 36:	Tepure Stream Forest



MANGAPEHI FOREST

RAP No.: 1

PNAP Survey No.: S17-29, S17-30

Grid Reference: NZMS260 S17 062998, 075990

Landform unit(s): Hill country-moderately steep to steep slopes; riparian flats

Area (ha) 55.4

Altitudinal Range: 200-340 m

Survey Methodology: Field survey; interpretation of 1993 aerial photographs

Conservancy: Waikato

BIOCLIMATIC ZONE	VEGETATION TYPE	LANDFORM
Lowland	1. <u>Kamahi-horoeka</u> -totara forest.	Hillslope
	2. (Rimu)-(kahikatea)/rimu-kahikatea-matai/horoeka-kamahi forest.	Toeslope, riparian flat and terrace.
	3. (Tawa)/ <u>kamahi-horoeka/wheki</u> forest.	Hillslope.
	4. <u>Tawa-rewarewa</u> forest.	Hillslope.
	5. <u>Tawa-rewarewa/kamahi</u> forest.	Hillslope.
	6. <u>Manuka</u> -kamahi-horoeka scrub.	Lower hillslope.
	7. <u>Tawa-rewarewa</u> -(kahikatea)-(rimu)-(matai) forest.	Hillslope, ridge crest
	8. <u>Manuka</u> scrub.	Riparian flat.
	9. <u>Grey willow</u> scrub.	Riparian flat.
	10. <u>Spanish heath</u> scrub.	Riparian flat.
	11. <u>Tawa-rewarewa-kamahi/wheki</u> forest.	Hillslope.
	12. <u>Kahikatea</u> forest.	Riparian flat.
	13. (Grey willow)-(hukihuki)-(manuka)/ <u>purei</u> - <i>Baumea rubiginosa</i> -swamp kiokio sedgeland.	Gully floor.

Landform

The RAP is located to the north-west of Mangapehi and Benneydale and is in two main parts. A relatively steep-sided gully occupies the west part of this RAP. The major landform is hillslope and there are associated terraces and riparian flats on the gully floor and small local bluffs on the upper hillslopes.

The eastern part of the RAP consists mainly of riparian flats, also in association with hillslopes. In the north-east of this area, the RAP extends on to a ridge crest.

Vegetation

The diverse array of vegetation types are best described in two groups: terrestrial and wetland vegetation.

Terrestrial vegetation (vegetation types 1, 2, 3, 4, 5, 6, 7, 11)

Along the terrace, riparian flat and toeslope of the gully west of Kopaki Road, modified primary forest, 18-20 m in height is present (vegetation type 2). The canopy comprises rimu, kahikatea and matai with emergent rimu and kahikatea. The understorey is open and grazed, and dominated by wheki and wheki ponga with occasional tawa poles. The shrub tier is almost absent and is generally characterised by

a few hangehange, wheki ponga, *Coprosma rhamnoides* and sapling totara and matai. The groundcover is mostly leaf litter with scattered ferns, mainly kiwikiwi and peretao.

On the northern slopes of the western gully three forest types are present. Kamahi and horoeka in association with totara, 8-10 m in height characterise the forest next to Kopaki road (vegetation type 1). In the middle section, forest with a variable, open canopy 8-10 m in height, characterised by kamahi in association with horoeka and emergent tawa is present. There are numerous canopy gaps dominated by wheki and local areas of hard fern and pasture (vegetation type 3). At the downstream end, tawa occurs in association with rewarewa forest (16-18 m in height) with gaps dominated by kamahi and local bluff areas sparsely vegetated. Kiokio is prominent on the bluffs (vegetation type 5). The understorey varies, from areas with a similar understorey to that of vegetation type 2 through to heavily grazed areas where it comprises pasture and hard fern.

On the southern slopes of the western gully are another two vegetation types. These have been heavily modified by the construction of a pipeline. There is a thin strip of scrub dominated by manuka (c.4 m in height) in association with kamahi and horoeka below the pipeline (vegetation type 6). The understorey has been disturbed by the dumping of overburden, but generally comprises manuka and Spanish heath in the shrub tier with hard fern and pasture species in the groundcover. Immediately downstream there is an area of forest 16-18 m in height, dominated by tawa with a minor element of rewarewa (vegetation type 4). The understorey is almost absent because of grazing and the slopes below the pipeline have been further disturbed by the dumping of overburden. There are occasional scattered ponga, mahoe and pole tawa in the 5-12 m tier, very occasional hangehange in the shrub tier and the groundcover is mostly leaf litter with several fern species including kiwikiwi, and occasional pikopiko, pakau and *Leptopteris hymenophylloides*.

To the east of Kopaki Road a further two forest types are present. Forest characterised by tawa in association with rewarewa and minor components of kahikatea, rimu and matai (vegetation type 7) is the most common. The canopy averages between 16-18 m in height and the understorey is generally grazed and quite open. The 2-5 m tier is characterised by dense treeferns, most commonly wheki and wheki ponga. There is almost no shrub tier and the groundcover generally comprises leaf litter with scattered kiwikiwi, pakau and rereti. Tawa, rewarewa and kamahi forest (10-12 m in height), with canopy gaps dominated by wheki, is also present (vegetation type 11). The understorey is relatively dense, with the shrub tier commonly characterised by wheki, mingimingi and *Coprosma rotundifolia*. The ferns kiwikiwi, *Leptopteris hymenophylloides* and the hookgrass *Uncinia uncinata* are common in the groundcover.

Wetland vegetation (vegetation types 8, 9, 10, 12, 13)

The manuka dominant scrub (vegetation type 8) is variable. In the east the canopy of manuka is very dense while in the western areas it is often degraded and open, with scattered purei and a ground cover dominated by adventive plants including Yorkshire fog, lotus and *Juncus articulatus*. While they have obvious differences in the composition of the canopy, the manuka scrub, grey willow scrub (vegetation type 9) and Spanish heath scrub (vegetation type 10) share similar features. There are local areas of raupo reedland, scattered purei, local patches of *Sphagnum* mainly on the margins, and a few large senescent emergent kahikatea. Pole kahikatea are common on the margins. Other species present include *Juncus gregiflorus*, *Baumea tenax*,

swamp kiokio (*Blechnum novae-zelandiae* (wetland form), *B. minus* of New Zealand authors), *Carex maorica*, Yorkshire fog and lotus. There are grey willow saplings in both the manuka and Spanish heath scrub.

The kahikatea forest (vegetation type 12) is secondary, with a very high density of stems, most of which are less than 20 cm dbh. There are minor components of rimu and matai in the canopy and throughout the majority of the area an understorey is present. Subcanopy trees are relatively common and include pole totara, kahikatea and tawa. The shrub tier is dominated by a thick layer of *Gabnia* sp. which shows extensive signs of grazing damage. Seedlings are abundant in the groundcover and include putaputaweta, hukihuki, pokaka and rohutu but there is almost no fern or herb component. Where the forest thins to a narrow strip, the canopy becomes quite fragmented, with no indigenous understorey and a ground cover of pasture species.

There is a small area of wetland in the most eastern part of the RAP (vegetation type 13). It is characterised by scattered grey willow, hukihuki and manuka emergent over sedgeland which is dominated by purei in association with *Baumea rubiginosa* and swamp kiokio. Spearwort and *Galium palustre* are common in the groundcover and there is an area of open water present.

Flora

Only typical species were noted.

Fauna

Common birds included paradise shelduck, fantail, grey warbler, kingfisher and Australasian harrier.

Threat/Modification

Grazing by livestock and feral goats is degrading the understorey and inhibiting regeneration. Fencing of the RAP, exclusion of stock, and control of goats is recommended. Grey willow is a threat to the structure and composition of the low statured wetland vegetation and should be controlled.

Construction of a pipeline has disturbed vegetation on the south face of the gully west of Kopaki Road but there is unlikely to be further significant vegetation disturbance from this source. A weir being constructed across Mangapehi Stream may affect the hydro-dynamics of the wetland vegetation east of Kopaki Road.

Justification

Both forest and wetland vegetation on the riparian flats landform unit has been greatly reduced in extent, for example only 5.8% of the 1840 forest cover remains. They are also under-represented in the current protected areas network (for example protected indigenous forest accounts for only 1.6% of the riparian flats landform unit). This RAP contains one of the largest and most natural examples of forest and wetland communities on the riparian flats landform unit. It is one of five RAPs to include wetland on the riparian flats landform unit (the others being RAPs 13, 14, 18 and 21), and contains the second largest example of this ecological unit. There are currently no protected examples of wetlands on the riparian flats landform unit within the ecological district.

On the hill country - moderately steep to steep slopes landform unit, the vegetation provides a contiguous sequence and acts as a buffer to the wetland areas. The wetland on the ridge is a relatively natural example of wetland on the hill-country - moderately steep to steep slopes landform unit and is contiguous with the surrounding forest. There are currently no protected examples of wetland on this landform unit, and this RAP is one of three covering this ecological unit (the others being RAPs 7 and 12).

MAPARA WILDLIFE MANAGEMENT RESERVE
EXTENSIONS

RAP No.: 2

PNAP Survey No.: S17-9, 10, 16, 18, 19, 25, 26

Grid Reference: NZMS260 S17 059959, 063965, 085939, 110940, 073926,
106876

Landform unit(s): Hill country-moderately steep to very steep slopes

Area (ha) 367.9

Altitudinal Range: 260-561 m

Survey Methodology: Field survey

Conservancy: Waikato

BIOCLIMATIC ZONE	VEGETATION TYPE	LANDFORM
Lowland	1. <u>Tawa</u> -totara-rewarewa-(rimu) forest.	Hillslope, gully.
	2. <u>Wheki</u> -mahoe-horoeka-manuka-putaputaweta scrub.	Hillslope, gully.
	3. <u>Kamahi</u> -tawa-rewarewa-(rimu)-(hinau) forest.	Hillslope.
	4. <u>Tawa</u> -kamahi-rewarewa forest.	Hillslope.
	5. (Rimu)/ <u>tawa</u> -rimu-rewarewa forest.	Spurs, hillslope, plateau.
	6. (Rimu)-(totara)-(kahikatea)/ <u>rimu-totara</u> forest.	Terrace.
	7. <u>Kahikatea</u> -rimu-totara-black maire forest.	Stream gully, hillslopes.
	8. (Rewarewa)/(houhere)-(tawa)/ <u>wheki</u> scrub ⇒ rank pasture.	Ridges, spurs, gullies.

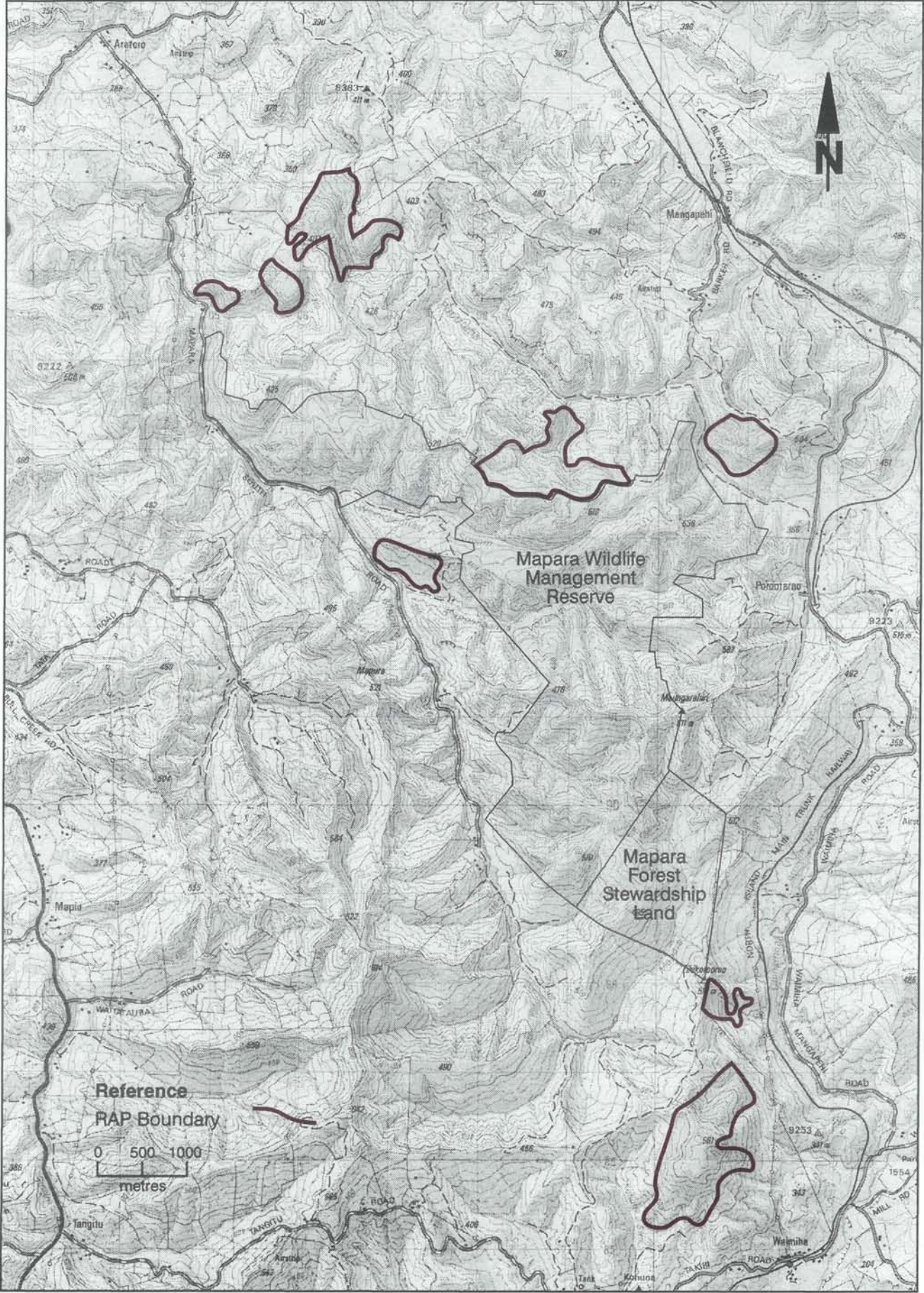
Landform

This RAP comprises several disjunct areas, either connected to or very close to Mapara Wildlife Reserve in the north-west of the Taumarunui Ecological District, predominantly characterised by hillslope dissected by several gullies, most of which have small streams flowing along the gully floor.

Vegetation

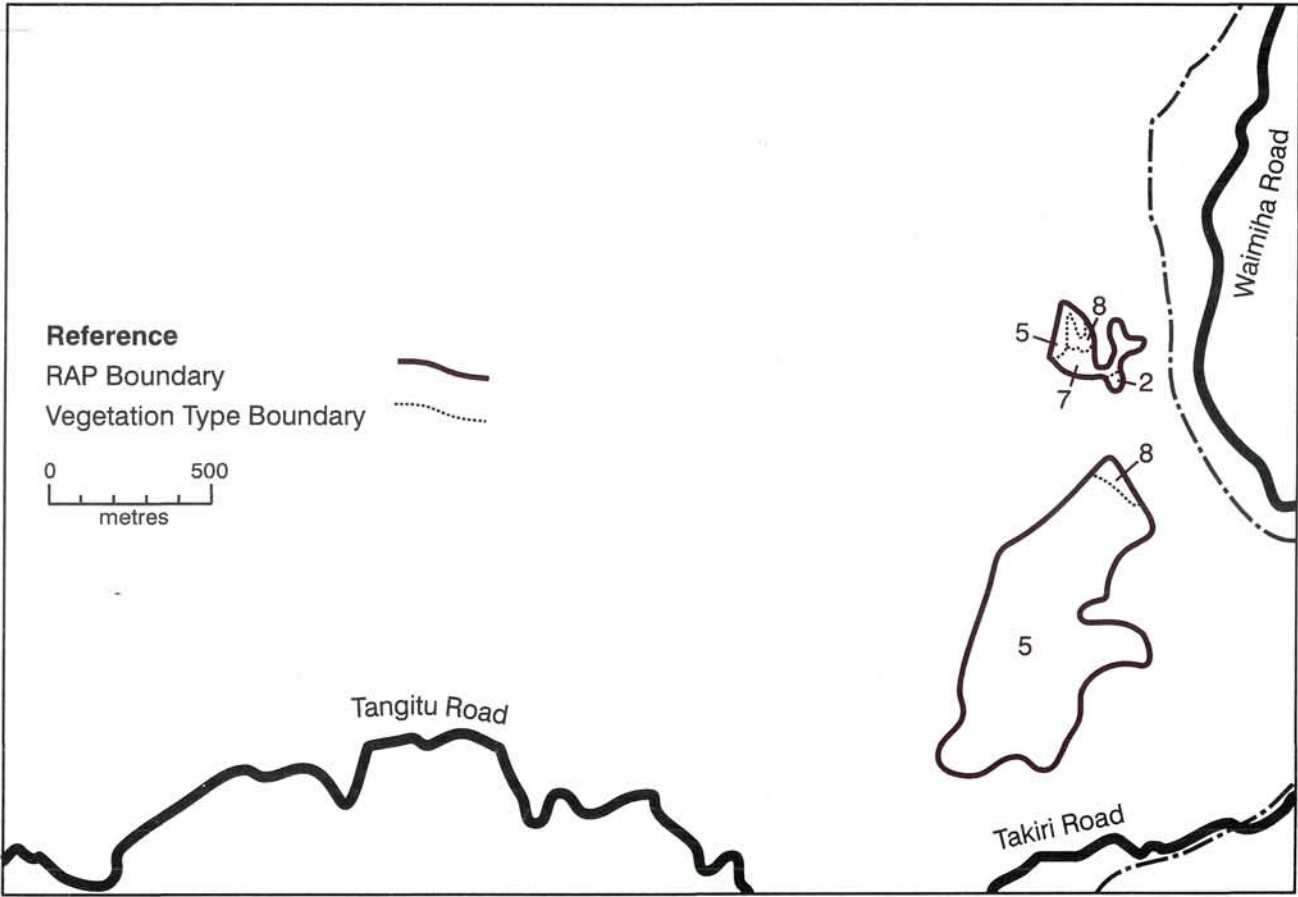
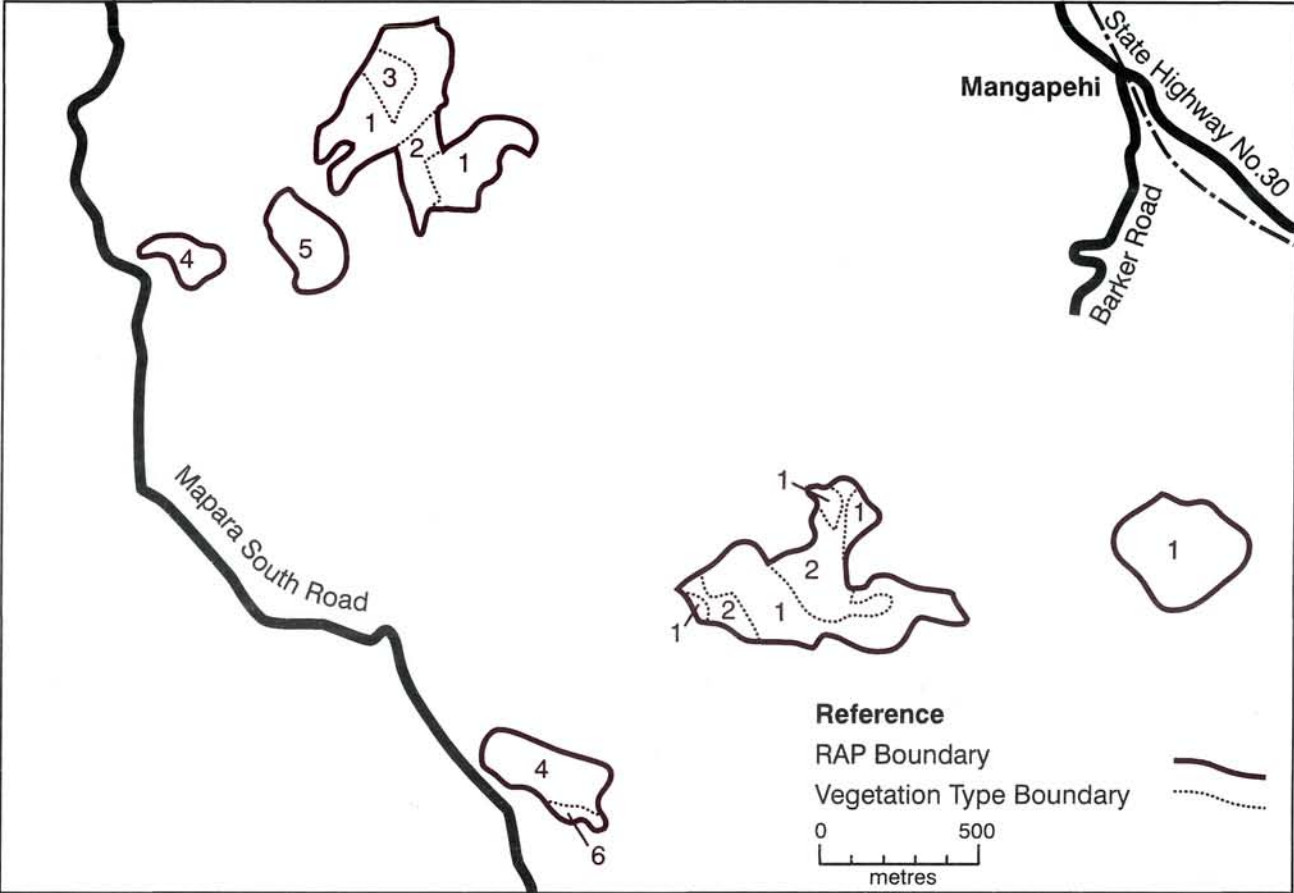
Secondary forest, mainly comprising tawa with less abundant rewarewa and totara and a minor rimu component (vegetation type 1) is common in the northern parts of the RAP. The canopy is generally between 18-20 m, and there are minor elements of hinau, kahikatea and matai. In some areas, totara and rimu are locally abundant on the ridge crests, while in gullies and on lower slopes there are local areas of kamahi, wheki, makomako and mahoe scrub. In areas that are open to grazing, the understorey is sparse, with almost no shrub tier. Treeferns, including katote and wheki with less abundant mamaku and ponga are common in the subcanopy in association with occasional pole totara, mahoe and porokaiwhiri. The groundcover is dominated by leaf litter with occasional *Metrosideros diffusa*, mahoe seedlings and several ferns including kiwikiwi and rereti. In small steep gullies there is more abundant groundcover, with additional species present including peretao and pakau, and

RAP 2 Mapara Wildlife Management Reserve Extension



RAP 2

Mapara Wildlife Management Reserve Extension



occasional young saplings, including pate, *Coprosma rotundifolia* and rangiora. In areas that are not grazed, the subcanopy is generally similar to the grazed areas. However, the shrub tier, whilst still sparse, shows signs of regeneration with saplings of tawa, porokaiwhiri, putaputaweta and horoeka and young treefern. The groundcover is also sparse and generally similar to the grazed areas but seedlings including tawa, miro, rewarewa and porokaiwhiri are common.

Wheki dominant scrub with mahoe, horoeka, putaputaweta and manuka (vegetation type 2) covers previously cleared areas. The canopy is generally 2-4 m and the relative mix of species varies, with local areas of almost pure wheki. Kamahi, mahoe and putaputaweta are locally abundant in some gullies. In the upper catchment of the area contiguous with the northern end of the Mapara Wildlife Management Reserve, rewarewa and tawa are commonly emergent. The understorey is quite dense with young wheki and saplings of mahoe, totara, makomako, hangchange and putaputaweta in the shrub tier. The groundcover mostly comprises leaf litter with scattered ferns, mainly pakau, kiwikiwi and petipeti.

In the northern area of the RAP, there is a local area of secondary forest dominated by kamahi with less abundant tawa and rewarewa and minor components of rimu and hinau (vegetation type 3).

Tawa dominant forest to c. 14 m with abundant kamahi and rewarewa occurs on heavily logged sites adjacent to Mapara South Road (vegetation type 4). Scattered rimu and matai are emergent on the upper slopes. The subcanopy comprises hinau, titoki and tawa over a middle tier of mahoe, porokaiwhiri and ponga. Wheki is dominant in canopy gaps. The ground cover is characterised by leaf litter, pakau and *Leptopteris hymenophylloides*. In heavily grazed areas there is no ground cover vegetation.

A similar but less modified forest type occurs on steep, less accessible hillslopes. Emergent rimu to c. 24 m in height occurs over tawa dominant canopy to c. 16 m (vegetation type 5). Rimu and rewarewa commonly occur in the canopy. Hinau, tawa, kamahi and porokaiwhiri are common subcanopy components over mahoe, young tawa, ponga and *Coprosma rhamnoides*. Wheki occurs in canopy gaps. *Metrosideros diffusa*, kiwikiwi and hooked sedges form a sparse ground cover with little regeneration. Stream gullies and steep banks are characterised by makomako and other broadleaved species in a mosaic, with wheki treefernland in canopy gaps.

A small area of secondary podocarp forest occurs on a terrace of the Mapara Stream in a mosaic with rank pasture (vegetation type 6). Emergent rimu, totara, and kahikatea trees from the original canopy cover occur over secondary, pole totara dominant, forest to c. 18 m in height. Rimu is also common in the canopy with scattered tawa. Middle tiers comprise pole totara in association with a variety of broadleaved species including horoeka, houhere, putaputaweta, as well as *Raukaua anomalus*, *Coprosma rhamnoides* and wheki ponga. Stream bank vegetation consists of a dense cover of the same broadleaved species with local kiokio. The ground cover generally comprises seedling kamahi, kiwikiwi and hooked sedges with local waewaekoukou. Rank pasture occurs in small clearings where stock graze intermittently. Patches of hard fern, bracken and dense blackberry thickets are locally scattered.

Remnant podocarp forest occurs in two stream gullies and adjacent hillslopes on sites at the southern end of Mapara Wildlife Management Reserve (vegetation type 7). Kahikatea and rimu dominant forest forms an open canopy (to c. 24 m in height) in association with totara and black maire. Hinau and tawa are common in the

subcanopy over wheki, totara and a diverse range of broadleaved species including whauwhaupaku, horoeka, pate, pokaka and houhere. Ground cover is generally sparse with scattered kiwikiwi and tawa seedlings.

Wheki dominant scrub with scattered emergent rewarewa, houhere, tawa and hinau (vegetation type 8) extends over ridge spurs and gullies adjoining Mapara Wildlife Management Reserve to the adjacent RAP.

Flora

Only typical species were noted.

Fauna

This RAP provides territories (food and nesting sites) for North Island kokako (category 'B' threatened species; Molloy and Davis 1994). North Island kokako are known to be present, or have been recently present in several of the areas recommended for protection (P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 1999). North Island kokako were heard in the parts of the RAP contiguous with the southern boundary of Mapara Wildlife Management Reserve.

Long-tailed bats, a category 'B' priority species for conservation management, are present in Mapara Wildlife Management Reserve and may utilise these areas for feeding and roosting.

At least 3 pairs of karearea (category 'B' priority species for conservation management) are present in the Mapara Wildlife Management Reserve and surrounding environs (P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 2000).

Kereru, Australasian harrier and common forest birds, including shining cuckoo, tui, silvereye, grey warbler, and pied tit are present.

Threat/Modification

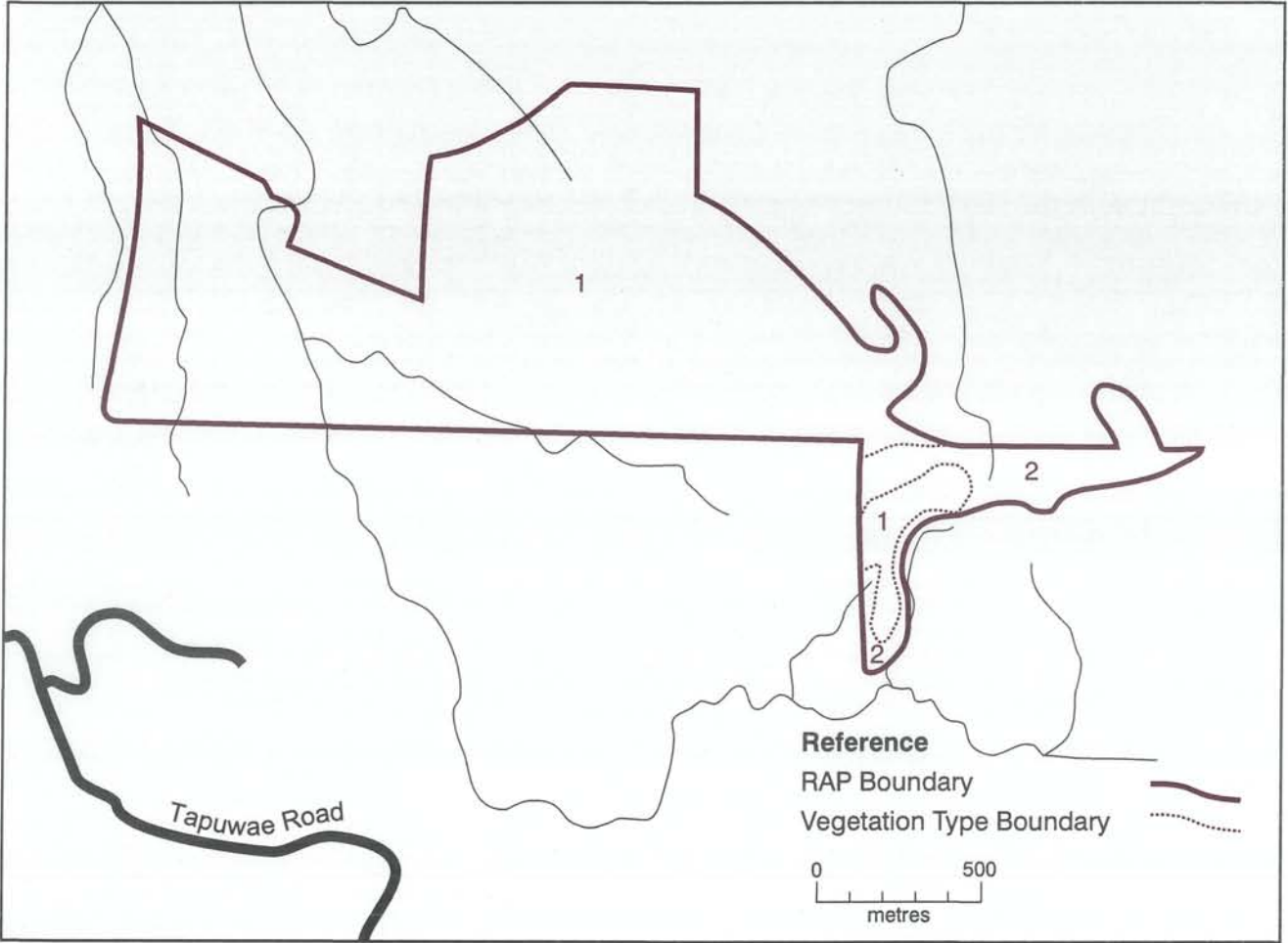
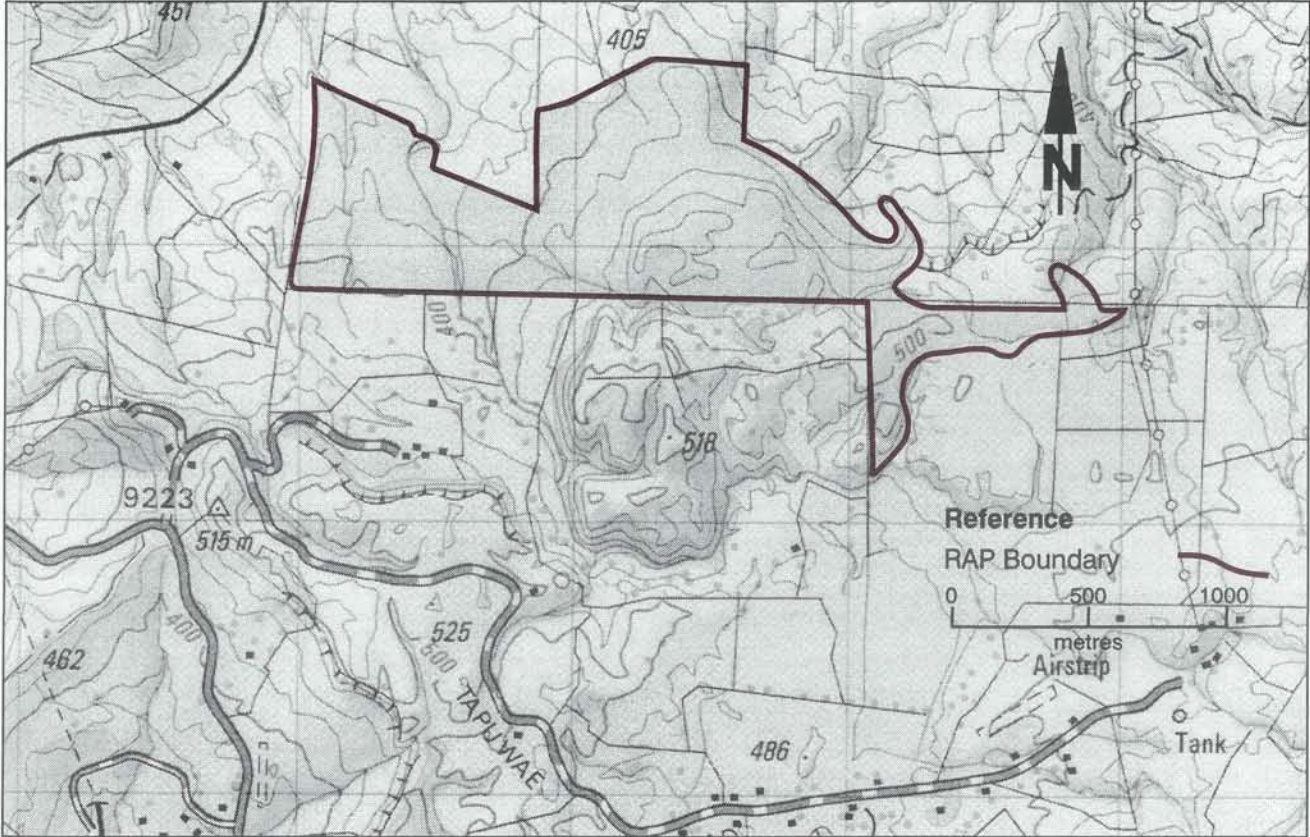
Grazing occurs in several areas and has resulted in a decrease in the abundance and diversity of understorey species. It is recommended that all areas are fenced and stock excluded. Goats and possums are controlled currently, although recent possum sign was abundant in some locations. The ongoing control of predators and browsers (already undertaken by DOC in some parts of this RAP; P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 1999) is necessary if North Island kokako are to successfully utilise the RAP.

Justification

This RAP comprises several areas of secondary forest with minor components of scrub which provide territories for North Island kokako, and will allow for an expansion in the population. This RAP is complementary to Mapara Wildlife Management Reserve, and several of the areas are contiguous with this reserve. Mapara is one of 23 key management sites identified in the North Island Kokako Recovery Plan 1999-2009, necessary to improve the status of North Island kokako by 2020 (Innes and Flux 1999).

Reference

Bradfield and Flux 1996



POROOTARAO FOREST

RAP No.: 3
PNAP Survey No.: S17-20
Grid Reference: NZMS260 S17 140930
Landform unit(s): Hill country-gently rising hillslopes; undulating terrain - minor plateaus
Area (ha) 144
Altitudinal Range: 380-500 m
Survey Methodology: Field inspection
Conservancy: Waikato

BIOCLIMATIC ZONE	VEGETATION TYPE	LANDFORM
Lowland	1. <u>Tawa</u> -rewarewa-kamahi-(rimu) forest.	Hillslopes.
	2. (Rimu)/ <u>rimu-tawa</u> forest	Plateau.

Landform

Gently rising hillslopes and a small plateau area immediately south-west of Benneydale.

Vegetation

This RAP largely comprises tawa dominant forest in association with rewarewa, kamahi, scattered titoki and rimu. There are scattered emergent rimu, matai, kahikatea, and very occasional northern rata (vegetation type 1). The majority of the RAP has been fenced for over 30 years resulting in the development of a good understorey. Tawa dominates the subcanopy over a shrub tier comprising abundant wheki, kareao (supplejack), and *Metrosideros diffusa*. Makomako is locally common on damp sites. Ground cover is generally characterised by a thick leaf litter with numerous tawa, porokaiwhiri and titoki seedlings, hooked sedges, kiwikiwi, and bush rice grass. Several fern species including rereti, pakau and mouku, are abundant on wetter sites.

The plateau area on the south-east of the site has been heavily logged, and comprises forest dominated by tawa and secondary rimu with very occasional emergent rimu (vegetation type 2).

Flora

Only typical species were noted.

Fauna

Two category 'B' priority species for conservation management) are known to occur in the general area of the RAP (P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 2000). Karearea have been seen flying over the forest, and it is likely that long-tailed bats are present as they have been located very close to the RAP.

Australasian harrier, kereru, pied tit and common forest birds including kingfisher, grey warbler, tui, bellbird, and silvereye are present.

Threat/Modification

The landowners are controlling goats currently by shooting. Ferrets have been reported from the RAP (K. New, landowner pers. comm. 1999). It is recommended that goat control is ongoing and that attempts be made to control ferrets.

Justification

This RAP contains the best quality representative example of unprotected indigenous forest on the undulating terrain - minor plateaus landform unit in the district. It is one of only three remaining areas of indigenous forest on the gently rising slopes and undulating terrain - minor plateaus landform unit in the Taumarunui Ecological District. Forest on the undulating terrain - minor plateaus landform unit, in particular, has been greatly reduced in extent, with only 2.6% of the estimated 1840 forest cover remaining.

MANGAPEHI SCENIC RESERVE EXTENSION

RAP No.:	4
PNAP Survey No.:	S17-22
Grid Reference:	NZMS260 S17 175935
Landform unit(s):	Hill country - moderately steep to steep slopes: undulating terrain - minor plateaus
Area (ha)	223.1
Altitudinal Range:	340-600 m
Survey Methodology:	Field inspection
Conservancy:	Waikato

BIOCLIMATIC ZONE	VEGETATION TYPE	LANDFORM
Lowland	1. <u>Rimu</u> -(totara)/ <u>tawa</u> -rimu forest.	Hillslopes.
	2. <u>Tawa</u> -rewarewa-kamahi-(rimu)-(hinau) forest.	Hillslopes.
	3. <u>Tawa</u> forest.	Plateau.

Landform

This RAP occurs predominantly on moderately steep hillslopes with a small part on a minor plateau. Several small streams dissect the site and flow into the Mangapehi River immediately south-east of Benneydale.

Vegetation

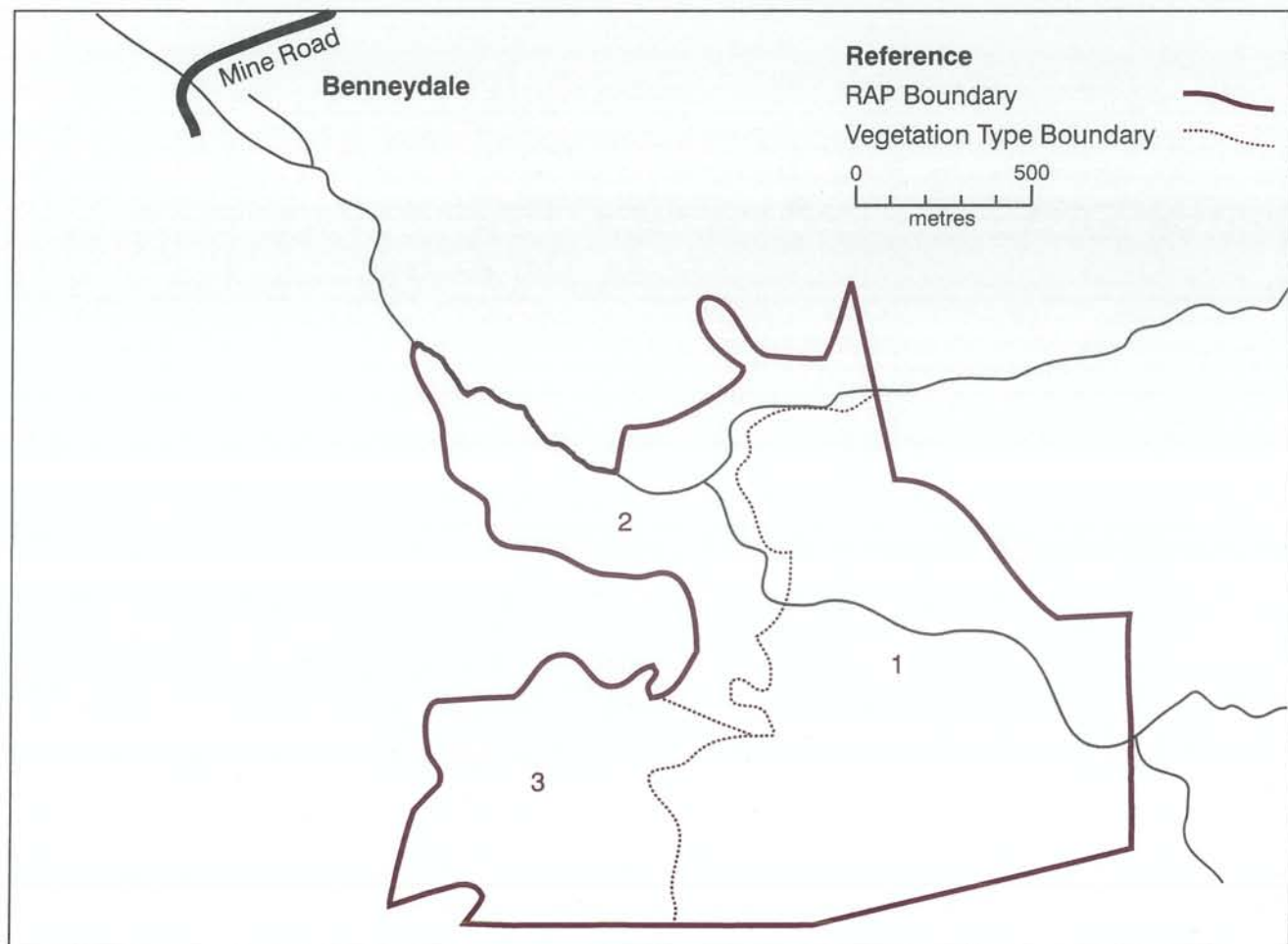
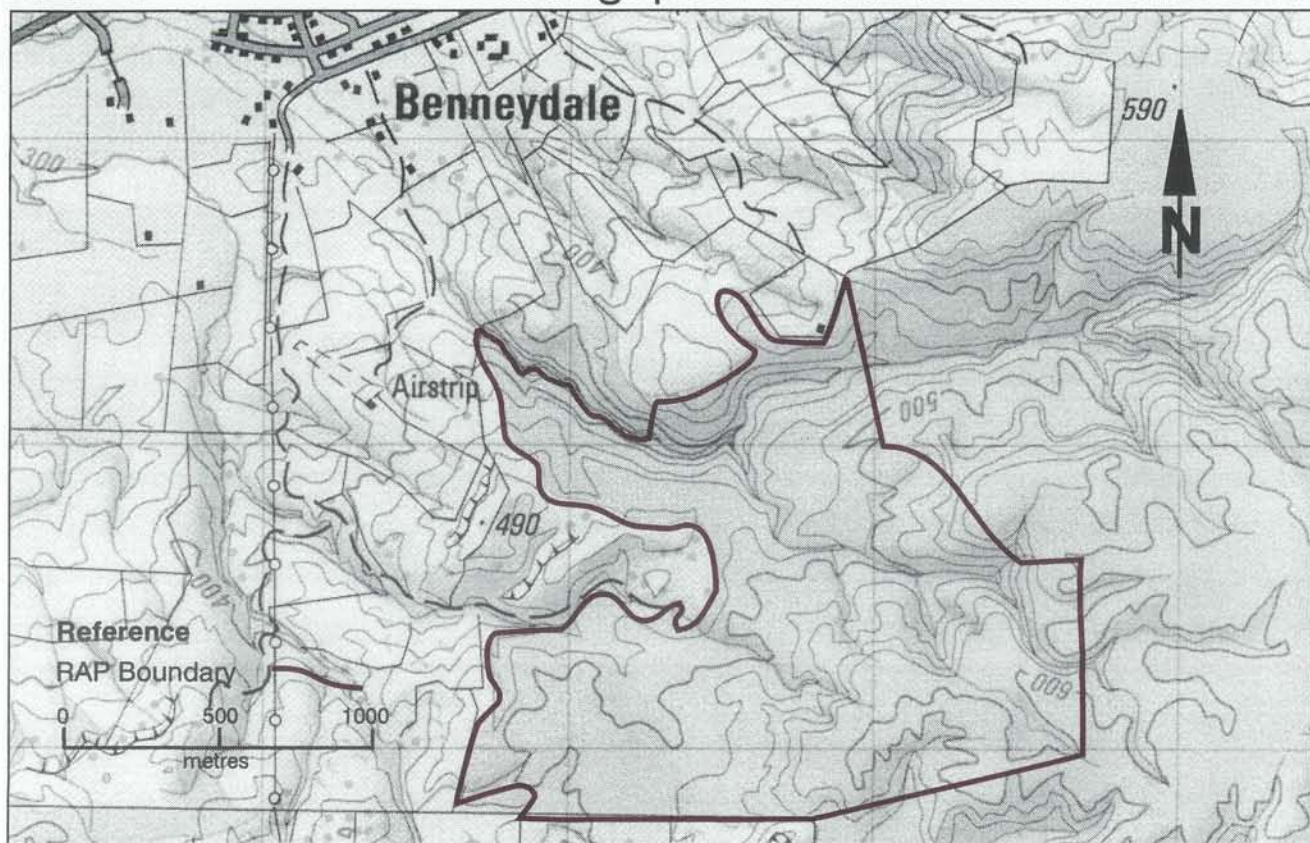
The upper hillslopes largely retain their original forest cover, comprising tawa in association with rimu and scattered matai and miro (vegetation type 1). The canopy is up to c.22 m and emergent rimu are locally abundant along with scattered totara and occasional northern rata. Hinau, tawa and scattered rimu occur in the subcanopy with locally common kamahi.

Tawa up to c.18 m in height dominates the canopy on lower slopes in association with abundant rewarewa and kamahi. There are scattered rimu and hinau, and a very few remnant emergent kahikatea, rimu and totara. The subcanopy comprises abundant tawa in association with rewarewa, wheki and ponga. Wheki occurs with makomako in stream gullies and recently disturbed sites (for example logging skid sites). Ground cover generally comprises deep leaf litter with locally scattered kiwikiwi, hooked sedges and seedling tawa (vegetation type 2).

The small area of forest on the undulating terrain - minor plateaus landform unit in the south western corner of the RAP was heavily logged in 1962. The canopy is almost entirely comprised of tawa with occasional rewarewa and rimu (vegetation type 3).

Flora

Only typical species were noted.



Fauna

Two category 'B' priority species for conservation management) are known to occur in the general area of the RAP (P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 2000). Karearea have been seen flying over the forest, and it is likely that long-tailed bats are present as they have been located very close to the RAP.

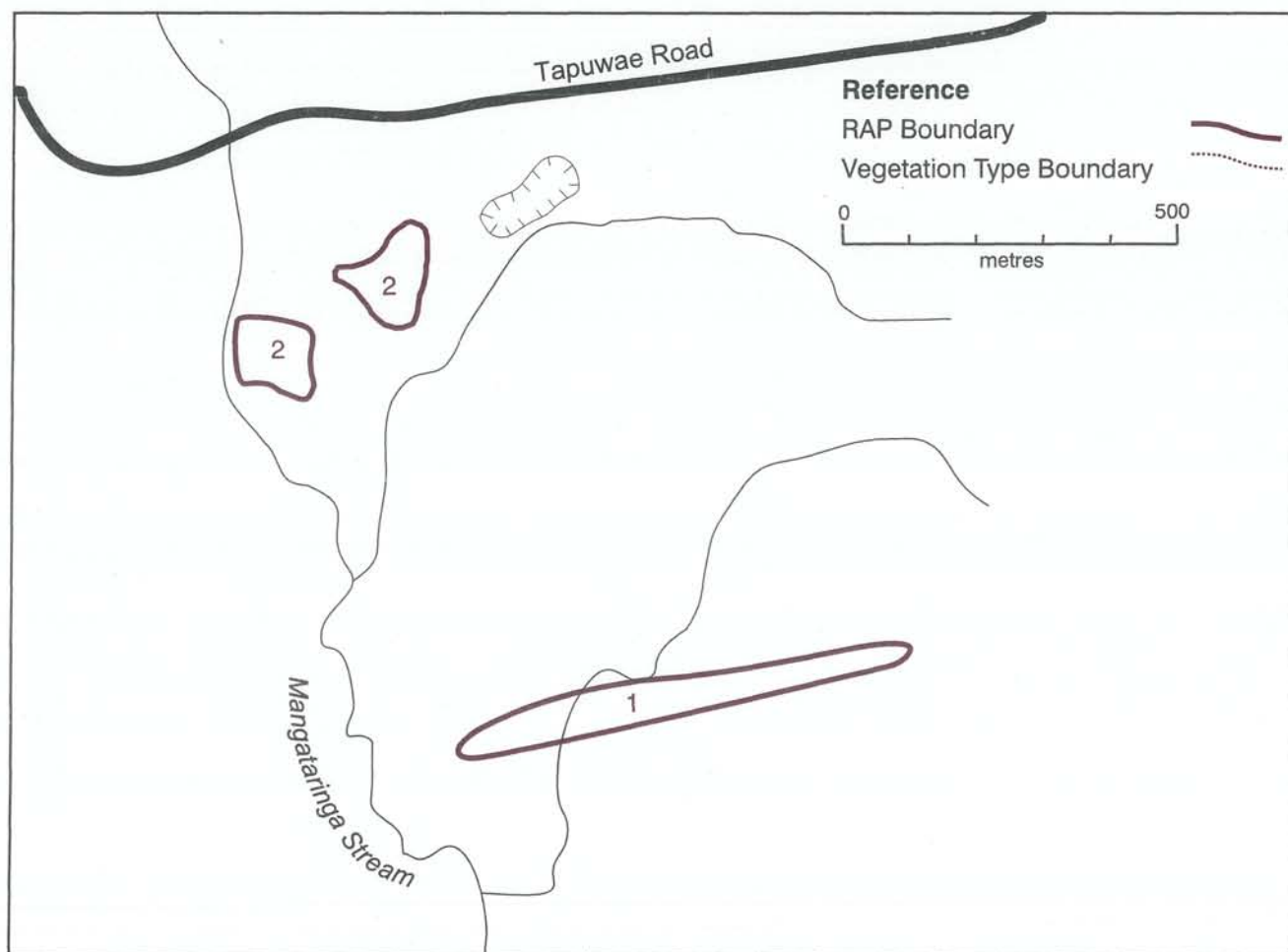
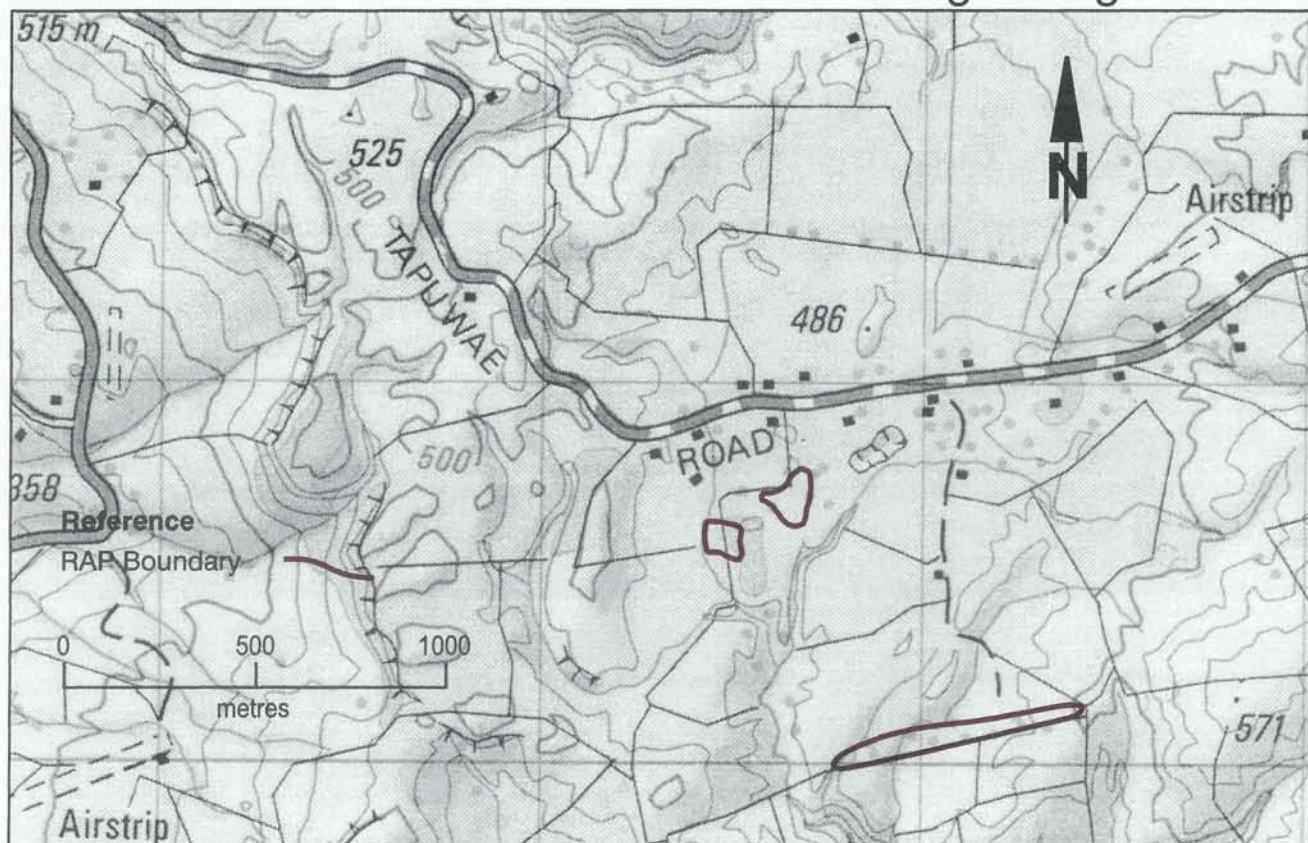
Common forest birds including grey warbler, tui, and fantail were noted.

Threat/Modification

Feral goats occur in moderate density and stock graze into the forest from adjacent, unfenced paddocks, resulting in a reduction in the diversity and abundance of understorey species. This can alter the structure and composition of a forest over the long term by restricting the regeneration of palatable species.

Justification

This RAP is the largest remaining area of indigenous forest on the undulating terrain - minor plateaus landform unit in the Taumarunui Ecological District. At present only 10 ha, or less than 1% of the undulating terrain - minor plateaus landform unit, is represented in the protected areas network, all of which occurs in the adjoining Mangapehi Scenic Reserve. The RAP is contiguous with and complementary to Mangapehi Scenic Reserve.



MANGATARINGA STREAM

RAP No.: 5
PNAP Survey No.: S17-38
Grid Reference: NZMS260 S17 145906
Landform unit(s): Undulating terrain - minor plateaus
Area (ha) 8.8
Altitudinal Range: +/-480 m
Survey Methodology: Field inspection
Conservancy: Waikato

BIOTIC ZONE	VEGETATION TYPE	LANDFORM
Lowland	1. <u>Tawa-totara-rimu-kahikatea-kamahi</u> treeland.	Rolling flats.
	2. <u>Totara-rimu-kahikatea</u> forest.	Rolling flats.

Landform

Gently rolling flats south of Benneydale.

Vegetation

Tawa in association with totara, rimu, kahikatea and kamahi forms an open treeland, 14-18 m in height, with the groundcover dominated by pasture. To the north, there are two small stands of forest, remnants of the primary forest cover, which are characterised by totara and rimu in association with kahikatea. The canopy is c.20 m and there are local, dense areas of pure rimu. The understorey is sparse, with horopito and wheki ponga present, and there is no small shrub tier. The ground cover comprises leaf litter with occasional kiwikiwi.

Flora

This RAP contains the only known population within the Taumarunui Ecological District of *Ileostylus micranthus* (a native mistletoe classed as 'nationally uncommon', subcategory 'declining'; de Lange *et al.* 1999). The mistletoe population occurs on two or three totara in the tawa dominated treeland, and is healthy and vigorous. No mistletoe was found during a brief inspection of the two northern stands, and previous surveys of this area have also failed to locate populations (F. Taplin, landowner pers. comm. 1999).

Fauna

Common forest birds were noted including fantail and shining cuckoo.

Threat/Modification

Livestock grazing has removed most of the understorey in the forest stands and is inhibiting regeneration. It is recommended that the forest stands be fenced and livestock excluded. Possum are controlled by the landowner but if control operations

should cease, possum browse would pose a serious threat to the mistletoe population. Ongoing possum control is therefore essential for the future health and survival of the mistletoe. The treeland is quite open and banding of host trees to inhibit possum access may be an effective control measure.

The lack of regeneration in the treeland poses a long term threat to the mistletoe population. As the present totara population ages and dies, no new host trees will become available to mistletoe. Options available to mitigate against this eventuality include fencing the treeland and excluding stock to allow regeneration. Active management of the area after fencing, such as the planting of particular host tree species, could also be considered. Alternatively, the forest stands to the north, if fenced and allowed to regenerate, would provide a good population of host trees. If natural colonisation of this area by mistletoe does not occur, then intervention to establish a population would need to be undertaken. This could also be an option in the area of scrub and treeland to the south of the RAP. However, a survey to establish the presence of suitable host species would need to be undertaken.

Justification

Indigenous forest on the undulating terrain - minor plateaus landform unit has been greatly reduced in extent in the ecological district. Only 2.6% of forest on the undulating terrain - minor plateaus landform unit remains, and less than 1% of this landform unit is represented in the existing reserve network. The RAP contains a representative example of this much reduced ecological unit. It differs from the two other RAPs (3 and 4) on this landform unit, in that the forest canopy is dominated by podocarps in the northern two forest stands, whereas the canopies of the other two RAPs contain significant proportions of tawa.

The conservation value of this RAP is further enhanced by the presence of *Ileostylus micranthus* (classified as 'nationally uncommon', subcategory 'declining'; de Lange *et al.* 1999). This is the only known population of this species in the ecological district.

References

de Lange and Norton (eds), 1997.

FIFE FOREST

RAP No.: 6
PNAP Survey No.: R18-07
Grid Reference: NZMS260 R18 864645
Landform unit(s): Riparian flats
Area (ha) 10.4
Altitudinal Range: 160-180 m
Survey Methodology: Field inspection
Conservancy: Waikato

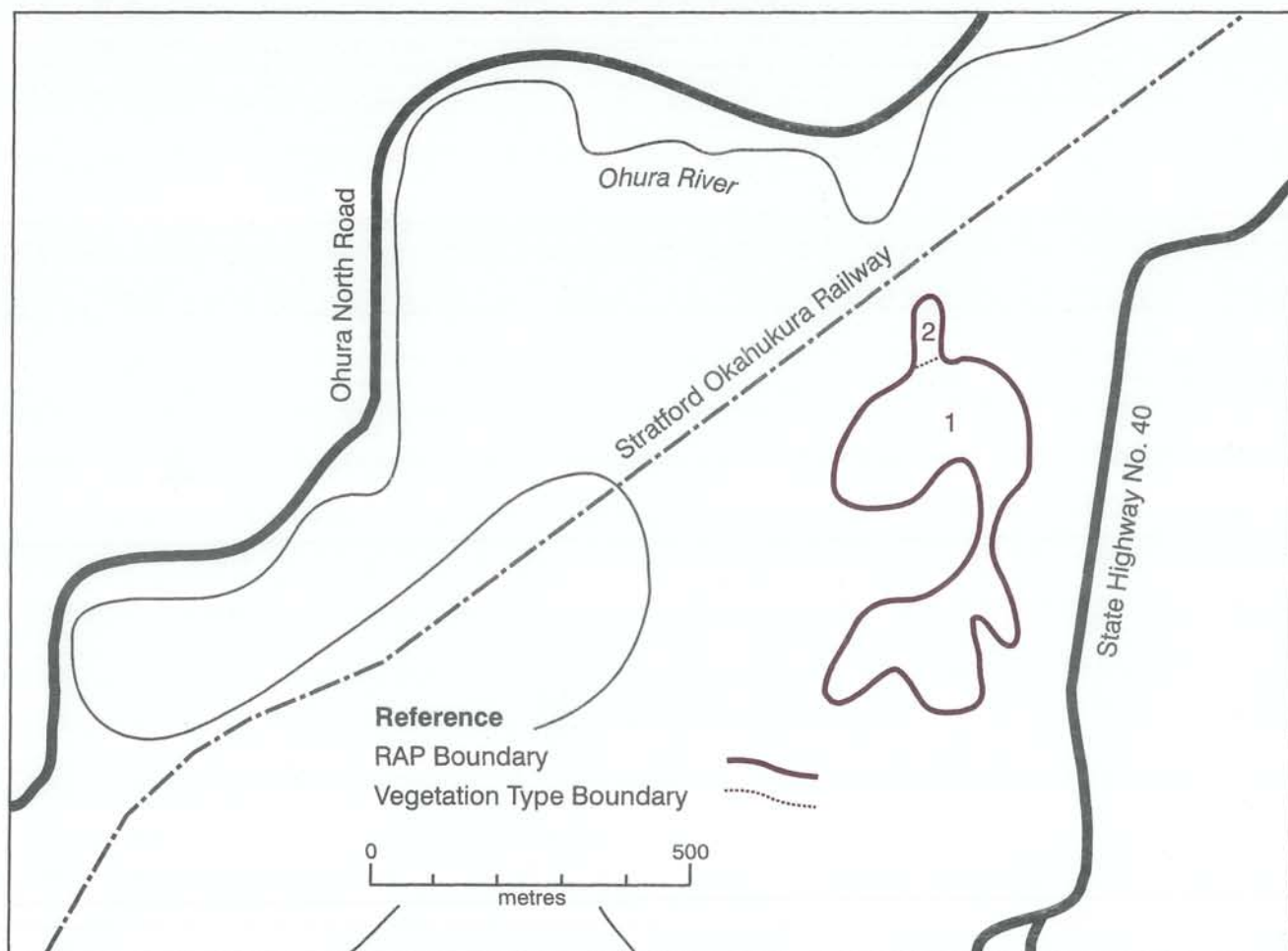
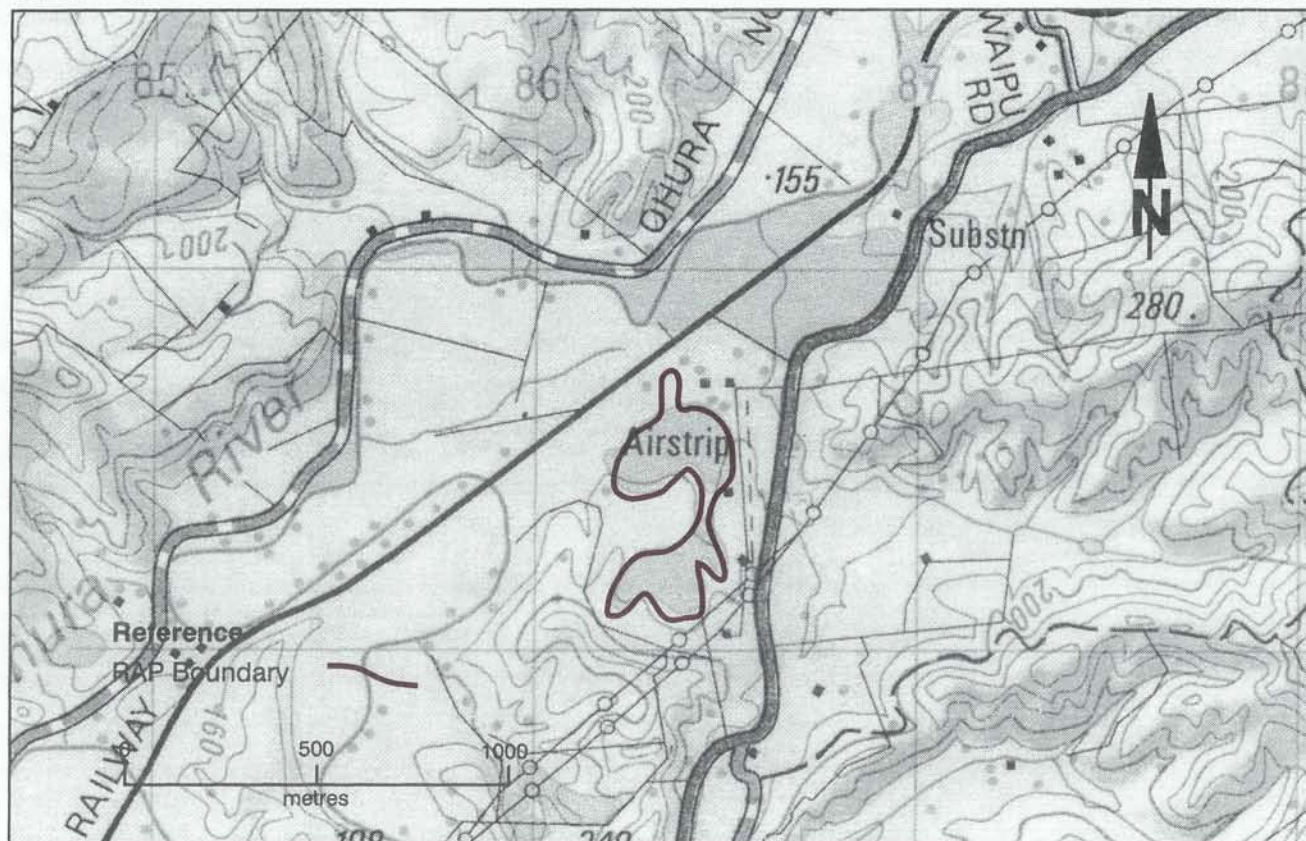
BIOCLIMATIC ZONE	VEGETATION TYPE	LANDFORM
Lowland	1. (Rimu)-(kahikatea)/ <u>kahikatea</u> -tawa forest.	Riparian flat and gently rolling hillslope.
	2. (Kahikatea)-(willow)/hukihuki/ <u>taupo</u> -purei reedland.	Riparian flat.

Landform

Located near the western edge of Taumarunui Ecological District, north-east of Ohura. This RAP is mostly on gently rolling lower hillslopes, grading into riparian flat in the north. A small stream flows through the forest and drains into the reedland in the north.

Vegetation

The vegetation is predominantly secondary forest 18-20 m in height, probably established following logging. There are occasional large remnant emergent trees from the primary forest cover. The original surveyor's maps show rimu, matai and kahikatea forest on the flats in the general vicinity (J. Fife, landowner pers. comm. 1999). The present canopy consists of occasional large rimu and kahikatea, emergent over a dense canopy of kahikatea in association with tawa. In the northern part of the site where the forest extends on the riparian flat, there are no emergent trees and the canopy comprises almost pure kahikatea. The understorey is variably modified by grazing. Regeneration is hindered by grazing and where the grazing pressure is high, generally closer to the margins and on flatter areas, the ground is mostly bare with a sparse cover of kiwikipi. Numerous seedlings of mahoe, taurepo, kaikomako and *Coprosma rotundifolia* showed signs of grazing damage and there were very few saplings of these species. However, there were numerous young poles (>2 m tall) of rimu, matai, miro and tawa, suggesting that grazing pressure may have increased in more recent times. The shrub tier varies in composition and density, but is generally characterised by a mix of *Coprosma rotundifolia*, *C. areolata*, *Raukawa anomalus* and poataniwha. Areas that are not subject to high grazing pressure have a higher density of shrubs and a greater abundance and diversity of ferns, particularly mouku, *Leptopteris hymenophylloides* and pakau. Other species present in areas not subject to high grazing pressure include hinau, kowhai, ramarama and manatu.



The wetland extending out from the forest at the northern end of the RAP is dominated by dense raupo in association with purei and scattered emergent hukihuki, taller kahikatea, willow, occasional koromiko and ti kouka. *Carex geminata*, *Juncus gregiflorus* and *J. effusus* occur around the margins.

Flora

Only typical species were noted.

Fauna

Spotless crane were heard calling in the raupo and other wetland birds, including pukeko, paradise shelduck and welcome swallow were noted. Kereru and common forest birds, including tui, fantail, grey warbler and shining cuckoo were present. Morepork were reported present and a bat flew into the homestead adjacent to the RAP 3-4 years ago (Mrs Fife, landowner pers. comm. 1999).

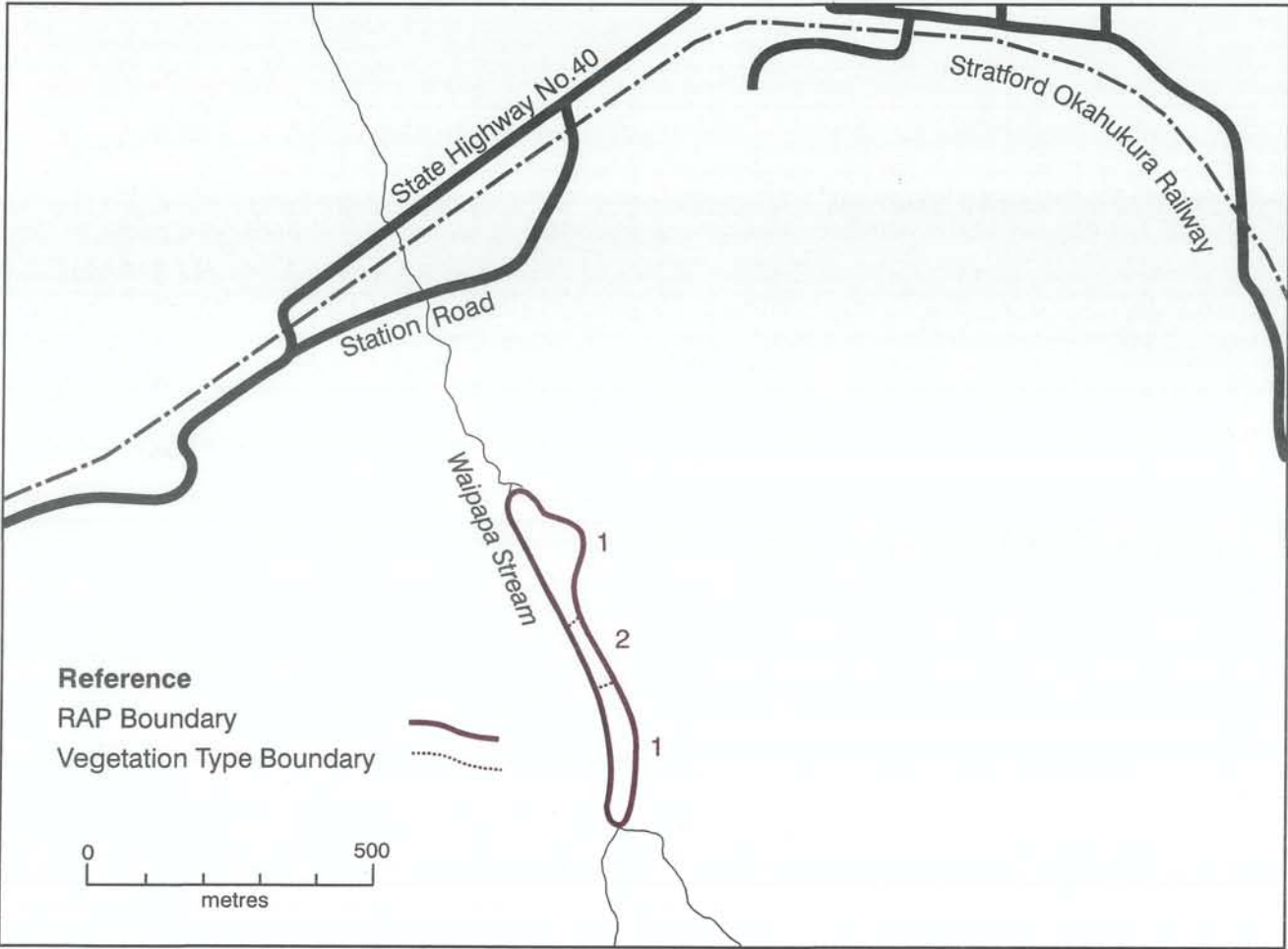
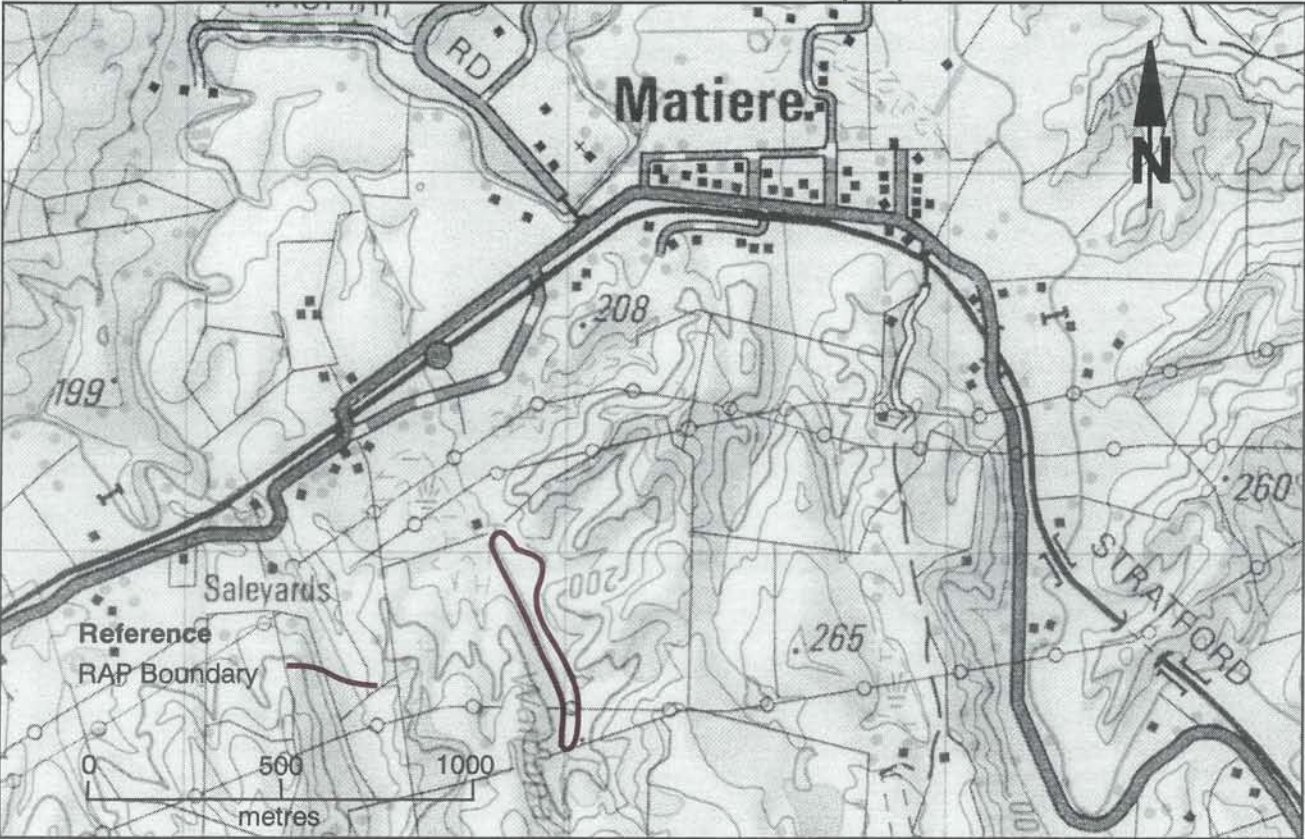
Threat/Modification

Grazing by stock, particularly cattle, has reduced both the diversity and abundance of understorey species. Stock damage, particularly trampling damage and pugging, is a serious threat to the wetland which is not fenced. Possums are present but are controlled by the landowner. Fencing of the RAP and the exclusion of stock together with ongoing possum control is recommended.

Willow and blackberry threaten to modify both the structure and composition of the wetland community. Barberry is abundant along some of the forest margins, and is occasionally present in the understorey, but is not considered an ecological threat to the forest. However, willow and blackberry should be controlled.

Justification

This RAP is one of the highest quality and largest areas of unprotected forest remaining on the riparian flats landform unit in the Taumarunui Ecological District. The contiguous wetland is a high quality example of raupo reedland. It is an intact sequence from forest to wetland, but both wetland and forest have been greatly reduced in extent. Around 2.2% of this landform unit is currently represented in the existing reserve network, and there are no wetlands in the existing protected natural area network on this landform unit in the ecological district. The presence of spotless crane in the wetland vegetation increases the conservation significance of this area.



WAIPAPA STREAM WETLAND

RAP No.: 7
PNAP Survey No.: S18-42
Grid Reference: NZMS260 S18 918679
Landform unit(s): Hill country-moderately steep to steep slopes
Area (ha) 3.1
Altitudinal Range: +/-180 m
Survey Methodology: Field survey
Conservancy: Wanganui

BIOTIC ZONE	VEGETATION TYPE	LANDFORM
Lowland	1. Ti kouka/manuka-whēki/ <u>raupo</u> -purei-(harakeke) reedland.	Gully floor.
	2. (Kahikatea)/ti kouka/ <u>purei-Carex <i>geminata</i></u> -swamp kiokio-harakeke treeland.	Gully floor.

Landform

A long, narrow gully floor immediately south-west of Matiere, near the western edge of the Taumarunui Ecological District.

Vegetation

Most of this RAP comprises reedland dominated by raupo in association with purei and harakeke (NZ flax, *Phormium tenax*). Whēki and manuka are emergent with scattered ti kouka overtopping both. Other minor emergent components include hūkihūki and karamu. Swamp kiokio and *Baumea rubiginosa* are also present amongst the raupo. A narrow strip of raupo occurs around the margins. This area has been degraded by stock damage (cattle) and the ground cover is dominated by exotic species including creeping buttercup, Yorkshire fog, *Juncus articulatus* and creeping bent with occasional indigenous species, most notably *Carex geminata* and spike sedge. Raupo forms a mono-dominant stand at the upstream end.

In the central part of the RAP there is a small area of ti kouka treeland with one emergent kahikatea. The understorey is characterised by purei and *Carex geminata* in association with harakeke and swamp kiokio.

Flora

Typical species only were noted.

Fauna

Spotless crane may be present in the raupo reedland. Birds observed include paradise shelduck, welcome swallow and fantail.

Threat/Modification

Stock are trampling and damaging the reedland, particularly over the area where the reedland narrows and on the margins. An old fence along the south-west margin of the wetland has limited the damage to parts of the south-west margin. Fencing the wetland and excluding livestock is recommended.

Justification

This RAP is one of three RAPs with wetlands in the hill country – moderately steep to steep slopes landform unit (the others being RAPs 1 and 12). The RAP contains the highest quality, most natural unprotected wetland in the landform unit. Although this landform unit comprises more than three-quarters of the ecological district, there are currently no wetlands protected within it.

HEA YNS FOREST

RAP No.: 8
PNAP Survey No.: S18-52
Grid Reference: NZMS260 S18 017780
Landform unit(s): Riparian flats
Area (ha) 4.6
Altitudinal Range: 260-280 m
Survey Methodology: Field inspection
Conservancy: Waikato

BIOCLIMATIC ZONE	VEGETATION TYPE	LANDFORM
Lowland	<u>L. Kahikatea-totara</u> -matai-rimu-miro forest.	Riparian flat, terrace, gully and toeslope.

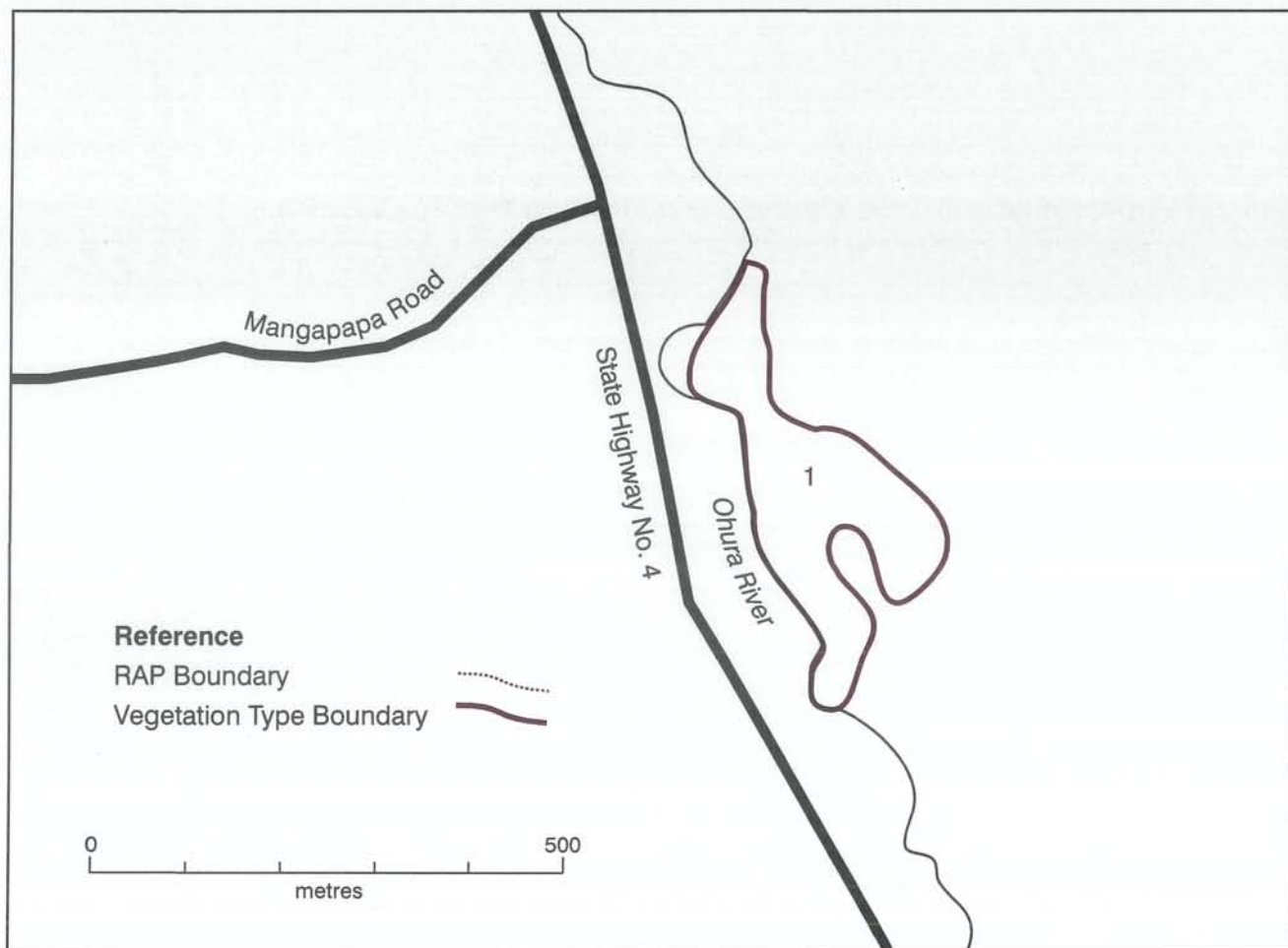
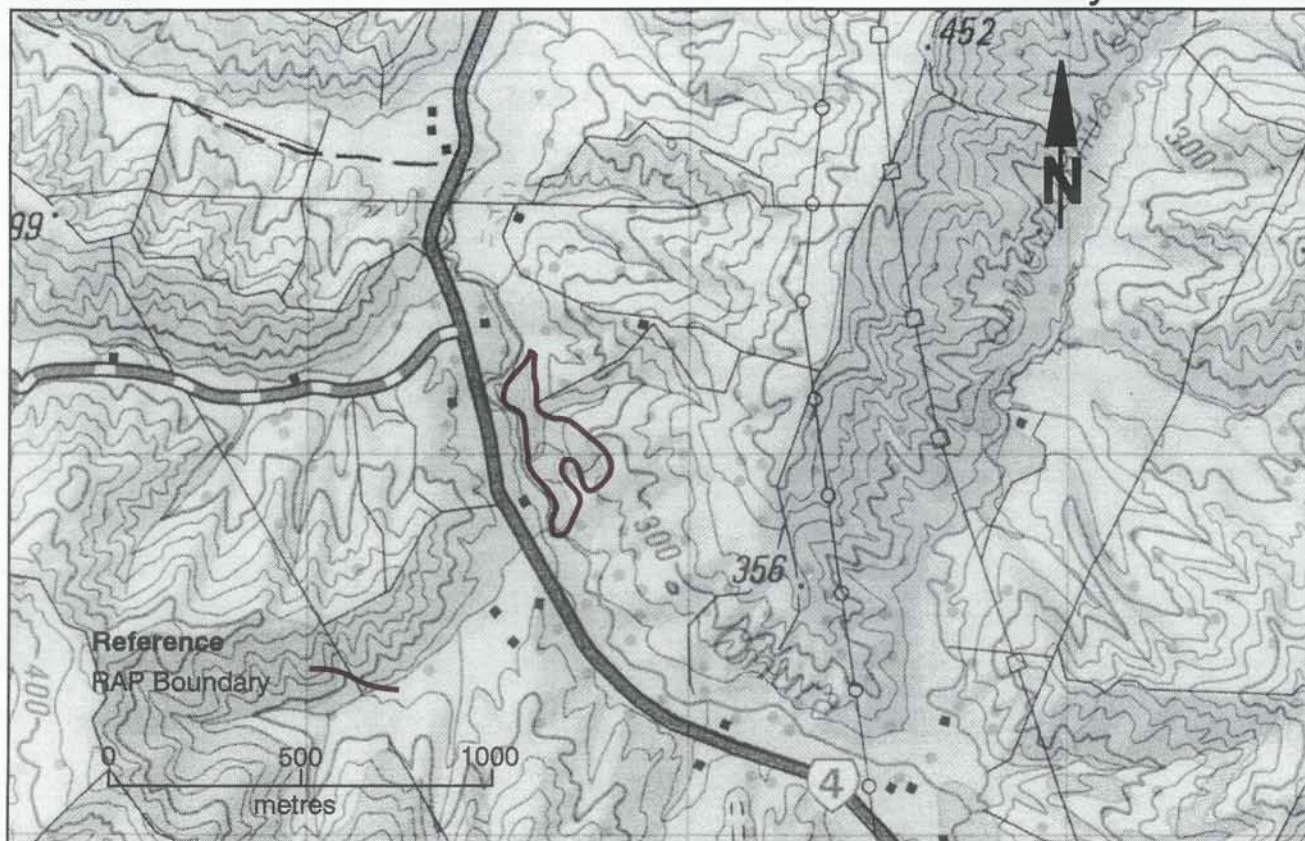
Landform

The RAP, adjacent to the Ohura River south of Tapuiwahine in the centre north of the ecological district, consists of a small area of riparian flat and terrace. It is dissected by a creek flowing through a small gully, and grades into toeslope to the east.

Vegetation

Occasional kahikatea and matai, probably remnant from the original primary forest, are emergent over a dense secondary canopy c.20 m of kahikatea and totara in association with matai, rimu and miro. The canopy is variable, with totara becoming more dominant towards the toeslope and kahikatea more dominant adjacent to the river.

The understorey is variable in direct relation to grazing. Approximately 25% of the site is fenced to exclude livestock. Within the fenced area on the terrace, and on drier riparian flats there are occasional pole totara and kahikatea (>3 m tall) and a relatively dense shrub tier, with *Coprosma rhamnoides*, *C. rotundifolia*, putaputaweta, kahikatea, mapou and mahoe (<1 m tall) common. However, blackberry dominates the shrub tier, and is locally very abundant. The groundcover is sparse, the most common component being herb Robert with occasional hooked sedges and kiwikiwi. Seedlings of kahikatea and mahoe were observed. On wetter riparian flat areas and on the scarp between the riparian flat and terrace, the groundcover is more abundant, with juvenile wheki, kiokio and pakau common. Outside the fenced area, the understorey has been severely grazed and is sparse. There are no shrubs and the groundcover is dominated by a closely cropped carpet of *Coprosma rhamnoides* in association with wall lettuce, herb Robert and local areas of moss. Blackberry is generally absent except within a gully where local dense patches of blackberry occur in a mosaic with patches of kiokio. Small trees including pate, mahoe, pole podocarps and manatu are present in low numbers within this gully.



Flora

Typical species only were noted.

Fauna

Birds observed included kereru, fantail, Australasian harrier and silvereye. Karearea were present until 10 years ago (D. Heayns, landowner pers. comm. 1999).

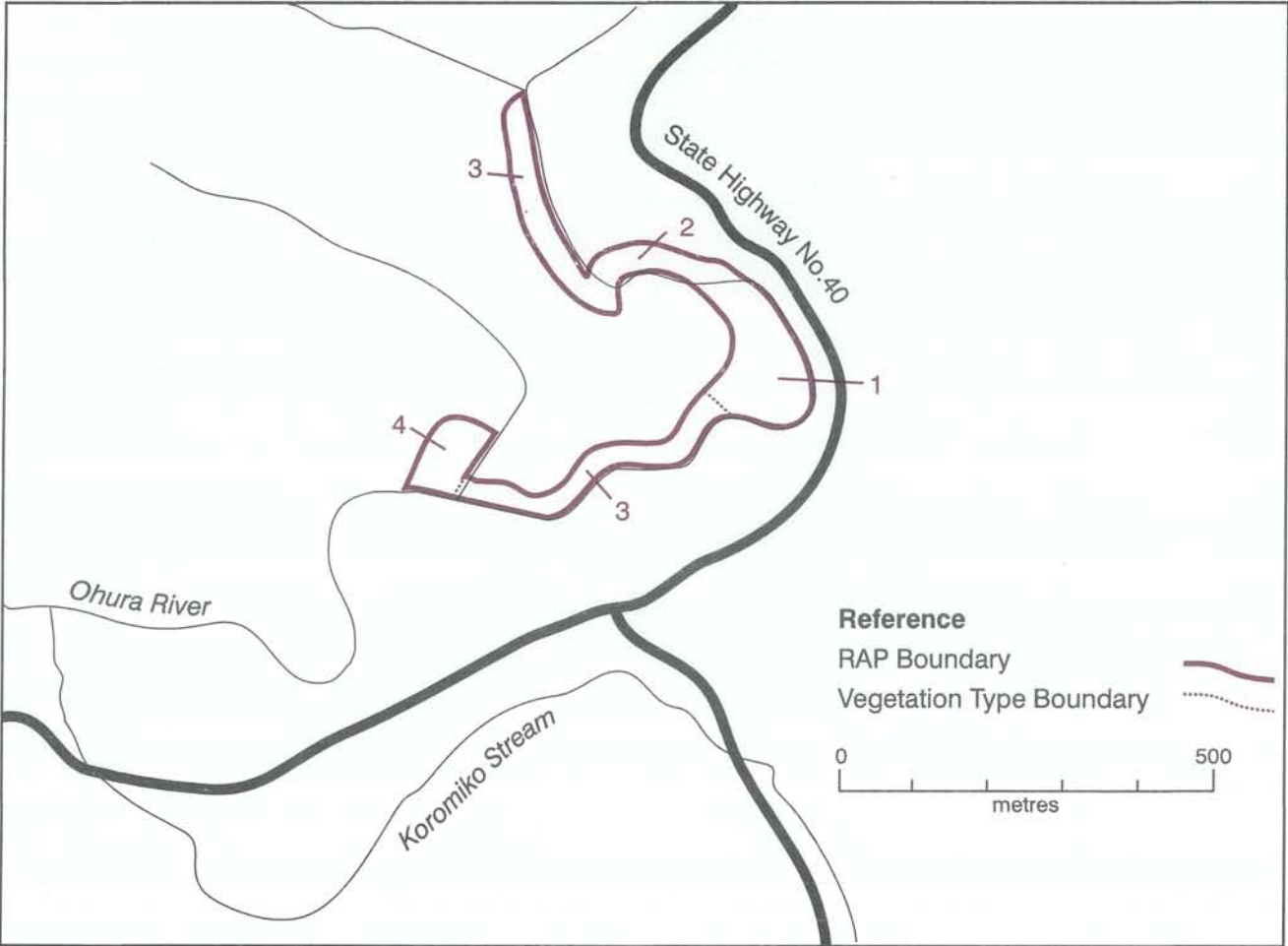
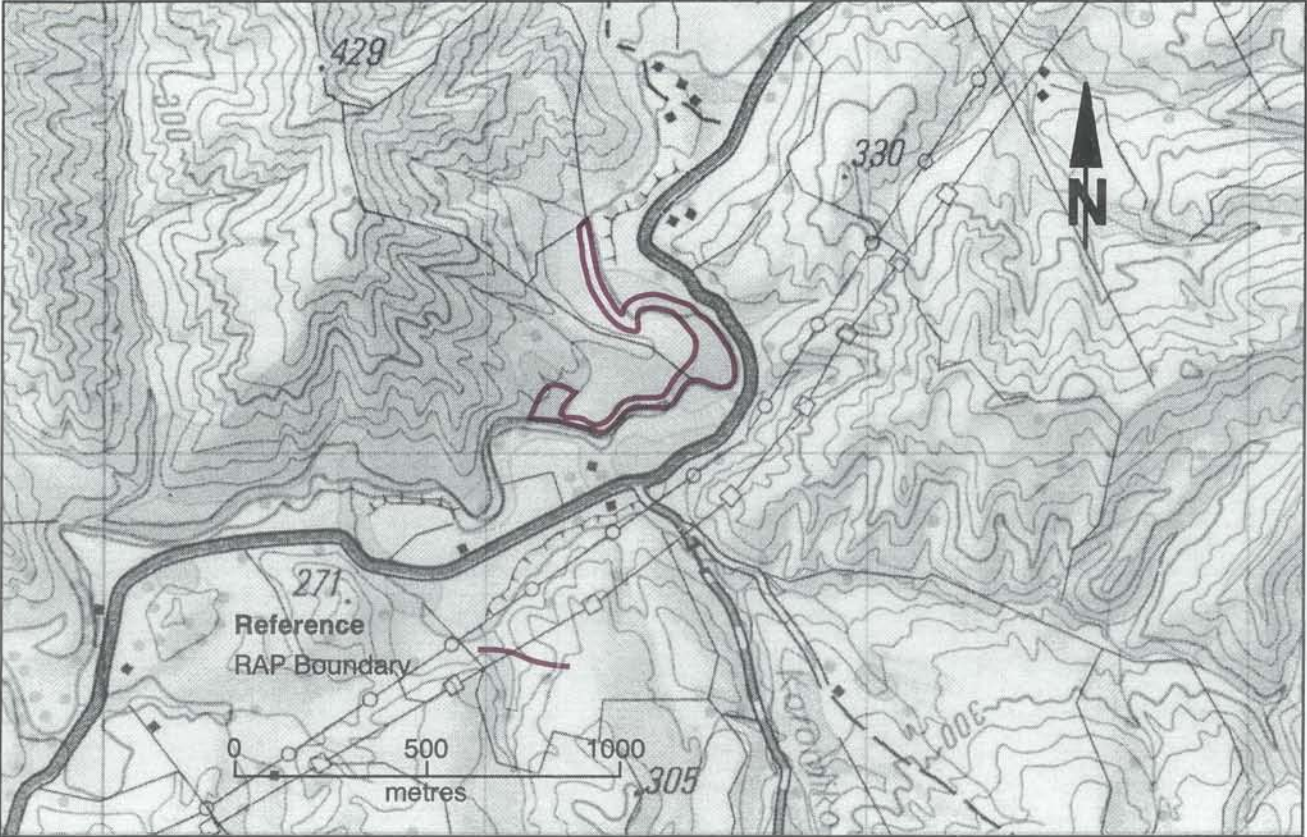
Threat/Modification

Over most of the site the diversity and abundance of understorey species has been reduced by stock grazing. Possums are present but they are controlled by the landowner. Fencing the remainder of the site and excluding livestock, as well as ongoing possum control, is recommended.

Blackberry is locally abundant in the fenced area, but is not a long term threat.

Justification

This forest is one of the largest remaining unprotected examples of forest on riparian flats. Forest on the riparian flats landform unit has been heavily reduced in extent with only 5.8% of the estimated 1840 forest cover remaining. It is also under-represented in the current protected areas network with only c.240 ha protected, representing only 1.6% of the entire riparian flats landform unit.



G E M M E L L F O R E S T

RAP No.: 9
PNAP Survey No.: S18-46
Grid Reference: NZMS260 S18 015722
Landform unit(s): Riparian flats
Area (ha) 6.9
Altitudinal Range: 200-220 m
Survey Methodology: Field survey
Conservancy: Waikato

BIOCLIMATIC ZONE	VEGETATION TYPE	LANDFORM
Lowland	1. <u>Kahikatea</u> -(matai)/ <u>kahikatea</u> -totara-(rimu) forest.	Riparian flat, scarp.
	2. Kahikatea-(rimu) treeland.	Riparian flat.
	3. <u>Totara</u> forest.	Riverbank.
	4. Totara-kahikatea-(matai)-(rimu) forest.	Terrace, gully.

Landform

An elongated area predominantly comprising river bank along the Ohura River south-west of Mangatupoto in the centre north of the ecological district. The southern end is a terrace dissected by a gully and to the north, mostly on the convex side of the river meander, are areas of riparian flat.

Vegetation

Four vegetation types are present, all of which are secondary and have established following logging (old tree stumps are present). The river banks are dominated by dense totara forest, 10-12 m in height. The understorey varies in relation to grazing pressure, the more accessible areas having a sparser understorey. Generally the shrub tier comprises scattered *Coprosma rotundifolia*, manatu and kaikomako with wheki becoming relatively abundant in places. Groundcover is mostly leaf litter with scattered kiwikiwi and hooked sedges.

On the riparian flat next to the river meander, kahikatea and occasional matai, probably remnant trees from the original primary forest, are emergent over a dense canopy of kahikatea in association with totara and occasional rimu 18-20 m in height. The understorey comprises scattered wheki ponga, pole rimu and kahikatea, turepo, poataniwha and *Neomyrtus pedunculata* in the 2-5 m tier. The shrub tier is mostly absent as a result of grazing, although there is a small area near the river with scattered kaikomako, ongaonga, *Coprosma rotundifolia* and manatu. The groundcover is also very sparse, consisting of scattered kiwikiwi, hooked sedges, and *Hypolepis ambigua* with blackberry, herb Robert and selfheal increasing in abundance closer to the margin.

Kahikatea in association with rimu (18-20 m in height) forms an open treeland on the other area of riparian flat. The understorey is dominated by pasture.

On the terrace, forest (18-20 m in height) characterised by totara and kahikatea in association with matai and rimu is present. The understorey is grazed and sparse, with most of the vegetation confined to the small gully. The composition of the understorey is generally similar to that of vegetation type 1 but it differs in that wheki and ongaonga are in the shrub tier.

Flora

Typical species only were noted.

Fauna

Kereru and common forest birds, including tui, grey warbler, fantail and shining cuckoo are present.

Threat/Modification

Grazing by livestock and feral goats is decreasing both the diversity and abundance of understorey species. Possums are present but they are controlled currently. Fencing and the exclusion of stock are recommended together with ongoing control of possums and control of feral goats.

Justification

Forest on the riparian flats landform unit is poorly represented in the current protected areas network and generally has been greatly reduced in extent with only 5.8% of the forests present in 1840 remaining today. Indigenous forests currently comprise only 5.2% of the total area of riparian flats and only one-third of these areas is protected in the reserve system. This RAP contains one of the more diverse assemblages of forest types on riparian flats in the ecological district and is one of the few unprotected examples of its type.

MANGAKAHU STREAM

RAP No.: 10
PNAP Survey No.: S18-62
Grid Reference: NZMS260 S18 185700
Landform unit(s): Hill country-moderately steep to steep slopes
Area (ha) 111.0
Altitudinal Range: 220-400 m
Survey Methodology: Field survey; interpretation of 1998 aerial photographs
Conservancy: Waikato

BIOCLIMATIC ZONE	VEGETATION TYPE	LANDFORM
Lowland	1. <u>Totara-kahikatea</u> -(rimu)-(matai) forest.	Riparian flat, toeslope.
	2. <u>Tanekaha</u> -totara forest.	Hillslope.
	3. <u>Totara</u> -kohuhu-horoeka-tanekaha forest.	Hillslope.
	4. <u>Kohuhu</u> -totara-horoeka-(tanekaha)- (whauwhaupaku)/ <u>manuka</u> scrub.	Hillslope.
	5. <u>Manuka</u> -(tanekaha)-(karamu)-(kohuhu)/ harakeke-kiokio rockland.	Bluff.
	6. <u>Manuka</u> scrub.	Spur crest, hillslope.
	7. (Willow)/(cotoneaster)/ <u>tall fescue</u> grassland.	Riparian flat.
	8. Manuka-(ti kouka)-(horoeka)/ <u>Baumea rubiginosa</u> -(purei)/lotus-creeping buttercup-Yorkshire fog sedgeland.	Riparian flat, hillslope seepage.

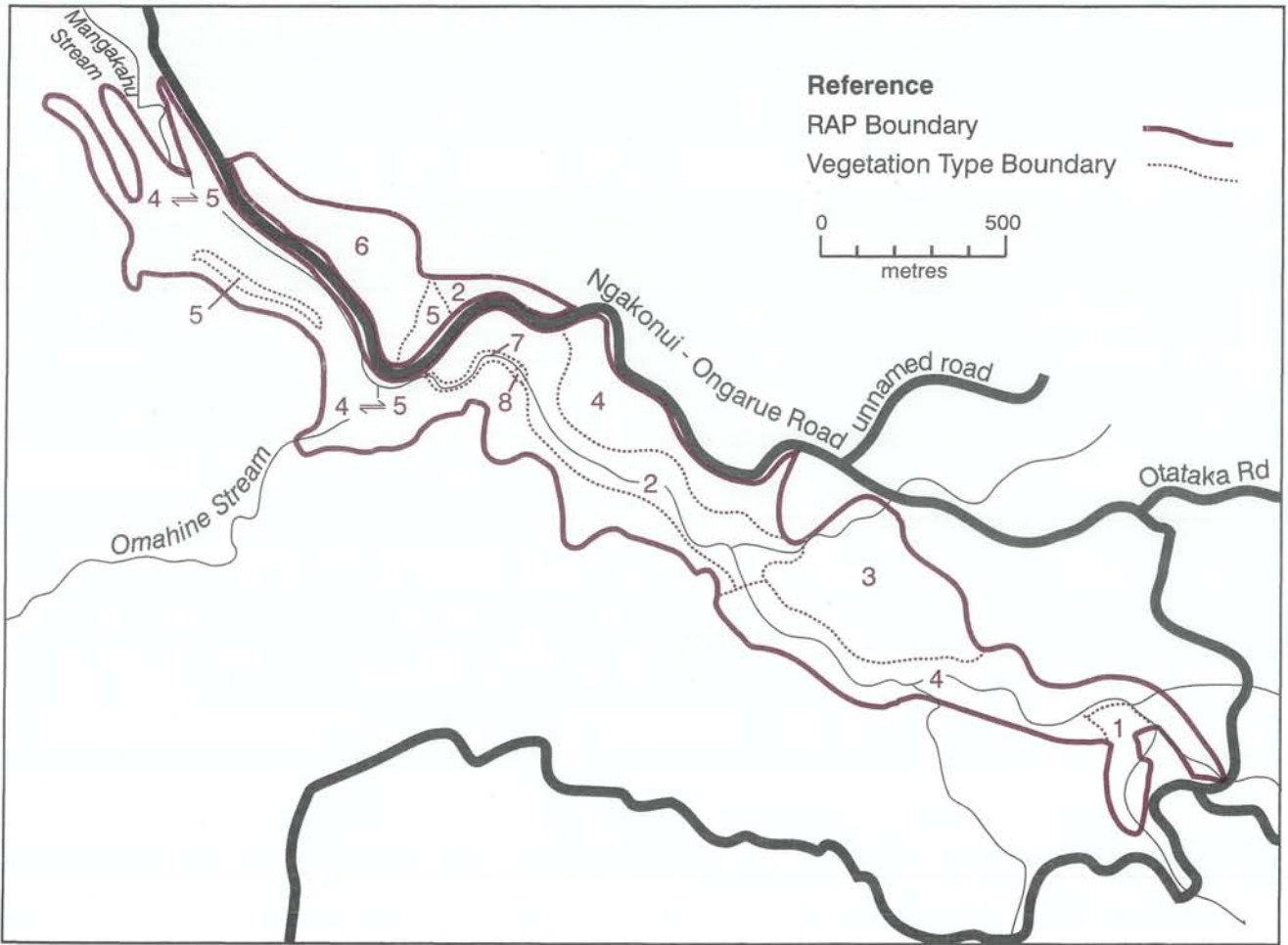
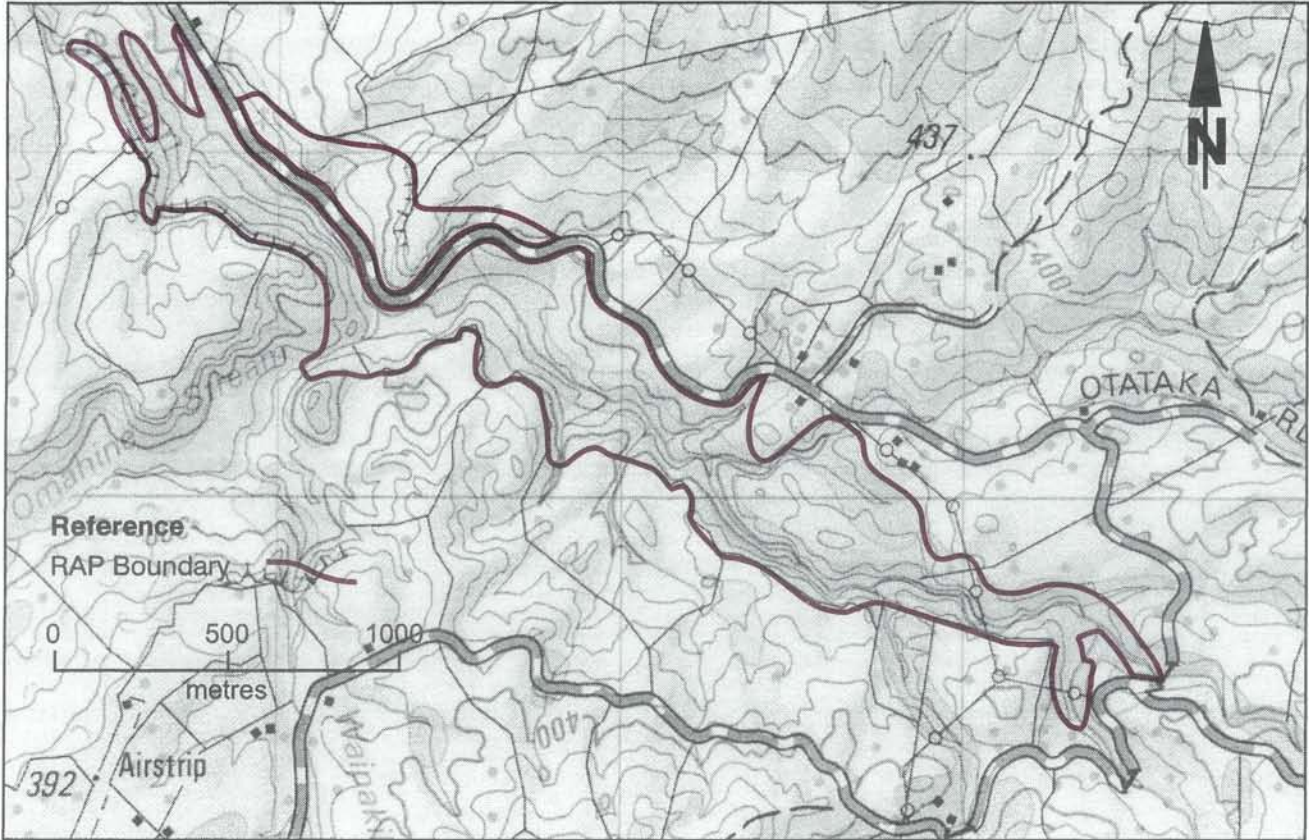
Landform

A large elongated area adjacent to Mangakahu Stream, to the east of Ongarue in the north-east of the ecological district. It generally comprises steep hillslopes (but varying from gentle to very steep) with narrow riparian flats and numerous narrow terraces cut into pumice alongside the stream. There are local areas of ignimbrite bluffs in the lower catchment.

Vegetation

There is a small area of primary forest 20-24 m in height at the eastern, upstream end of the RAP (vegetation type 1). It is dominated by totara in association with kahikatea and minor components of rimu and matai. There are pole totara, matai and kahikatea in the subcanopy, with treeferns (particularly wheki ponga) dominating the 2 - 5 m tier. The shrub tier and groundcover vary. In flat dry areas they are both sparse with occasional poataniwha and podocarp saplings in the shrub tier and the groundcover is dominated by leaf litter with occasional kiwikiwi and *Hypolepis* sp. On steeper slopes next to the stream and on the wetter riparian flats there are more shrubs, particularly mingimingi and kotukutuku, and ferns, particularly kiokio, rereti and *Leptopteris hymenophylloides*. Whauwhaupaku is present in the 2-5 m tier.

Moving downstream from this area on the steep slopes on either side of the stream, the vegetation consists of secondary scrub 3-5 m in height characterised by variable mixes of kohuhu, horoeka (lancewood) and totara in association with whauwhaupaku and



tanekaha and numerous areas of lower statured manuka (vegetation type 4). This vegetation type continues for the entire length of the RAP on the south-west side of the stream. A local area next to Otataka Road on the opposite side of the stream tends to have more kohuhu in the canopy, whilst further downstream totara and manuka increase in abundance. The understorey reflects the canopy composition. Where the canopy is taller, the understorey has numerous saplings of totara with less abundant bracken, mingimingi and saplings of horoeka. The groundcover is sparse, and consists mostly of leaf litter with hooked sedges. Low-statured manuka areas tend to have an undeveloped understorey.

On the north-east side of the stream in the mid-upper catchment, there is an area of forest dominated by totara in association with kohuhu, tanekaha and horoeka (vegetation type 3). The canopy height is variable, averaging about 8 m. The understorey is similar to the older areas of vegetation in vegetation type 4. Downstream from this area there is an extensive area of tanekaha dominated forest (vegetation type 2). The canopy, which varies from 10-16 m, includes totara and some local areas of kohuhu and horoeka, with a few large totara and miro along stream margins. The majority of this forest has been present with a similar canopy composition since at least the 1920s, and has increased in extent over time (A. Frazer, landowner pers. comm. 1999). The understorey is in excellent condition, with miro, putaputaweta and manatu common in the subcanopy. There is abundant *Coprosma rhamnoides*, *Raukahu anomalous* and poataniwha, with saplings of miro, matai, totara and kahikatea in the shrub tier. The ferns kiwikipi and *Leptopteris hymenophylloides* and bush rice grass are common in the ground cover which is dominated by *Uncinia uncinata*.

Sedgeland occurs (vegetation type 8) on the riparian flats adjacent to and in seepages within the tanekaha forest type described above. It comprises *Baumea rubiginosa* in association with scattered purei. Emergent manuka are common, and occasional emergent ti kouka and horoeka also occur. The sedgeland shows signs of grazing damage, with small open areas and tracks dominated by lotus, creeping buttercup and Yorkshire fog. Swamp kiokio and *Blechnum penna-marina* are also present. Sedgeland in the seepage in the tanekaha forest has fewer emergents and more swamp kiokio.

On the riparian flats immediately downstream from the sedgeland is exotic grassland (vegetation type 7). It comprises scattered willow and low grazed shrubs of cotoneaster emergent over tall fescue (*Festuca arundinacea*) dominated grassland. Along much of the stream margin downstream from here are willows with narrower areas of grassland.

In the downstream third of the RAP, on the north-east side of the stream, there is a large bluff locally known as The Temple (A. Frazer, landowner pers. comm. 1999). The bluff is sparsely vegetated by manuka in association with tanekaha, karamu and kohuhu emergent over harakeke and kiokio (vegetation type 5). This bluff vegetation type also occurs further downstream on the south-west side of the stream. On the crest of the bluff, and extending down the west facing slopes, dense, low manuka scrub (2 m in height) dominates.

Flora

Only typical species were noted.

Fauna

Kereru and common forest birds, including fantail, grey warbler, tui, bellbird, Australasian harrier, shining cuckoo, kingfisher and morepork are present. Occasional karearea have been reported from the area (A. Frazer, landowner pers. comm. 1999)

Threat/Modification

Goats are causing damage to the understorey, and they should be controlled. Most of the area is not currently grazed but those areas that are grazed have a considerably less dense and diverse understorey. Fencing and the exclusion of stock over the entire area is recommended.

Environmental pest plants pose a significant threat to the vegetation of this RAP. Japanese honeysuckle is present and has the potential to spread into large areas of vegetation. Brush wattle and pines are established in scrub, and, with Spanish heath and cotoneaster, threaten to displace indigenous bluff vegetation. Willow occurs along the stream margin and may become established in the wetland vegetation, changing the structure and composition of the vegetation. Selaginella is present in the understorey of the tanekaha-totara forest (vegetation type 2) and will compete with and displace indigenous bryophytes. Control of these species should be planned and undertaken.

Justification

This RAP contains a diverse array of vegetation types including the only example of unprotected tanekaha forest identified within the Taumarunui Ecological District. Bayfield *et al.* (1986) noted in their survey of Scenic Reserves of East Taranaki that the tanekaha forest in Waitaha Scenic Reserve was not observed elsewhere in the land district. There are also examples of bluff and wetland vegetation which increase the diversity of the RAP.

TUHUA

RAP No.:	11
PNAP Survey No.:	S18-30
Grid Reference:	NZMS260 S18 220660
Landform unit(s):	Hill country-moderately steep to steep slopes
Area (ha)	131
Altitudinal Range:	640-1042 m
Survey Methodology:	Field survey
Conservancy:	Waikato

BIOCLIMATIC ZONE	VEGETATION TYPE	LANDFORM
Sub-montane	1. <u>Horopito</u> -putaputaweta-(hakeke)-(kamahi) scrub	Scarp.
	2. Kotukutuku-kamahi-horopito-(hakeke) forest and scrub.	Scarp.
	3. Hall's totara/kamahi-totara-horopito-kapuka forest and scrub.	Scarp.
	4. <u>Hall's totara-mountain toatoa</u> -hupiro- <i>Coprosma</i> sp. 't' scrub.	Hill top plateau.
	5. <u>Kamahi</u> -Hall's totara-horopito-hupiro-mountain toatoa scrub and forest.	Gully, hill top plateau.
	6. <u>Hall's totara-kamahi</u> -hakeke-kotukutuku-hupiro-mountain toatoa forest and scrub.	Hill top plateau.
	7. (Rimu)/(hinau)-(kamahi)/whauwhaupaku-mahoe-wheki ponga-wheki-putaputaweta-horoeka-horopito scrub.	Scarp, upper hillslopes.

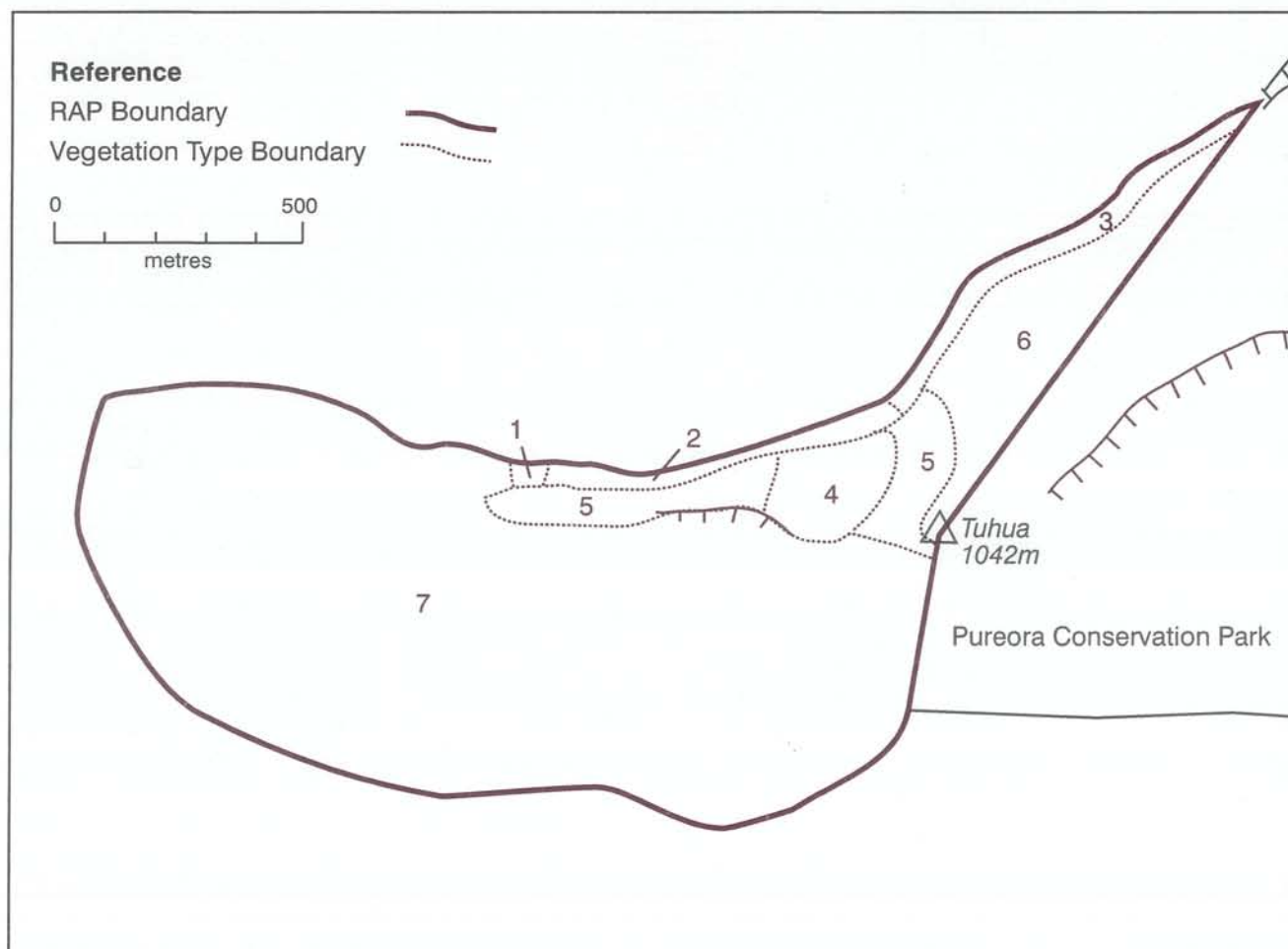
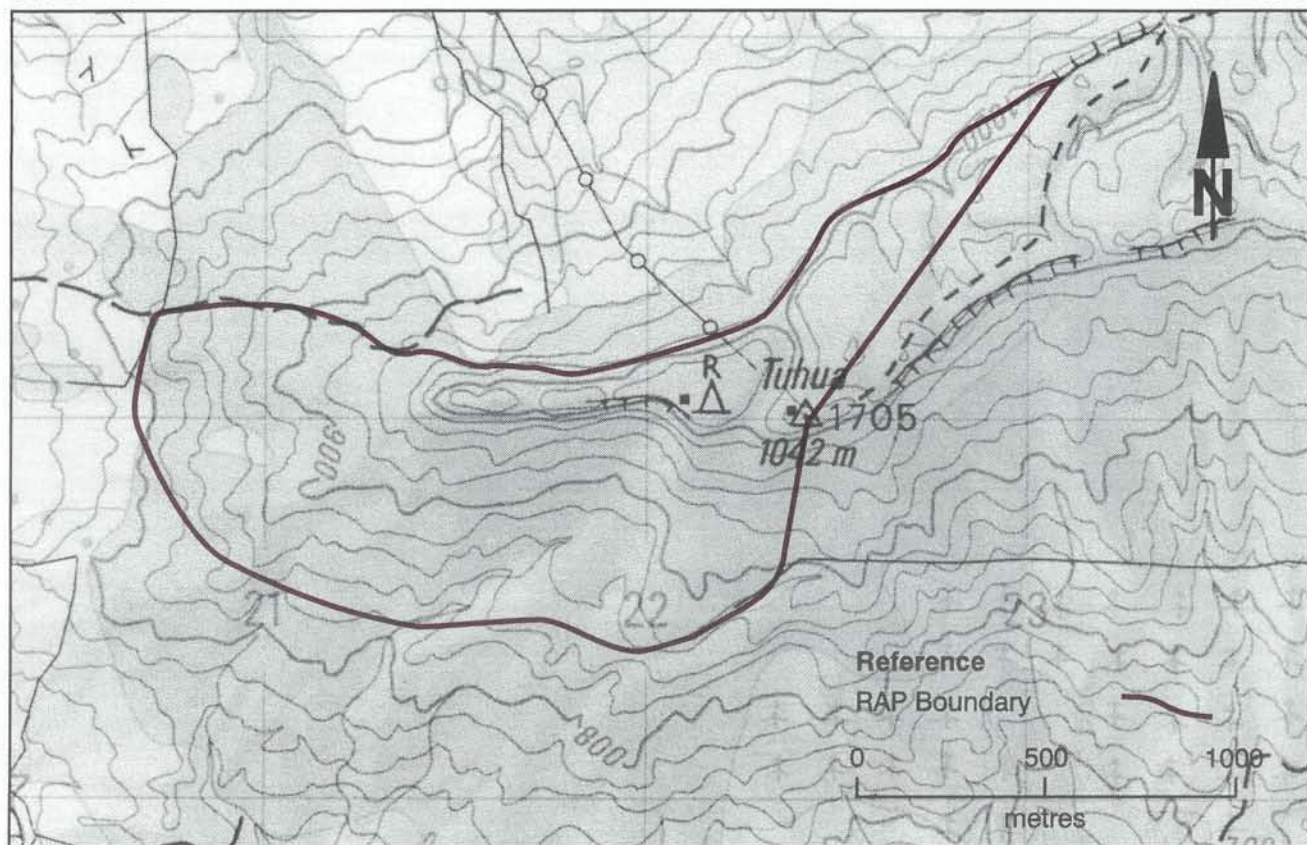
Landform

Tuhua RAP is located in the north-east of the ecological district and is characterised by a north-east to south-west trending hill top plateau with very steep scarps and bluffs immediately below the summit. The scarps are around 40 m in elevation, and below them the slopes become moderately steep. A gully bisects the plateau which is broad (c.400 m across) to the north-east of the gully but quickly narrows (from c.200 m to <50 m wide) in the south-west.

Vegetation

Human disturbance has played a significant role in determining the structure and composition of the vegetation on Tuhua. The low statured vegetation on the plateau has probably arisen following burning, while logging and clearance for farming has modified the vegetation that extends downslope below the plateau.

The plateau to the north-east of the gully is covered with scrub dominated by Hall's totara and kamahi, 4-6 m in height. Hakeke, kotukutuku and kapuka are also common canopy components and there are a few emergent Hall's totara as well as numerous dead stems. Vegetation in the gully and on the western end of the plateau consists of scrub and forest dominated by kamahi with Hall's totara, horopito, hupiro and



mountain toatoa. Canopy height varies between 2-6 m. The forest at the western end of the plateau is older with minor components of kapuka and tawheowheo.

The scarp to the west of the gully has forest and scrub dominated by varying mixes of kotukutuku, kamahi and horopito with lesser amounts of hakeke. There are local dense areas of hakeke and of kotukutuku, most commonly on the lower scarp. The canopy varies in height between 2.5-6 m. To the east of the gully, forest and scrub, 2.5-6 m high, is present. The canopy consists predominantly of Hall's totara and kamahi in association with hakeke, kotukutuku and kapuka. The canopy composition is variable, and to the east, kamahi becomes more abundant in the canopy.

The understorey of all of these vegetation types is generally similar, very moist with a dense but not very diverse shrub tier, and with abundant mosses, particularly on the plateau. Composition tends to vary slightly with the developmental stage of the vegetation and taller canopied older areas have katote <2 m tall in the shrub tier. Horopito is abundant and scattered hupiro and rohutu were noted. Saplings of Hall's totara and broadleaved species are also present in the canopy. The ground cover generally consists of varying mixes of bush rice grass and the ferns kiwikipi, puniu and heruheru.

At the western end of the scarp there is a local area of horopito dominated scrub on an old slip face. The canopy, which is less than 3 m high, also includes putaputaweta and components of hakeke and kamahi.

On the plateau immediately west of the gully is low scrub (less than 3 m high). The canopy is dominated by Hall's totara and mountain toatoa in association with *Coprosma* sp. 't', hupiro and kamahi. The understorey is characterised by mingimimi and hupiro in the shrub tier with *Blechnum procerum* and matukutuku in the groundcover. Where the canopy thins, there are patches of *Sphagnum*, and in one local area there are a few *Juncus gregiflorus* and, in a mud hollow, *Juncus planifolius*.

On the south facing scarps and upper hillslopes scrub is present, characterised by varying mixtures of whauwhaupaku, mahoe, wheki ponga, wheki, putaputaweta, horoeka and horopito. There are scattered low emergent hinau and kamahi and very occasional tall emergent rimu which are remnants from the original forest cover. Scattered pole tawa, rimu and totara are present in the scrub canopy, while below the scarp, kotukutuku and hakeke are present in the canopy. A local area of treeland occurs on the lower boundary of the south-facing hillslopes. The treeland is dominated by totara with the occasional miro, white maire and black maire over broadleaved shrub species forming scrub. Dominant species are putaputaweta, horopito, kapuka and kamahi, with houhere, horoeka, makomako and toro also present but less abundant.

Flora

Pua o te reinga (classed as 'nationally uncommon', subcategory 'recovering-conservation dependant', de Lange *et al.* 1999; category 'A' priority species for conservation management, Molloy & Davis 1994) is present. It is the largest and most healthy known-population in the Taumarunui Ecological District (A. Holzapfel, Waikato Conservancy, Department of Conservation pers. comm. 1999).

Fauna

Typical forest birds including Australasian harrier, shining cuckoo, fantail, tui and grey warbler are present.

Threat/Modification

The RAP is not grazed by livestock. Possum and goat are present, but in low numbers. Control has been undertaken recently and should be ongoing.

A small area of vegetation has been cleared for two radio transmitters on the plateau. This clearing provides opportunity for weed establishment.

Justification

This is one of the highest areas in the ecological district and this is reflected in the vegetation composition, which differs from most other sites in the ecological district. Whilst similar vegetation is present on other high points in the ecological district, the abundance of kotukutuku is unusual. The vegetation of Tuhua is very uncommon in the Taumarunui Ecological District. Whaley and Holzapfel (1996) reported that it does not occur in the adjoining Waitomo Ecological District (see Section 1). This, combined with the presence of a large and healthy Pua o te reinga population, makes Tuhua RAP a site of outstanding conservation value.

Notes

There is a large area of scrub contiguous with the RAP, mid-slope on the south facing hillslope. It is similar in composition to vegetation type 7, but without the emergent trees and with manuka becoming a prominent component of the canopy. This area does not meet the criteria to be included in the RAP, nonetheless it is of conservation value providing a buffer to the upperslopes and extending the altitudinal sequence of vegetation. If formal protection of the RAP is undertaken, then the status of this area should also be considered at that time.

HAITANA SWAMP

RAP No.: 12
PNAP Survey No.: S18-24
Grid Reference: NZMS260 S18 153643
Landform unit(s): Hill country-moderately steep to steep slopes.
Area (ha) 6.3
Altitudinal Range: +/-340 m
Survey Methodology: Field survey
Conservancy: Waikato

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
	1. Open water.	Pond.
	2. (Grey willow)-(manuka)/ <u>raupo</u> -purei-(harakeke) reedland.	Gully floor.
	3. (Grey willow)-(manuka)/raupo-purei/ <u>Yorkshire fog</u> -lotus reed-grassland.	Gully floor.

Landform

This RAP is located to the north-east of the Taumarunui township on a gully floor in the hill country-moderately steep to steep landform unit. It has been altered in the past by the construction of a dam which has created a pond.

Vegetation

The predominant cover is vegetation type 3, characterised by scattered clumps of raupo and purei with Yorkshire fog and lotus, and scattered emergent grey willow and manuka. The composition of this vegetation type varies, with raupo less common below the dam.

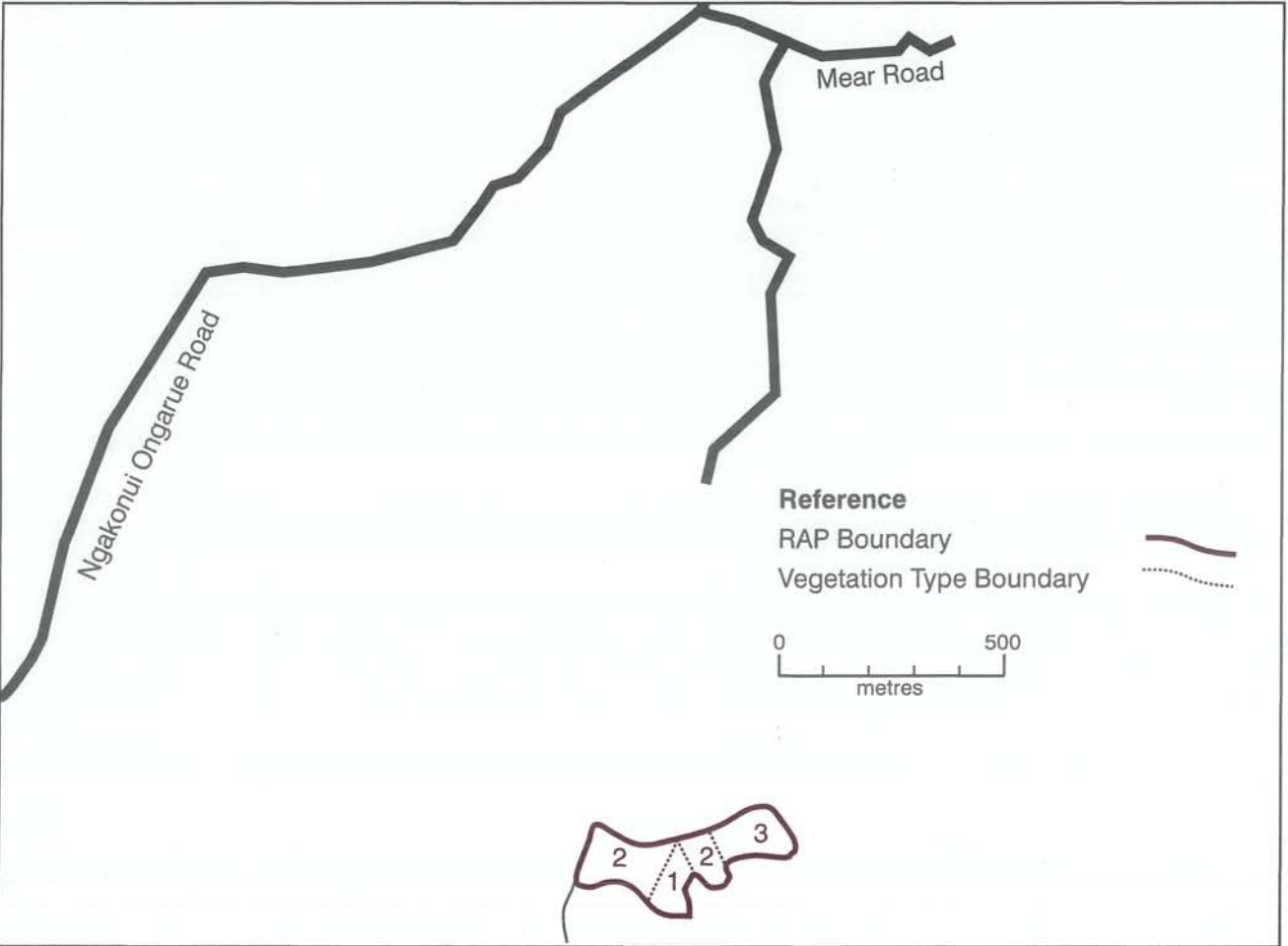
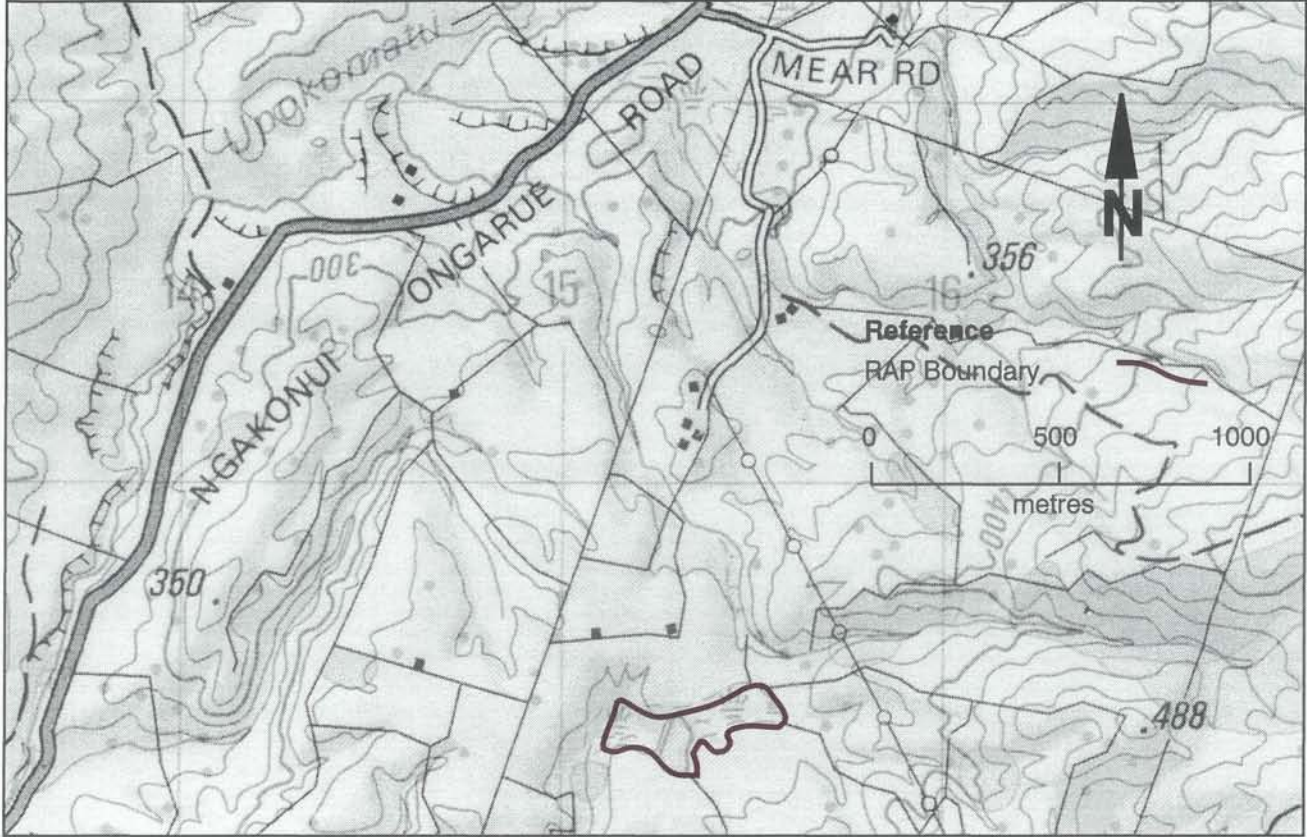
Vegetation type 2 occurs immediately north-east of the pond and is characterised by occasional grey willow and manuka emergent over reedland which is dominated by raupo in association with purei and occasional harakeke.

Flora

Typical species only were noted.

Fauna

Two dabchick (category 'C' priority species for conservation management; Molly and Davis 1994) were observed on the pond. Fernbird, which were recorded in 1981 in the area with spotless crane (SSWI Site No. Sq 28/42-1), are reported to be in the RAP (Mr Duncan, landowner pers. comm. 1999). Other species reported in 1981 were pukeko, Australasian harrier, grey duck, white heron and pied stilt. Additional species seen during this survey were paradise shelduck and welcome swallow.



Threat/Modification

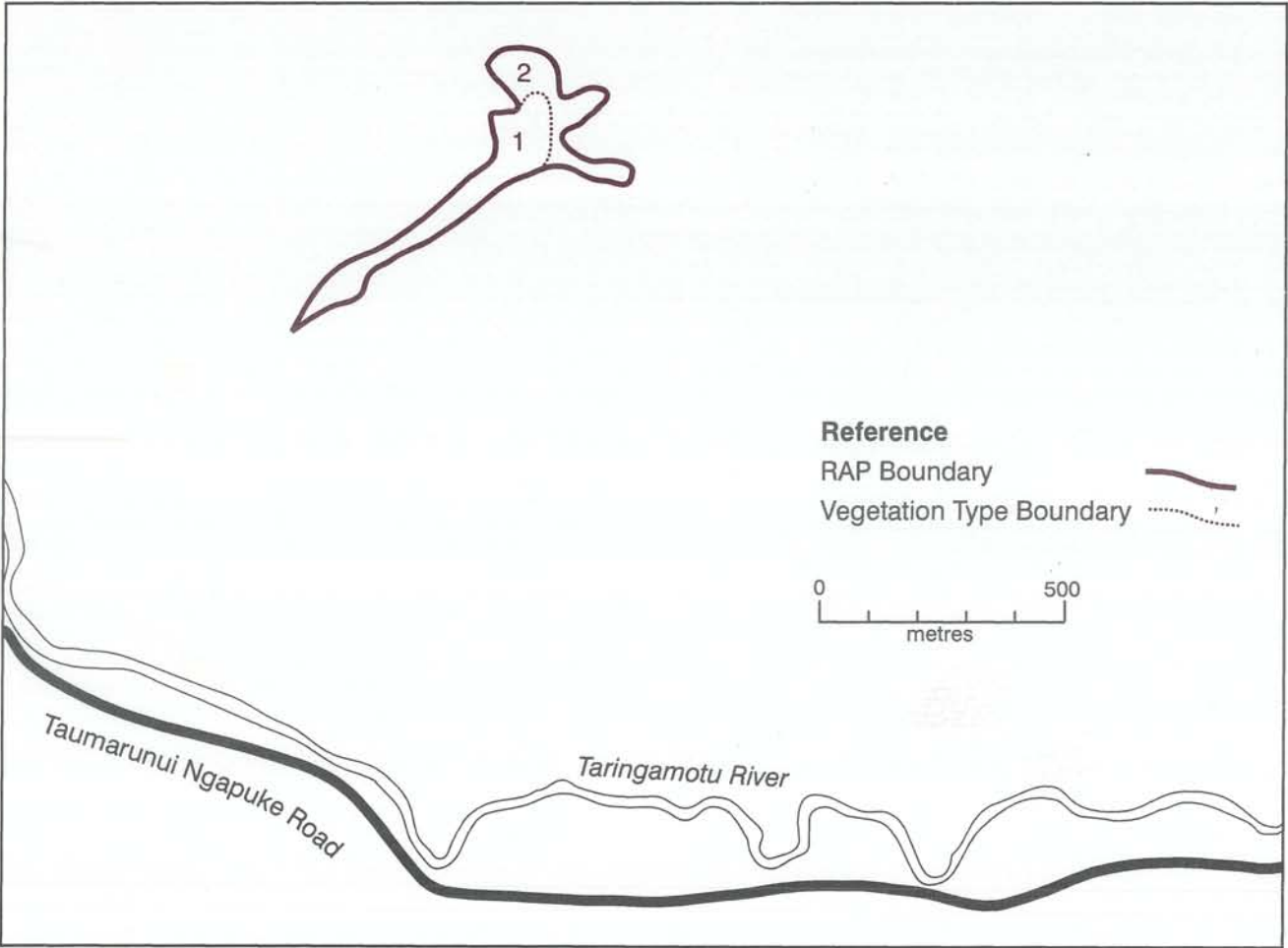
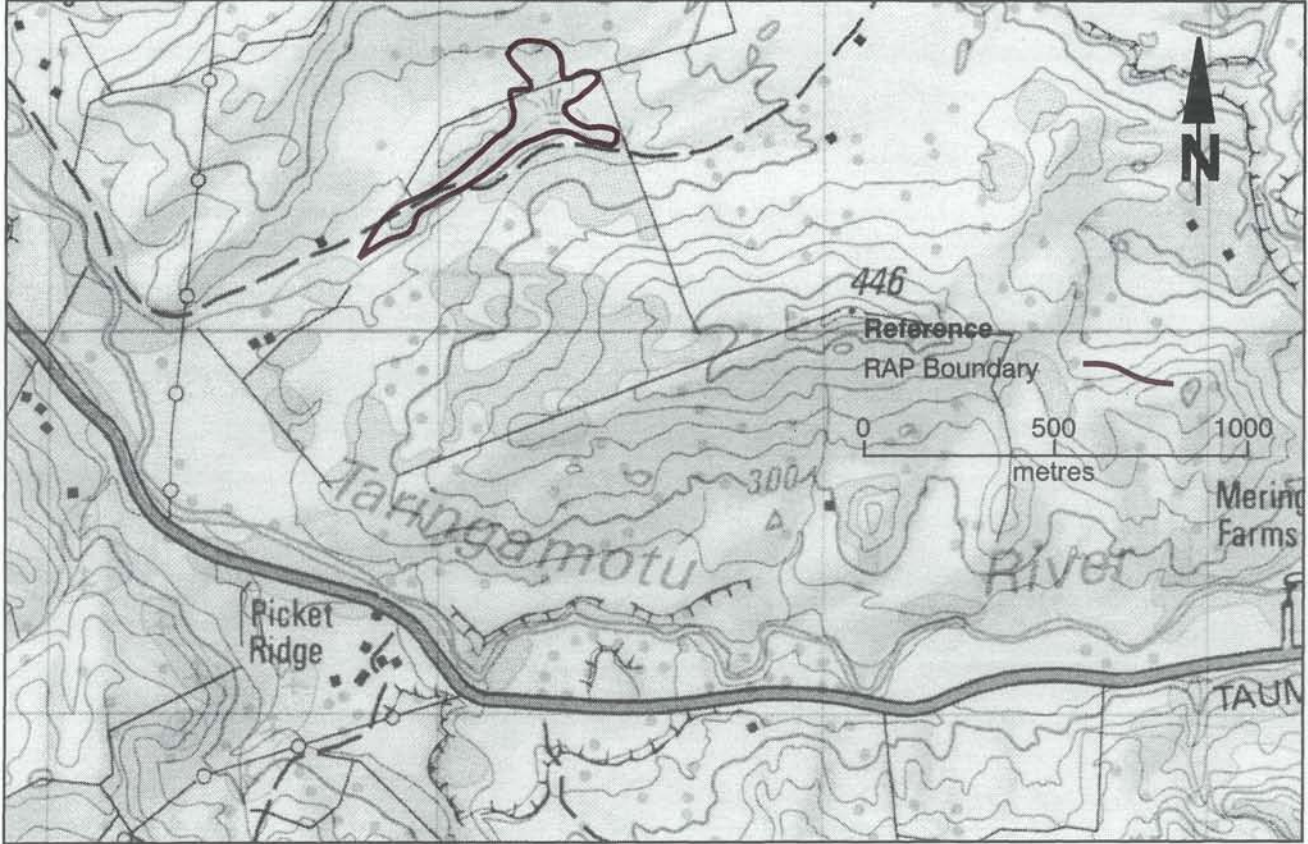
The wetland is grazed and stock damage, particularly by cattle, is severe in the reedland. However, with fencing and the exclusion of stock it is likely that the area will quickly recover. Feral cats have been seen in the area (Mr Duncan, landowner pers. comm. 1999) and are a threat to the birdlife.

Grey willow should be eliminated before it spreads further and changes both the structure and composition of the wetland vegetation.

Maimai are present and seasonal hunting is likely to disturb the indigenous birdlife.

Justification

The hill country - moderately steep to steep slopes - landform unit comprises more than three-quarters of the ecological district but there are currently no wetlands protected within this landform unit. This RAP is one of three RAPs in this landform unit (the others being RAPs 1 and 7). It contains the largest, representative example of wetland vegetation within the landform unit. A relatively diverse assemblage of wetland birds is present including dabchick, a category 'C' priority species for conservation management (Molloy and Davis 1994). They are not known to occur in any currently protected natural area in the ecological district.



TARINGAMOTU SWAMP

RAP No.: 13
PNAP Survey No.: S18-27
Grid Reference: NZMS260 S18 175605
Landform unit(s): Riparian flats
Area (ha) 7.9
Altitudinal Range: +/- 260 m
Survey Methodology: Field inspection
Conservancy: Waikato

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. Grey willow/raupo-(harakeke) forest.	Wetland.
	2. (Ti kouka)/raupo-Carex sp.-Baumea rubiginosa reed-sedgeland.	Wetland.

Landform

A wetland on a riparian flat of a stream flowing into the Taringamotu River, to the north-east of the Taumarunui township.

Vegetation

Grey willow forms an open canopy over abundant raupo with *Carex* sp. And harakeke over most of this RAP. Crack willow and ti kouka are locally scattered in the canopy. Retoretore is common where water has ponded under crack willow at the centre of the site. Swamp kiokio, *Carex* sp., *Epilobium ciliatum*, and creeping buttercup occur with grey willow suckers next to running water (vegetation type 1).

A small reed-sedgeland comprising raupo in association with *Baumea rubiginosa* and *Carex* sp. occurs in the north and east of the RAP. *Juncus acuminatus* is a minor component. Scattered emergent ti kouka, toetoe, *Coprosma propinqua* ' *C. robusta* and harakeke are present (vegetation type 2).

Flora

Only typical species were noted.

Fauna

Spotless crane were heard calling from the raupo and numerous pukeko were observed. Australasian harrier were noted, as well as common forest birds including shining cuckoo, bellbird, grey warbler, and fantail.

Threat/Modification

Livestock graze much of this RAP, limiting the abundance and diversity of palatable wetland plant species. Damage to raupo from trampling and soil compaction caused by stock movement were observed. The wetland should be fenced and stock excluded.

Grey willow is spreading, suppressing and shading out wetland species. Blackberry occurs on the margin of this RAP, also inhibiting native regeneration. Grey willow, in particular, should be controlled.

Justification

This RAP is one of the highest quality, largest remaining areas of wetland vegetation on the riparian flats landform unit in the Taumarunui Ecological District. It is the third largest wetland on this landform unit to be recommended for protection, and is one of five RAPs containing examples of this ecological unit (the others being RAPs 1, 14, 18 and 21). Wetlands on this landform unit have been greatly reduced in extent, and there are currently no protected examples of wetlands on this landform unit in the Ecological District.

PICKET RIDGE WETLAND

RAP No.: 14
PNAP Survey No.: S18-63
Grid Reference: NZMS260 S18 169590
Landform unit(s): Riparian flats
Area (ha) 1.9
Altitudinal Range: 260-280 m
Survey Methodology: Field survey
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Raupo</u> -(purei) reedland. 2. <u>Purei-Carex geminata</u> sedgeland. 3. <u>Open water-raupo-purei</u> waterfield. 4. <u>Totara</u> -kahikatea-matai treeland. 5. <u>Kiokio</u> fernland ⇔ <u>wheki ponga</u> -(houhere)- (ti kouka)-(black maire) treefernland.	Ox-bow cut-off. Ox-bow cut-off. Ox-bow cut-off. Riparian flat. Scarp.

Landform

This RAP is located to the north-east of the Taumarunui township adjacent to the Taringamotu River. It is a relatively small area comprising part of an ox-bow cut-off and adjacent riparian flats with the associated scarp created by river erosion.

Vegetation

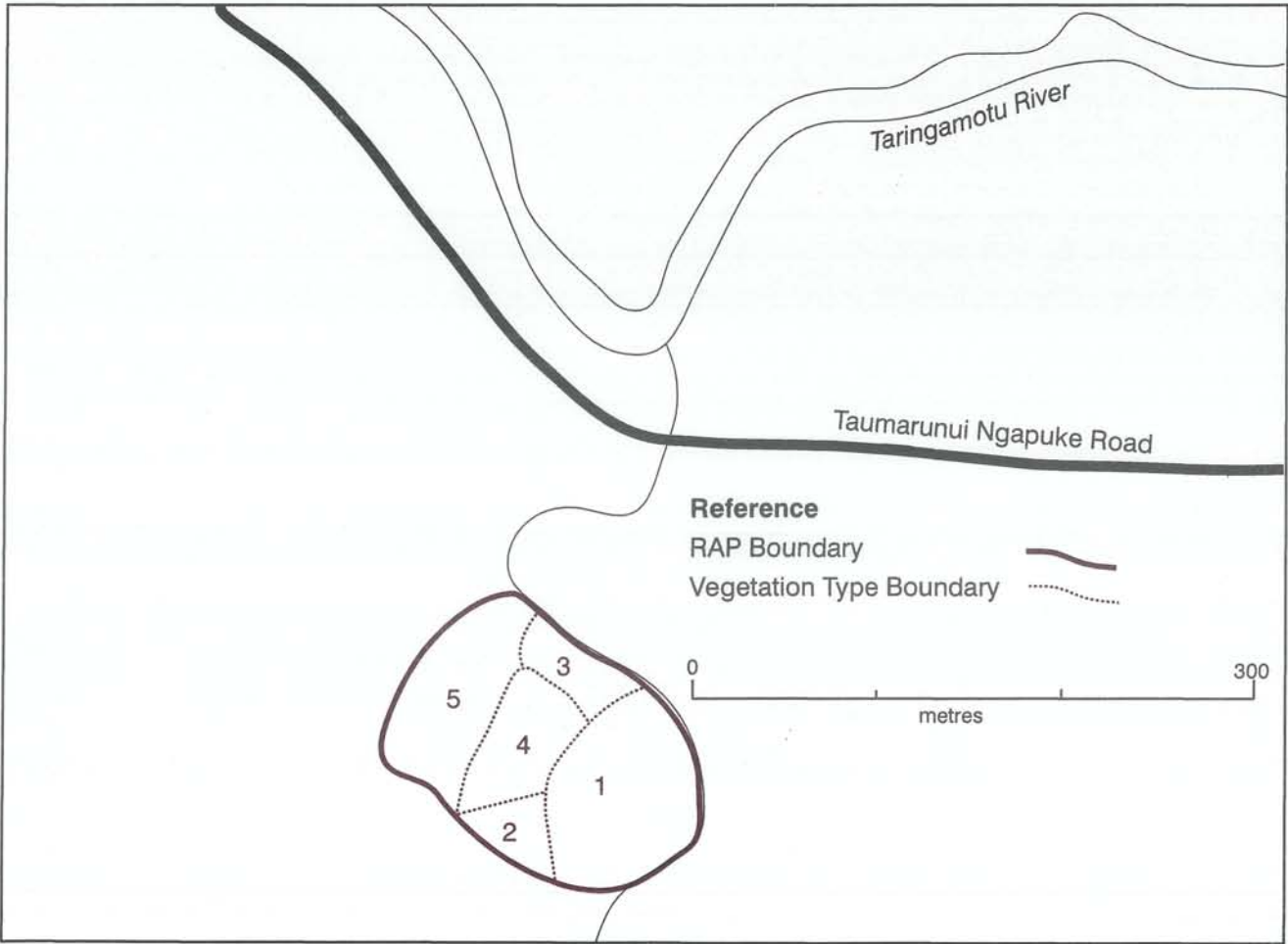
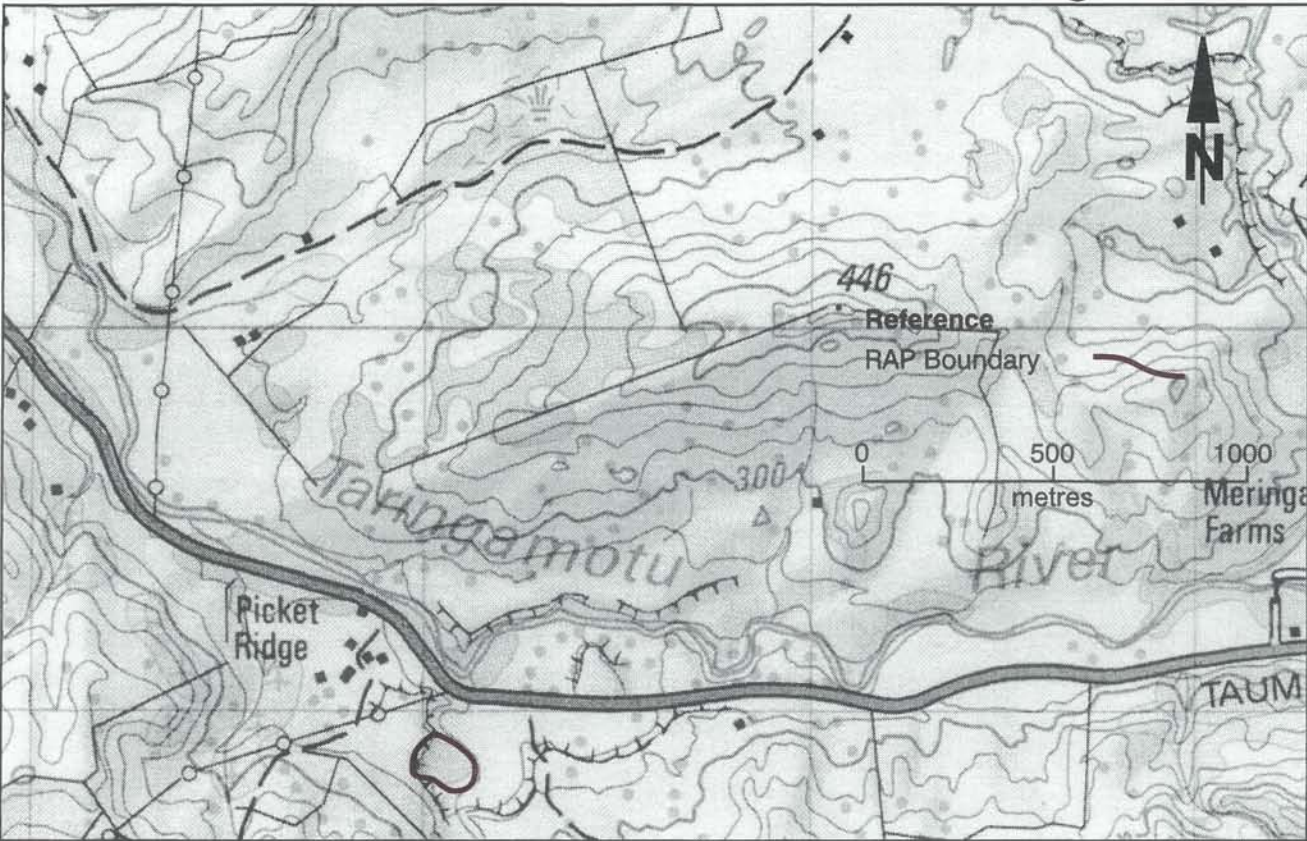
Within the ox-bow cut-off, open water with scattered raupo and a minor component of purei on the margins (vegetation type 1), grades into dense raupo reedland with occasional purei (vegetation type 3). Blackberry is common on the margins. There is also a drier area of sedgeland characterised by purei and *Carex geminata* (vegetation type 2). Blackberry is also on the margins of this vegetation type.

The totara treeland reaches 12 m in height, and has minor components of kahikatea and matai. The understorey is generally open and mostly comprises blackberry and pasture grasses in the groundcover with occasional scattered turepo, putaputaweta and whauwhaupaku and *Coprosma rhamnoides* in the shrub tier.

A mosaic of two vegetation types is present on the scarp. Kiokio fernland occurs in almost vertical areas, while in steep to very steep areas the vegetation consists of wheki ponga treefernland, up to 3m in height, with minor components of houhere, ti kouka and black maire (generally on the toeslope). Patches of blackberry and buddleia are locally common. The understorey of the treefernland is sparse. The groundcover includes the ferns kiwikiwi and kiokio.

Flora

Only typical species were noted.



Fauna

Spotless crane are present and fernbird have been previously reported from the site (SSBI site no. S18/H033 unpub. data held by Wanganui Conservancy). Other birds present include paradise shelduck, pukeko and fantail.

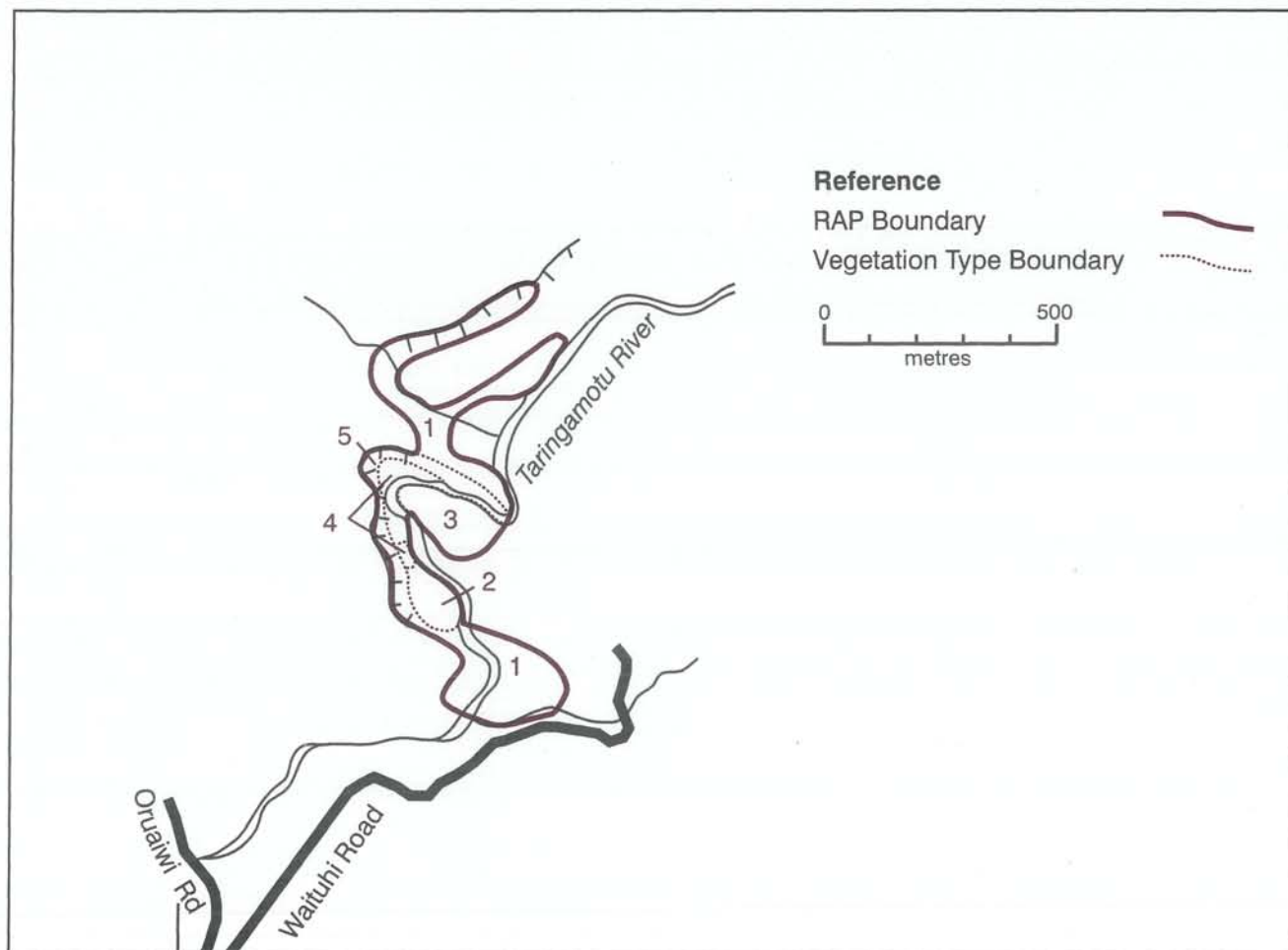
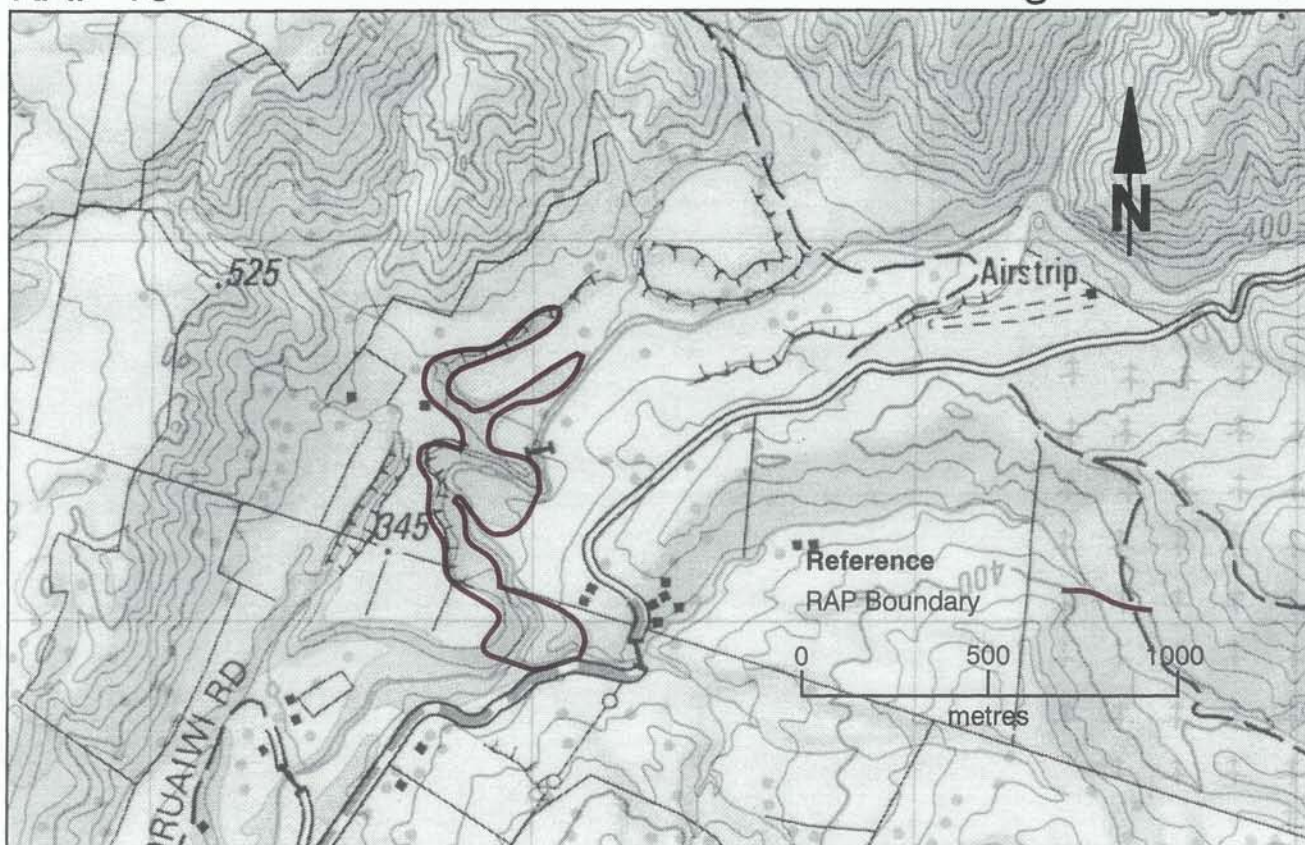
Threat/Modification

Several environmental pest plants are present. Grey willow and blackberry are a threat to the wetland vegetation. Grey willow in particular can change both the structure and composition of the vegetation. Buddleia, blackberry and Himalayan honeysuckle could displace indigenous vegetation on the bluff. Control of these species should be considered.

Maimai are present.

Justification

Wetland vegetation on the riparian flat landform unit has been highly reduced in extent, and is under represented in the protected areas network where there are no known examples currently protected. The presence of spotless crane further increases its conservation significance. This RAP is the only one of the five RAPs covering wetlands on the riparian flats landform unit with an example of an ox-bow cut-off wetland (the others being RAPs 1, 13, 18 and 21).



TARINGAMOTU RIVER

RAP No.: 15
PNAP Survey No.: S18-65
Grid Reference: NZMS260 S18 228620
Landform unit(s): Riparian flats
Area (ha) 15.8
Altitudinal Range: 320-340 m
Survey Methodology: Field inspection
Conservancy: Waikato

BIOTIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Totara-kamahi</u> forest.	Terrace, scarps.
	2. Totara-kahikatea-matai-(miro) forest.	Terrace, scarps.
	3. Pole totara-pole kahikatea-pole miro treeland.	Riparian flats.
	4. <u>Blackberry</u> -manuka-rank pasture grasses shrubland	Riparian flats. Scarps.
	5. (Kowhai)/buddleia-blackberry shrubland.	
	6. (Wharariki)-(koromiko) rockland (not mapped).	Bluffs.

Landform

This RAP is located in the upper reaches of the Taringamotu River, south of Tuhua in the east of the ecological district. It includes vegetation on riparian flats, terraces, scarps and bluffs contiguous with the Taringamotu River. Steep bluffs and scarps characterise the RAP. A long narrow north-west, south-east trending bluff at the centre of the site has a large, irregular-shaped hole in the middle c.40 m high and 20 m wide.

Vegetation

Predominantly secondary forest established following clearance although a small example of remnant podocarp forest remains. Rockland, scrub and shrubland vegetation occurs on terrace scarps and bluffs.

The forest canopy is dominated by secondary totara with kamahi to c.16 m in height with scattered emergent matai over much of the RAP (vegetation type 1). Totara is locally dominant on terrace scarp tops. Black maire is a minor canopy component and the subcanopy comprises scattered pole rimu, matai, kamahi, and totara. Whauwhaupaku, mahoe and wheki are dominant in the middle tiers. Where heavy grazing occurs, the ground cover consists of kiwikipi and rereti with pasture grasses. Elsewhere, *Coprosma rhamnoides* and locally abundant blackberry dominate the groundcover.

Remnant podocarp forest (vegetation type 2) occurs on the lowest lying terrace adjacent to the Taringamotu River. On poorly drained areas kahikatea and matai form an open canopy (to c.20 m in height) with totara becoming more common on drier sites and scarps. Kowhai is locally common in the subcanopy with scattered black

maire. The middle tier consists of scattered pole rimu, matai and totara, with putaputaweta, horoeka, and wheki. The ferns rereti, pikopiko, and pakau and locally occurring blackberry form the ground cover.

Forest on the riparian flats has a similar species composition but is a heavily grazed pole stand with no understorey. Manatu and ti kouka are locally common (vegetation type 3).

Small areas of riparian flat to the west of the Taringamotu River contain a dense thicket of blackberry scrub in association with manuka and rank pasture grasses (vegetation type 4).

Terrace scarps are characterised by scattered kowhai over buddleia in association with blackberry, *Poa anceps*, and scattered manuka (vegetation type 5). Bluff vegetation comprises scattered wharariki and koromiko (vegetation type 6, not mapped).

Flora

Only typical species were noted.

Fauna

Australasian harrier and common forest birds including shining cuckoo, bellbird, tui, grey warbler, and fantail were noted.

Threat/Modification

Blackberry is invading areas of treeland and forest margins where soils are poorly drained and is competing with indigenous species. Buddleia is widespread in rockland vegetation and is competing with indigenous species.

Heavy grazing on terraces and riparian flats is resulting in reduced diversity and abundance of understorey species. The RAP needs fencing to exclude stock.

Milling of podocarps on riparian flats is occurring. Further milling would be detrimental to the conservation values of this RAP.

Justification

This RAP is one of the highest quality, largest remaining areas of podocarp forest on the riparian flats landform unit in the Taumarunui Ecological District. Indigenous forest on this landform has been highly reduced in extent and only c.2% of this landform unit is currently represented in the existing reserve network.

HAUHUNGAROA

RAP No.:	16
PNAP Survey No.:	T18-01
Grid Reference:	NZMS260 T18 330600
Landform unit(s):	Hill country - moderately steep to steep slopes
Area (ha)	540
Altitudinal Range:	600-1078
Survey Methodology:	Interpretation of aerial photographs; observation from nearby high point, field survey.
Conservancy:	Waikato

BIOTIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. Hall's totara/horopito-broadleaved species tree-shrubland.	hillslope, summit

Landform

Located on the middle eastern margin of the ecological district, Hauhungaroa, at 1078 m a.s.l., is the highest point in the ecological district. The majority of this site comprises steep slopes, however in the north-east, there is an area of relatively gentle slopes.

Vegetation

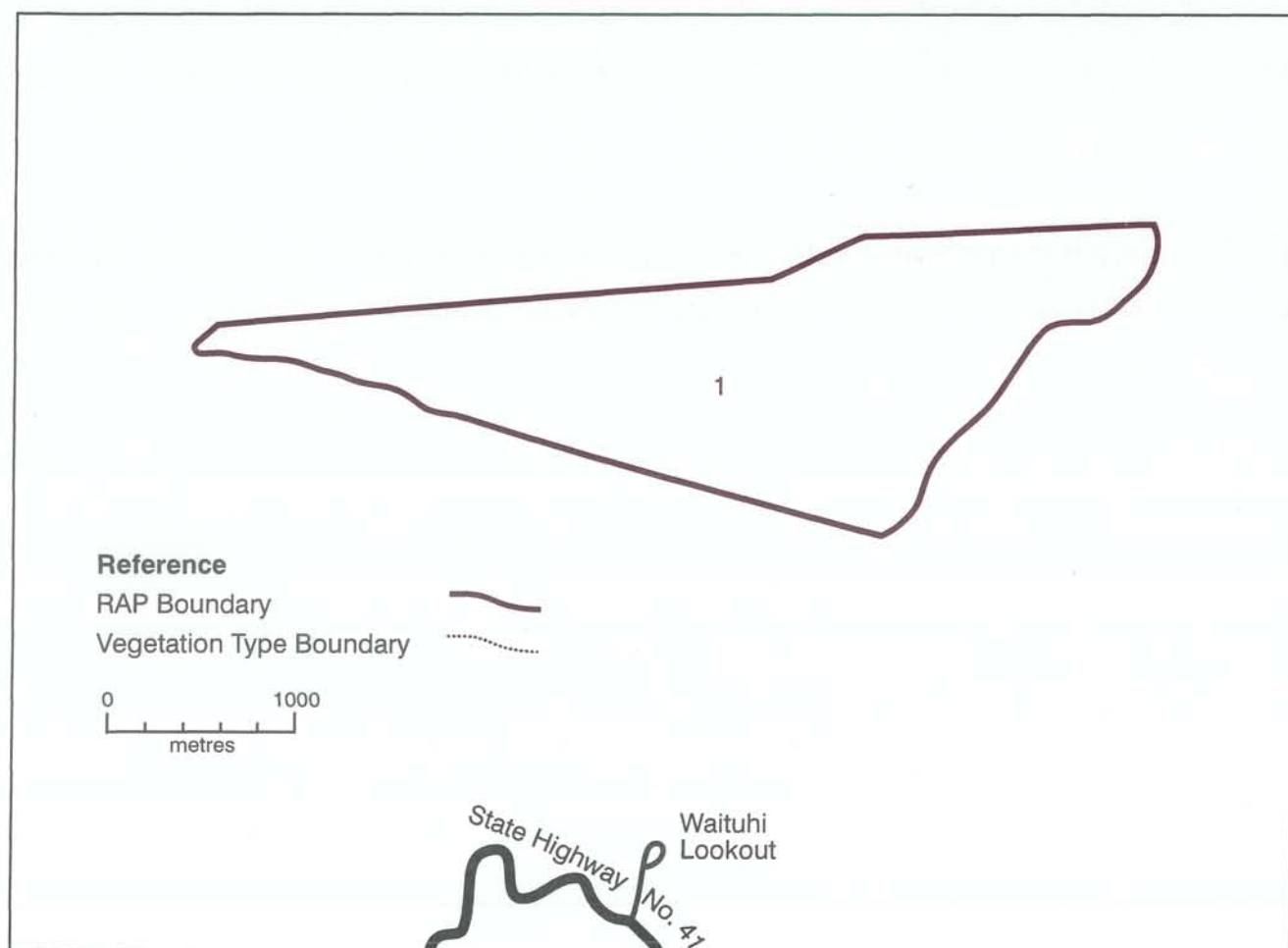
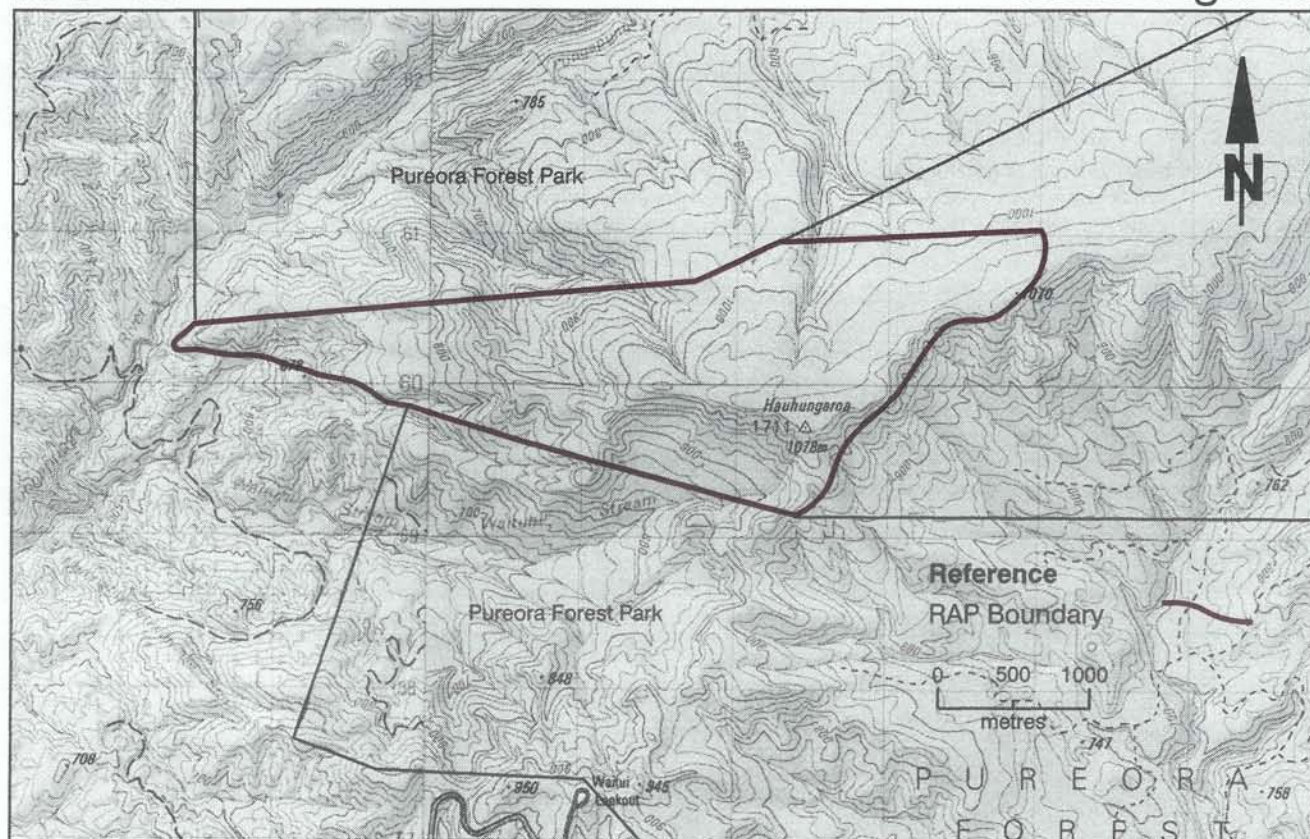
The vegetation comprises common low emergent Hall's totara over a dense canopy characterised by varying mixes of horopito and other broadleaved species including hakeke, kamahi, toro, putaputaweta, white maire, hupiro and *Coprosma* sp. 't'. Katote is also present in the canopy along with occasional black maire and kanono, and very local horoeke. There are local dead kamahi and local areas of forest dominated by Hall's totara. The understorey is dominated by horopito, but with hupiro and *Coprosma* sp. 't' present in the shrub tier. Bush rice grass dominates the groundcover in association with local *Uncinia uncinata*, kiwikiwi, heruheru and *Blechnum procerum*. Epiphytic makawe, kowaowao and *Hymenophyllum* spp. Are also present in the understorey.

Flora

Typical species only are known to be present.

Fauna

Rifleman and common forest birds including fantail and grey warbler are present.



Threat/Modification

Control of possum and goats with 1080 was undertaken recently and should be ongoing. Increases in the possum and goat population would result in a decrease in the abundance and diversity of understorey species.

Justification

Hauhungaroa RAP comprises a large area of unprotected indigenous vegetation linking two large parts of Pureora Conservation Park. Protection of the RAP is very important to maintain connectivity between these ecologically significant protected natural areas of outstanding conservation value. Moreover, this RAP, in combination with the Puketapu RAP (No. 17) and an additional area of land linking Puketapu RAP with Tongariro Forest Park (to which access for the current survey was denied), would create a continuous corridor of protected indigenous habitat linking Pureora Conservation Area with Tongariro Forest Park. Such a corridor is of high conservation value as it allows the free flow of genetic material between populations, can link seasonally important food sources and wintering habitats, and increase the effective population sizes of rare bird species (O'Donnell, 1991). This is particularly important for obligate or primary forest dwellers. For instance, in North Westland, rifleman, tomtit and North Island robin (all of which occur in Taumarunui Ecological District) do not generally move across non-forested areas (O'Donnell, 1991).

References

de Groot 1997.

PUKETAPU 3A

RAP No.: 17

PNAP Survey No.: S18-35

Grid Reference: NZMS260 S18 300540

Landform unit(s): Hill country-moderately steep to steep slopes

Area (ha) 2,950

Altitudinal Range: 380-800 m

Survey Methodology: Field survey; interpretation of 1999 aerial photographs

Conservancy: Tongariro/Taupo

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. (Miro)-(rimu)/hinau/wheki-whauwhaupaku-putaputaweta-horoeka-rangiora-horopito scrub	Hillslope, ridge crest, spurs.
	⇔ (miro)-(rimu)/hinau-kamahi/ <u>putaputaweta</u> -kamahi-horoeka-mahoe wao scrub.	Hillslope, gully.

Landform

This RAP is located along the central eastern margin of the ecological district. It is an extensive area comprising most of the catchments of several streams including Waione Stream, Waipungapunga Stream and the headwaters of Waipari Stream. There are several north-east to south-west trending ridges, with the streams flowing to the south-west. The valleys are steep-sided with long and very narrow valley floors. The ridge crests are also narrow; the majority of the RAP consists of hillslopes, spurs and gullies.

Vegetation

The RAP has been extensively logged and the highly modified vegetation consists of a mosaic of two scrub types. The first scrub type is characterised by varying mixes of wheki, whauwhaupaku, putaputaweta, horoeka, rangiora and horopito (3-5 m in height), with low emergent hinau and scattered tall emergent rimu and miro remnants from the original forest cover. The exact composition of the scrub canopy varies from areas where wheki dominates locally through to abundant broadleaf areas. The understorey is quite browsed and open, although in steeper areas that are less accessible to browsing animals the understorey tends to be denser. Horopito in association with rangiora is the most abundant component of the shrub tier. The groundcover comprises leaf litter with bush rice grass, and *Uncinia uncinata* several fern species including petipeti, peretao, kiwikiwi. There are occasional saplings and seedlings of broadleaved canopy species.

The second scrub type tends to occur on lower to middle slopes and in gullies. It is characterised by a variable canopy (5-6 m in height) of putaputaweta in association with kamahi, mahoe wao (*Melicytus lanceolatus*) and horoeka and minor components of kapuka and kohuhu. Emergent kamahi and hinau are overtopped by remnant occasional miro and rimu. There are small local areas where the rimu, miro and hinau form quite a dense canopy. The understorey is essentially the same as the

other scrub type but wheki ponga are present in the 2-5 m tier and there are occasional sapling and seedling podocarps. Pole rimu emerging through the scrub canopy are reasonably common, particularly on lower slopes and in gullies. There are also small local patches where tawa are emergent and abundant.

Tracks, skid sites and hauler sites which occur throughout the RAP tend to be dominated by toetoe in association with manuka. The ground cover consists mainly of exotic species, including catsear, browntop, Yorkshire fog and lotus but hard fern is locally dominant.

Flora

Only typical species were noted.

Fauna

Whio (blue duck; category 'B' threatened species; Molloy and Davis 1994) are present in the Waipari Stream catchment.

Kereru and common forest birds including grey warbler, fantail and shining cuckoo are present. Paradise shelduck were also observed.

Threat/Modification

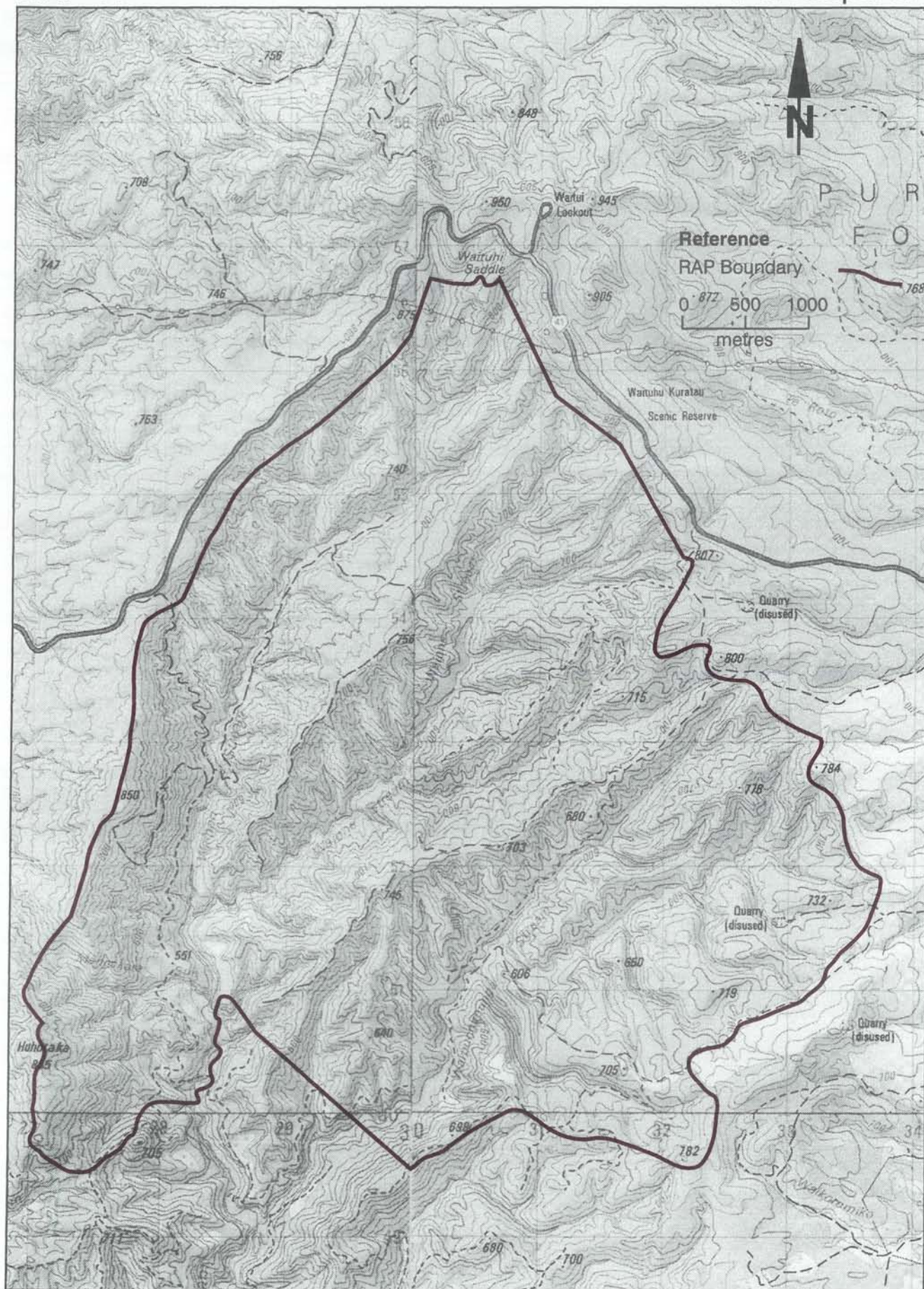
Browsing by ungulates has decreased the diversity of understorey plant species and is reducing regeneration. Continual browsing by ungulates, particularly stock, will further modify the understorey.

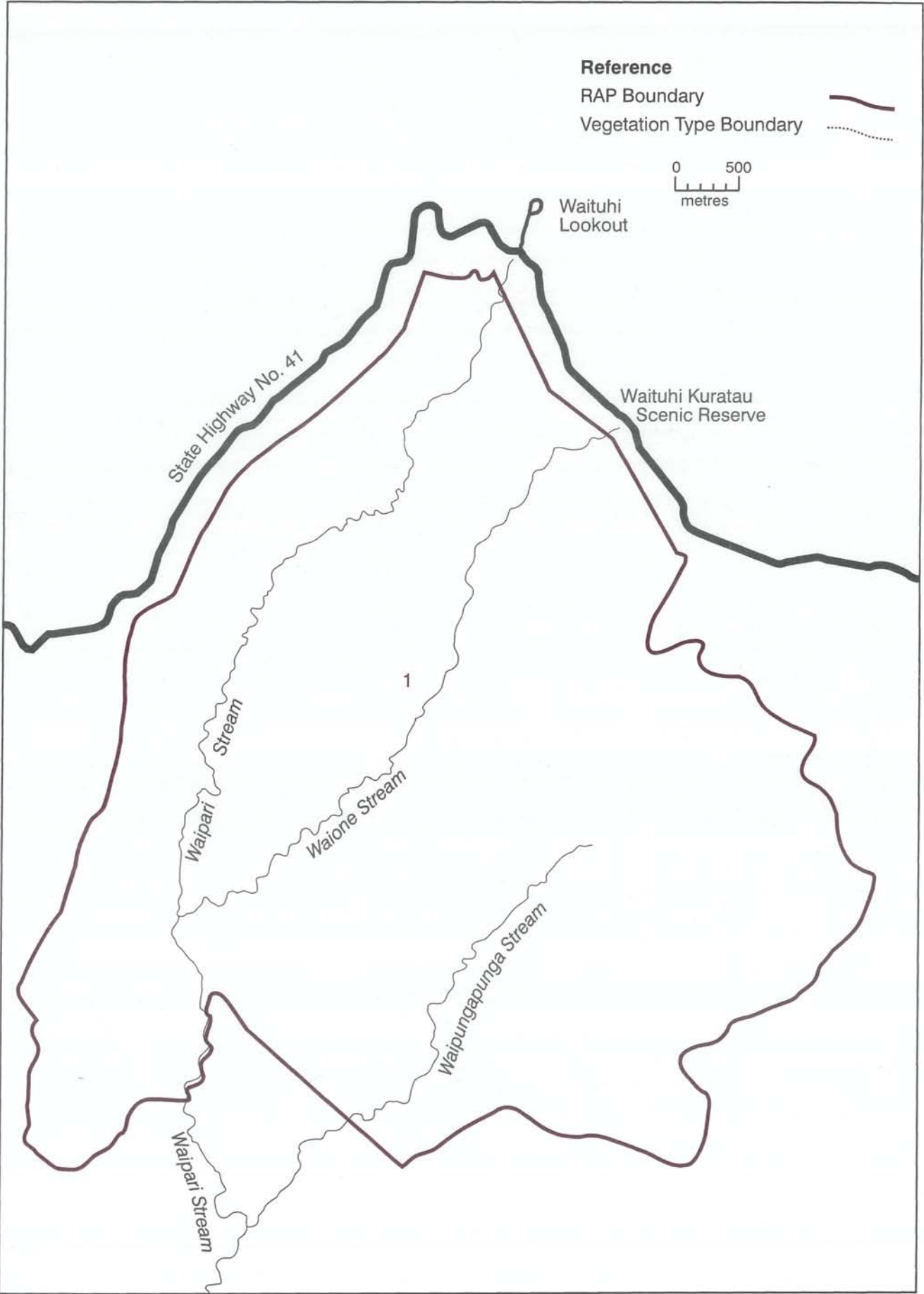
Justification

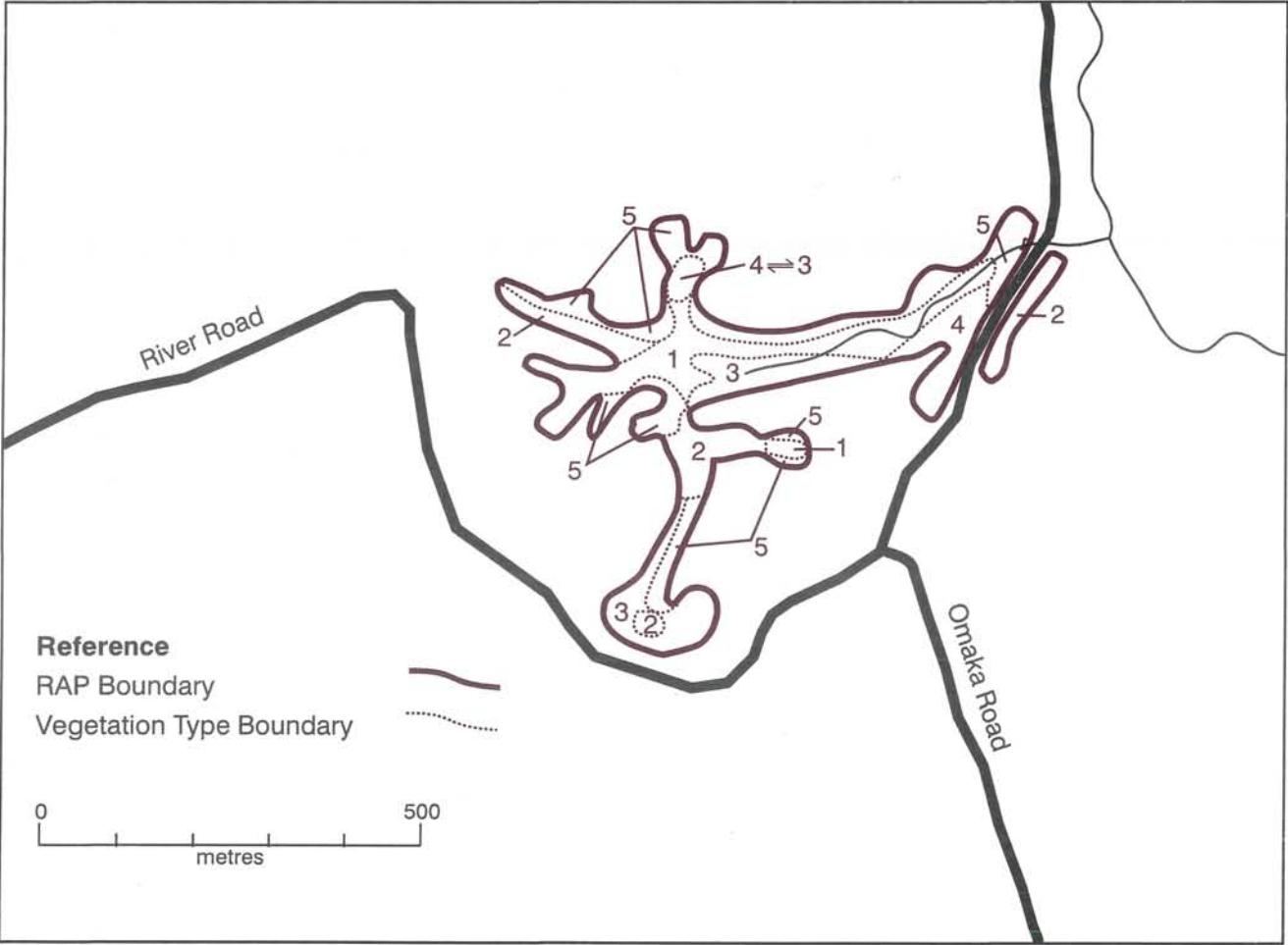
This RAP is part of an extensive tract of indigenous vegetation that is of outstanding wildlife habitat value. It is an extensive area which forms part of an important habitat corridor linking Pureora Conservation Park and Tongariro Conservation Area. Such a corridor is of high conservation value as it increases the effective population sizes of rare bird species, can link seasonally important food sources and wintering habitats, and allows the free flow of genetic material between populations (O'Donnell, 1991). This is particularly important for obligate or primary forest dwellers. For instance, in North Westland, rifleman, tomtit and North Island robin (all of which occur in Taumarunui Ecological District) do not generally move across non-forested areas (O'Donnell, 1991). It also contains significant habitat for whio, a category 'B' nationally threatened species.

Notes

This RAP represents only part of the Recommended Area for Survey (sites S18-34 and 35) identified by de Groot (1997) as access to the adjoining areas was not granted. Interpretation of aerial photographs and observation from roads suggests that large areas of indigenous scrub and forest are still present over much of the adjoining area. It is suggested that further negotiation be undertaken to enable a survey of the adjoining area, as protection of these areas would create a continuous habitat corridor between Pureora Conservation Park and Tongariro Conservation Area.







KARAKIA SWAMP

RAP No.: 18
PNAP Survey No.: S18-18
Grid Reference: NZMS260 S18 024506
Landform unit(s): Riparian flats
Area (ha) 14
Altitudinal Range: +/- 180 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Grey willow/raupo</u> shrubland.	Wetland.
	2. <u>Raupo</u> reedland.	Wetland.
	3. (Ti kouka)-(manuka)-grey willow/ <u>raupo</u> -harakeke shrub-reedland.	Wetland.
	4. <u>Totara</u> /mahoe forest ⇔ <u>manuka</u> -(ti kouka) shrubland.	Riparian flat.
	5. (Totara)-(kahikatea)/ <u>manuka</u> -grey willow scrub.	Riparian flat.

Landform

A wetland at the confluence of several small streams on a riparian flat formed by the Whanganui River, south-west of the Taumarunui township around the centre of the ecological district.

Vegetation

This RAP comprises a mosaic of wetland vegetation types grading into secondary shrubland and forest types.

Over most of the area grey willow forms an open canopy over raupo (vegetation type 1). Swamp kiokio and blackberry are common amongst the raupo and barberry occurs locally on drier sites and margins. Where the water table is higher grey willow is less common and raupo dominates (vegetation type 2).

Small pockets of shrub-reedland occur with scattered ti kouka, manuka and grey willow forming an open canopy over abundant raupo in association with harakeke and scattered koromiko (vegetation type 3). Totara forest with local mahoe groves forms a mosaic with manuka shrubland (vegetation type 4). The forest canopy includes minor components of kahikatea and rimu, with whauwhaupaku, rewarewa, pole rimu and totara in the middle tiers. Scattered ti kouka are present in the manuka shrubland.

Manuka scrub occurs on free draining wetland margins and adjacent hillslopes. Grey willow is also present in the canopy and there are scattered emergent totara and kahikatea (vegetation type 5).

Flora

Only typical species were noted.

Fauna

Fernbird, which are uncommon in the ecological district were observed. Also recorded were NZ falcon, pukeko, fantail, bellbird, and silvereye. Spotless crane were heard calling from the raupo.

Threat/Modification

Extensive infestations of grey willow occur over much of the area, dominating the wetland habitat and suppressing indigenous wetland plants. Control of grey willow should be considered.

Blackberry is also abundant in the RAP and on adjacent hillslopes.

Sheep and cattle graze the margins of this RAP, reducing both the diversity and abundance of the wetland indigenous plants. Minimal damage to plants by trampling and pugging of soils was observed but this is a potential threat. Fencing to restrict livestock from the wetland margins is recommended.

Justification

This RAP contains the largest example of wetland vegetation on this landform unit to be recommended for protection. It is in good condition, i.e. relatively unmodified, and representative of its type. Wetlands on this landform unit have been greatly reduced in extent and there are currently no wetlands protected on the riparian flats landform unit. There are five RAPs containing examples of wetland vegetation on the riparian flats landform unit (the others being RAPs 1, 13, 14 and 21).

The presence of spotless crane and fernbird greatly enhances the wildlife values of this wetland.

MANUNUI

RAP No.: 19
PNAP Survey No.: 70349
Grid Reference: NZMS260 S18 105555
Landform unit(s): Riparian flats
Area (ha) 11.0
Altitudinal Range: +/- 180 m
Survey Methodology: Field survey
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1 Kahikatea/ ~~kahikatea-totara~~ forest.	Riparian flat.

Landform

An area of riparian flat adjacent to the Whanganui River, immediately east of the Taumarunui township around the centre of the ecological district.

Vegetation

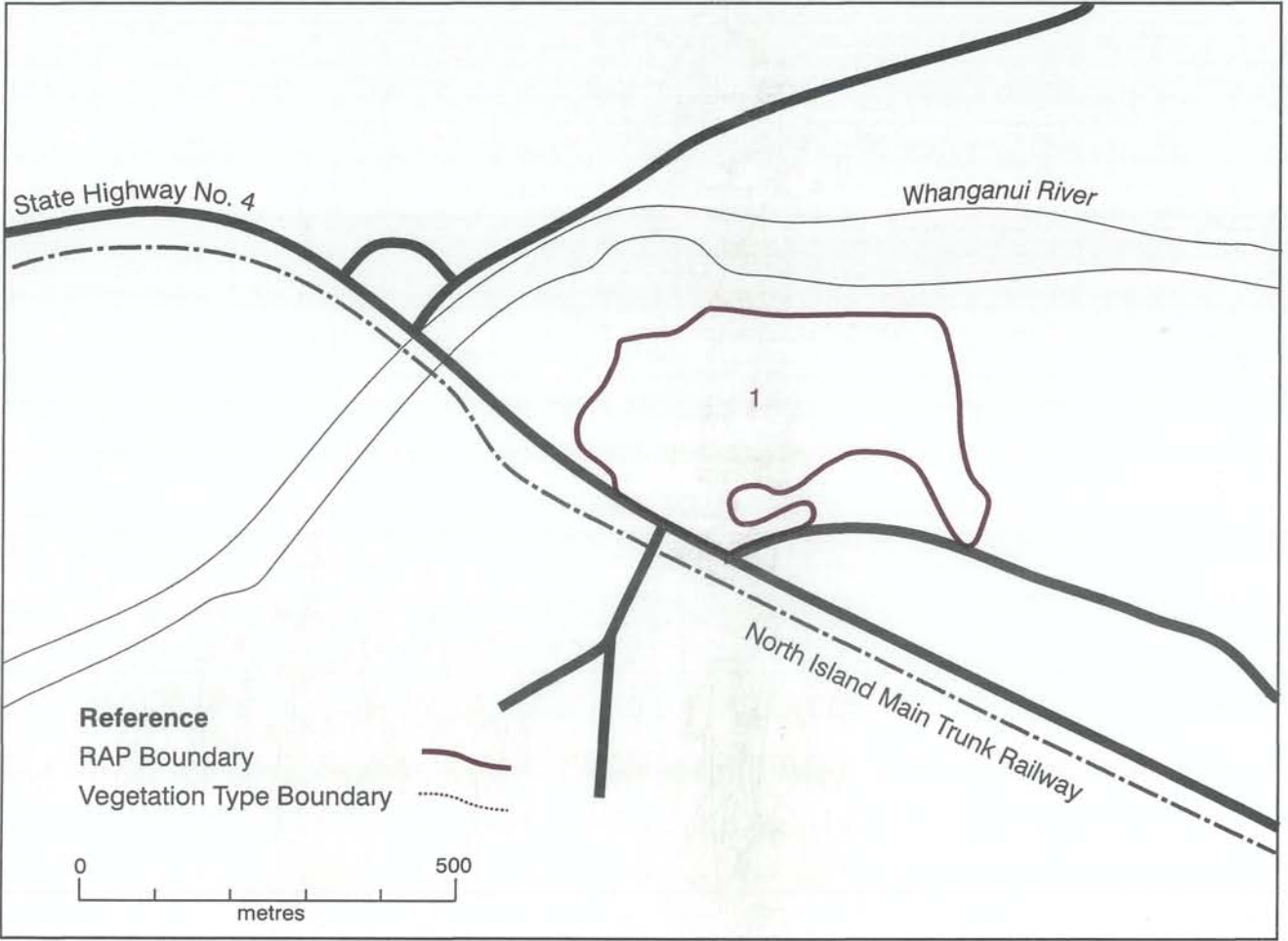
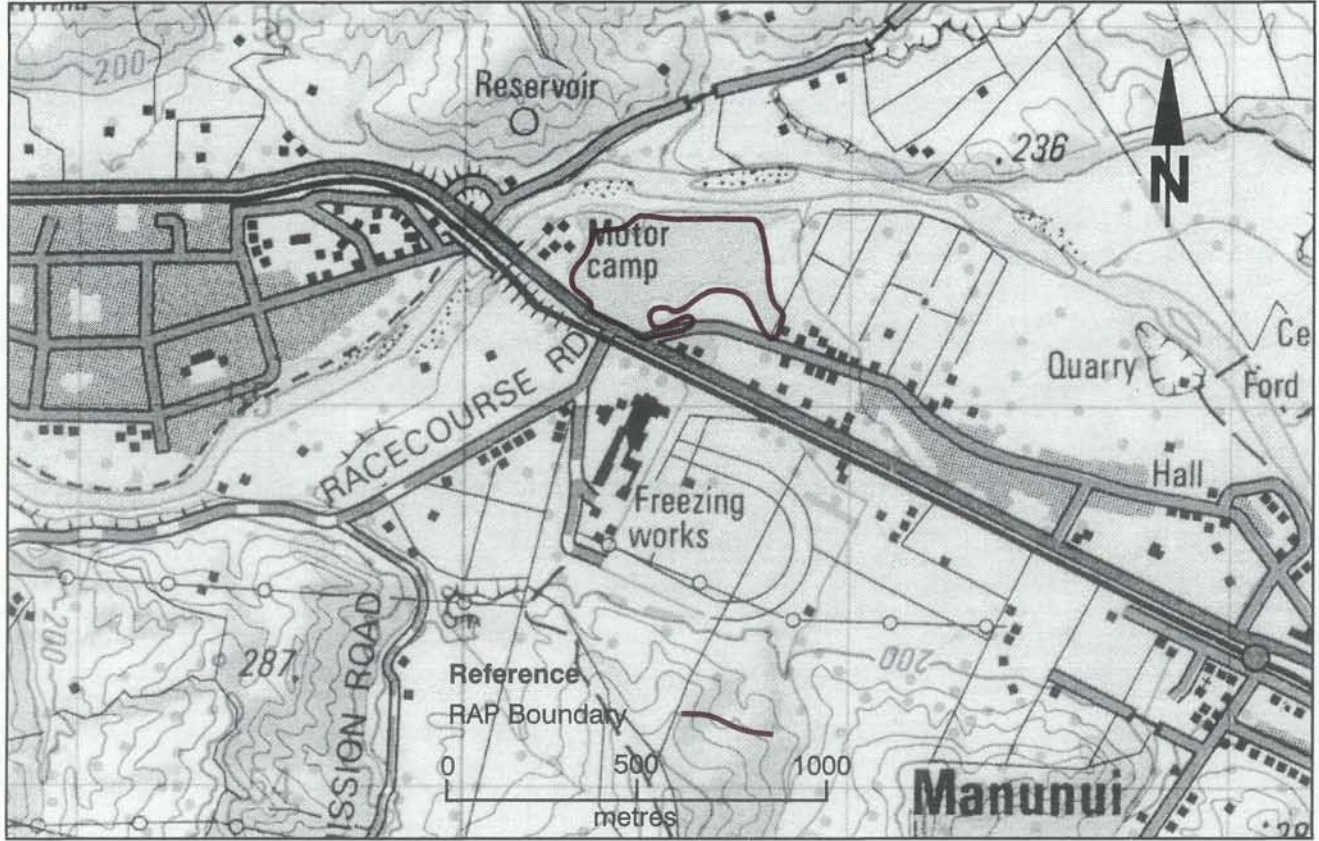
Modified primary forest characterised by a canopy of kahikatea and totara at least 20 m in height, with emergent kahikatea. Other canopy components include miro, matai and rimu. Canopy gaps are reasonably common, and are generally dominated by varying mixes of manatu, mahoe, tree privet, whcki ponga and pate. There are some small areas in canopy gaps dominated by Himalayan honeysuckle and Japanese honeysuckle with ivy, creeping buttercup and exotic grasses, including perennial ryegrass, dominating the groundcover. The understorey is generally quite dense and diverse, with *Coprosma rotundifolia*, kanono (*Coprosma grandifolia*), poataniwha and turepo common components of the shrub tier. Other species present include horopito, ramarama, *Coprosma rhamnoides* and *Fuchsia perscandens*. Groundcover species commonly include *Uncinia uncinata*, the ferns mouku and pakau. Ivy is abundant. Good regeneration of totara, kahikatea and miro saplings was noted.

Flora

Coprosma rubra, *Fuchsia perscandens* and *Jovellana sinclairii* have been recorded from only a few sites in the ecological district and occur in this RAP.

Fauna

Common forest birds including fantail, silvereye and grey warbler are present.



Threat/Modification

Several environmental pest plants are present, including tree privet, Chinese privet, ivy, climbing spindleberry and Japanese honeysuckle. These species pose a serious threat to both the structure and composition of the forest. There has been recent control of environmental pest plants but it did not appear to be comprehensive. A plan for the control and ongoing monitoring of environmental pest plants should be developed.

The understorey shows signs of disturbance from recreational users straying from formed tracks, and creating new tracks. Because the RAP adjoins public camping grounds, users should be encouraged to use only properly formed tracks which should be clearly marked.

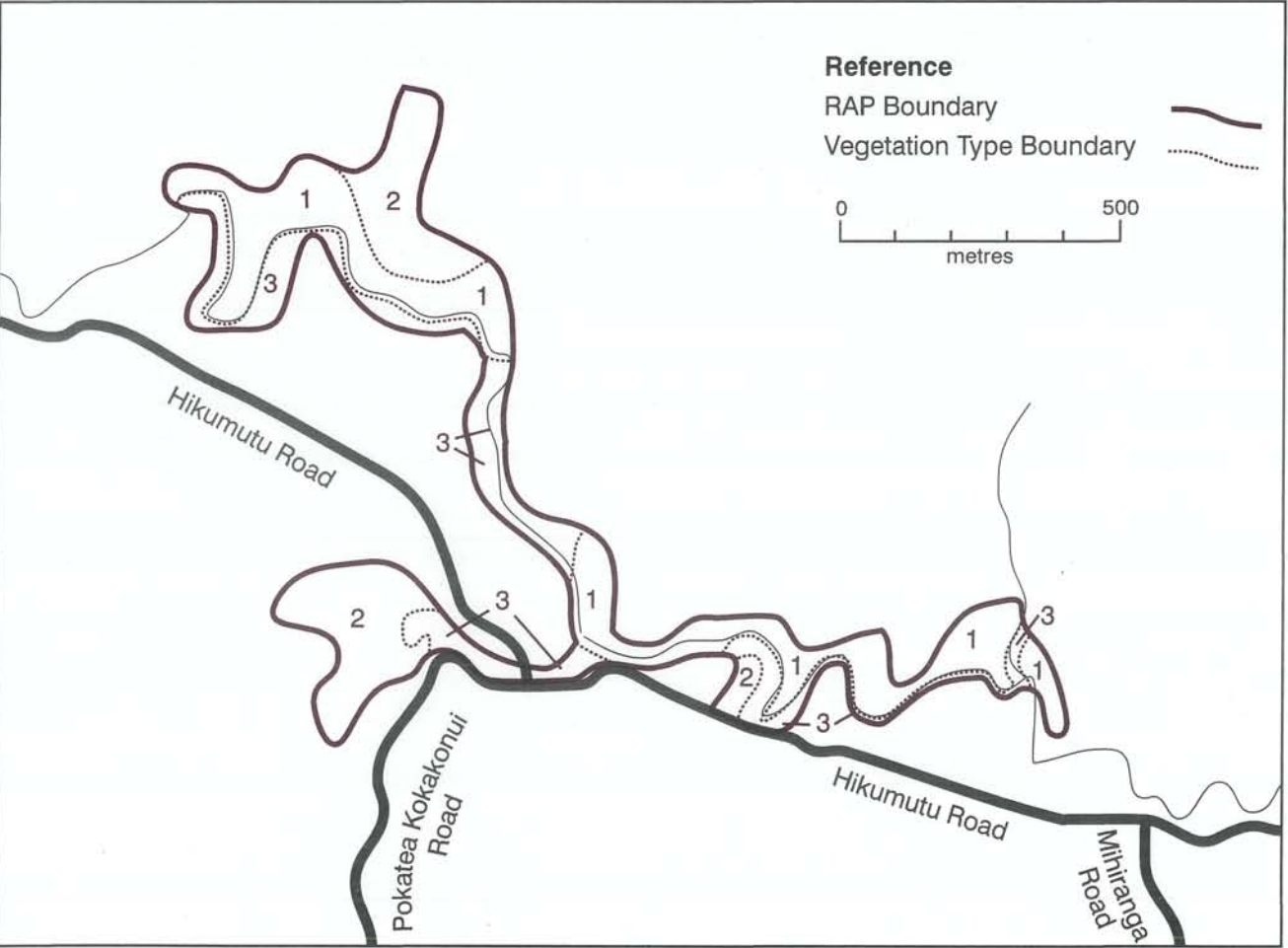
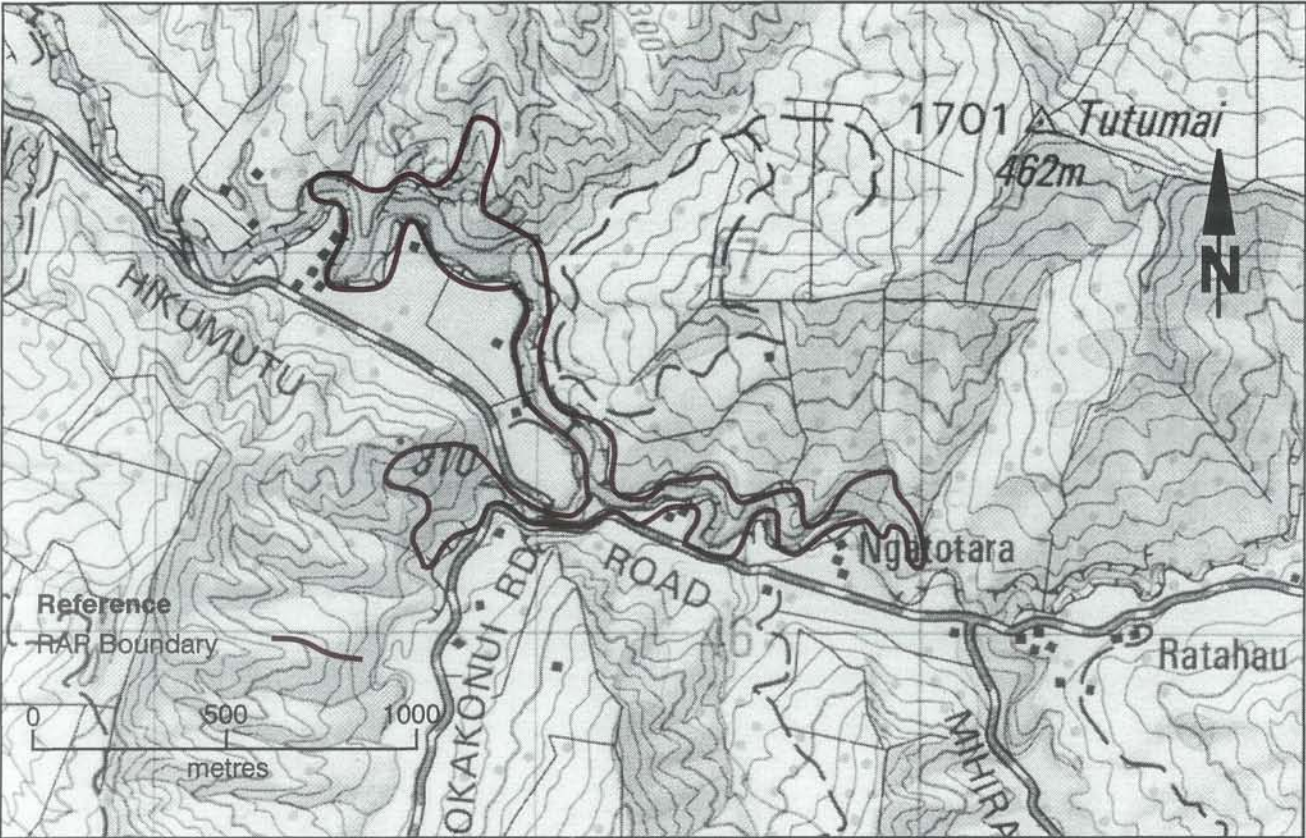
Justification

Forest on the riparian flats landform unit has been heavily reduced in extent, with only 5.8% of the 1840 forest cover remaining. This ecological unit is also under-represented in the current protected areas network: the total amount of protected forest covers only 1.6% of the total area of the riparian flats landform unit. This site is one of the largest remaining areas of forest on riparian flats and is one of the few examples which is not grazed. Although it is already classed as a recreation reserve, this status does not recognise the important conservation value of the forest. The change in status need apply to the forest area only and should not include the motor camp.

References

Department of Conservation 1997

Ogle and Bibby 2000



HIKUMUTU STREAM

RAP No.: 20
PNAP Survey No.: S19-40
Grid Reference: NZMS260 S19 033470 to 099462
Landform unit(s): Terraces; hill country - moderately steep to steep slopes
Area (ha) 23.3
Altitudinal Range: 200 - 300 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOTIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <i>Totara</i> -kahikatea-rimu-matai forest. 2. <i>Totara</i> -(kahikatea)-(matai)/pasture treeland. 3. <i>Totara</i> -ti kouka/houhere-buddleia scrub.	Terrace. Scarps. Incised stream gully, terrace scarps.

Landform

Located to the south of the Taumarunui township, this RAP follows the Hikumutu Stream and comprises pumice riparian terraces, which are long, thin, and convoluted, together with the adjoining scarps and hillslopes.

Vegetation

Hikumutu Stream is characterised by secondary vegetation that has established following heavy logging and later clearance. Occasional remnant emergent totara from the original forest cover are present.

Pole totara up to c.16 m in height dominate the canopy over much of the RAP (vegetation type 1) in association with pole kahikatea, rimu and matai. Middle tiers are sparse, generally comprising scattered houhere, horoeka and saplings of matai, rimu and totara. Manuka and mingimingi are common at the forest edges. Ground cover is generally sparse and consists only of scattered kiwikiwi.

Stream gully and terrace scarp vegetation typically comprises mixtures of totara and ti kouka over houhere, buddleia, koromiko, Japanese honeysuckle, *Muehlenbeckia australis* and kiokio in a mosaic with rank pasture and hard fern (vegetation type 2).

Totara dominant treeland (to a canopy height of c.16-18 m; vegetation type 3) occurs on hillslopes and small areas on terraces. Kahikatea and matai are scattered in the canopy and the ground cover consists of pasture. Mingimingi and manuka occur on margins. Open clearings dominated by pasture grass are common throughout this vegetation type.

Flora

Only typical species were noted.

Fauna

Common forest birds including tui, silvereye, fantail, grey warbler, and bellbird were noted. Kiwi and North Island robin have been reported from this RAP during the last 12 months (J. Goslin, landowner, pers. comm. 1999).

Threat/Modification

Sustained heavy grazing of much of this RAP has resulted in a reduction in species diversity and abundance. The RAP requires fencing to exclude livestock.

Stoat and ferret numbers are reported to be high and increasing (J. Goslin, landowner pers. comm. 1999). This poses a serious threat to the native bird population which may include kiwi (see fauna section). Possum numbers are also reported to be increasing (J. Goslin, landowner pers. comm. 1999). Pest animal control should be undertaken.

Japanese honeysuckle and montbretia, which suppress understorey species and pose a serious threat to indigenous forest, were noted at the site. Control of these species should be considered.

Blackberry, bamboo and wilding pines were also recorded on margins. They are unlikely to spread into the indigenous forest but will establish in shrubland.

Justification

This is one of the largest, highest quality, remaining areas of indigenous forest on the terraces landform unit in the Taumarunui Ecological District. Indigenous forest on this landform unit has been greatly reduced in extent. Only about 3% of this landform unit is currently represented in the reserve network.

PIRIAKA LOOKOUT FOREST

RAP No.: 21
PNAP Survey No.: S19-43
Grid Reference: NZMS260 S19 137494
Landform unit(s): Riparian flats
Area (ha) 19.8
Altitudinal Range: 240-260 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. Kahikatea-(matai) forest.	Terraces
	2. (Kahikatea)/(kahikatea)-(rimu)/ <u>manuka</u> / <u>swamp kiokio-blackberry</u> -(raupo) shrubland.	Wetland
	3. (Tarata)-(totara)/ <u>bracken</u> -blackberry fernland ⇔ putaputaweta-ti kouka-kohuhu- tarata shrubland	Terraces, scarps, gullies.
	4. Manuka-kohuhu-koromiko-bracken- wharariki shrubland	Bluffs.

Landform

Incised river terraces formed by old meander channels of the Whanganui River, to the west of Kakahi near State Highway 4 in the east of the ecological district.

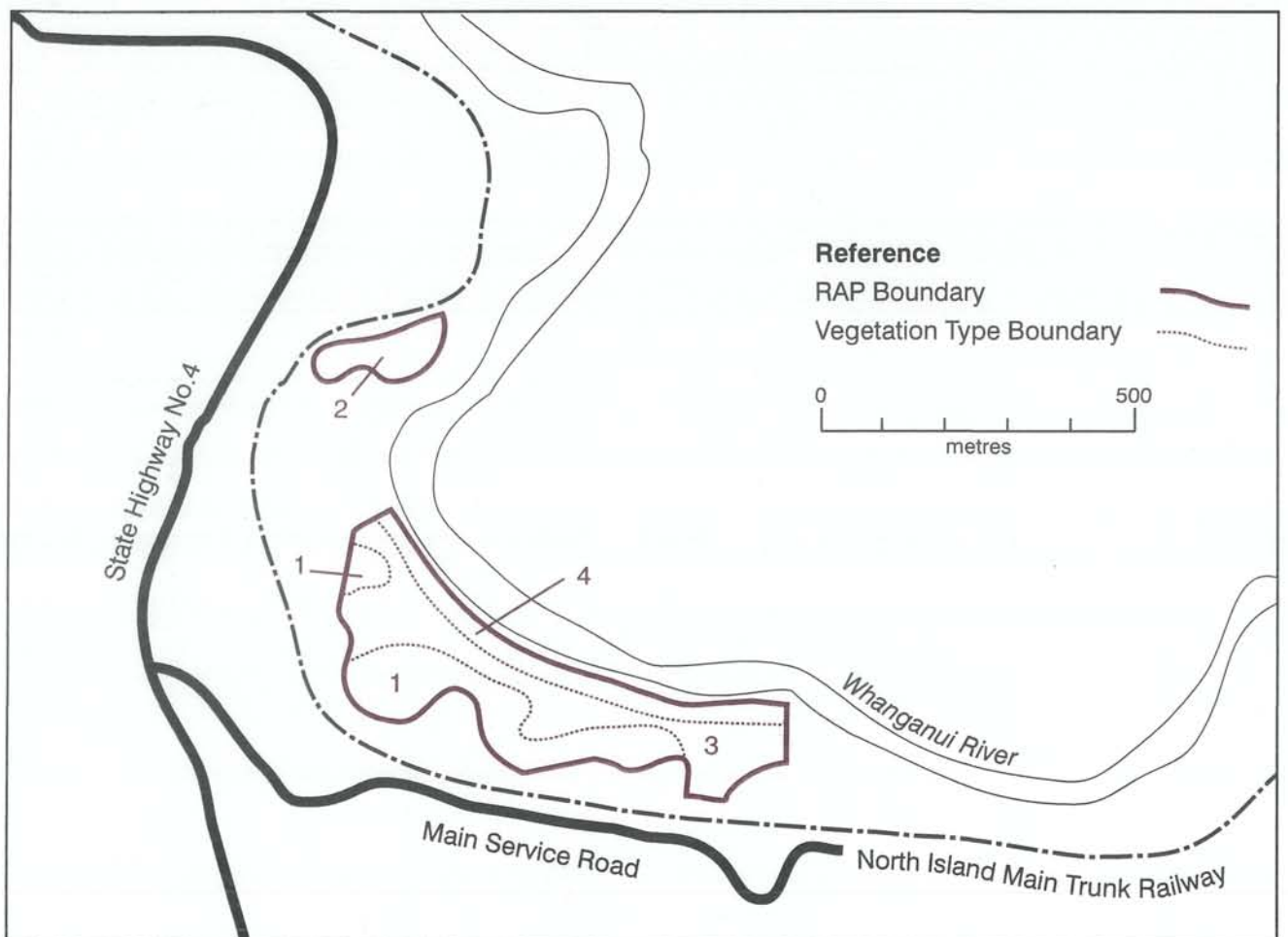
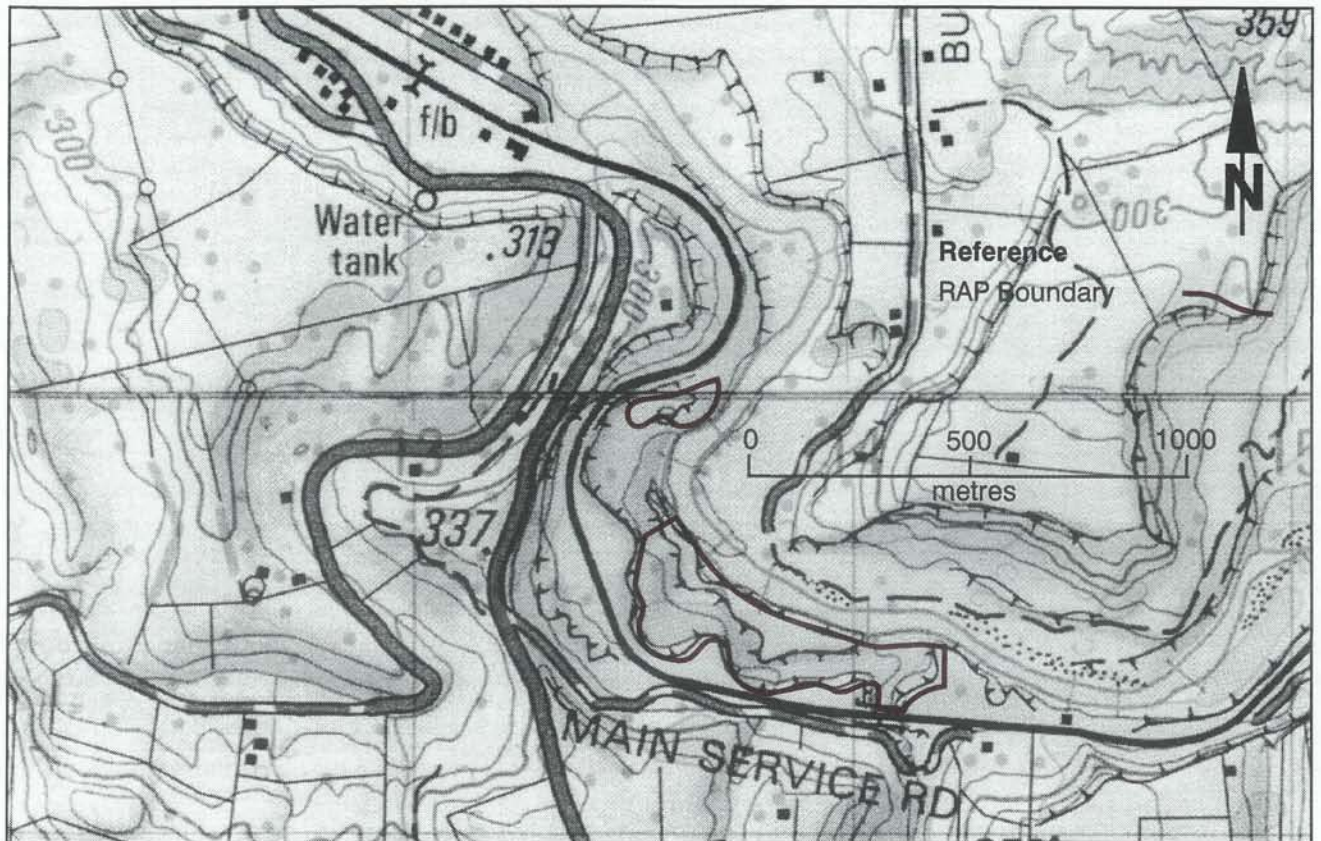
Vegetation

A mosaic of vegetation types characterised by modified primary forest dominated by kahikatea on low lying terraces, and secondary shrubland and scrub on raised terraces, scarps, bluffs, and stream gullies.

Remnant kahikatea to c.20 m in height with scattered matai form the dominant canopy over much of the low lying terrace area. Totara is occasional in the subcanopy over a dense understorey comprising pole totara, mapou, whauwhaupaku, koromiko, mahoe-wao, houhere, buddleia and abundant blackberry. Makomako and blackberry dominate stream gullies.

A wetland occurs on the lowest lying terrace, where manuka forms an open canopy over abundant swamp kiokio and blackberry, in association with koromiko. Raupo is locally common in areas where the water table is high. Occasional remnant kahikatea to c.30 m in height and scattered secondary kahikatea and rimu to c.12 m high are emergent over the canopy (vegetation type 2).

A mosaic of fernland and shrubland is present on scarps, raised terraces, and stream gullies. The fernland is dominated by bracken in association with blackberry and occasional emergent tarata and totara, while the scrub is characterised by varying mixtures of putaputaweta, ti kouka (cabbage tree), kohuhu and tarata. Other species



present in the shrubland include houhere, whauwhaupaku, mapou, pole totara, manuka and mahoe wao.

The bluff above the Whanganui River is dominated by shrubland characterised by varying mixtures of manuka, kohuhu, makomako, koromiko, bracken and wharariki. One or two black wattle are present in the shrubland, and crack willow occurs locally along the toeslope.

Flora

Typical species only were noted.

Fauna

Kereru and other forest birds, including tui, bellbird, fantail, and grey warbler were noted.

Threat/Modification

Adventive species are relatively common within this RAP but most do not threaten the long-term viability of the site. Buddleia and blackberry are common in the forest understorey but will be eventually replaced by shade tolerant indigenous species as the canopy recovers and closes. Blackberry and buddleia are also present in the fernland-shrubland mosaic, along with lupin, gorse, broom and pampas. These species are all likely to be replaced in the long-term due to succession, whereby fernland and shrubland will develop into forest. The only area that these species are likely to persist in the long-term is on the bluffs.

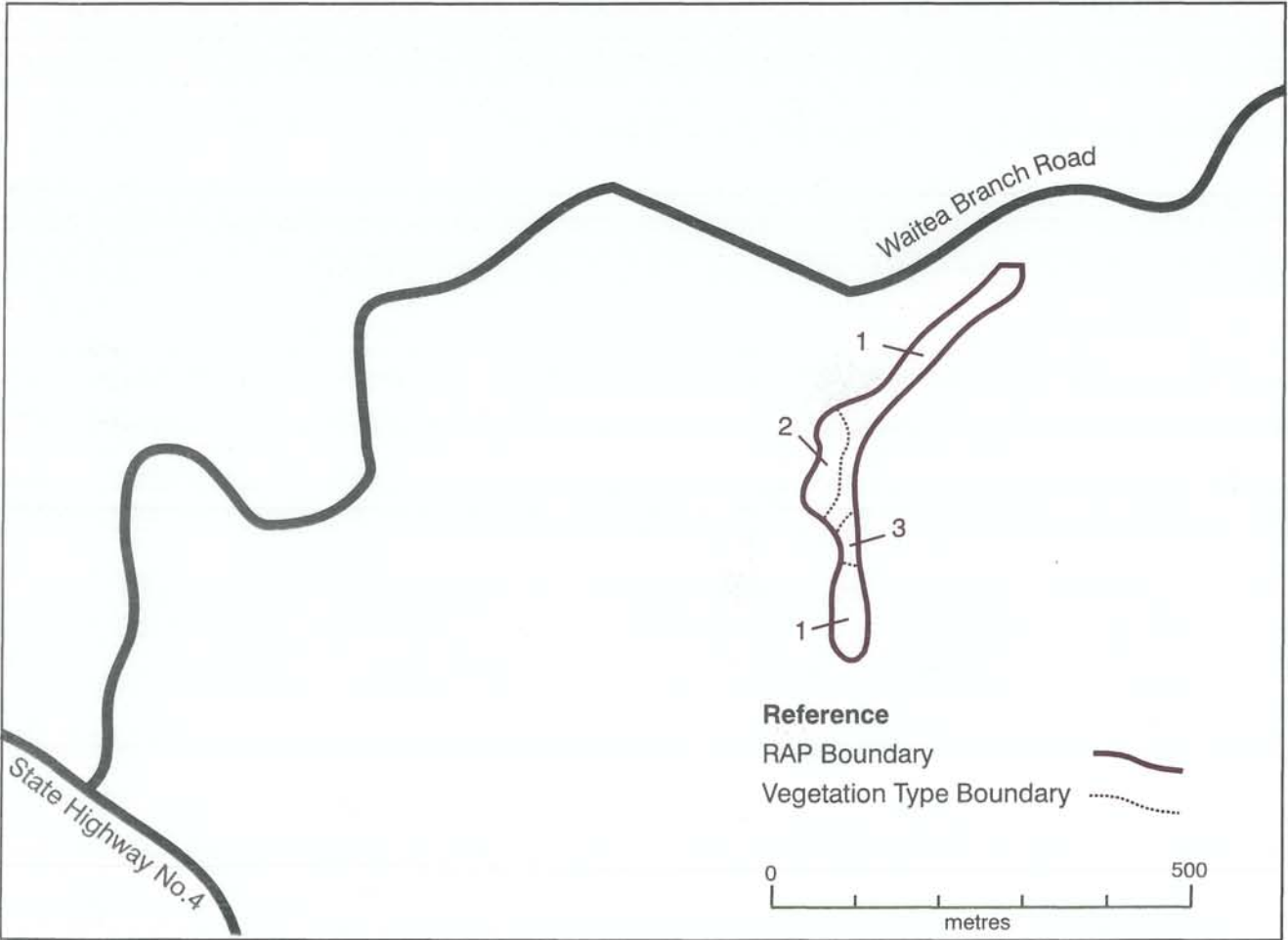
Japanese honeysuckle is locally common in a stream gully at the eastern end of the RAP, and two small infestations of montbretia (less than 10m² in total) were observed on the margin of the small, western forest fragment. Both of these species are a threat to the terrestrial vegetation and should be controlled.

Blackberry threatens wetland vegetation where it can form dense persistent thickets and inhibit low stature wetland plants. If management of blackberry is undertaken, control measures should be focused on wetland vegetation only.

Small areas of radiata pine plantation are contiguous with the RAP. When the trees are harvested, care should be taken to ensure indigenous vegetation is not damaged.

Justification

This RAP, is one of only two RAPs to contain both wetland and forest on the riparian flats landform unit (the other being RAP 1). The wetland and forest are relatively large, representative examples of their type, and would have once been widespread on the riparian flats landform unit. However, they have been greatly reduced in extent, for example only 5.8% of the estimated 1840 forest cover on this landform unit remains. In total only 2.2% of the riparian flat landform unit is protected.



PERCY WETLAND

RAP No.: 22
PNAP Survey No.: S19-46
Grid Reference: NZMS260 S19 160482
Landform unit(s): Undulating terrain-lahar plain
Area (ha) 3.3
Altitudinal Range: +/- 240 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOTIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. (Grey willow)/ <u>raupo</u> -purei reedland.	Wetland.
	2. <u>Purei</u> -swamp kiokio-blackberry sedgeland.	Wetland.
	3. (Purei)/ <u>open water</u> waterfield.	Pond.

Landform

This RAP is located immediately south-west of Kakahi which is in the east of the ecological district. It is a wetland on a depression fed by a stream draining the surrounding undulating terrain.

Vegetation

Scattered grey willow are emergent over reedland dominated by raupo in association with purei and swamp kiokio, and local *Eleocharis acuta* and *Lemna minor*. Manuka and ti kouka are locally scattered, and occasional totara are present on wetland margins.

An area of purei sedgeland occurs on the western corner of the RAP in association with swamp kiokio, blackberry, and a few *Cortaderia fulvida*. Creeping buttercup, *Epilobium ciliatum* and pasture grasses occur in drier areas and shallow water, with retoretore and *Lemna minor* elsewhere. *Juncus effusus* becomes more common along the wetland margins, grading into pasture. Occasional grey willow are present.

A small area of open water occurs behind an artificial dam. A few emergent purei are present.

Flora

Typical species only were noted.

Fauna

Spotless crane, grey duck, pukeko, Australasian harrier and fantail were recorded.

Threat/Modification

Scattered grey willow are present and without control they will increase in abundance and displace indigenous species. However, the population is currently small and control is feasible and recommended. Blackberry is present on the margins of the RAP and appears to be increasing in abundance. Control of blackberry should be undertaken as it has the potential to compete with indigenous species.

Most of the wetland, except for the wettest areas and a small fenced off portion, is intermittently grazed, reducing the diversity and abundance of species, and restricting regeneration. Where livestock have been excluded there is a general increase in the diversity and abundance of species. Minimal damage to plants from trampling was noted but this is a potential threat. The wetland should be fenced to exclude grazing stock.

The dam built at the western end has modified the natural drainage pattern of the wetland to create a small pond and habitat for waterfowl.

Justification

This is the best known example of wetland on the undulating terrain - lahar plain landform unit. It is a relatively large and natural example of wetland vegetation. Wetland vegetation on this landform unit has been greatly reduced in extent and there are no wetlands on this landform unit in the existing protected area network in the ecological district. No other wetlands on this landform unit have been recommended for protection.

KAKAHI STREAM FOREST

RAP No.: 23

PNAP Survey No.: S19-45

Grid Reference: NZMS260 S19 168468

Landform unit(s): Undulating terrain-lahar plain

Area (ha) 6.6

Altitudinal Range: +/-360 m

Survey Methodology: Field inspection, existing information, aerial photographs

Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Rimu</u> /tawa forest.	Plain.
	2. Rimu/ <u>totara-tawa</u> forest.	Hillslope, scarp.
	3. <u>Tawa</u> -totara/pasture treeland.	Plain.

Landform

Undulating lahar plain grading into gentle hillslope and terraces adjoining the Kakahi Stream, south of the Kakahi township in the east of the ecological district.

Vegetation

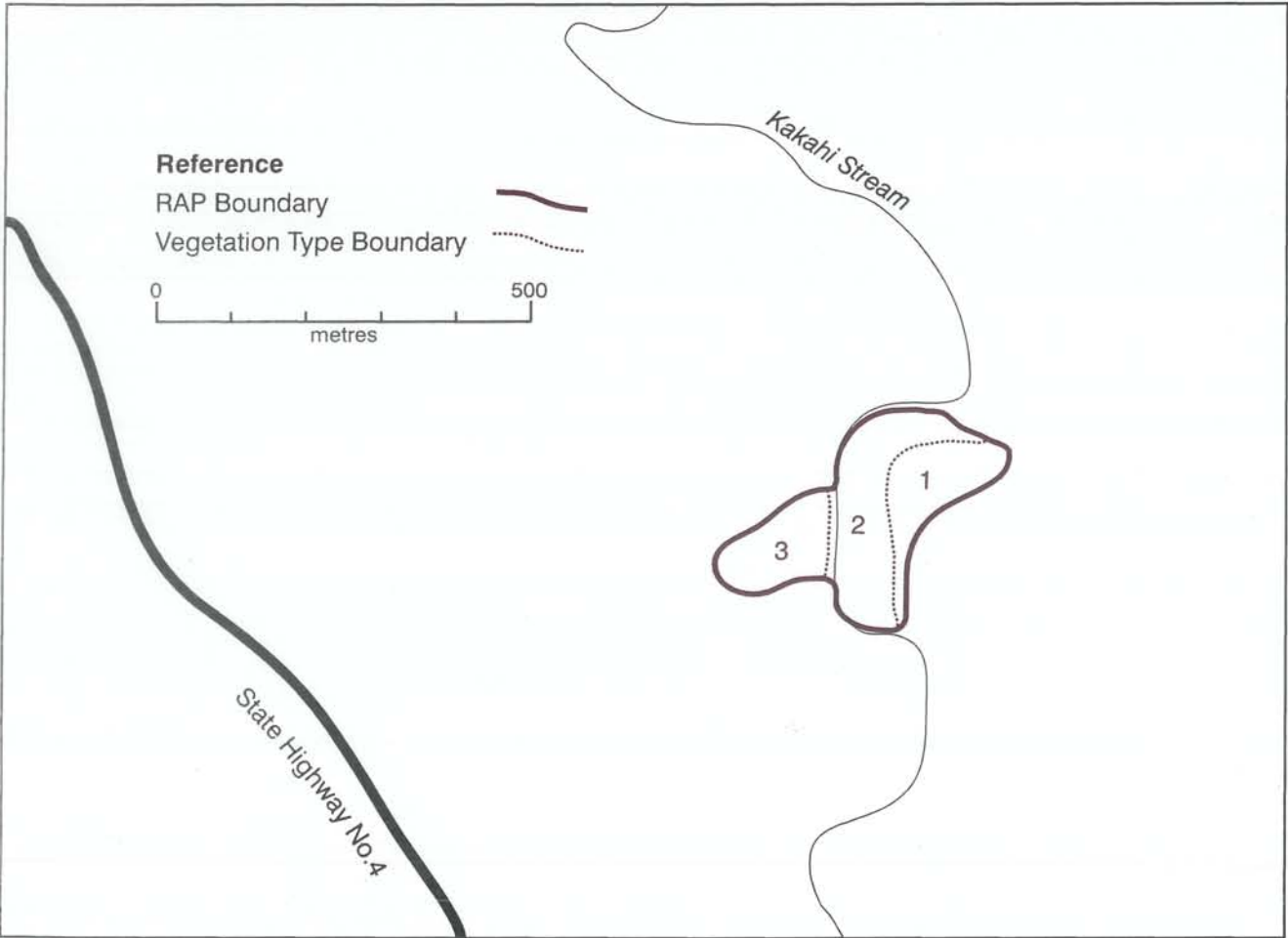
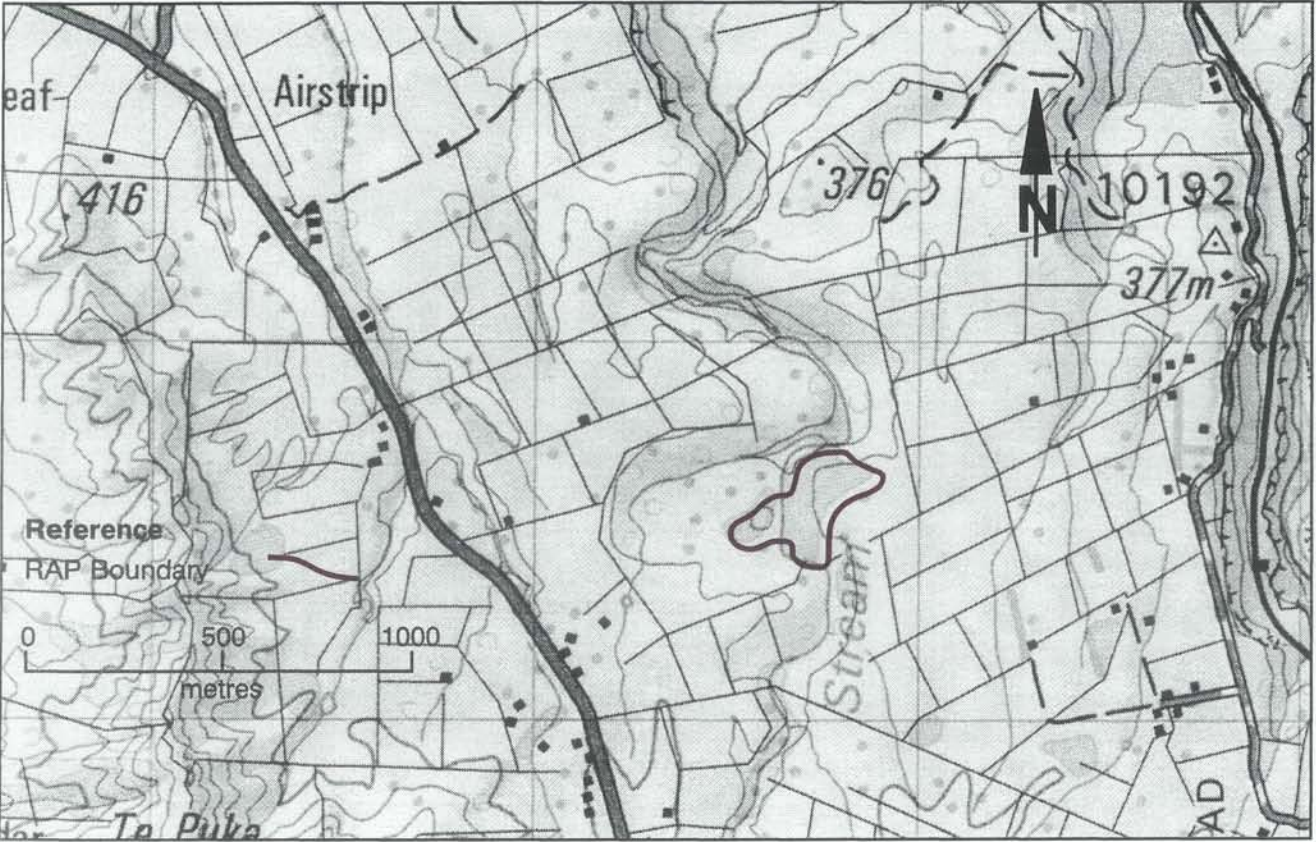
A modified remnant of podocarp forest, where selective logging of larger totara and rimu has occurred in the past. The current cover comprises three forest types.

Dense mature rimu dominant forest up to c.22 m in height occurs on the lahar plain on the eastern side of Kakahi Stream. Tawa forms the subcanopy. The understorey appears to be open and heavily grazed with only scattered saplings of rimu and totara (vegetation type 3).

The second vegetation type occurs on slopes adjoining the plain and Kakahi Stream. Rimu is emergent over tawa up to 18 m in height which dominates the canopy in association with totara and scattered kahikatea and matai. Mahoe, mapou and pole totara generally comprise the middle tiers. However, on stream margins the middle tiers are characterised by mixtures of kamahi, mahoe, horoeka and scattered ti kouka. Ground cover comprises *Coprosma rhamnoides* on drier sites and several fern species including kiokio, kiwikiwi, rereti, and pikopiko on damp sites. Density and composition is variable depending on grazing pressure, which appears heavier on lower slopes where numerous stock tracks are evident. There are occasional canopy gaps along stream margins dominated by pasture species.

Tawa to c.18 m in height with totara forms a treeland canopy on terraces on the west of Kakahi Stream. Matai and rimu are minor canopy components. The treeland is heavily grazed with few understorey species and very little regeneration.

Blackberry, buddleia, kiokio, exotic grasses and herbaceous species are common on stream banks.



Flora

Only typical species were noted.

Fauna

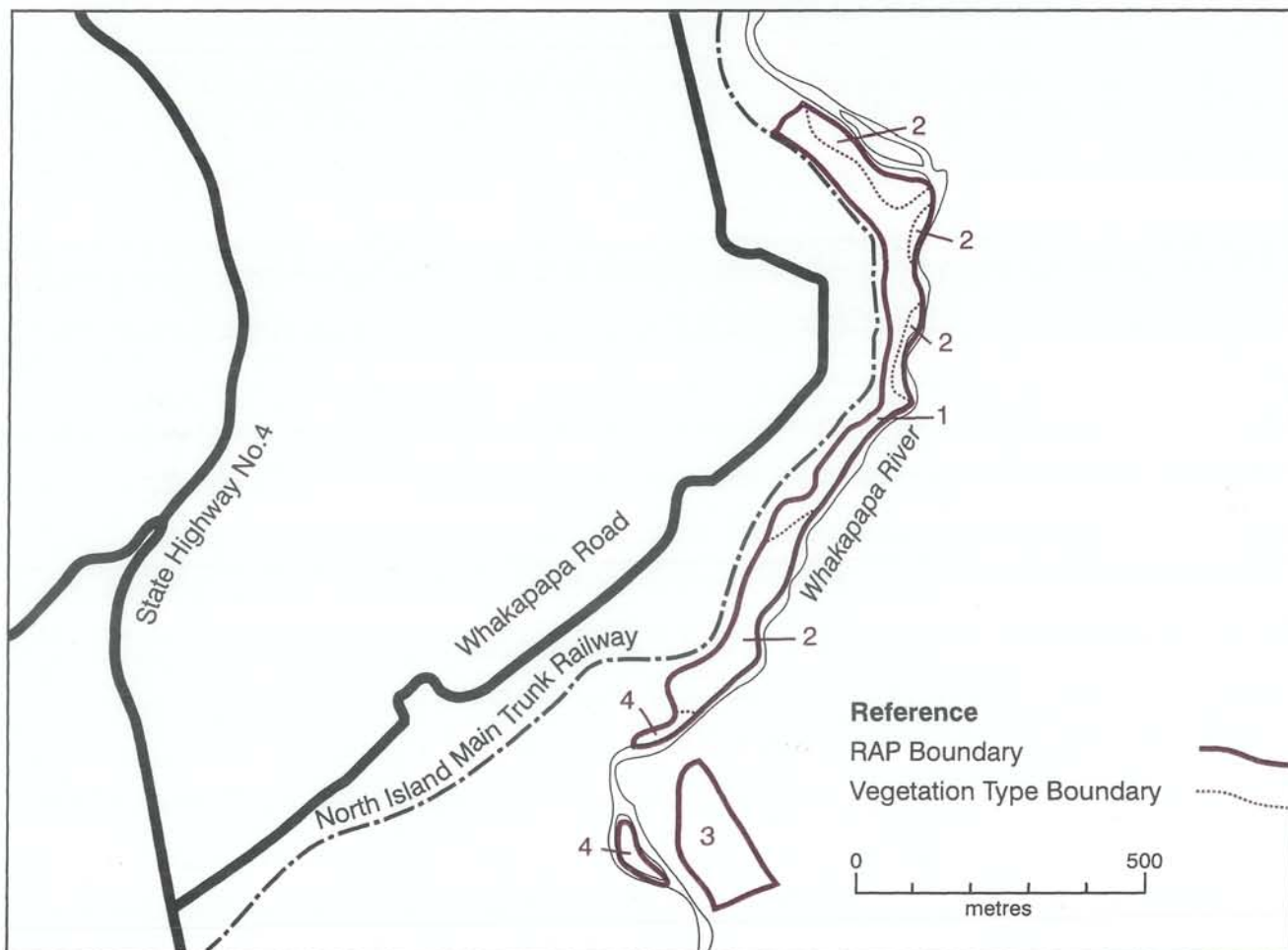
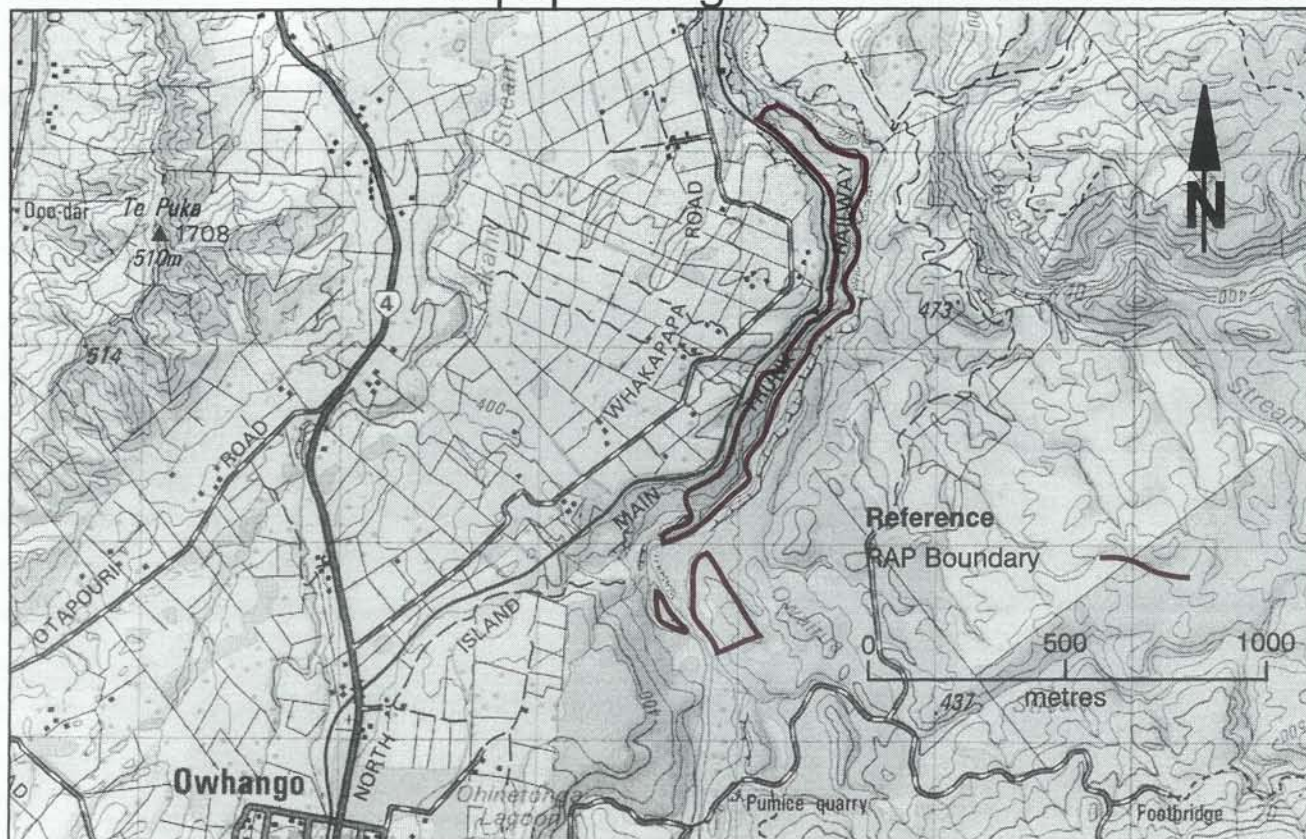
Common forest birds including shining cuckoo, whitehead, tui and silvereye were noted.

Threat/Modification

Much of the area is fenced. However, the site is heavily grazed and tracked on the western side of Kakahi Stream, and little ground cover is evident. The part of the RAP on the eastern side of the Kakahi Stream also appears to be heavily grazed, possibly by deer. Stock grazing is reducing the diversity and abundance of understorey species. Cattle carcasses have been dumped on stream margins, degrading water quality. It is recommended that this site be retired from grazing.

Justification

This RAP contains one of the highest quality, largest remaining representative examples of indigenous forest occurring on the undulating terrain-lahar plain landform unit in the Taumarunui Ecological District. Indigenous forest on this landform unit has been largely cleared. Only c.3% of the landform unit is protected.



WHAKAPAPA GORGE SCENIC RESERVE EXTENSION

RAP No.: 24
PNAP Survey No.: S19-42
Grid Reference: NZMS260 S19 183460
Landform unit(s): Gorge
Area (ha) 48.34
Altitudinal Range: 340-400 m
Survey Methodology: Field inspection, aerial photographs, existing reports
Conservancy: Tongariro/Taupo

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. Mahoe-manuka-buddleia scrub ⇔ hard fern fernland ⇔ blackberry-gorse-lupin shrubland.	Steep gorge slopes.
	2. (Rimu)-(kahikatea)/ <u>tawa</u> -rewarewa forest ⇔ wheki-mahoe-pate scrub.	Gorge slopes.
	3. <u>Rimu</u> -kahikatea-(matai)/ <u>tawa</u> forest ⇔ pole rimu-pole totara-(rewarewa) forest.	Terrace.
	4. <u>Black beech</u> -rimu-kahikatea-(kowhai) forest.	Terrace, bluff.

Landform

Most of the RAP is on steep banks of the Whakapapa Gorge immediately north-east of Owango in the south-east of the ecological district. Areas of river terrace adjacent to the Whakapapa River are included in the RAP at its southern end.

Vegetation

Scrub, fernland and shrubland form a mosaic on steep gorge slopes (vegetation type 1). The scrub is characterised by mahoe, manuka, koromiko and buddleia, with a few scattered emergent rewarewa and tawa. The fernland comprises hard fern while shrubland is dominated by exotic species: blackberry, gorse and lupin.

On the remaining gorge slopes the vegetation comprises a mosaic of forest and scrub (vegetation type 2). The forest is characterised by a tawa dominant canopy in association with rewarewa and locally common emergent remnant rimu, kahikatea and occasional matai. The middle tier consists of wheki, kamahi, and pole kahikatea and tawa. Local areas of scrub are generally dominated by wheki, mahoe, and pate, but wheki is locally abundant in some gaps.

A small area of unprotected forest occurs on a terrace which is almost totally surrounded by the Whakapapa Scenic Reserve. It consists of abundant remnant rimu up to 24 m in height with minor components of kahikatea and occasional matai emergent over a tawa canopy. Middle tiers comprise mainly tawa and pole totara over ponga. On the lower terrace this vegetation grades into pole totara and rimu forest with locally common rewarewa (vegetation type 3). Small canopy gaps dominated by pasture species are present.

Black beech to c. 24 m forms an open canopy over a small isolated area of terrace in the south of the RAP. Similar forest occurs on top of a bluff on the western side of the river (vegetation type 4). Rimu and kahikatea are common in the canopy with scattered matai, miro and totara. Kowhai is locally common on river margins. The middle tiers comprise dense mingimingi, putaputaweta, koromiko, kamahi, rangiora, hangehange and pole totara over a dense ground cover of *Astelia fragrans*, toetoe, kidney fern, hooked sedges and beech seedlings.

Flora

Typical species only were noted. A rare plant *Thismia rodwayi* (classed as 'nationally uncommon', subcategory 'naturally uncommon-sparse', de Lange *et al.* 1999) occurs in nearby Ohinetonga Scenic Reserve (Buckley and McLuckie 1995) and may also occur in this RAP, although it was not found in this survey.

Fauna

Karearea and Australasian harrier as well as common forest birds including tui, grey warbler and fantail were noted.

Threat/Modification

Adventive species are widespread in the RAP, but pose little threat to the conservation values. Most species, including gorse, lupin and blackberry are likely to be replaced by native woody species in the long term as the area regenerates. Some species such as pines will persist longer-term but will probably be replaced by indigenous species as the pines age and collapse.

Crack willow occurs along river terrace margins at the southern end of the gorge. It spreads along river margins and competes with indigenous plant species. Control of this species should be considered.

Justification

The RAP contains a high quality, representative example of indigenous forest on the gorge landform unit. It also contains the highest quality example of indigenous forest on terraces, a type that has been greatly reduced in extent. The RAP is contiguous with and complementary to the Whakapapa Gorge Scenic Reserve and Ohinetonga Scenic Reserve. It is the only example of the gorge landform unit in the Taumarunui Ecological District to be recommended for protection.

OWHANGO FOREST

RAP No.: 25
PNAP Survey No.: S19-47
Grid Reference: NZMS260 S19 155441
Landform unit(s): Undulating terrain-lahar plain
Area (ha) 6.0
Altitudinal Range: +/-380 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Totara</u> -kahikatea-matai forest.	Lahar plain.

Landform

A gently undulating lahar plain immediately north-west of Owhango in the south-east of the ecological district.

Vegetation

A mixture of primary and secondary podocarp forest. Selective logging of larger trees has occurred but many of the old canopy trees are still present.

Totara up to 22 m in height dominates the canopy with kahikatea, matai, and scattered miro. Vigorous pole matai and totara stands occur locally in the subcanopy with occasional tawa and black maire. *Muehlenbeckia australis* and *Rubus cissoides* are common, climbing into the subcanopy. The middle layers are characterised by scattered wheki ponga, pole totara, horopito and small leaved shrubs including *Raukawa anomalus*, rohutu, kaikomako, turepo, and *Coprosma rhamnoides*.

There is little ground cover over much of the site. Only small local areas of exotic herbs or scattered kiwikipi occur.

Flora

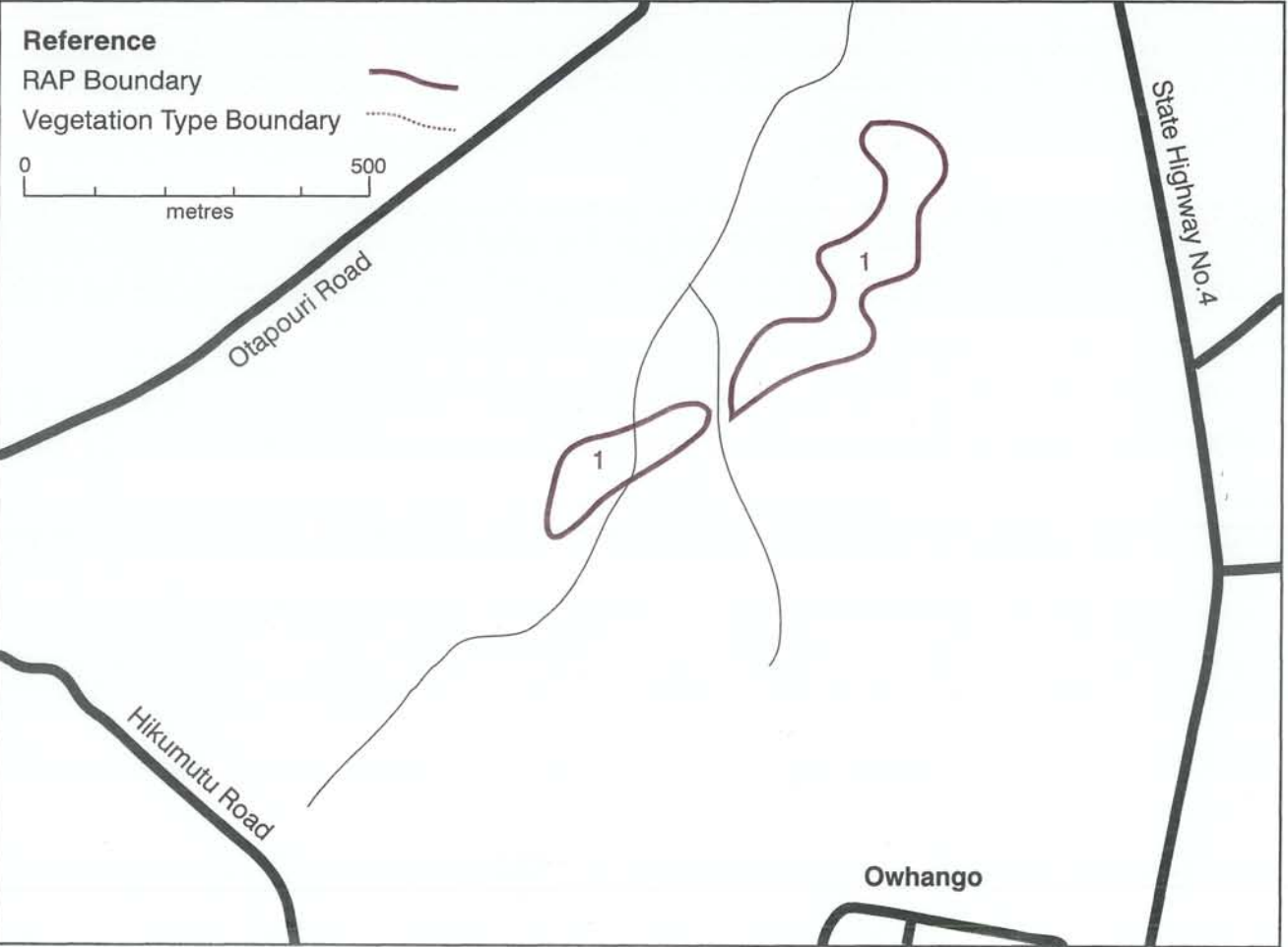
Only typical species were noted.

Fauna

Forest birds are abundant including whitehead, kereru, shining cuckoo, tui, bellbird, grey warbler, fantail, and Australasian harrier.

Threat/Modification

A small infestation of old man's beard occurs at the northern end of the RAP. Old man's beard is a vigorous woody climber which can smother canopy trees and suppress native regeneration by shading seedlings and saplings in an intact forest. This



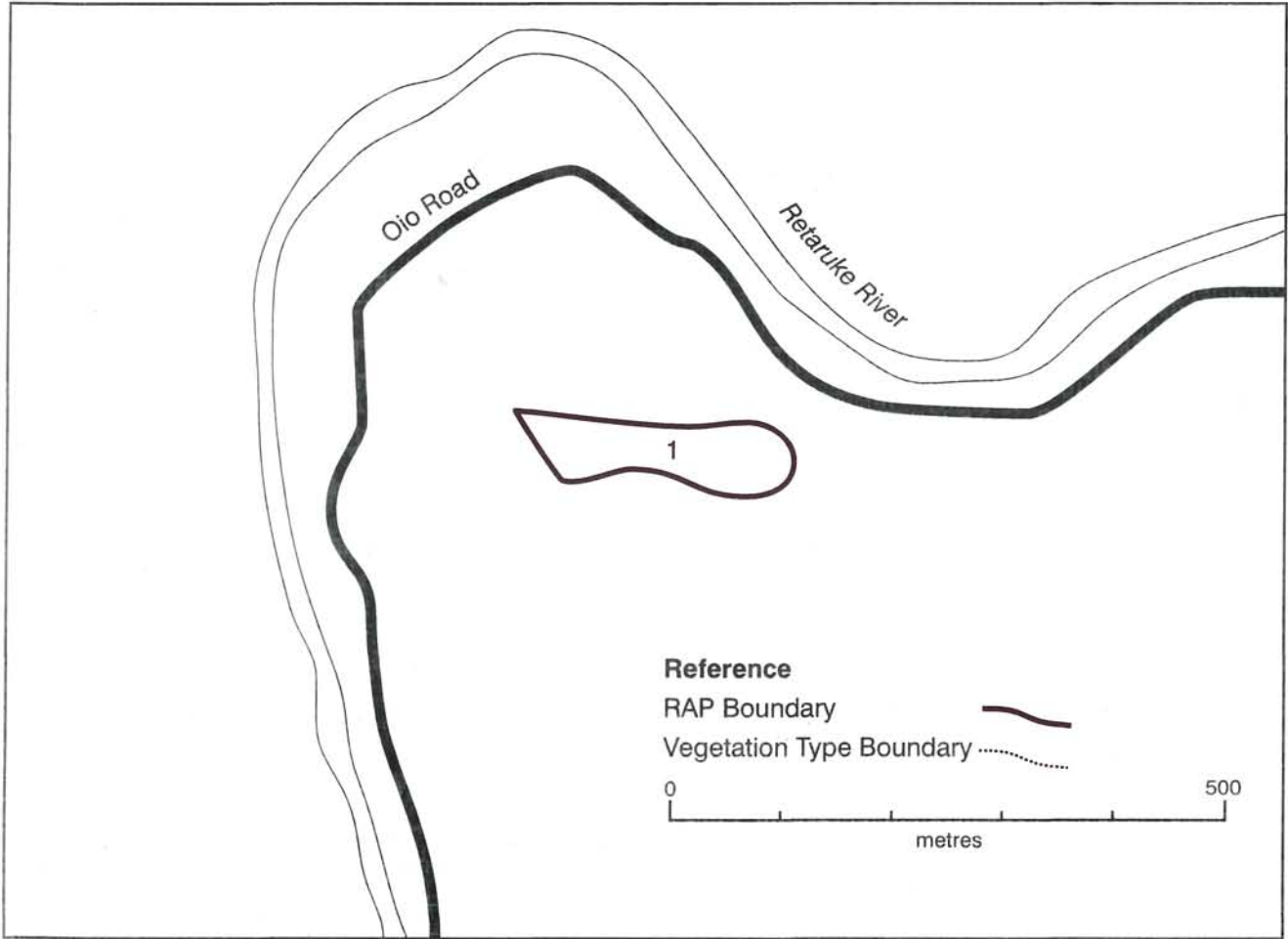
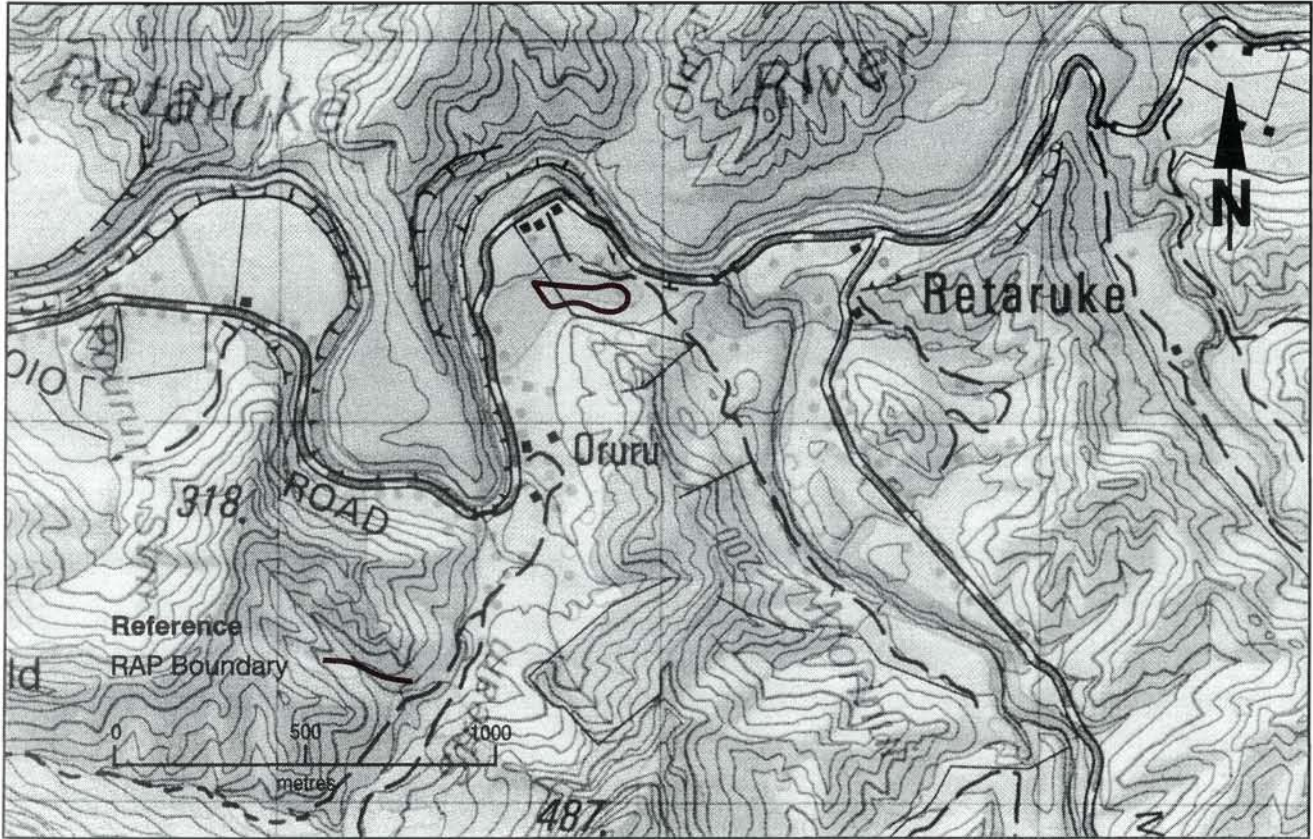
infestation poses a serious threat to this forest if left unchecked. Old man's beard should be eliminated from this site before it spreads further.

Two large eucalyptus trees emergent in the canopy are an obvious exotic element in the RAP. A derelict shed with a rusting car inside also detracts from the natural character of the RAP.

Although the RAP is fenced it is intermittently grazed by deer. This has greatly reduced the diversity and abundance of species in the understorey, which is generally barren. Continued grazing threatens to limit regeneration of canopy species and alter the structure and composition of the forest. Deer and other livestock should be excluded from the RAP.

Justification

This relatively large area of indigenous forest is one of the highest quality remaining on the undulating terrain-lahar plain landform unit in the Taumarunui Ecological District. Indigenous forest on this landform unit has been greatly reduced in extent and less than 3% of the landform unit is currently protected in the reserves network.



OIO ROAD WETLAND

RAP No.: 26
PNAP Survey No.: S19-03
Grid Reference: NZMS260 S19 937293
Landform unit(s): Terraces
Area (ha) 1
Altitudinal Range: +/- 140 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Manuka</u> /purei- <i>Baumea rubiginosa</i> -swamp kiokio- <i>Carex maorica</i> - <i>Hypolepis distans</i> shrubland.	Wetland.

Landform

A wetland on a riparian terrace of the lower Retaruke River in the south of the ecological district.

Vegetation

A small area of wetland vegetation modified by the clearance of kahikatea forest and grazing.

The wetland vegetation comprises an open canopy of manuka over purei. *Baumea rubiginosa*, swamp kiokio, *Carex maorica* and *Hypolepis distans*. Purei becomes increasingly common along the wetland margins. Raupo, kapungawha, and grey willow occur locally with scattered emergent ti kouka and kahikatea. Retoretore and *Lemna major* cover the water surface between emergent plants.

Flora

This RAP is the only known location of *Hypolepis distans* within Taumarunui Ecological District.

Fauna

Pukeko and paradise duck are present.

Threat/Modification

Stock have access to the RAP and some local cattle trampling and grazing of the vegetation was observed. Grazing modifies the composition and structure of the wetland community and damages natural drainage patterns by soil compaction. It recommended that the area is fenced and livestock removed.

Drainage of the lower part of this wetland (not included in the RAP) in early 1999 may have long term effects on the water table in the upper part of the wetland. Further alterations to the drainage patterns of this site should not be undertaken, and, if practicable, work to restore the natural drainage pattern would be desirable.

Grey willow occurs locally and although it currently has little impact on the conservation values of the RAP, without control the willow population is likely to expand and displace indigenous species and alter the structure of the wetland. Successful control of this species is likely if undertaken now while the population is small.

Japanese honeysuckle and blackberry are common along the margin outside of the RAP. Control of these species should be considered to prevent them from spreading to drier parts of the RAP.

Justification

This RAP contains areas of good quality and relatively diverse representative examples of wetland vegetation. Wetland vegetation on the terraces landform unit has been greatly reduced in extent and is under represented in the existing reserves network. Currently protected wetlands on the terraces landform unit represent less than 0.1% of the total area of the landform unit. This RAP is one of five RAPs to contain examples of this ecological unit (the others being RAPs 28, 32, 34 and 35), and it is the only site known to contain *Hypolepis distans*.

RETARUKE RIVER TERRACE FOREST

RAP No.: 27
PNAP Survey No.: S19-51
Grid Reference: NZMS260 975320
Landform unit(s): Terraces
Area (ha) 11.7
Altitudinal Range: 140 m - 200 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Totara</u> -matai-miro-manuka forest. 2. Totara-(kahikatea)/ <u>manuka</u> -(horoeaka) scrub.	Terrace. Scarps.

Landform

The RAP occurs partly on a pumice riparian terrace and predominantly on the scarp adjoining the Retaruke River in the south of the ecological district.

Vegetation

This RAP is characterised by secondary vegetation which has probably established following clearance.

The forest canopy on the terrace is dominated by totara up to c.10 m in height in association with manuka and pole matai and miro. The middle tiers are generally sparse. The groundcover consists of locally scattered *Coprosma rhamnoides*, in association with a deep layer of moss and scattered assorted indigenous herbs, grasses and orchids. These include *Deyeuxia avenoides*, *Luzula picta*, *Thelymitra longifolia*, *Caladenia chlorostylus*, *Orthoceras novae-zeelandiae*, papataniwhaniwha, *Drosera peltata* subsp. *auriculata*, and *Arthropodium candidum*.

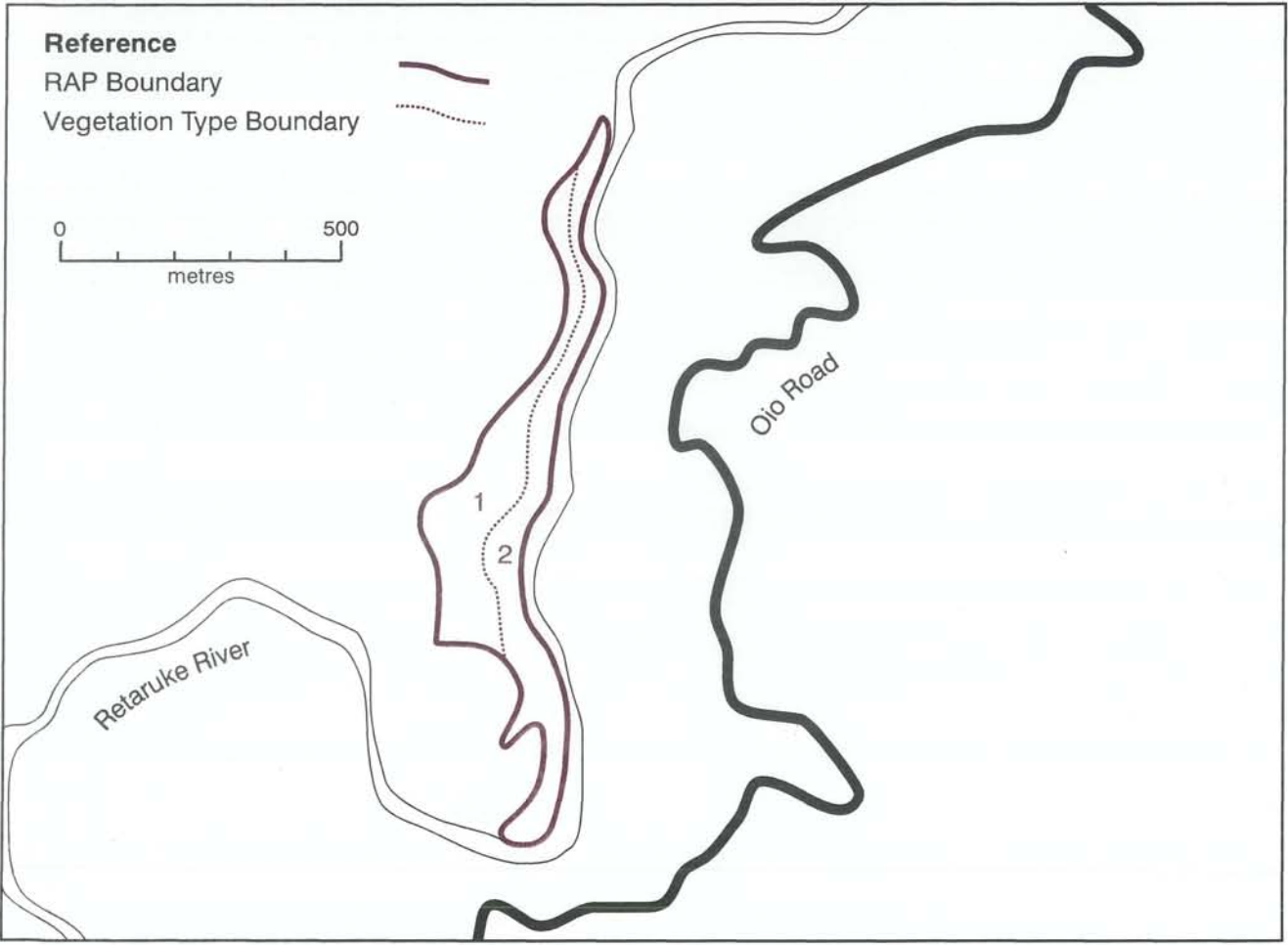
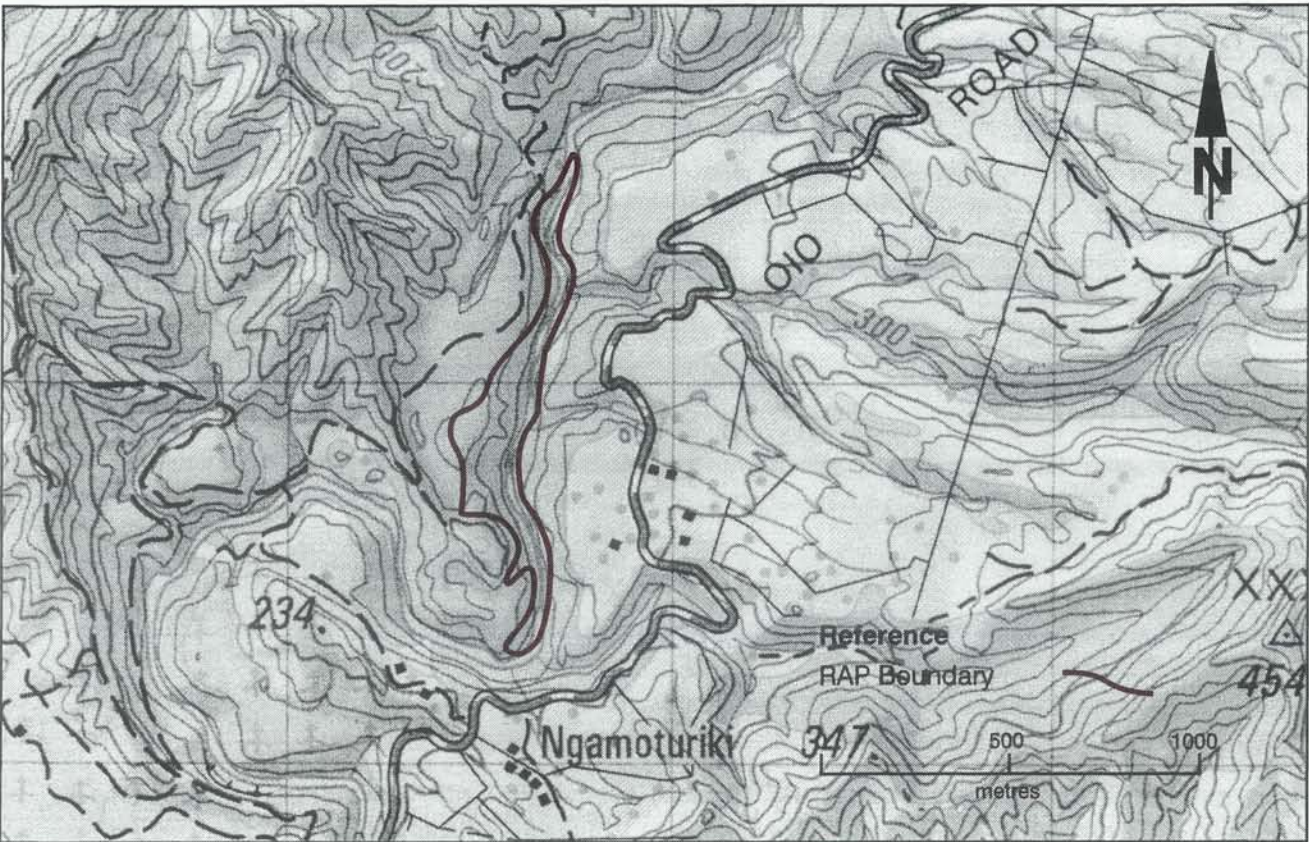
Scarps are characterised by pole totara and scattered pole kahikatea (to c.6 m in height) over manuka dominant scrub (to c.3 m) with a minor component of horoeaka. Vegetated slips and steep banks are a noticeable feature of the slopes and their vegetation consists of mixtures of kiokio and waewaekoukou with occasional emergent horoeaka.

Flora

Only typical species were noted.

Fauna

Common forest birds including tui, bellbird, and fantail are present.

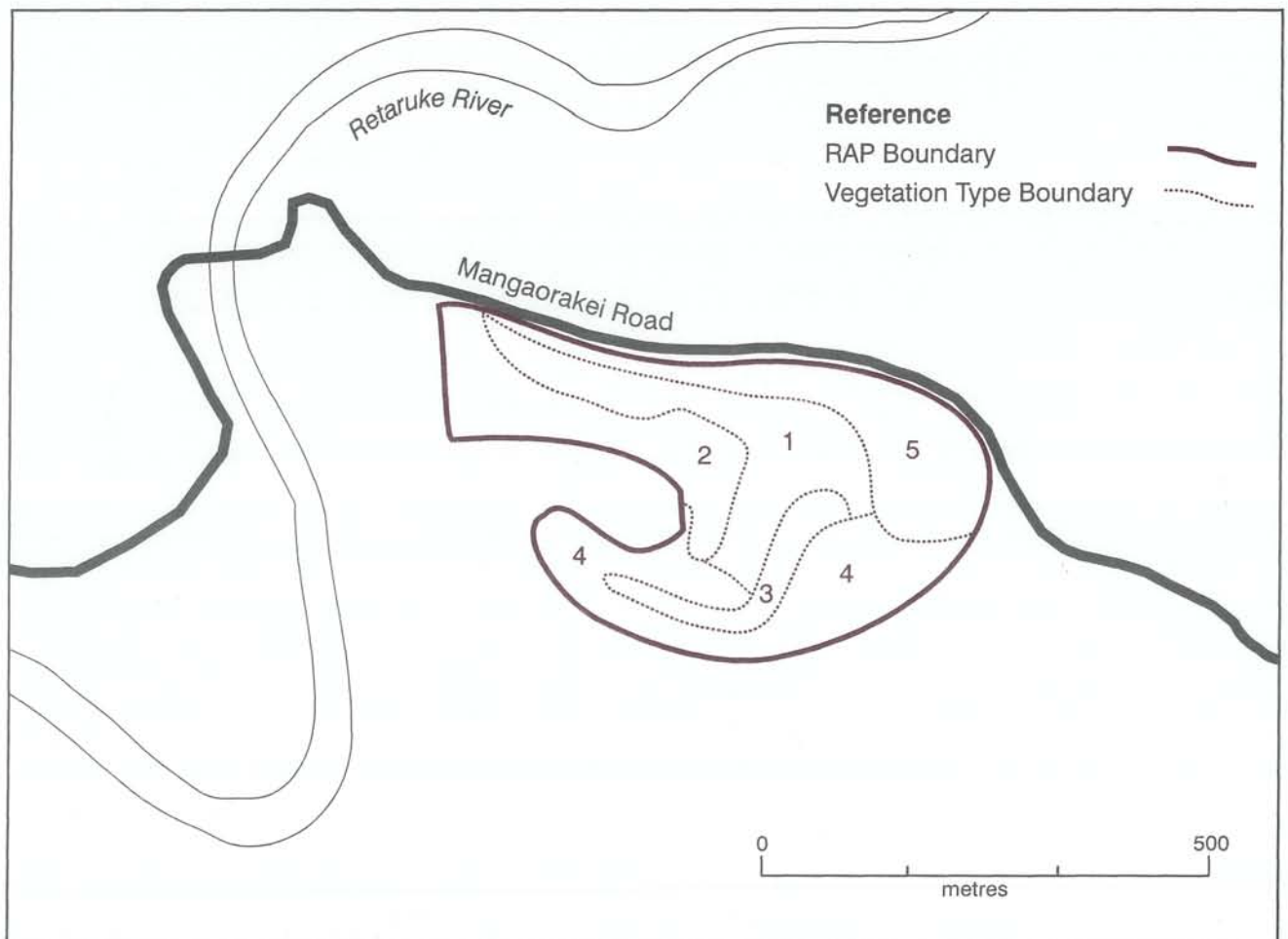
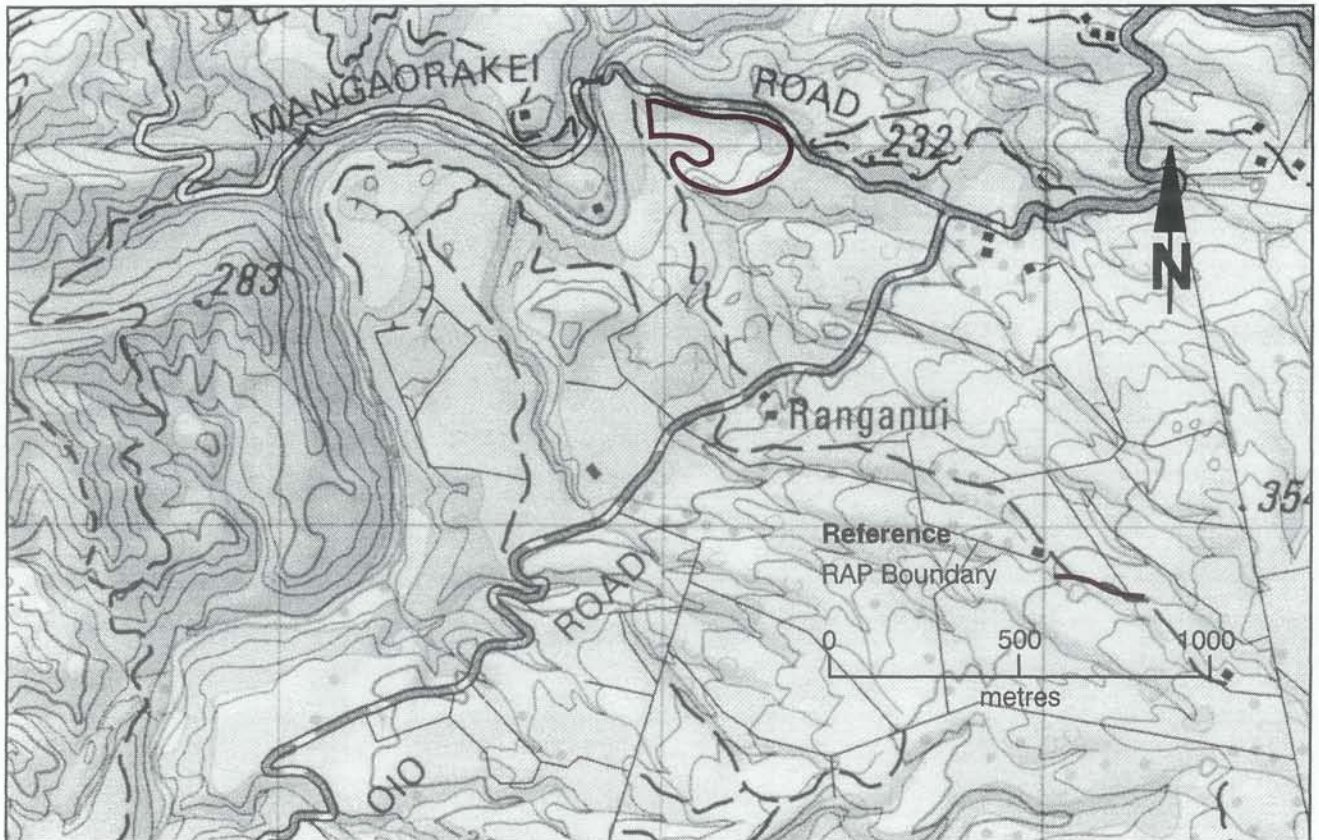


Threat/Modification

The diversity and abundance of understorey species on terraces have been reduced by a long history of grazing by stock and high numbers of feral goats. Ongoing grazing will continue to restrict regeneration and modify the structure and composition of the forest. Fencing the RAP and excluding stock is recommended.

Justification

This terrace forest is representative of indigenous forest that would have once been widespread on the terraces landform unit in the Taumarunui Ecological District. Indigenous forest on this landform unit has been greatly reduced in extent. Only about 3% of the landform unit is currently represented in the protected areas network.



LILEY WETLAND

RAP No.: 28
PNAP Survey No.: S19-52
Grid Reference: NZMS260 989339
Landform unit(s): Terraces
Area (ha) 3.7
Altitudinal Range: +/- 160 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Manuka/Baumea rubiginosa-Baumea tenax</u> -swamp kiokio/ <i>Sphagnum</i> moss-shrub-sedgeland.	Wetland.
	2. <u>Manuka</u> shrubland.	Wetland.
	3. <u>Manuka/raupo</u> -swamp kiokio reedland.	Wetland.
	4. Blackberry-bracken- <i>Muehlenbeckia australis</i> vineland.	Hillslope
	5. Kahikatea-totara/ <u>houhere</u> -whauwhaupaku-horoeka-ti kouka-karamu forest.	Hillslope

Landform

A primarily compact wetland on a low lying riparian terrace of the Retaruke River, and adjoining hillslopes to the east and south-east of the wetland. This RAP is located in the south of the ecological district.

Vegetation

This RAP includes three wetland vegetation types, a forest type, and a vineland. The dominant vegetation type comprises emergent manuka (to c.3 m) with scattered harakeke, koromiko, and *Coprosma rigida*, over *Baumea rubiginosa*. *Baumea tenax*, swamp kiokio and local *Carex virgata*. Waewaeakaka is scattered throughout and small pockets of raupo occur locally on wetter sites. An open area of scattered manuka over *Carex geminata* with scattered blackberry, creeping buttercup and swamp kiokio occurs at the centre of this type. This area is badly damaged by livestock grazing and trampling. *Sphagnum* forms a deep ground cover (up to 1 m in depth in places) except where grazing occurs (vegetation type 1).

There is a dense uniform canopy of manuka with swamp kiokio, waewaeakaka in the understorey, and on the western boundary locally common *Baumea rubiginosa*. Blackberry occurs along the fenceline on the outer margin of this vegetation type, and on open drier sites. Redwoods have been planted along the southern fenceline (vegetation type 2).

A small area of raupo reedland occurs in a depression at the base of the eastern hillslopes. The reedland is characterised by an emergent open canopy of manuka (to 3 m) over raupo in association with swamp kiokio (vegetation type 3). Bracken and

Muehlenbeckia australis are common, and young wilding radiata pines are scattered in the canopy (vegetation type 4).

Secondary forest (to c. 12 m in height) occurs on hillslopes at the eastern end of the reserve. Kahikatea and totara are emergent over a broadleaved canopy dominated by houhere and including whauwhaupaku, horoeka, karamu and ti kouka. Wheki ponga dominates canopy gaps (vegetation type 5). A narrow strip of ti kouka over blackberry and bracken scrub occurs on wetland margins.

Flora

Only typical species were noted.

Fauna

Common forest birds including tui, shining cuckoo, fantail and grey warbler were noted. Numerous pukeko were also observed.

Threat/Modification

Blackberry occurs in open areas within the RAP, and on wetland margins and adjacent recently cleared hillslopes. Wilding pines are present and may continue to spread into low stature seral scrub on hillslopes. Control of pines and blackberry around the wetland is recommended.

Although this RAP is fenced, damage from domestic livestock grazing and trampling is evident on drier sites and, if continued, will further reduce the diversity and abundance of wetland plant species. Exclusion of livestock is recommended.

A small eucalyptus plantation occurs adjacent to the RAP. Care should be taken when these trees are harvested to ensure wetland vegetation is not damaged and that sediment from runoff is minimised.

Justification

This RAP contains a relatively unmodified, representative example of wetland vegetation. Wetland vegetation on this landform unit has been greatly reduced in extent and is under represented in the existing reserve system. Only 8.7 ha of wetland vegetation is currently protected in this landform unit. This RAP is one of five containing wetland on the terraces landform unit (the others being RAPs 26, 32, 34 and 35), and is the second largest area of wetland on the landform unit.

The area of secondary forest and scrub on adjacent hillslopes acts as a protective buffer for the wetland.

KAWAUTAHI STREAM FOREST

RAP No.: 29
PNAP Survey No.: S19-08, 09
Grid Reference: NZMS260 S19 024342
Landform unit(s): Terraces; hill country - moderately steep to steep slopes
Area (ha) 335.2
Altitudinal Range: 160-380 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Kanuka-totara</u> -kahikatea forest.	Hillslopes.
	2. Rewarewa/ <u>kanuka</u> forest ⇔ rewarewa/ <u>tawa</u> forest.	Hillslopes, spurs, gullies.
	3. Kahikatea-miro-matai-totara forest.	Terrace.
	4. (Totara)-(kanuka)/kanuka-manuka/pasture shrubland.	Terrace.
	5. (Kahikatea)-(totara)/pasture grass-creeping buttercup treeland ⇔ <i>Carex geminata-juncus gregiflorus</i> -raupo-pasture sedge-rushland.	Riparian flat.
	6. (Manuka)-(kahikatea)/ <i>Carex</i> sp.- <i>Carex geminata</i> - <i>Baumea rubiginosa</i> -raupo/ <i>Sphagnum</i> sedgeland.	Wetland.
	7. (Ti kouka)/ <u>raupo</u> -blackberry-(swamp kiokio) reedland.	Wetland.
	8. <u>Totara-kahikatea</u> -(matai)-(rimu) forest.	Terrace.
	9. <u>Kahikatea-rimu</u> -totara-(matai) forest.	Terrace.
	10. Totara-kahikatea/manuka-kanuka scrub.	Terrace.
	11. Kahikatea-horoeka-putaputaweta-houhere scrub (not mapped).	Stream gullies.
	12. Kiokio-wharariki-karamu-koropuka-kanuka-koromiko rockland ⇔ barberry-buddleia-cotoneaster rockland (not mapped).	Bluffs, scarps.

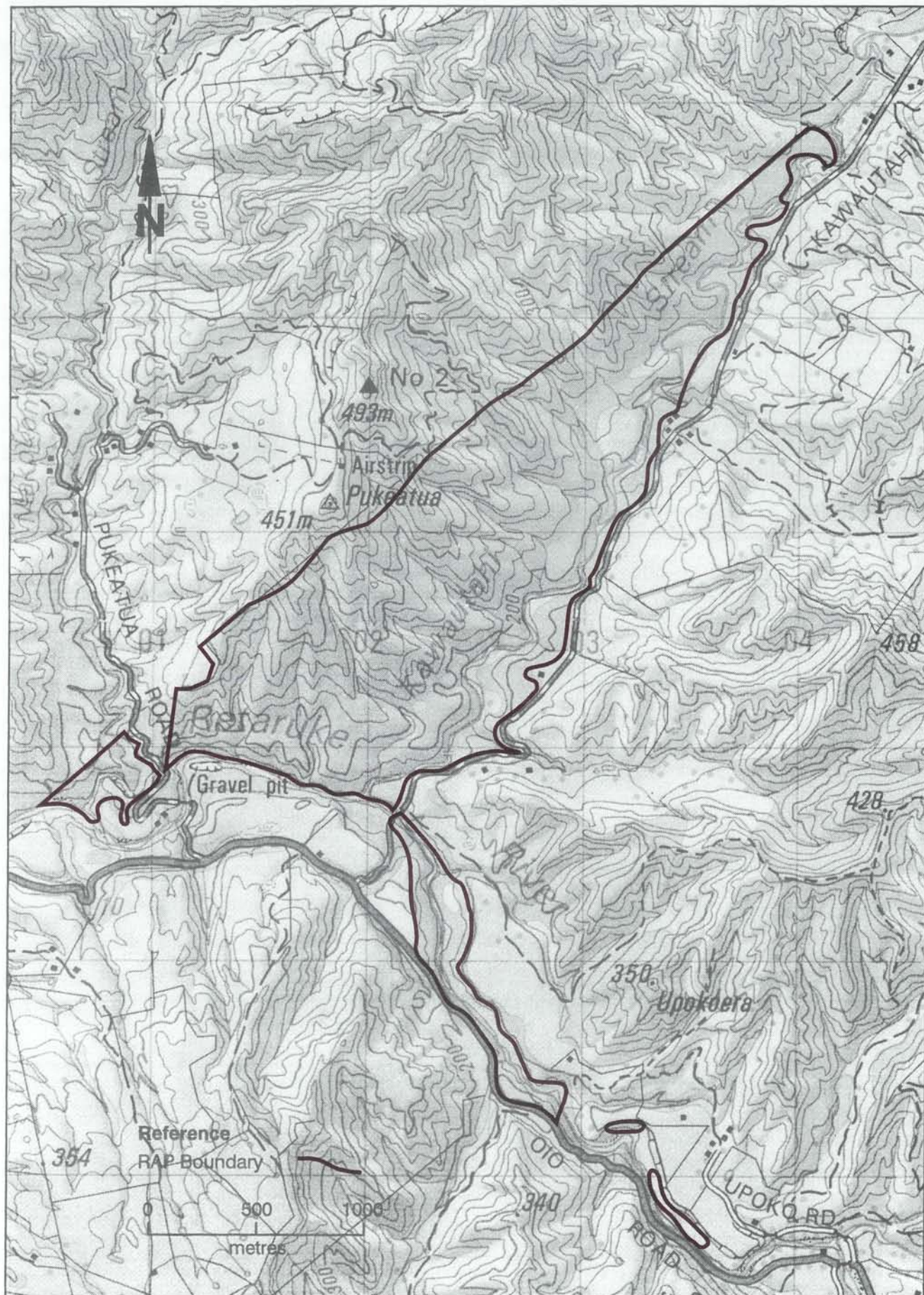
Landform

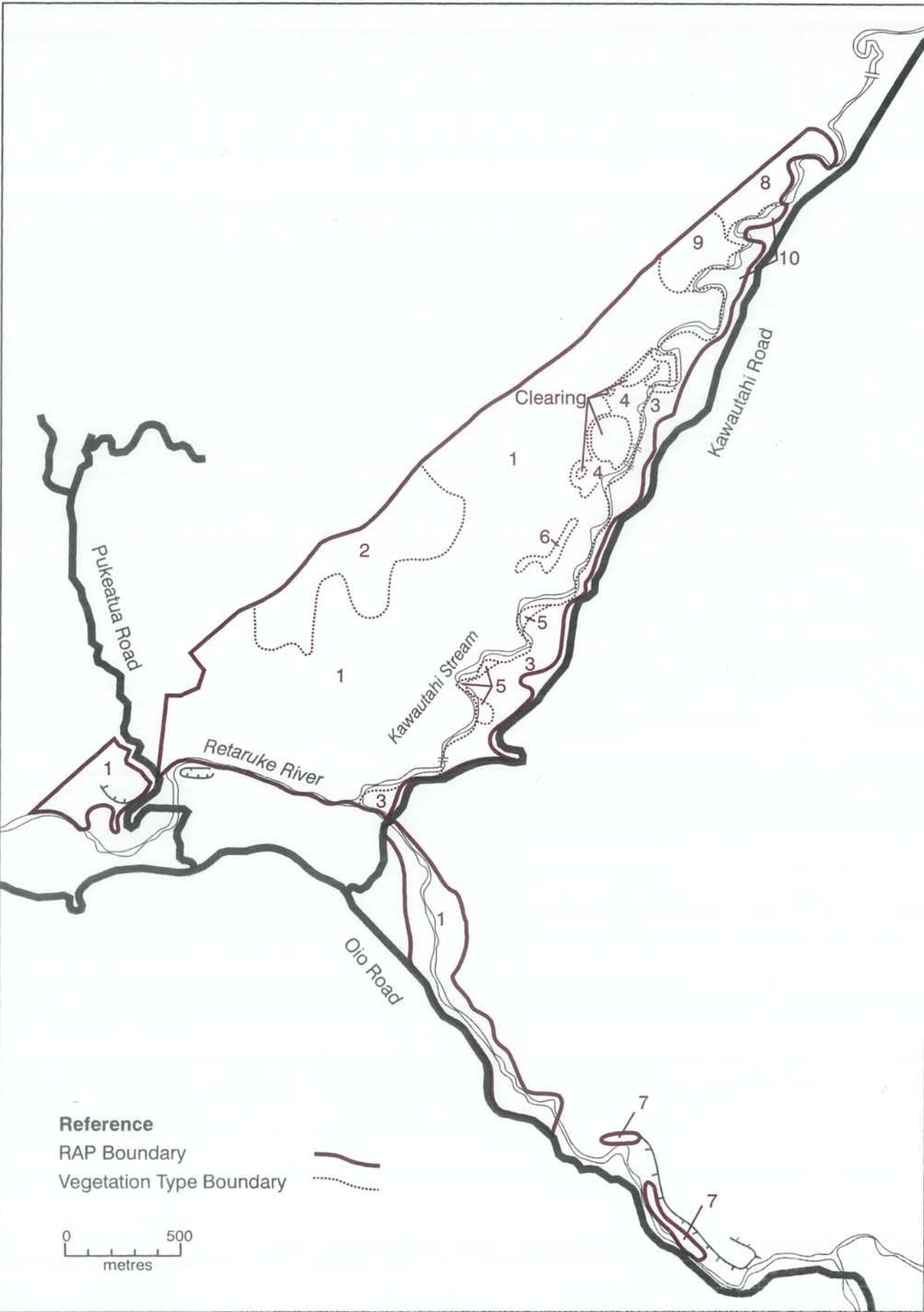
This RAP is located in the south of the ecological district, around the confluence of the Retaruke River and Kawautahi Stream. Predominantly, it is on moderately steep hillslopes dissected by many stream gullies that grade into riparian terraces and flats. Two wetlands are present.

Vegetation

Kawautahi Stream Forest is characterised by secondary forest and shrubland that has established following previous clearance.

Hillslope vegetation (vegetation type 1) comprises a kanuka and pole totara dominant canopy and occurs over the majority of the RAP. Canopy height varies reaching c. 14 m over most of the site, but only c. 8-10 m in the forest adjacent to the Makomiko Stream.





and c.6-8 m on the Retaruke River marginal strip. Density of cover is patchy, reflecting the intensity of previous disturbance. Pole kahikatea is common in the canopy with scattered pole miro and matai. Wheki, pole totara and matai dominate the middle tiers over a sparse groundcover of pasture grasses and waewae-koukou.

On steep upper hillslopes, spurs and gullies, rewarewa emergent over kanuka forest occurs in a mosaic with small areas of rewarewa emergent over tawa forest to a canopy height of 12-16 m (vegetation type 2).

Pole kahikatea and broadleaved species including horoeka, putaputaweta, houhere, and ti kouka occur in stream gullies on hillslopes. There are occasional rare emergent kahikatea to c.22 m in height in stream gullies at the base of a terrace scarp adjacent to Makomiko Stream (vegetation type 11).

Terrace vegetation on the eastern side of Kawautahi Stream is characterised by pole podocarp forest (vegetation type 3), comprising mixtures of pole kahikatea, miro, matai and totara to a height of c. 12 m. Manatu is scattered locally where the canopy is more open. Manuka occurs occasionally in the middle tier and there is a variable ground cover of moss.

Terrace vegetation on the western side of Kawautahi Stream is heavily grazed and comprises shrubland dominated by kanuka and manuka (vegetation type 4). Scattered emergent kanuka and pole totara are present. Large open grazed clearings, dominated by pasture species, occur in this area and these clearings are excluded from the RAP.

Locally scattered stands of kahikatea and totara treeland with occasional manatu over pasture grasses and creeping buttercup occur on riparian flats. This vegetation type forms a mosaic with small, locally scattered *Carex geminata*-*Juncus gregiflorus* sedge-rushlands where the groundcover is dominated by pasture species (vegetation type 5).

Two areas of wetland are present on this RAP. A narrow, elongated sedgeland occurs in a depression formed where a hillslope and a riparian terrace of the Kawautahi Stream converge (vegetation type 6). Scattered manuka and pole kahikatea are emergent over *Baumea rubiginosa* in association with *Carex* sp., *Carex geminata* and raupo. The raupo tends to have an irregular distribution and is abundant locally. Ground cover is dominated by *Sphagnum* with local areas of swamp buttercup and selfheal. Hard fern is locally common. The second wetland occurs on a river terrace of the Retaruke River (vegetation type 7). Scattered emergent ti kouka occurs over raupo-dominant reedland. Dense thickets of blackberry are locally common and swamp kiokio is scattered throughout.

Advanced secondary totara-dominant forest merges into similar aged kahikatea and rimu forest on terraces in the north of the RAP (vegetation types 8 & 9).

Totara up to c.16 m in height dominates the forest canopy on the terrace in the northern most end of the RAP. Kahikatea is common in the canopy with scattered matai and rimu. The middle tiers are generally sparse but ti kouka and horoeka are locally common. Manuka and blackberry are locally common at forest edges (vegetation type 8).

Forest dominated by kahikatea and rimu (vegetation type 9) occurs to the south of a small tributary dissecting the terrace on the western side of Kawautahi Stream. Totara is common in the canopy with scattered matai. The subcanopy comprises pole totara and rimu, with wheki and kanuka.

A small area of secondary scrub occurs on the adjacent terrace on the eastern side of Kawautahi Stream. Pole totara and kahikatea are emergent over scrub dominated by manuka and kanuka with minor components of horoeaka and houhere, and scattered wilding pines (vegetation type 10).

Terrace scarps and bluffs are common on stream and river margins (vegetation type 12; not mapped). These areas are sparsely vegetated and comprise mixtures of kiokio, wharariki, karamu, koropuka, kanuka, and koromiko, as well as local adventive-dominant areas containing barberry, buddleia, and cotoneaster.

Flora

Only typical species were noted.

Fauna

Common forest birds including tui, bellbird, shining cuckoo, fantail, and grey warbler were noted.

Threat/Modification

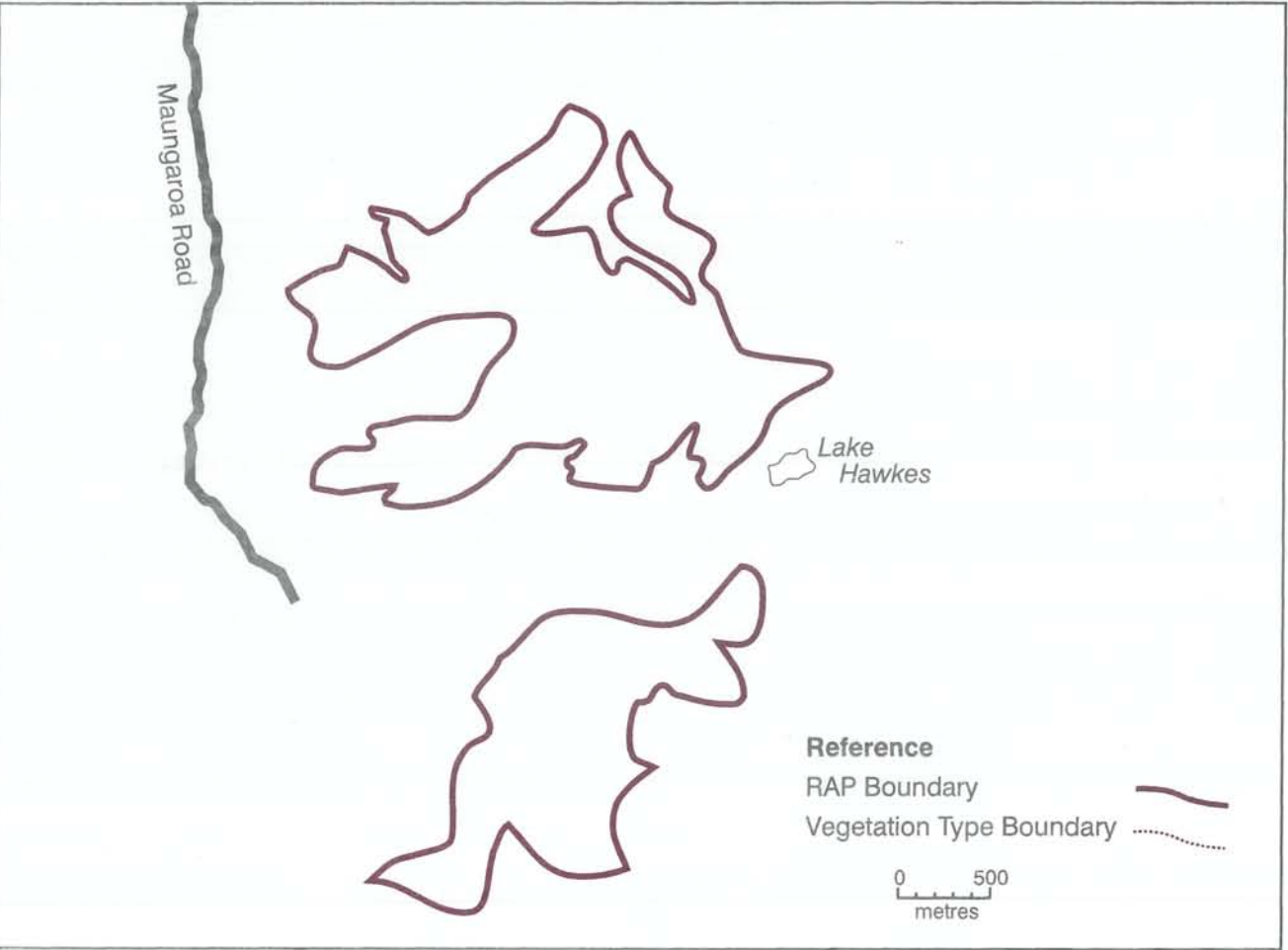
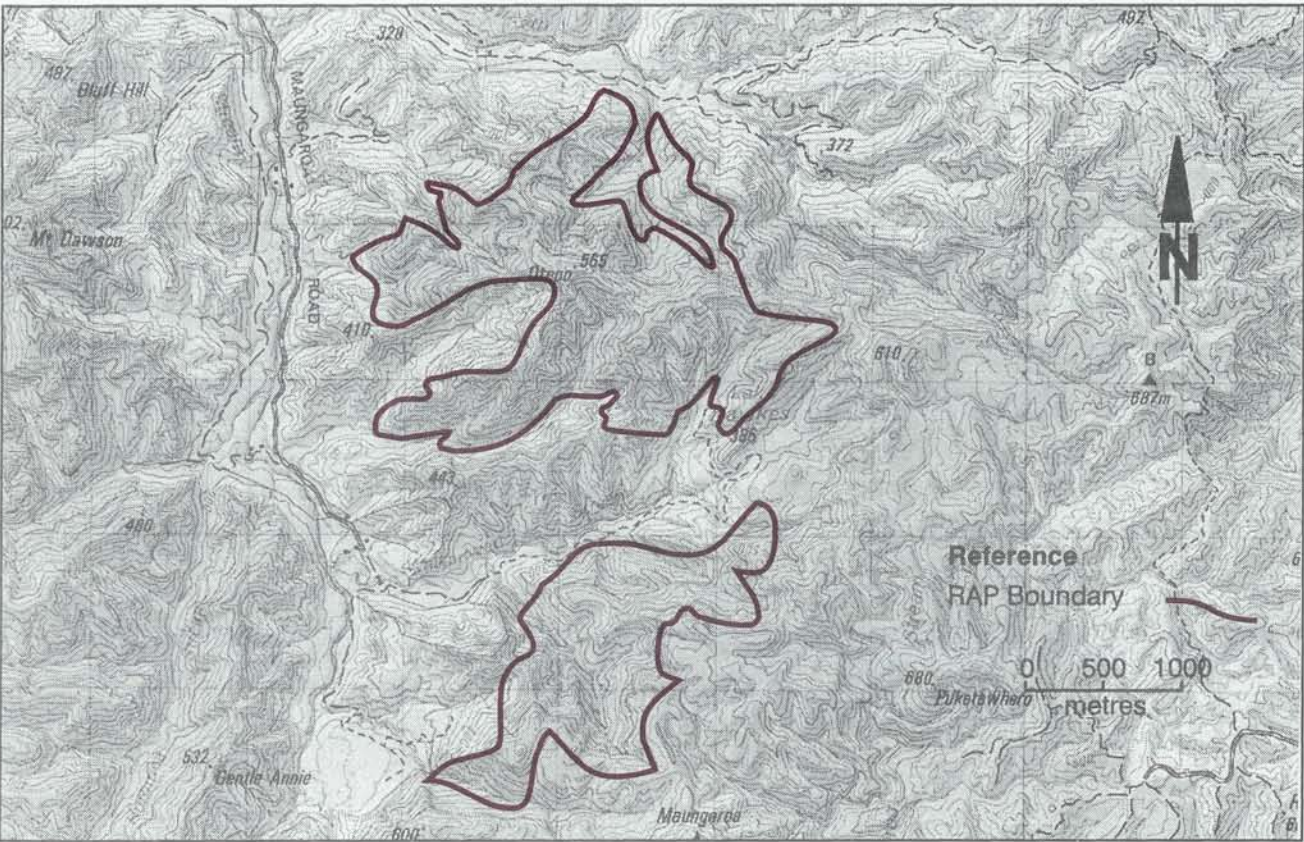
Heavy grazing occurs over most of this site. This has resulted in reduced diversity and abundance of understorey species and may hinder regeneration of canopy species. Livestock have compacted the soil and altered the natural drainage pattern through extensive tracking. Fencing of the RAP and the exclusion of livestock is recommended.

An infestation of Japanese honeysuckle is present, control of which is achievable if undertaken in the near future while the population remains compact and relatively small. Without control, this species poses a serious long term threat to the conservation values of the RAP. Blackberry is present in the wetlands and control should be considered.

There are other weed species present, but these are not a serious threat to the conservation values as they are restricted to high light conditions and are unlikely to invade an intact forest canopy. They include barberry, cotoneaster, and buddleia along forest margins.

Justification

This is a high quality representative example of indigenous vegetation on the terraces landform unit and is the second largest example of terrace forest in the Taumarunui Ecological District. This RAP contains a unique sequence of indigenous vegetation on riparian flats, terraces and hillslopes, now uncommon in the ecological district. The waterways of the Retaruke River and Kawautahi Stream, which flow through the RAP form a significant feature of the RAP, and include waterfalls in Kawautahi Stream



ROKOKAHU SCENIC RESERVE EXTENSION

RAP No.: 30
PNAP Survey No.: S19-44
Grid Reference: NZMS260 S19 975265 and 975245
Landform unit(s): Hill country - moderately steep to steep slopes; hill country - very steep slopes
Area (ha) 497.6
Altitudinal Range: 280-565 m
Survey Methodology: Field inspection, aerial photographs, existing reports
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	%	LANDFORM
Lowland	1. (Rimu)-(matai)/ ~~tawa~~ -tawheo wheo-kamahi forest.	50	Hillslopes.
	2. <u>Black beech</u> / tawheowheo-kamahi-heketara forest.	30	Ridges, spurs.
	3. (Rewarewa)-(tawa)/wheki-manuka scrub.	10	Hillslopes.
	4. Wheki ponga shrubland.	5	Hillslopes.
	5. Tuhara-koromiko-koropuka-(wharariki) rockland. (Vegetation types are not mapped.)	5	Bluffs.

Landform

This RAP is located on the southern margin of Taumarunui Ecological District. It comprises two separate areas of steep hill country dissected by numerous tributaries that drain into the Morinui Stream, both areas being contiguous with Rotokahu Scenic Reserve. The tributaries contain a network of ridges, spurs, deep gullies, steep hillslopes and bluffs.

Vegetation

This RAP comprises tawa forest grading into black beech forest on ridges and leading spurs, scrub and treefernland on lower hillslopes and rockland on bluffs throughout. The forest canopy over most of the area is dominated by tawa up to c.20 m in height in association with emergent scattered rimu, matai and occasional miro. Kamahi and tawheowheo are locally common in the canopy and dominant in the subcanopy, particularly on upper slopes. Middle tiers comprise a mixture of abundant heketara, kiekie, ponga, and katote with sapling canopy species on upper slopes and drier slopes. Pukatea, porokaiwhiri and kareao dominate the understorey in gullies and on lower slopes. Ground cover generally comprises a mixture of bush rice grass with several fern species, mainly petipeti and *Lastreopsis glabella*, and a range of filmy ferns including locally abundant irirangi. Parataniwha dominates the groundcover in stream gullies on the lower slopes.

The vegetation of lower hillslopes contiguous with farmland, typically comprises manuka and wheki scrub with scattered emergent rewarewa and tawa (to c.8 m in

height) or wheki ponga shrubland that has established following wild fires or clearance.

Black beech up to c. 18 m in height forms the canopy on ridges and leading spurs. Tawheowheo in association with kamahi and heketara dominates the subcanopy. Middle tiers comprise abundant black beech saplings, mingimingi and heketara in association with mapou, rangiora and kamahi. Totorowhiti in association with koropuka is locally dominant in the understorey on exposed ridges. The ground cover consists of scattered petipeti, bush rice grass and hooked sedges with locally abundant waewaeokou in association with dense kamahi seedlings on exposed ridges.

Impressive sandstone bluffs are a characteristic feature of ridges in this RAP. Bluffs are sparsely vegetated with scattered tuhara, in association with koromiko, koropuka, occasional wharariki, and a range of indigenous herbs and ferns.

Flora

Only typical species were noted.

Fauna

Forest birds including tui, shining cuckoo, fantail and grey warbler are abundant, while pied tit, whitehead and North Island robin are less common. Kereru and karearea have been reported (P. Karam, landowner pers. comm. 1999).

Threat/Modification

Damage to plants from animal browsing was observed as well as abundant goat tracks and sign, and occasional pig rooting. Livestock graze the periphery of the site but the steepness of the terrain limits their access to much of the RAP.

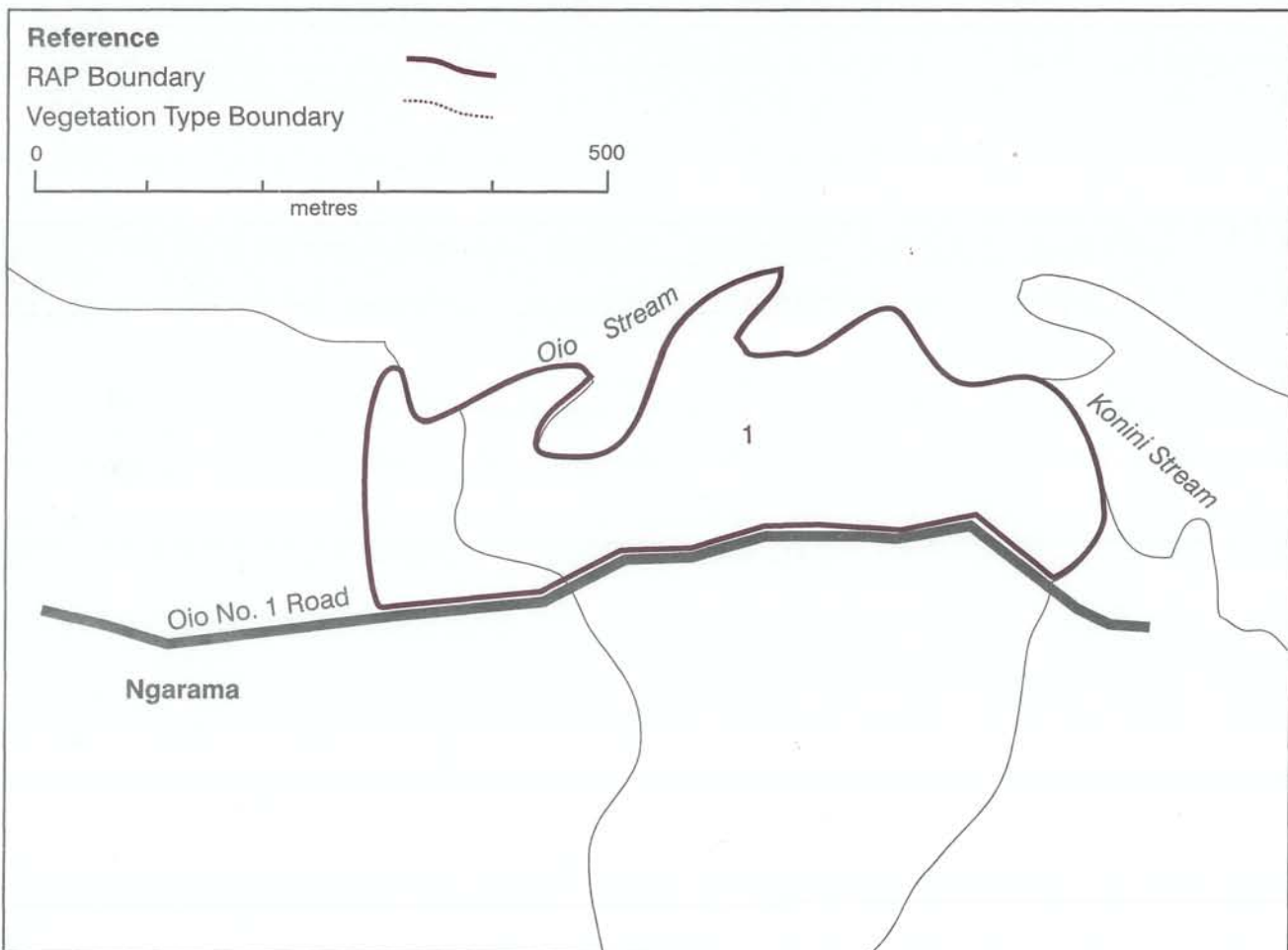
Feral goats threaten to alter the structure and composition of this forest over the long term by selectively restricting regeneration of palatable species as well as reducing the diversity and abundance of other understorey species. Landowners currently control goats and this needs to be ongoing. Control of other feral browsing animals, such as possums, should also be undertaken.

Justification

The area of forest in and around Rotokahu and Retaruke Scenic Reserves is an important habitat corridor linking the Erua Stewardship Area-Tongariro National Park with the Whanganui National Park (Ogle 1980). The RAP is one of the largest, most natural examples of forest vegetation on hill country - very steep slopes' and moderately steep to steep slopes landform unit. Its protection is important to enhance the long term viability of this ecologically significant habitat corridor, and it also provides a large buffer to the north of Lake Hawkes (an area of high scientific importance). This RAP is one of four areas contiguous with Rotokahu and/or Retaruke Scenic Reserves identified as priority for protection by Stephen and Fuller (1989). Two of the areas have since been protected (Kokaka Conservation Area and Taheke Conservation Area) and this RAP encompasses the larger of the two remaining areas.

Notes

Only the main part of this RAP was surveyed. A larger area has been recommended for protection, as it appears to have similar values.



OIO NO. 1 ROAD FOREST

RAP No.: 31
PNAP Survey No.: S19-18
Grid Reference: NZMS260 S19 085335
Landform unit(s): Terraces
Area (ha) 10.2
Altitudinal Range: 240-260 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. Totara-matai-(rimu)-(kahikatea)-(miro) forest.	Riparian terrace, scarp.

Landform

This RAP occurs on a riparian terrace and scarp of the Oio Stream to the west of Raurimu in the south of the ecological district.

Vegetation

A secondary pole podocarp stand dominated by totara up to 18 m in height, established following clearance. Matai and scattered rimu, kahikatea and miro are also present in the canopy and there are occasional large emergent totara from the original forest cover. The middle tiers are generally sparse with some black maire and scattered sapling miro, matai and totara. The ground cover consists of *Coprosma rhamnoides*, kiokio, waewaekoukou, bush rice grass, and hooked sedges. Following recent pest animal control, it appears to be recovering well from heavy browsing by goats.

On track and stream margins the understorey is characterised by a variety of shrub species including kohuhu, horoeka, and houhere in association with manuka, bracken, pole rimu, and pole totara. Hard fern and pasture grasses occur in small clearings.

Poa anceps and kiokio with koromiko, *Anaphalioides trinervis* and *Senecio rufiglandulosus* dominate small areas along stream banks.

Flora

Only typical species were noted.

Fauna

Whitehead and common forest birds were noted, including tui, grey warbler and fantail.

Threat/Modification

Large numbers of sycamore seedlings are establishing from roadside sycamore plantings. Sycamore competes with indigenous vegetation and adult sycamore trees along the road should be removed along with seedlings within the forest. Small infestations of Japanese honeysuckle occur along track and streamside margins and should be controlled whilst still small.

Although the RAP is fenced, the fence is not stock proof and requires repair. Stock reduce the diversity and abundance of species in the understorey by grazing and trampling, and also aid the spread of weed species. It is recommended that the fence be made stock proof and that livestock are excluded from the area.

Possums are present in low numbers. Control of possums is planned for this area shortly. Goats have been present in high numbers in recent years but are now controlled by the landowner.

Justification

This forest is one of the highest quality, largest remaining representative areas of totara dominant mixed podocarp forest on the terraces landform unit in the Taumarunui Ecological District. Indigenous forest on this landform unit has been greatly reduced in extent. Currently protected areas represent only c. 3% of the total area of the terraces landform unit.

STURGEON WETLAND

RAP No.: 32
PNAP Survey No.: S19-12
Grid Reference: NZMS260 S19 043316
Landform unit(s): Terraces
Area (ha) 4
Altitudinal Range: +/- 200 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. (Ti kouka)-(horoeka)/ <u>raupo</u> - <i>Carex</i> sp. reedland.	Wetland.
	2. <u>Crack willow</u> treeland.	Alluvial terrace.
	3. <u>Blackberry</u> vineland ⇔ (totara)/pasture grassland.	Alluvial terrace.
	4. <u>Matai</u> -kahikatea-(totara) forest.	Alluvial terrace.
	5. <u>Manuka</u> / <i>Eleocharis acuta-juncus</i> sp./ pasture shrubland.	Alluvial terrace.
	6. <u>Totara</u> -matai-(rimu) forest.	Alluvial terrace and scarp.
	7. Totara-matai forest.	Alluvial terrace.
	8. (Ti kouka)-(manuka)/ <u>kiokio</u> -koromiko scrub.	Stream banks and scarp.

Landform

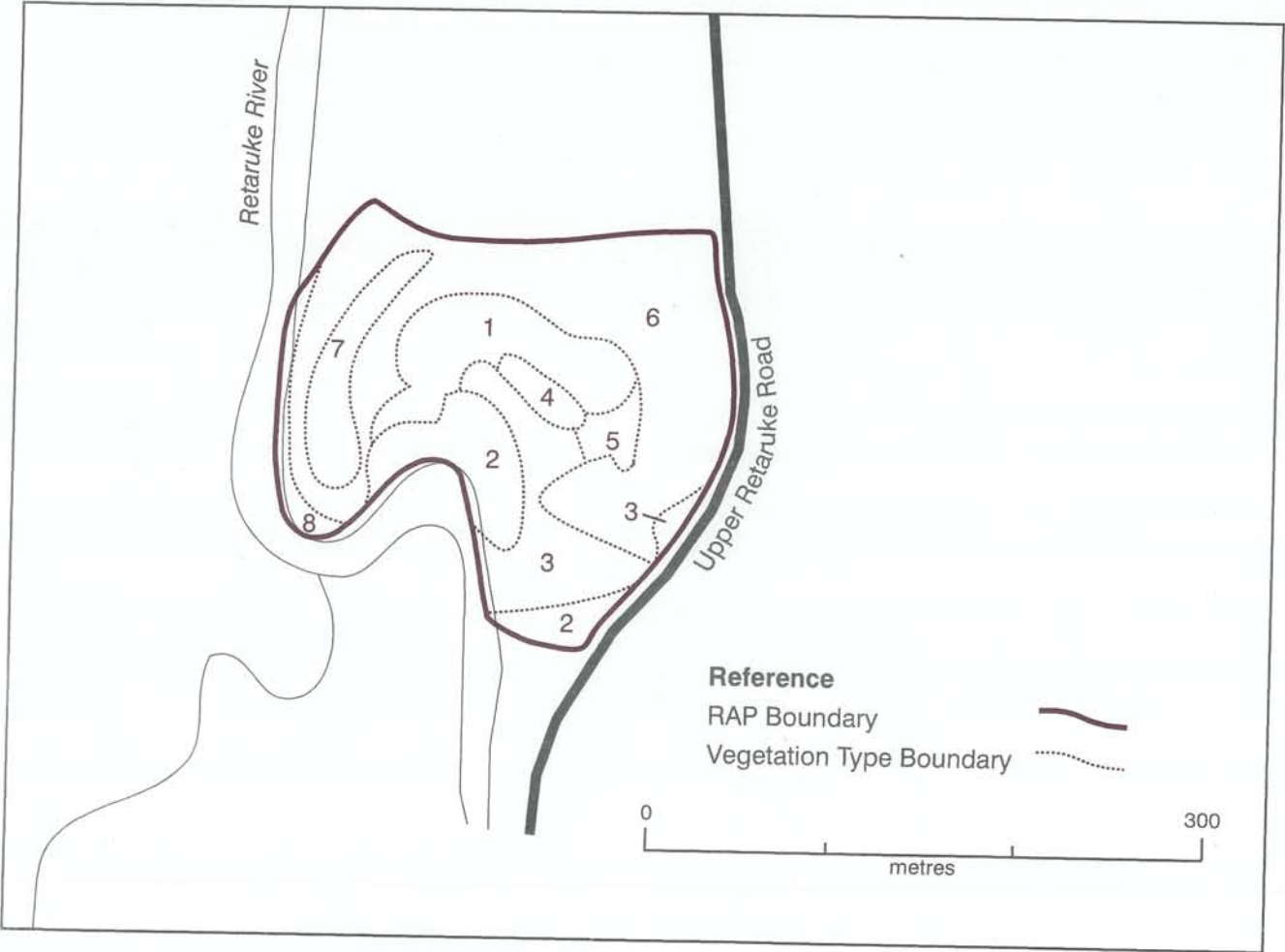
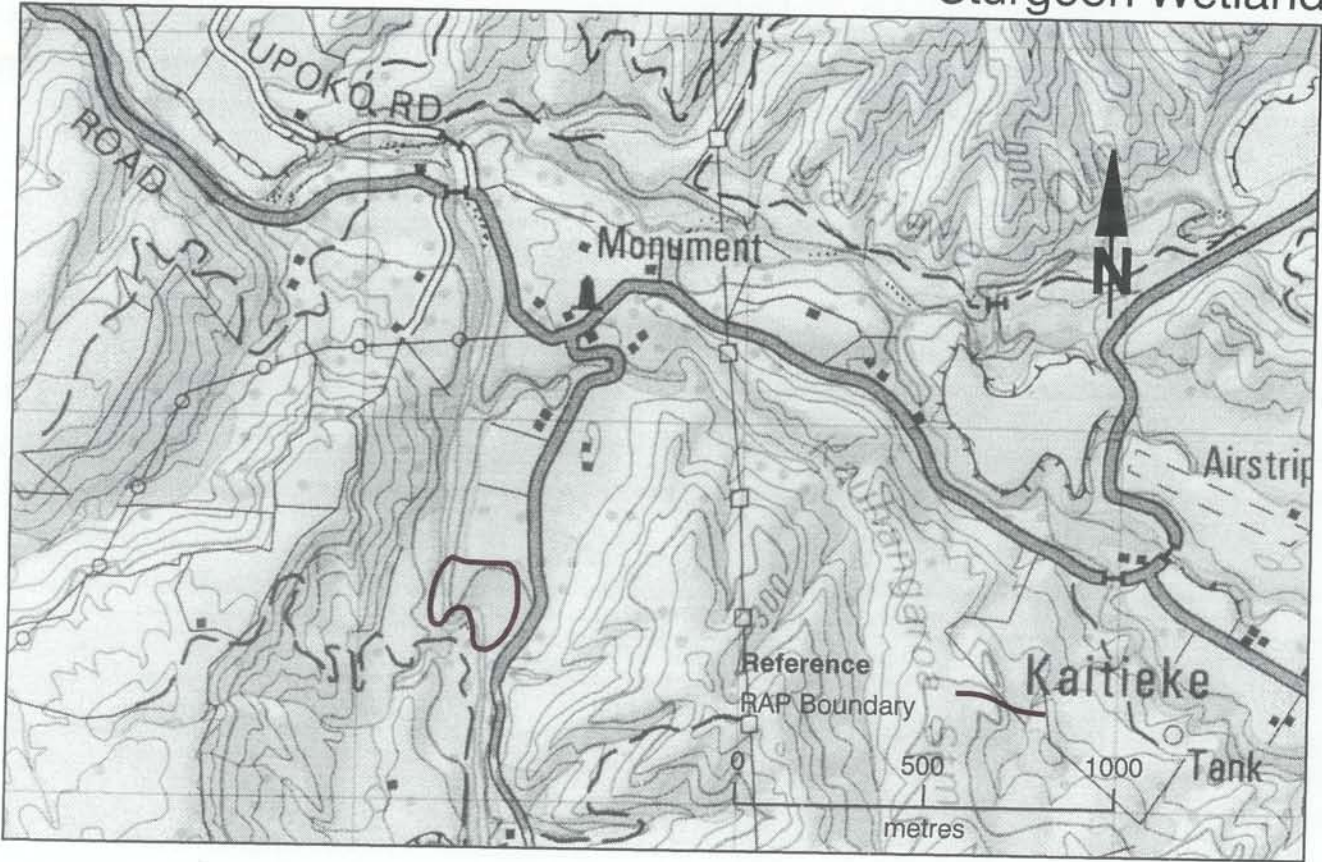
This RAP is located to the west of Raurimu in the south of the ecological district. It includes an old meander of the Retaruke River, a poorly drained alluvial terrace, adjacent scarps, and an elevated alluvial terrace.

Vegetation

Several distinct vegetation types form an uninterrupted sequence of wetland vegetation contiguous with indigenous terrace forest.

Raupo dominant reedland with scattered emergent ti kouka and horoeka forms the main cover on the lowest terrace. *Carex* sp. is a minor component and swamp kiokio is scattered throughout the groundcover. Hard fern occurs locally on drier sites. Blackberry, manuka, and a variety of exotic herbs are common on wetland margins (vegetation type 1).

An area of crack willow treeland up to c. 10 m in height (vegetation type 2) also occurs on the lowest terrace at the southern end of the reedland. Ground cover comprises mixtures of watercress, retoretore, monkey musk and *Carex* spp., with pasture grasses on slightly drier sites. Blackberry dominant vineland occurs in a mosaic with scattered totara over rank pasture on previously cleared, slightly drier areas of the same terrace (vegetation type 3).



A small forest area in the centre of the lowest lying terraces is dominated by matai, up to c. 14 m in height with kahikatea and scattered totara. A single mountain toatoa tree was found here. Poataniwha is abundant in the subcanopy over a shrub tier of densely regenerating canopy species, small-leaved shrubs and locally common waewaeakaka. *Sphagnum* dominates the groundcover (vegetation type 4).

A small area of manuka shrubland occurs on toeslopes of the upper terrace. *Eleocharis acuta* and *Juncus* sp. form a patchy subcanopy over pasture (vegetation type 5).

Pole podocarp forest to c. 12 m in height is present on scarps. The canopy is relatively open and dominated by totara in association with matai and infrequent rimu. The middle tiers are characterised by horoeka with pole totara, matai and scattered rimu. Pole kahikatea and manuka are common at wetland margins. Ground cover is sparse on steep sites and comprises scattered rereti and korokio (*Blechnum vulcanicum*; vegetation type 6).

On elevated terraces the forest canopy is typically dominated by totara and matai over a subcanopy of pole podocarps comprising totara in association with matai and scattered rimu. The shrub tier contains *Coprosma rhamnoides* and waewaeakoukou, and *Sphagnum* forms the ground cover (vegetation type 7).

Retaruke River banks and terrace scarps are characterised by scrub dominated by varying mixtures of kiokio, koromiko, koropuka with scattered emergent ti kouka and manuka (vegetation type 8).

Flora

Only typical species were noted.

Fauna

Spotless crane were heard calling in the raupo reedland. North Island robin, grey duck and grey teal have been reported in the RAP, and one bittern was recorded four years ago (B. Sturgeon, landowner pers. comm. 1999). Kereru and common forest birds are also present, as well as Australasian harrier.

Threat/Modification

The site is sporadically grazed and stock damage is evident at wetland margins which are heavily tracked. Vegetation is trampled and soils compacted from stock movement. There is a reduction in the diversity and abundance of understorey species and regeneration where stock have access. Goats are present in low density and are currently controlled by the landowner. Control of goats should be ongoing, the area fenced and livestock excluded.

Japanese honeysuckle is invading the site, smothering subcanopy and understorey vegetation and suppressing regeneration. It should be eliminated whilst at its current low density.

Blackberry is widespread on wetland margins forming dense thickets competing with low stature wetland species. Control should be considered to prevent further spread into the wetland.

Justification

This RAP contains a good quality sequence of wetland vegetation on an alluvial terrace contiguous with indigenous forest on an elevated terrace and scarps. This sequence, now uncommon in the ecological district, would have once been widespread but wetland and forest vegetation on this landform unit has been greatly reduced in extent. The presence of spotless crane increases the conservation significance of this RAP. Sturgeon Wetland contains the third largest area of wetland vegetation on the terraces landform unit. It is one of five RAPs containing examples of this ecological unit (the others being RAPs 26, 28, 34 and 35). Only 8.7 ha of wetland is protected in this landform unit in the ecological district, while protected indigenous forest represents less than 3% of the total area of the landform unit.

TE RIMU STATION FOREST

RAP No.: 33
PNAP Survey No.: S19-17
Grid Reference: NZMS260 S19 084310
Landform unit(s): Terraces
Area (ha) 3.3
Altitudinal Range: +/- 240 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Kahikatea</u> forest.	Terrace.
	2. <u>Kahikatea-matai</u> treeland.	Terrace.

Landform

A river terrace of the Kaitieke Stream and adjoining scarps, located in the south of the ecological district to the west of Raurimu.

Vegetation

Secondary pole podocarp forest has established following extensive logging. Some larger podocarps from the original cover remain.

Pole kahikatea up to c. 16 m form the forest canopy over most of the RAP. Kaikomako and pole totara are rare in the canopy and a very few scattered pole miro occur. Middle tiers are sparse with occasional wheki ponga and saplings of totara and kahikatea. The ground cover comprises a variety of fern species including *Diplazium australe*, *rereti*, and kiwikipiwi as well as local *Metrosideros diffusa* and *Coprosma rotundifolia* (vegetation type 1).

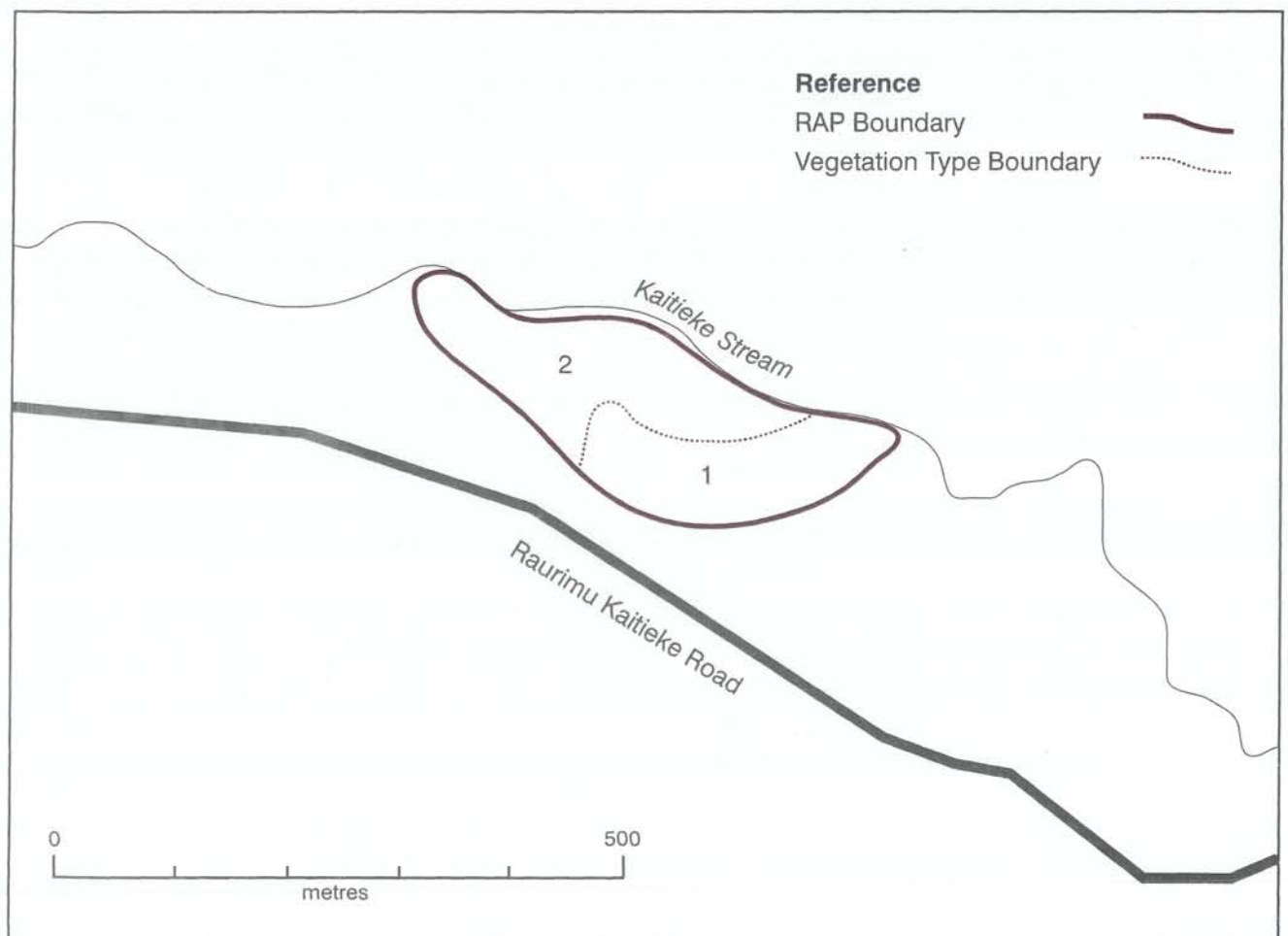
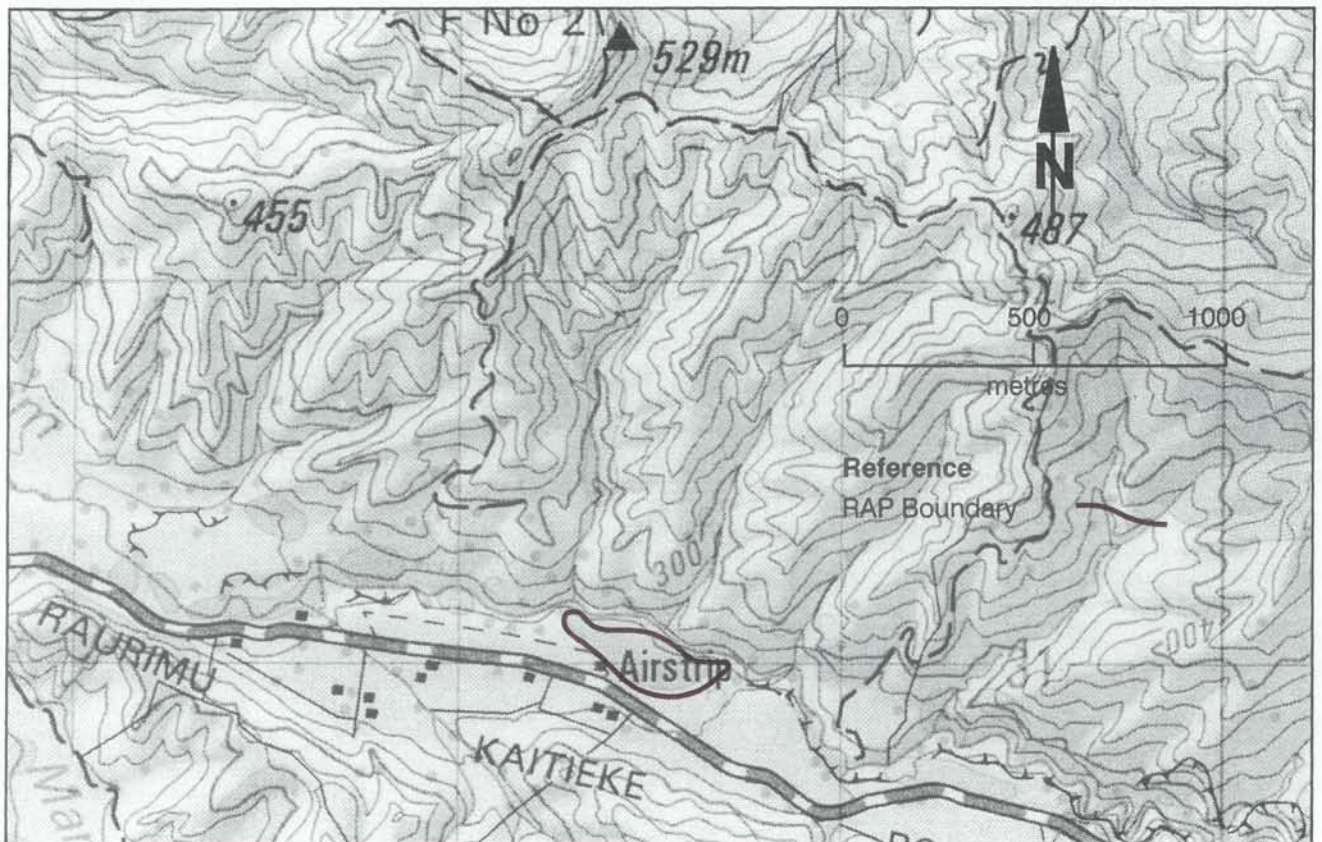
Kahikatea dominant treeland occurs over the remainder of the site. Matai is common in the canopy and totara occurs locally. Middle tiers comprise mixtures of horoeka, *Raukawa anomalous*, poataniwha, kotukutuku, and wheki ponga. *Rubus schmidelioides* is common. Small canopy gaps dominated by pasture with scattered pole totara occur locally (vegetation type 2)

Flora

Only typical species were noted.

Fauna

Kereru, whitehead and common forest birds including fantail, grey warbler, tui, bellbird, and shining cuckoo were observed.



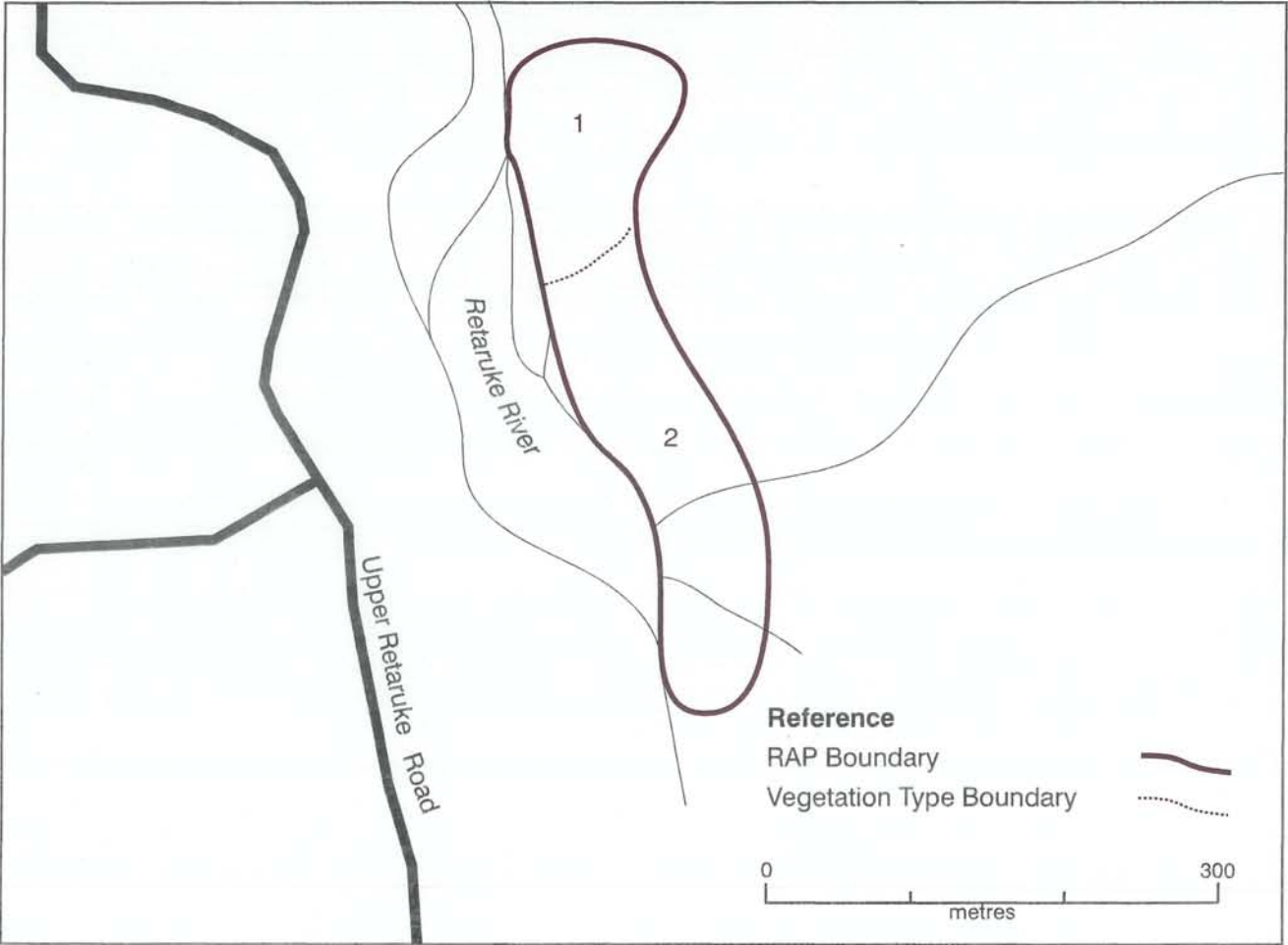
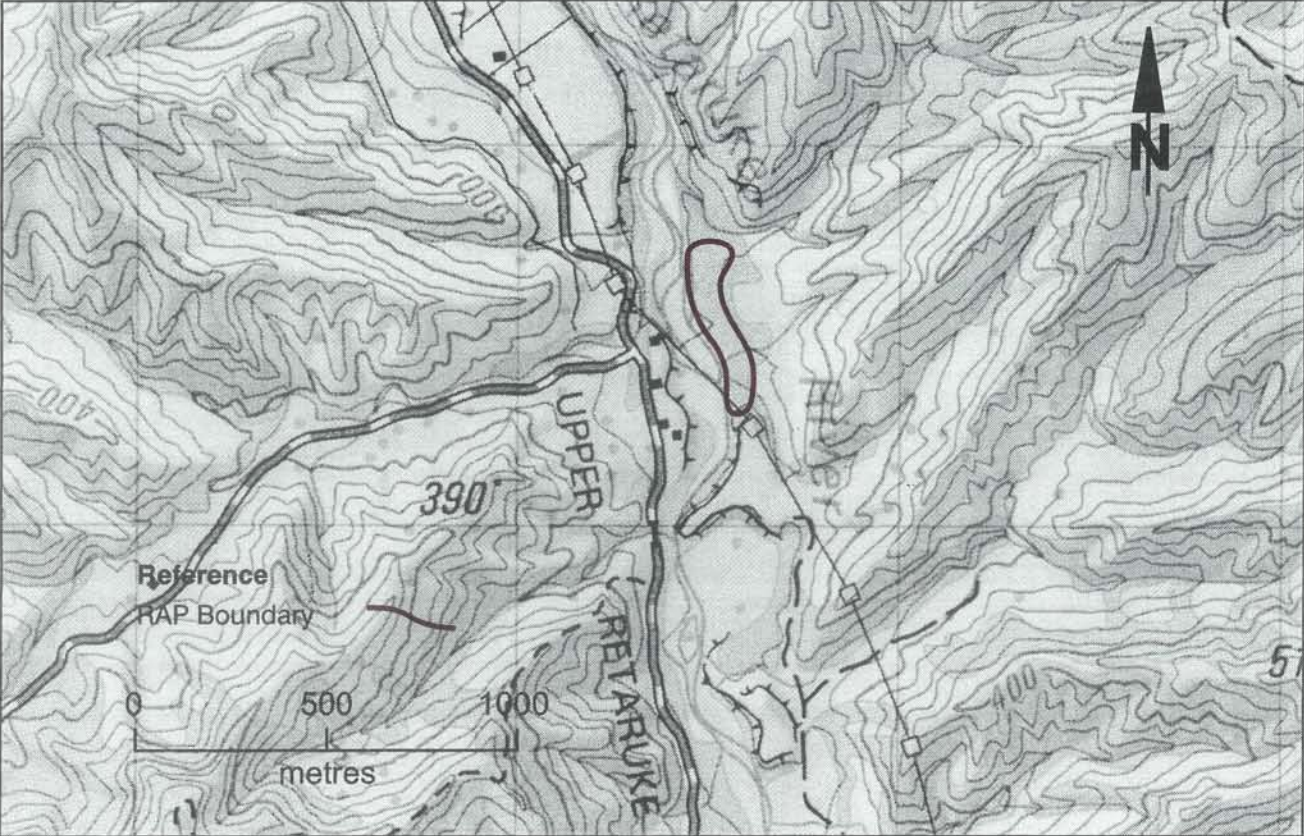
Threat/Modification

Sustained grazing by cattle and horses has inhibited regeneration and resulted in a decrease in the abundance and diversity of understorey species. It is recommended the RAP be fenced and stock excluded.

Goats and deer are currently being controlled and this needs to be ongoing.

Justification

This RAP is representative of a forest type that would have once been widespread on the terraces landform unit in the Taumarunui Ecological District. Forest on this landform unit has been greatly reduced in extent. Currently protected areas represent only c. 3% of the total area of this landform unit.



MATHIESON WETLAND

RAP No.: 34
PNAP Survey No.: S19-16
Grid Reference: NZMS260 S19 062263
Landform unit(s): Terraces
Area (ha) 1.3
Altitudinal Range: 340-360 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. (Manuka)/ <i>Baumea rubiginosa</i> -raupo- <i>Carex virgata</i> - <i>Baumea tenax</i> / <i>Sphagnum</i> moss-shrub-sedgeland.	Wetland.
	2. <i>Totara</i> -(matai)-(kahikatea) forest ⇔ <i>kahikatea</i> - matai treeland.	Scarps and terrace.

Landform

A poorly drained alluvial pumice terrace and adjacent scarps formed by the Retaruke River. A small wetland is on an elevated terrace at the north end of the site.

Vegetation

Vegetation has developed following clearance of the original forest cover. It comprises a small area of wetland vegetation and secondary pole podocarp forest.

Wetland vegetation is relatively diverse and comprises scattered emergent manuka (to c.3 m) over a canopy dominated by *Baumea rubiginosa*. *Baumea tenax*, raupo and *Carex virgata* are less common canopy components. The ground cover typically comprises a thick layer of *Sphagnum* in association with *Carex maorica*, *Eleocharis gracilis*, *Juncus prismatocarpus*, *Gonocarpus micranthus*, and *Juncus gregiflorus* (vegetation type 1)

Pole totara up to 18 m in height with scattered pole kahikatea and matai form the dominant forest canopy on scarps over most of the RAP. The understorey comprises scattered saplings of canopy species over *Sphagnum*. Treeland dominated by pole kahikatea up to 18 m in height occurs on the terrace. The understorey consists of scattered manuka and ti kouka over a ground cover of *Sphagnum* and a wide variety of indigenous and exotic species. These include *Carex geminata*, creeping buttercup, lotus, swamp plantain and marsh thistle, while *Pterostylis* sp., swamp kiokio and *Baumea tenax* occur locally in wetter areas (vegetation type 2).

Flora

Only typical species were noted.

Fauna

Common forest birds including bellbird, tui and grey warbler were noted.

Threat/Modification

The bottom half of the wetland which is not included in the RAP has been drained to create more pasture for grazing. Further drainage should not be undertaken.

There is moderate grazing by domestic livestock over the site affecting the structure and composition of wetland and forest types by restricting regeneration of palatable species. Wetland vegetation is particularly vulnerable to damage from trampling and soil compaction. Fencing and the exclusion of livestock is recommended.

Justification

This RAP encompasses a relatively intact sequence of wetland and forest vegetation on the terraces landform unit. It is one of five RAPs to include wetland on the terraces landform unit (the others being RAPs 26, 28, 32 and 35). Wetland vegetation and indigenous forest have been greatly reduced in extent with currently protected areas comprising only c.3% of the total area of this landform unit. Only 8.7 ha of wetland vegetation is protected in this landform unit in the ecological district.

TODD WETLAND

RAP No.: 35
PNAP Survey No.: S19-23
Grid Reference: NZMS260 S19 155320
Landform unit(s): Terraces
Area (ha) 6
Altitudinal Range: +/- 540 m
Survey Methodology: Field inspection
Conservancy: Wanganui

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Crack willow</u> forest.	Wetland.
	2. <u>Grey willow forest</u>	Wetland.
	3. <u>Juncus effusus</u> -(manuka)/ <u>Eleocharis gracilis-Sphagnum cristatum</u> - <u>E. acuta-Juncus articulatus</u> sedge-land	Wetland.
	4. <u>Raupo-purei</u> - <u>Cortaderia fulvida</u> sedge-reedland	Wetland.
	5. <u>Purei</u> sedge-land	Wetland.
	6. Grey willow/ <u>raupo-purei</u> sedge-reedland	Wetland.
	7. <u>Raupo</u> reedland ↔ <u>purei</u> sedge-land ↔ open water	Wetland.
	8. <u>Raupo</u> reedland.	Wetland.

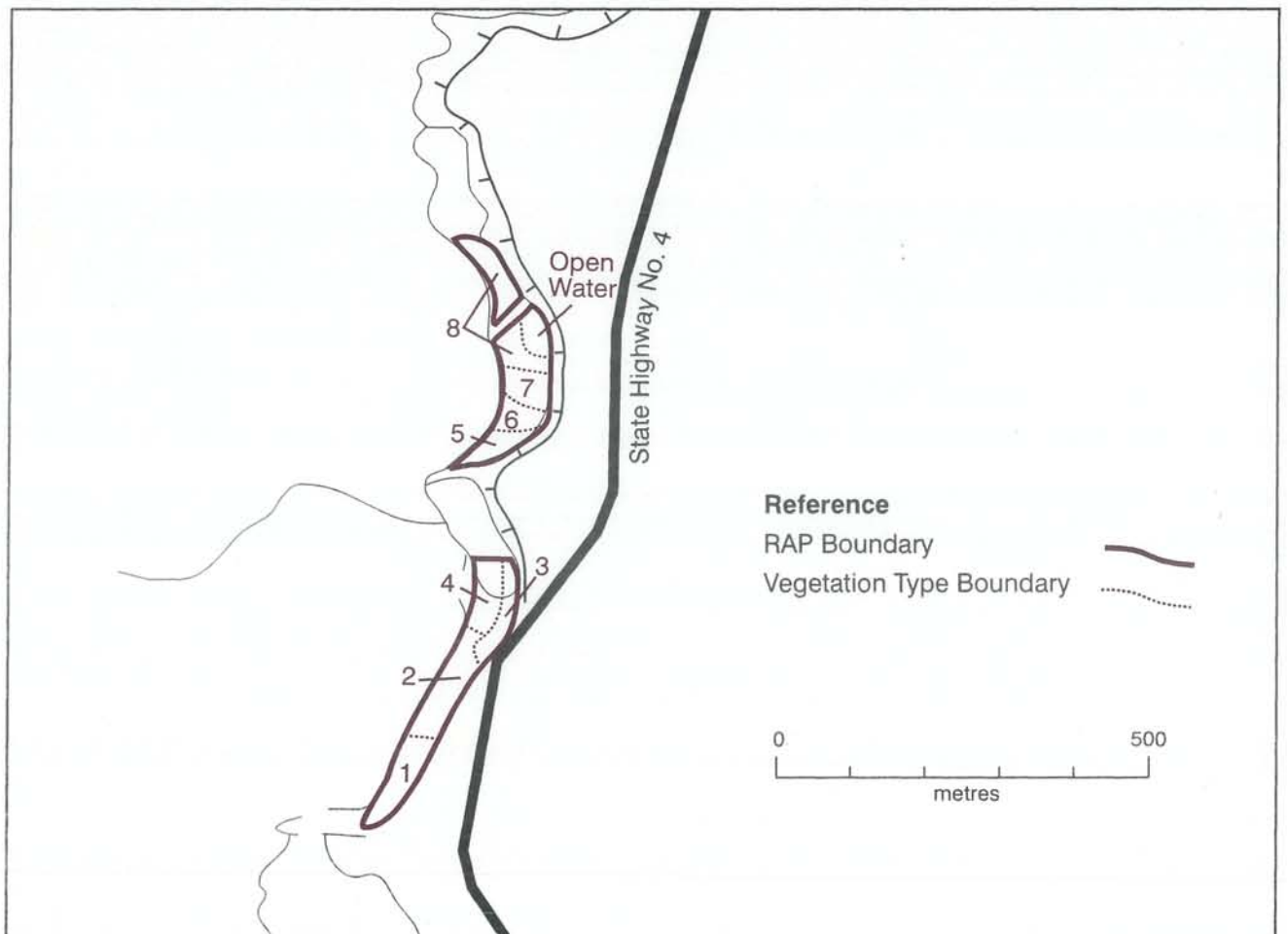
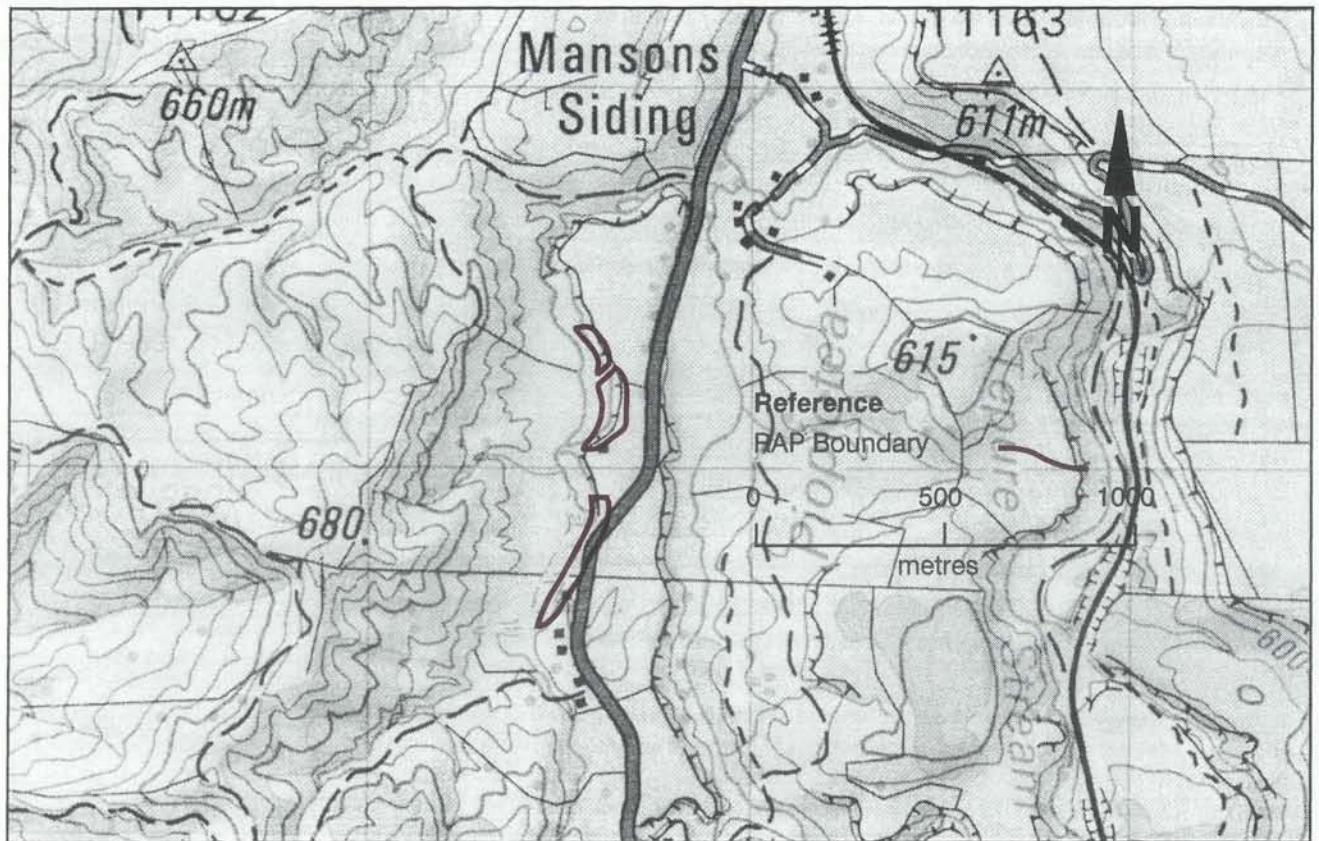
Landform

This RAP is located north of Raurimu in the south of the ecological district. There are two separate areas on a long, narrow pumice flat draining into the Piopioteca Stream. Steep incised pumice scarps bound the eastern side of the wetland.

Vegetation

A relatively large area of crack willow forest (vegetation type 1) with an indigenous understorey dominated by toetoe, purei and scattered harakeke occurs at the southern end of the southern section of the RAP. Immediately downstream of the crack willow forest is a smaller area of grey willow forest (vegetation type 2). The understorey of the grey willow forest is also dominated by indigenous species, mainly purei and swamp kiokio. Immediately downstream again, there is an area of sedge-reedland dominated by raupo in association with purei and less common *Cortaderia fulvida* (vegetation type 3). Other species present in the sedge-reedland include swamp kiokio and occasional *Carex maorica*, with local areas of *Carex geminata*. Emergent species include scattered shrub grey willow and occasional manuka, pole kahikatea, wheki, karamu, *Coprosma propinqua* and *C. sp. 't'*. A small area of manuka shrubland occurs on the western side of the sedge reedland.

A small low statured sedgeland (vegetation type 4) dominated by *Eleocharis acuta* and *Sphagnum cristatum* in association with *E. acuta* and *Juncus articulatus*



occurs between the scarp and the grey willow forest and sedge-reedland. There are scattered taller *Juncus effusus* and occasional manuka. Less common indigenous species present include *Gonocarpus micranthus*, *Pratia angulata*, *Blechnum penna-marina*, *Schoenus maschalinus* and *Hypericum japonicum*. A local area of *Carex geminata* occurs at the northern end of this vegetation type.

At the upstream end of the northern section of the RAP, sedgeland dominated by purei is present (vegetation type 5). Other species present in the sedgeland include raupo, *Cortaderia fulvida* and swamp kiokio. The sedgeland grades into sedge-reedland dominated by raupo and purei with scattered emergent shrub grey willow (vegetation type 6). Other species present in the sedge-reedland include swamp kiokio, *Carex maorica*, blackberry and very occasional *Coprosma* sp. 't'. Immediately downstream there is a mosaic of raupo reedland, purei sedgeland and open water (vegetation type 7). Raupo dominant reedland is present (vegetation type 8) above and below the dam at the northern end of the RAP. Downstream of the dam, purei is a noticeable component of the reedland.

Flora

Typical species only were noted.

Fauna

This habitat is a paradise shelduck moulting site for c. 500 birds (unpublished SSBI records held by DOC, Wanganui). Grey ducks are reported by the landowner. Numerous pukeko were observed (c. 20-30).

Common forest birds including tui, pipit and bellbird, as well as Australasian harrier are present.

Threat/Modification

The presence of several large tree stumps and kahikatea poles suggests that this area was once swamp forest. Despite the loss of this vegetation and modification by dam construction, the current vegetation is predominantly indigenous.

Stock have access to all parts of this RAP, intermittently grazing the southern half and heavily grazing the margins, thereby limiting species diversity and abundance of palatable wetland species. Livestock movement has caused soil compaction and damage to raupo and other plants. It is recommended that the area be fenced and livestock access restricted.

Grey willow presents the greatest pest plant threat to the RAP. Shrubs of grey willow were observed throughout the RAP, generally in low abundance. This suggests that grey willow is continuing to invade the vegetation. Control of this species should be undertaken, before grey willow becomes well established throughout the RAP.

Blackberry is locally present in the RAP and outside of the RAP, near the margins. Control to limit the spread of blackberry should be undertaken.

There is a relatively large area of crack willow at the southern end of the RAP. However, no juvenile crack willow was observed in the remainder of the RAP. Control to limit further spread is quite feasible and should be undertaken.

The steep pumice scarps that make up much of the eastern boundary of the RAP are prone to erosion and some infilling of the wetland has occurred in the southern portion of the site following the 1998 October floods.

Justification

Todd wetland is one of five RAPs to contain examples of wetland on the terraces landform unit (the others being RAPs 26, 28, 32 and 34). The wetland present here is the largest of the five areas, and provides good quality habitat for wetland birds. Low statured sedgelands, such as the *Fleocharis acuta-Sphagnum cristatum* sedgeland in this RAP are uncommon in the ecological district. Wetlands on this landform unit have been highly reduced in extent, with only 8.7 ha of wetland vegetation protected on this landform unit in the ecological district.

TE PURE STREAM FOREST

RAP No.: 36
PNAP Survey No.: S19-50
Grid Reference: NZMS260 S19 183460
Landform unit(s): Undulating terrain-lahar plain
Area (ha) 13.3
Altitudinal Range: 580-600 m
Survey Methodology: Field inspection
Conservancy: Tongariro/Taupo

BIOCLIMATIC ZONE	VEGETATION AND HABITAT TYPE	LANDFORM
Lowland	1. <u>Tawa</u> -kamahi forest.	Undulating plain, hillslopes.
	2. <u>Kamahi</u> -black maire-tawa forest	Undulating plain

Landform

This RAP is a gently undulating plateau that grades into gentle hillslopes north of Raurimu in the south of the ecological district.

Vegetation

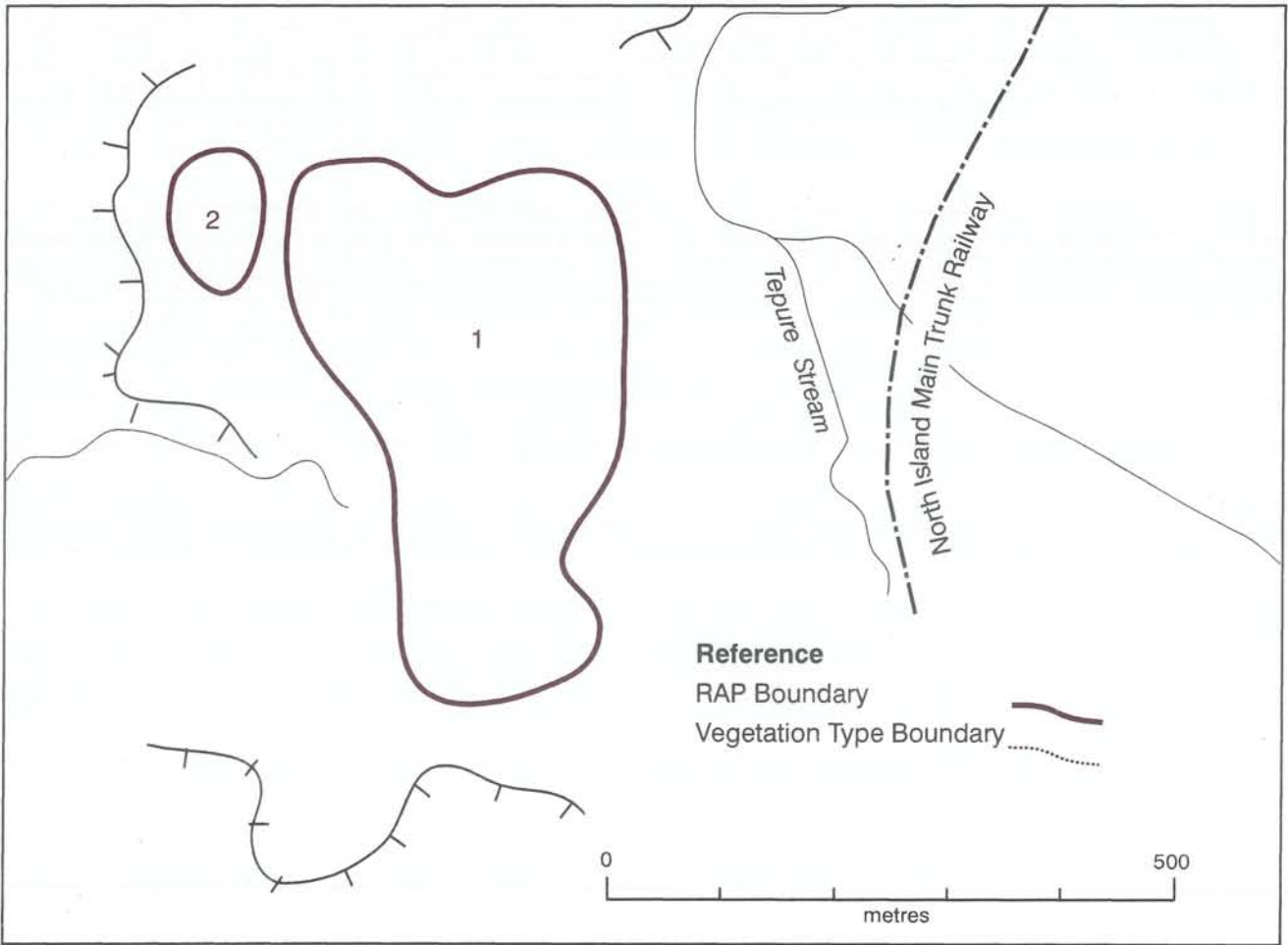
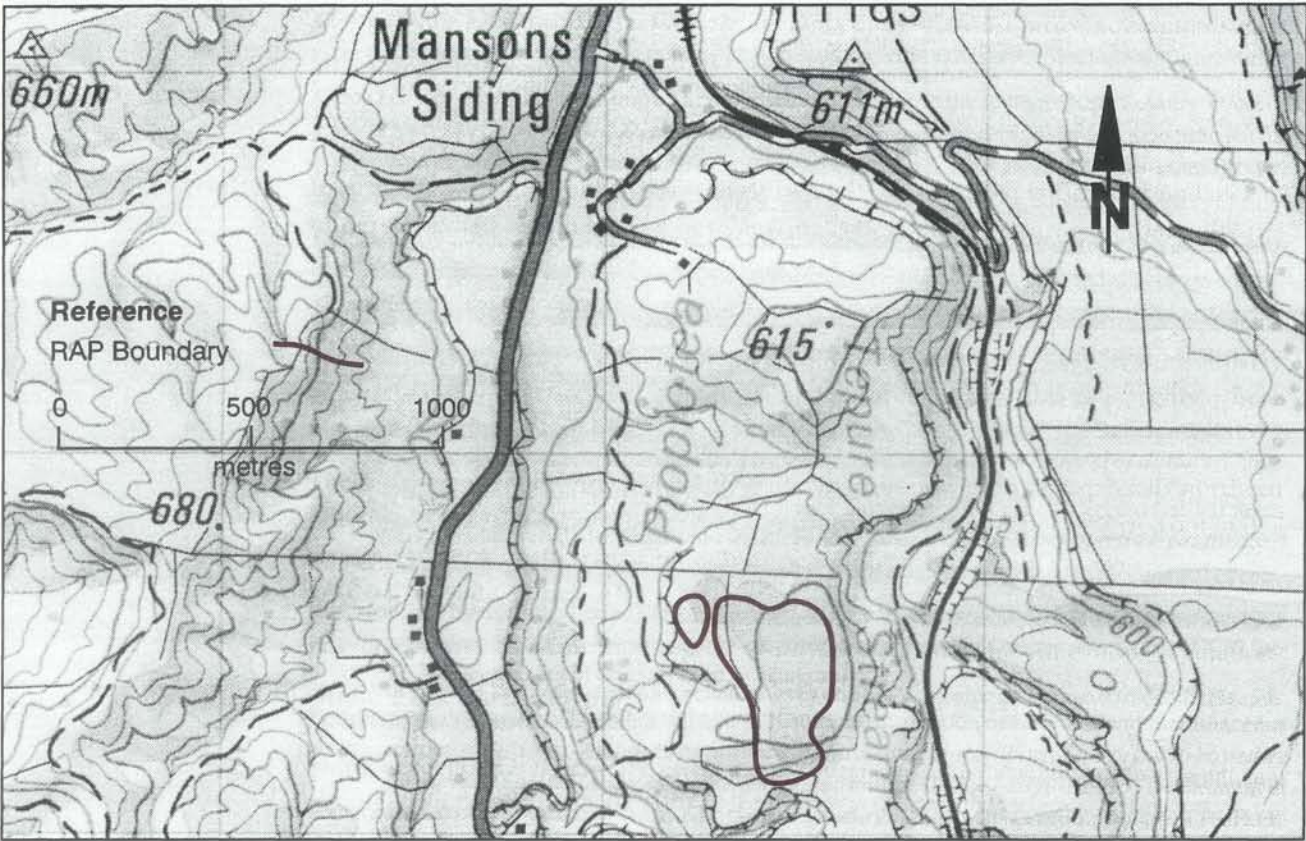
The forest has been selectively logged for larger podocarps in the past but retains a relatively diverse and dense mixed podocarp-broadleaved canopy.

The forest canopy over most of the plain and adjoining hillslopes is dominated by tawa up to c. 18 m in height in association with abundant kamahi. Rimu, black maire, hinau, miro and matai are minor canopy components with occasional kahikatea occurring on damp sites. The subcanopy typically comprises tawa and kamahi with scattered pokaka and black maire. The middle tier is characterised by wheki in association with whauwhaupaku, horoecka, putaputaweta, *Coprosma* sp. "t" and mapou. The shrub tier typically comprises a mixture of horopito, pole matai, young tawa and toropapa over a ground cover of locally scattered *Polystichum sylvaticum* and deep leaf litter. Pasture clearings extend into the forest from stock tracks.

A small fragment of kamahi dominant forest (to c. 14 m in height) occurs in the north-western corner of the RAP (vegetation type 2). Black maire and tawa are abundant in the canopy over a middle tier of horopito, miro, mahoe, and mahoe wao. The ground cover is variable, reflecting grazing pressure and generally comprises scattered young wheki with kiwikiwi and young horopito. Clearings occur locally and these are dominated by low pasture grasses and hard fern.

Flora

Only typical species were noted.



Fauna

Kereru, New Zealand falcon, whitehead, and common forest birds including shining cuckoo, tui, fantail, and grey warbler were noted.

Threat/Modification

Intermittent grazing by sheep and cattle occurs, reducing diversity and abundance of understorey species in areas where grazing is heavy and threatening to modify the future structure and composition of the forest.

Old logging tracks and numerous stock tracks dissect the forest, creating canopy gaps which provide potential establishment sites for adventive species such as blackberry and barberry. These are currently restricted to forest and shrubland margins, where higher light conditions prevail.

The canopy generally appears healthy with vigorous new growth, especially northern rata and *Metrosideros perforata*. Possum control has recently been carried out in this area but larger kamahi trees generally appear unhealthy.

Exclusion of grazing stock, control of weeds on the forest margins and ongoing possum control are necessary to prevent further decline of the indigenous vegetation.

Justification

This is a relatively large, high quality example of indigenous forest in the undulating terrain-lahar plain landform unit. The intact and relatively diverse canopy of this RAP is representative of the indigenous forest which would have once been widespread on this landform unit in the Taumarunui Ecological District but which has been greatly reduced. Less than 3% of the undulating terrain - lahar plain - landform unit is currently protected in the existing reserve network.

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Appendix 1

CHECKLIST OF INDIGENOUS VASCULAR PLANTS IN TAUMARUNUI ECOLOGICAL DISTRICT

The following list is compiled from previous vegetation surveys undertaken as part of the Biological Survey of Reserves in the ecological district (Fuller & Edwards 1989; and Bayfield *et al.* 1986) and the current survey.

Nomenclature follows Allan (1961), Moore and Edgar (1976), Healy and Edgar (1980), Brownsey, Given and Lovis (1985), Connor and Edgar (1987), and Webb, Sykes and Garnock-Jones (1988).

Abbreviations used:

- aff. : affinities with
- agg. : aggregate, comprising more than one species
- cf. : compare with
- f. : forma, form
- incl. : including
- sp. : species (singular)
- spp. : species (plural)
- subsp. : subspecies
- s.l. *sensu lato*, in the broad sense
- s.s. : *sensu stricto*, in the narrow sense
- x : hybrid
- var. : variety
- * : possibly adventive

- 1. Fuller and Edwards 1989
- 2. Bayfield *et al.* 1986
- 3. Ogle *et al.* 1994a
- 4. Ogle *et al.* 1994b
- 5. Ogle 1999
- 6. Whaley and Holzapfel 1996
- 7. Ogle and Bibby 2000
- 8. C. Ogle, Wanganui Conservancy, Department of Conservation pers. comm. 1999

Gymnosperms

<i>Dacrycarpus dacrydioides</i>	kahikatea
<i>Dacrydium cupressinum</i>	rimu
<i>Manoao colensoi</i>	manoao; silver pine
<i>Libocedrus bidwillii</i>	kaikawaka; pahautea
<i>Phyllocladus alpinus</i>	mountain toatoa
<i>Phyllocladus trichomanoides</i> var. <i>trichomanoides</i>	tanekaha

<i>Podocarpus hallii</i>	Hall's totara
<i>Podocarpus totara</i>	totara
<i>Prumnopitys ferruginea</i>	miro
<i>Prumnopitys taxifolia</i>	matai

Monocot. trees and shrubs

<i>Cordyline australis</i>	ti kouka
<i>Cordyline banksii</i>	ti ngahere, forest cabbage tree
<i>Cordyline indivisa</i>	mountain cabbage tree
<i>Phormium cookianum</i>	wharariki
<i>Phormium tenax</i>	harakeke
<i>Rhopalostylis sapida</i>	nikau

Dicot. trees and shrubs

<i>Alectryon excelsus</i> var. <i>excelsus</i>	titoki
<i>Alseuosmia macrophylla</i>	toropapa
<i>Alseuosmia pusilla</i>	
<i>Alseuosmia turneri</i>	
<i>Aristotelia serrata</i>	makomako, wineberry
<i>Ascarina lucida</i> (1)	
<i>Beilschmiedia tawa</i>	tawa
<i>Brachyglottis elaeagnifolia</i> (6)	
<i>Brachyglottis kirkii</i> var. <i>kirkii</i> (3)	kohurangi
<i>Brachyglottis repanda</i> s.s.	rangiora
<i>Carmichaelia australis</i>	makaka, maukoro
<i>Carpodetus serratus</i>	putaputaweta
<i>Coprosma colensoi</i>	
<i>Coprosma crassifolia</i>	
<i>Coprosma foetidissima</i>	hupiro
<i>Coprosma grandifolia</i>	kanono
<i>Coprosma lucida</i>	karamu
<i>Coprosma propinqua</i> subsp. <i>propinqua</i>	
<i>Coprosma propinqua</i> subsp. <i>propinqua</i> X <i>C. robusta</i>	
<i>Coprosma rhamnoides</i> subsp.	
<i>Coprosma rigida</i>	
<i>Coprosma robusta</i>	karamu

<i>Coprosma rotundifolia</i>	
<i>Coprosma rubra</i> (3)	
<i>Coprosma</i> sp. (unnamed; species "t" of Eagle 1982)	
<i>Coprosma tenuicaulis</i>	hukihuki
<i>Coprosma tenuifolia</i>	
<i>Coriaria arborea</i> var. <i>arborea</i>	tutu
<i>Cyathodes empetrifolia</i>	
<i>Cyathodes juniperina</i>	prickly mingimingi
<i>Dracophyllum strictum</i>	totorowhiti
<i>Dracophyllum subulatum</i>	monoao
<i>Dracophyllum traversii</i> (incl. <i>D. pyramidale</i>) (Barkla 1992)	
<i>Elaeocarpus dentatus</i> (incl. <i>E. d.</i> var. <i>obovatus</i>)	hinau
<i>Elaeocarpus hookerianus</i>	pokaka
<i>Fuchsia excorticata</i>	kotukutuku
<i>Gaultheria antipoda</i>	tawiniwini
<i>Gaultheria antipoda</i> X <i>G. paniculata</i>	
<i>Gaultheria oppositifolia</i>	kama
<i>Gaultheria oppositifolia</i> X <i>G. paniculata</i>	
<i>Gaultheria paniculata</i>	koropuka
<i>Gaultheria</i> sp. (unnamed; included in <i>G. depressa</i> , as var. <i>novae-zelandiae</i> by Franklin 1962) (1)	snowberry
<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>	hangehange
<i>Griselinia littoralis</i>	kapuka
<i>Griselinia lucida</i>	puka
<i>Hebe macrocarpa</i> (including <i>H. corriganti</i>)	
<i>Hebe stricta</i> var. <i>stricta</i>	koromiko
<i>Hebe</i> sp. (<i>H. parviflora</i> agg.; c f. <i>Veronica</i> <i>arborea</i>)	
<i>Hedycarya arborea</i>	porokaiwhiri
<i>Helicbrysum lanceolatum</i>	niniaio
<i>Hoheria populnea</i> var. <i>lanceolata</i>	houhere, lacebark
<i>Knigbtia excelsa</i>	rewarewa
<i>Kunzea ericoides</i> var. <i>ericoides</i>	kanuka
<i>Laurelia novae-zelandiae</i>	pukatea
<i>Leptospermum scoparium</i>	manuka

<i>Leucopogon fasciculatus</i>	mingimingi
<i>Leucopogon fraseri</i> s.l	patotara
<i>Lophomyrtus bullata</i>	ramarama
<i>Lophomyrtus bullata</i> ' <i>L. obcordata</i> (3)	
<i>Lophomyrtus obcordata</i>	rohutu
<i>Macropiper excelsum</i> var. <i>excelsum</i>	kawakawa
<i>Melicope simplex</i>	poataniwha
<i>Melicytus lanceolatus</i> (incl. <i>M. l.</i> var. <i>latior</i>)	mahoe wao
<i>Melicytus micranthus</i>	mahoe wao
<i>Melicytus ramiflorus</i> subsp. <i>ramiflorus</i>	mahoe
<i>Metrosideros robusta</i>	northern rata
<i>Myrsine australis</i>	mapou
<i>Myrsine salicina</i>	toro
<i>Neomyrtus pedunculata</i>	rohutu
<i>Nestegis cunninghamii</i>	black maire
<i>Nestegis lanceolata</i>	white maire
<i>Nestegis montana</i>	rororo
<i>Nothofagus fusca</i>	red beech
<i>Nothofagus menziesii</i>	silver beech
<i>Nothofagus solandri</i> var. <i>cliffortioides</i> (1)	mountain beech
<i>Nothofagus solandri</i> var. <i>solandri</i>	black beech
<i>Nothofagus truncata</i>	hard beech
<i>Olearia arborescens</i>	
<i>Olearia furfuracea</i>	akepiro
<i>Olearia ilicifolia</i>	hakeke
<i>Olearia townsonii</i>	
<i>Olearia rani</i>	heketara
<i>Olearia virgata</i> subsp. <i>virgata</i> (3)	
<i>Pennantia corymbosa</i>	kaikomako
<i>Pimelea prostrata</i> s.s. (1)	pinatoro
<i>Pittosporum eugenioides</i>	tarata
<i>Pittosporum tenuifolium</i> subsp. <i>colensoi</i>	rautawhiri
<i>Pittosporum tenuifolium</i> subsp. <i>tenuifolium</i>	kohuhu
<i>Plagianthus regius</i>	manatu, ribbonwood
<i>Pseudopanax arboreus</i> var. <i>arboreus</i>	whauwhaupaku, five finger
<i>Pseudopanax colensoi</i>	orihou

<i>Pseudopanax crassifolius</i>	horoeaka, lancewood
<i>Pseudopanax laetus</i>	
<i>Pseudowintera axillaris</i>	horopito
<i>Pseudowintera colorata</i>	horopito
<i>Quintinia serrata</i> (incl. <i>Q. acutifolia</i> and <i>Q. elliptica</i>)	tawheowheo
<i>Raukaua anomalus</i>	
<i>Raukaua edgerleyi</i>	raukawa
<i>Raukaua simplex</i>	
<i>Rhabdothamnus solandri</i>	taurepo
<i>Schefflera digitata</i>	pate
<i>Solanum aviculare</i> var. <i>aviculare</i> (incl. <i>S. a.</i> var. <i>albiflorum</i> and <i>S. cheesemanii</i>) (2)	poroporo
<i>Sophora microphylla</i> s.l	kowhai
<i>Streblus heterophyllus</i>	turepo
<i>Teucrium parvifolium</i> (historical record in Fuller and Edwards 1989)	
<i>Urtica ferox</i>	ongaonga
<i>Weinmannia racemosa</i> subsp. <i>racemosa</i>	kamahi
<i>Monocot. lianes</i>	
<i>Freycinetia banksii</i>	kiekie
<i>Ripogonum scandens</i>	kareao, supplejack
<i>Dicot. lianes</i>	
<i>Calystegia sepium</i>	pohue
<i>Calystegia tuguriorum</i>	
<i>Clematis foetida</i>	akakaiku
<i>Clematis forsteri</i>	
<i>Clematis paniculata</i>	puawananga
<i>Fuchsia excorticata</i> X <i>F. perscandens</i>	
<i>Fuchsia perscandens</i>	
<i>Metrosideros carminea</i>	akakura
<i>Metrosideros colensoi</i>	rata
<i>Metrosideros diffusa</i>	rata
<i>Metrosideros fulgens</i>	rata
<i>Metrosideros perforata</i>	aka
<i>Muehlenbeckia australis</i>	puka

<i>Muehlenbeckia complexa</i> (1)	pohuehue
<i>Parsonsia capsularis</i>	akakiore
<i>Parsonsia heterophylla</i>	akakaikiore
<i>Passiflora tetrandra</i>	kohia
<i>Rubus australis</i>	tataramoa
<i>Rubus cissoides</i>	tataramoa
<i>Rubus schmidelioides</i>	akatataramoa
<i>Lycopods</i>	
<i>Huperzia varia</i>	Whiri-o-Raukatauri
<i>Lycopodium deuterodensum</i>	puakarimu
<i>Lycopodium fastigiatum</i>	
<i>Lycopodium scariosum</i>	matukutuku
<i>Lycopodium volubile</i>	waewaekoukou
<i>Tmesipteris elongata</i>	
<i>Tmesipteris tannensis</i>	
<i>Ferns</i>	
<i>Adiantum cunninghamii</i>	huruhuru tapairu
<i>Adiantum fulvum</i>	huruhuru tapairu
<i>Anarthropteris lanceolata</i>	
<i>Asplenium bulbiferum</i> s.s.	mouku
<i>Asplenium flabellifolium</i>	
<i>Asplenium flaccidum</i> s.s.	makawe
<i>Asplenium gracillimum</i>	petako-paraharaha
<i>Asplenium gracillimum</i> X <i>A. bookerianum</i>	
<i>Asplenium bookerianum</i>	petako-paraharaha
<i>Asplenium oblongifolium</i>	huruhuruwhenua
<i>Asplenium polyodon</i>	petako
<i>Azolla filiculoides</i> subsp. <i>rubra</i>	retoretore
<i>Blechnum chambersii</i>	rereti
<i>Blechnum colensoi</i>	peretao
<i>Blechnum discolor</i>	petipeti, crown fern
<i>Blechnum filiforme</i>	panako
<i>Blechnum fluviatile</i> agg.	kiwikiwi
<i>Blechnum membranaceum</i>	
<i>Blechnum montanum</i>	

<i>Blechnum nigrum</i> (3)	
<i>Blechnum novae-zelandiae</i> s.s.	kiokio
<i>Blechnum novae-zelandiae</i> (wetland form; <i>B. minus</i> of NZ authors)	swamp kiokio
<i>Blechnum penna-marina</i>	
<i>Blechnum procerum</i>	
<i>Blechnum vulcanicum</i>	korokio
<i>Botrychium biforme</i> (3)	
<i>Ctenopteris heterophylla</i>	
<i>Cyathea dealbata</i>	ponga
<i>Cyathea medullaris</i>	mamaku
<i>Cyathea smithii</i>	katote: soft treefern
<i>Deparia petersenii</i>	
<i>Dicksonia fibrosa</i>	wheki ponga
<i>Dicksonia lanata</i>	
<i>Dicksonia squarrosa</i>	wheki
<i>Diplazium australe</i>	
<i>Gleichenia dicarpa</i> (3)	
<i>Gleichenia microphylla</i>	waewaekaka
<i>Grammitis billardierei</i> (2)	
<i>Grammitis ciliata</i> (3)	
<i>Grammitis pseudociliata</i> (1)	
<i>Grammitis magellanica</i>	
<i>Histiopteris incisa</i>	matata
<i>Hymenophyllum demissum</i>	irirangi
<i>Hymenophyllum dilatatum</i>	matua mauku
<i>Hymenophyllum ferrugineum</i>	mauku
<i>Hymenophyllum flabellatum</i>	mauku
<i>Hymenophyllum flexuosum</i> (3)	mauku
<i>Hymenophyllum malingii</i>	
<i>Hymenophyllum multifidum</i> (1)	mauku
<i>Hymenophyllum pulcherrimum</i>	
<i>Hymenophyllum rarum</i>	mauku
<i>Hymenophyllum revolutum</i>	mauku
<i>Hymenophyllum sanguinolentum</i>	piripiri
<i>Hymenophyllum scabrum</i>	mauku

<i>Hypolepis ambigua</i>	
<i>Hypolepis distans</i>	
<i>Hypolepis rufobarbata</i>	
<i>Lastreopsis glabella</i>	
<i>Lastreopsis hispida</i>	
<i>Leptolepia novae-zelandiae</i>	
<i>Leptopteris hymenophylloides</i>	heruheru
<i>Leptopteris superba</i>	heruheru
<i>Leptopteris hymenophylloides</i> X <i>L. superba</i>	
<i>Lindsaea trichomanoides</i>	
<i>Microsorium pustulatum</i>	kowaowao (hounds tongue fern)
<i>Microsorium scandens</i> (1)	mokimoki
<i>Ophioglossum coriaceum</i>	
<i>Paesia scaberula</i>	matata (hard fern)
<i>Pellaea rotundifolia</i>	tarawera (button fern)
<i>Pneumatopteris pennigera</i>	pakau
<i>Polystichum richardii</i>	pikopiko (hard shield fern)
<i>Polystichum silvaticum</i>	
<i>Polystichum vestitum</i>	puniu (shield fern)
<i>Pteridium esculentum</i>	rarahu (bracken)
<i>Pteris macilenta</i>	
<i>Pteris tremula</i> (3)	turawera (shaking brake)
<i>Pyrrosia eleagnifolia</i>	leather-leaf fern
<i>Rumobra adiantiformis</i>	
<i>Sticherus cunninghamii</i>	wackura
<i>Trichomanes reniforme</i>	konehu (kidney fern)
<i>Trichomanes venosum</i>	
Orchids	
<i>Bulbophyllum pygmaeum</i>	piripiri
<i>Caladenia chlorostyla</i>	
<i>Chiloglottis cornuta</i> (1)	
<i>Corybas cheesemanii</i> (8)	
<i>Corybas iridescens</i> (4)	spider orchid
<i>Corybas papa</i> (4)	spider orchid
<i>Corybas trilobus</i> s.s.	

<i>Drymoanthus adversus</i>	
<i>Farina autumnalis</i>	raupeka
<i>Farina mucronata</i> s.s.	peka-a-waka
<i>Gastrodia cunninghamii</i> (1)	huperei
<i>Microtis unifolia</i>	maikaika
<i>Orthoceras novae-zeelandiae</i>	maikaika
<i>Pterostylis banksii</i>	tutukiwi
<i>Pterostylis banksii</i> var. <i>patens</i>	
<i>Pterostylis</i> "aff. <i>montana</i> " (3)	
<i>Tbelymitra longifolia</i>	maikuku
<i>Tbelymitra pauciflora</i>	
<i>Winika cunninghamii</i>	

Grasses

<i>Cortaderia fulvida</i>	toetoe
<i>Deyeuxia avenoides</i>	
<i>Dichelachne crinita</i> (3)	patiti
<i>Echinopogon ovatus</i> (1)	
<i>Elymus</i> sp.	
<i>Hierochloe redolens</i> (1)	karetu
<i>Microlaena avenacea</i>	bush rice grass
<i>Microlaena stipoides</i>	patiti
<i>Poa anceps</i> subsp. <i>anceps</i>	
<i>Poa cita</i>	
<i>Rytidosperma clavatum</i>	
<i>Rytidosperma gracile</i>	

Sedges

<i>Baumea articulata</i> (planted, 8)	
<i>Baumea rubiginosa</i>	
<i>Baumea tenax</i>	
<i>Carex breviculmis</i>	
<i>Carex coriacea</i> (3)	
<i>Carex dipsacea</i>	
<i>Carex dissita</i>	
<i>Carex flagellifera</i> (1)	manaia
<i>Carex forsteri</i> (7)	

<i>Carex geminata</i> s.s.	
<i>Carex lessoniana</i> (3)	
<i>Carex maorica</i>	
<i>Carex secta</i>	purei
<i>Carex solandri</i>	
<i>Carex testacea</i> (1)	
<i>Carex virgata</i>	purei
<i>Eleocharis acuta</i>	
<i>Eleocharis gracilis</i>	
<i>Eleocharis sphacelata</i>	
<i>Gahnia pauciflora</i>	takahikahi
<i>Gahnia procera</i>	
<i>Gahnia setifolia</i>	mapere
<i>Isolepis distigmata</i>	
<i>Isolepis prolifer</i>	
<i>Isolepis reticularis</i>	
<i>Lepidosperma australe</i>	
<i>Machaerina sinclairii</i>	tuhara
<i>Morelotia affinis</i>	
<i>Schoenoplectus tabernaemontani</i>	kapungawha
<i>Schoenus apogon</i>	
<i>Schoenus maschalinus</i>	
<i>Schoenus nitens</i> (1)	
<i>Schoenus tendo</i>	
<i>Uncinia banksii</i>	matau
<i>Uncinia distans</i> (1)	matau
<i>Uncinia ferruginea</i>	matau
<i>Uncinia filiformis</i>	
<i>Uncinia gracilentia</i>	matau
<i>Uncinia laxiflora</i>	
<i>Uncinia uncinata</i>	kamu, matau a Maui
<i>Uncinia zotovii</i>	matau
Rushes	
<i>Juncus australis</i>	wi
<i>Juncus distegus</i> (3)	
<i>Juncus gregiflorus</i>	wi

Juncus pauciflorus (1)

Juncus planifolius

Juncus prismatocarpus

Juncus sarophorus wi

Luzula picta var. *picta*

Luzula subclavata

Monocot. herbs (other than orchids, grasses, sedges and rushes)

Arthropodium candidum

Astelia fragrans kakaha

Astelia grandis (3) mauri

Astelia solandri kowharawhara

Astelia sp. (unnamed; aff. *A. nervosa*) mauri

Astelia trinervia mauri

Collospermum bastatum kahakaha

Collospermum microspermum

Dianella nigra turutu

Lemna minor karearea

Libertia pulchella (3)

Libertia ixioides (3) mikoikoi

Luzuriaga parviflora

Potamogeton cheesemanii

Potamogeton suboblongus

Thismia rodwayi

Typha orientalis raupo

Composite herbs

Anaphalioides trinervis puatea

Gnaphalium audax

Gnaphalium gymnocephalum

Gnaphalium limosum

Helicbrysum filicaule

Lagenifera pumila papataniwhaniwha

Pseudognaphalium luteoalbum agg.

Raoulia albo-sericea

Raoulia australis

Senecio minimus

Senecio rufiglandulosus

Dicot. herbs (other than composites)

Acaena anserinifolia piripiri

Australina pusilla (3)

Callitriche muelleri (1)

Cardamine sp. (i) (*C. debilis* agg. *C. 'Narrow Petal'* of Pritchard 1957) (7) panapana

Cardamine sp. (ii) (*C. debilis* agg. *C. 'Long Style'* of Pritchard 1957) (7) panapana

Dactylanthus taylorii Pua o te reinga; wae wae atua

Drosera binata

Drosera peltata subsp. *auriculata*

Elatostema rugosum parataniwha

Epilobium alsinoides s.s. (4)

Epilobium brunnescens

Epilobium chionanthum

Epilobium nerteroides

Epilobium nummulariifolium

Epilobium pallidiflorum tawarewa

Epilobium pedunculare

Epilobium pubens

Epilobium rotundifolium

Galium propinquum mawc

Geranium potentilloides var. *potentilloides*

Geranium solanderi

Gonocarpus micranthus subsp. *micranthus*

Gunnera monoica

Haloragis erecta subsp. *erecta* toatoa

Hydrocotyle dissecta

Hydrocotyle elongata

Hydrocotyle heteromeria

Hydrocotyle microphylla

Hydrocotyle moschata

Hydrocotyle novae-zeelandiae

Hypericum japonicum

<i>Jovellana repens</i> (3)	
<i>Jovellana sinclairii</i>	
<i>Myosotis</i> sp. (<i>M. forsteri</i> agg.)	
<i>Nertera depressa</i>	
<i>Nertera scapanioides</i>	
<i>Nertera (Leptostigma) setulosa</i>	
<i>Nertera villosa</i>	
<i>Oreomyrrhis ramosa</i>	
<i>Oxalis exilis</i>	
<i>Pratia angulata</i> s.l	panakenake
<i>Ranunculus reflexus</i>	maruru
<i>Solanum americanum</i> (1)	
<i>Stellaria decipiens</i>	kohukohu
<i>Urtica incisa</i>	
<i>Viola filicaulis</i>	
<i>Wahlenbergia violacea</i>	

Appendix 2

CHECKLIST OF ADVENTIVE VASCULAR PLANTS IN TAUMARUNUI ECOLOGICAL DISTRICT

(From current survey, Bayfield *et al.* 1986, and Fuller & Edwards 1989 unless otherwise quoted)

1. Fuller and Edwards 1989
2. Bayfield *et al.* 1986
3. Ogle *et al.* 1994a
4. Ogle *et al.* 1994b
5. Ogle 1999
6. Whaley and Holzapfel 1996
7. Ogle and Bibby 2000
8. C. Ogle, Wanganui Conservancy, Department of Conservation pers. comm. 1999

Gymnosperms

<i>Chamaecyparis lawsoniana</i> (1)	Lawsons cypress
<i>Cupressus macrocarpa</i>	macrocarpa
<i>Larix decidua</i>	larch
<i>Pinus radiata</i>	radiata pine
<i>Pseudotsuga menziesii</i>	Douglas fir

Dicot. trees and shrubs

<i>Acacia dealbata</i>	silver wattle
<i>Acacia mearnsii</i>	black wattle
<i>Acacia melanoxylon</i>	Tasmanian blackwood
<i>Acer pseudoplatanus</i>	sycamore
<i>Berberis glaucocarpa</i>	barberry
<i>Berberis darwinii</i>	Darwin's barberry
<i>Betula pendula</i>	silver birch
<i>Buddleja davidii</i>	buddleia
<i>Calluna vulgaris</i>	heather
<i>Cotoneaster franchetii</i>	
<i>Cotoneaster glaucophyllus</i>	cotoneaster
<i>Cotoneaster simonsii</i>	
<i>Crataegus monogyna</i>	hawthorn
<i>Cytisus scoparius</i>	broom
<i>Dendrobenthamia capitata</i>	strawberry dogwood

<i>Erica lusitanica</i>	Spanish heath
<i>Eucalyptus</i> sp. (unidentified)	eucalypt
<i>Hypericum androsaemum</i>	tutsan
<i>Juglans ailantifolia</i>	Japanese walnut
<i>Leycesteria formosa</i>	Himalayan honeysuckle
<i>Ligustrum lucidum</i>	tree privet
<i>Ligustrum sinense</i>	Chinese privet
<i>Lupinus arboreus</i>	lupin
<i>Paraserianthes lophantha</i>	brush wattle
<i>Paulownia tomentosa</i>	paulownia
<i>Populus alba</i> "Nivea" (1)	silver poplar
<i>Populus nigra</i> "Italica"	Lombardy poplar
<i>Populus</i> sp.	poplar
<i>Rhododendron</i> sp. (unidentified)	rhododendron
<i>Rosa rubiginosa</i>	sweet brier
<i>Rubus</i> sp. (<i>R. fruticosus</i> agg.)	blackberry
<i>Salix babylonica</i>	weeping willow
<i>Salix cinerea</i>	grey willow
<i>Salix fragilis</i>	crack willow
<i>Sambucus nigra</i> (7)	elderberry
<i>Ulex europaeus</i>	gorse

Dicot. Itanes

<i>Calystegia silvatica</i> (1)	
<i>Celastrus orbiculatus</i> (7)	climbing spindle berry
<i>Clematis vitalba</i>	old man's beard
<i>Elaeagnus X reflexa</i> (3)	elaeanus
<i>Hedera helix</i>	ivy
<i>Humulus lupulus</i> (8)	hops
<i>Ipomoea indica</i> (1)	blue morning glory
<i>Lonicera japonica</i>	Japanese honeysuckle
<i>Solanum dulcamara</i> (7)	bittersweet
<i>Tropaeolum spectiosum</i>	Chilean flame creeper
<i>Wisteria sinensis</i>	wisteria

Lycopods and psilopsids

<i>Selaginella kraussiana</i>	

Grasses

<i>Avena sativa</i> (1)	
<i>Agrostis capillaris</i>	browntop
<i>Aira caryophylla</i>	silvery hairy grass
<i>Agrostis stolonifera</i>	creeping bent
<i>Alopecurus geniculatus</i> (1)	kneed foxtail
<i>Anthoxanthum odoratum</i>	sweet vernal
<i>Bromus willdenowii</i>	prairie grass
<i>Bromus hordeaceus</i>	soft brome
<i>Cortaderia selloana</i>	pampas
<i>Dactylis glomerata</i>	cocksfoot
<i>Festuca arundinacea</i>	tall fescue
<i>Glyceria declinata</i>	glaucous sweetgrass
<i>Glyceria</i> sp.	sweetgrass
<i>Glyceria maxima</i>	reed sweetgrass
<i>Holcus lanatus</i>	Yorkshire fog
<i>Lolium perenne</i>	rye grass
<i>Paspalum dilatatum</i>	paspalum
<i>Pbleum pratense</i> (1)	timothy
<i>Poa annua</i>	annual poa
<i>Poa trivialis</i>	
<i>Pseudosasa japonica</i>	bamboo
<i>Sporobolus africanus</i>	ratstail
<i>Vulpia myuros</i>	vulpia hair grass

Sedges

<i>Carex divulsa</i>	
<i>Carex ovalis</i>	
<i>Carex vulpinoidea</i>	
<i>Cynosurus cristatus</i>	crested dogstail
<i>Cyperus brevifolius</i>	
<i>Cyperus eragrostis</i>	
<i>Isolepis sepulcralis</i>	
<i>Schoenoplectus californicus</i> (de Lange et al. 1998)	

Rushes

Juncus acuminatus

Juncus articulatus

Juncus bufonius

Juncus effusus

rush

Juncus tenuis

track rush

Luzula multiflora

Monocot. herbs (other than orchids, grasses, sedges and rushes)

Agapanthus praecox

agapanthus

Crocsmia X crocosmitiflora

montbretia

Elodea canadensis (2)

Canadian pondweed

Nymphaea alba

white water lily

Tradescantia fluminensis

tradescantia

Zantedeschia aethiopica

arum lily

Composite herbs

Achillea millefolium

yarrow

Arctium minus (7)

burdock

Bellis perennis

daisy

Carduus acanthoides (1)

plumeless thistle

Carduus tenuiflorus (1)

winged thistle

Cirsium arvense

California thistle

Cirsium palustre

marsh thistle

Cirsium vulgare

Scotch thistle

Conyza albida

fleabane

Conyza bonariensis

Erigeron karvinskianus

Mexican daisy

Gnaphalium coarctatum

cudweed

Hieracium pilosella

mouse-ear hawkweed

Hypochoeris radicata

catsear

Lactuca serriola

prickly lettuce

Lapsana communis

nipplewort

Leontodon taraxacoides

hawkbit

Leucanthemum vulgare

oxeye daisy

Matricaria dioscoidea

rayless camomile

<i>Mycelis muralis</i>	wall lettuce
<i>Picris</i> sp. (1)	ox tongue
<i>Senecio bipinnatisectus</i>	Australian fireweed
<i>Senecio jacobaea</i>	ragwort
<i>Sonchus oleraceus</i>	puha
<i>Taraxacum officinale</i>	dandelion
<i>Tripleurospermum inodorum</i> (1)	scentless chamomile

Dicot. herbs (other than composites)

<i>Acaena agnipila</i>	sheep's burr
<i>Acaena novae-zelandiae</i>	piripiri
<i>Alternanthera philoxeroides</i> (9)	alligator weed
<i>Anagallis arvensis</i>	scarlet pimpernel
<i>Aquilegia vulgaris</i>	columbine
<i>Callitriche stagnalis</i>	starwort
<i>Cardamine hirsuta</i>	bitter cress
<i>Centaureum erythraea</i>	centaury
<i>Cerastium fontanum</i>	mouse-ear chickweed
<i>Conium maculatum</i>	hemlock
<i>Daucus carota</i> (1)	wild carrot
<i>Digitalis purpurea</i>	foxglove
<i>Duchesnea indica</i>	Indian strawberry
<i>Epilobium ciliatum</i>	willow herb
<i>Euphorbia peplus</i>	milkweed
<i>Fragaria vesca</i>	wild strawberry
<i>Galium aparine</i>	cleavers
<i>Galium palustre</i>	marsh bedstraw
<i>Geranium molle</i>	dove's foot
<i>Geranium robertianum</i>	herb Robert
<i>Lepidium</i> sp. (1)	
<i>Linum bienne</i> (1)	
<i>Linum catharticum</i>	
<i>Lotus pedunculatus</i>	lotus
<i>Lythrum hyssopifolia</i>	hyssop loosestrife
<i>Mentha X piperita</i>	peppermint
<i>Mentha pulegium</i> (1)	penny royal
<i>Mentha spicata</i> (1)	spearmint

<i>Mimulus guttatus</i>	monkey musk
<i>Mimulus moschatus</i> (1)	musk
<i>Myosotis arvensis</i>	forget-me-not
<i>Myosotis laxa</i> var. <i>caespitosa</i>	forget-me-not
<i>Nasturtium microphyllum</i> (1)	watercress
<i>Nasturtium officinale</i>	watercress
<i>Orobanche minor</i>	broomrape
<i>Oxalis</i> sp.	oxalis
<i>Parentucellia viscosa</i>	tarweed
<i>Phytolacca octandra</i>	inkweed
<i>Plantago australis</i>	swamp plantain
<i>Plantago lanceolata</i>	narrow-leaved plantain
<i>Plantago major</i>	broad-leaved plantain
<i>Polygonum aviculare</i>	wireweed
<i>Polygonum hydropiper</i>	water pepper
<i>Polygonum persicaria</i>	willow weed
<i>Prunella vulgaris</i>	selfheal
<i>Ranunculus acris</i>	
<i>Ranunculus flammula</i>	spearwort
<i>Ranunculus repens</i>	creeping buttercup
<i>Rumex acetosella</i>	sheep's sorrel
<i>Rumex crispus</i>	curled dock
<i>Rumex obtusifolius</i>	dock
<i>Sagina procumbens</i>	pearlwort
<i>Solanum nigrum</i>	black nightshade
<i>Solanum tuberosum</i> (1)	potato
<i>Stachys sylvatica</i>	hedge stachys
<i>Stellaria alsine</i>	bog stitchwort
<i>Stellaria graminea</i> (1)	stitchwort
<i>Stellaria media</i>	chickweed
<i>Torilis arvensis</i> (1)	hedge parsley
<i>Trifolium dubium</i>	suckling clover
<i>Trifolium pratense</i>	red clover
<i>Trifolium repens</i>	white clover
<i>Urtica urens</i>	nettle
<i>Verbascum thapsus</i>	woolly mullein

<i>Veronica anagallis-aquatica</i> (2)	water speedwell
<i>Veronica arvensis</i>	field speedwell
<i>Veronica serpyllifolia</i>	turf speedwell
<i>Vicia sativa</i>	vetch

Appendix 3

CHECKLIST OF WILDLIFE RECORDED IN TAUMARUNUI ECOLOGICAL DISTRICT

Information from Bayfield *et al.* 1986; P. Bradfield, Maniapoto Area Office, Department of Conservation pers. comm. 2000; Bradfield & Flux 1996; de Groot 1997; Fuller & Edwards 1989; NIWA Freshwater Fish Database; O'Donnell 1982 & 1983; Ogle 1983; Wanganui Conservancy SSBI database; and the current survey.

Mammals

Indigenous

<i>Chalinolobus tuberculatus</i>	long-tailed bat, pekapeka
<i>Mystacina tuberculata rhyacobia</i>	short-tailed bat, pekapeka

Introduced

<i>Bos taurus</i>	cow
<i>Capra hircus</i>	goat
<i>Cervus elaphus</i>	red deer
<i>Dama dama</i>	fallow deer
<i>Erinaceus europaeus occidentalis</i>	hedgehog
<i>Felis catus</i>	cat
<i>Lepus europaeus</i>	hare
<i>Mus musculus</i>	mouse
<i>Mustela erminea</i>	stoat
<i>Mustela furo</i>	ferret
<i>Mustela nivalis</i>	weasel
<i>Oryctolagus cuniculus cuniculus</i>	rabbit
<i>Ovis aries</i>	sheep
<i>Rattus norvegicus</i>	Norwegian rat
<i>Rattus rattus</i>	ship rat
<i>Sus scrofa</i>	pig
<i>Trichosurus vulpecula</i>	possum

Birds

Indigenous

<i>Acanthisitta chloris granti</i>	North Island rifleman, titipounamu
<i>Anas castanea</i>	grey teal, tete

<i>Anas rhynchos variegata</i>	New Zealand shoveler, kuruwhengi
<i>Anas superciliosa superciliosa</i>	grey duck, parera
<i>Anthornis melanura melanura</i>	bellbird, korimako
<i>Anthus novaeseelandiae novaeseelandiae</i>	New Zealand pipit, pihoihoi
<i>Apteryx australis mantellii</i>	North Island brown kiwi
<i>Ardea novaehollandiae novaehollandiae</i>	white-faced heron
<i>Botaurus poiciloptilus</i>	Australasian bittern, matuku
<i>Bowdleria punctata readeae</i>	North Island fernbird, matata
<i>Callaeas cinerea wilsoni</i>	North Island kokako
<i>Chrysococcyx lucidus lucidus</i>	shining cuckoo, pipiwharauroa
<i>Circus approximans</i>	Australasian harrier, kahū
<i>Cyanoramphus auriceps</i>	yellow-crowned parakeet, kakariki
<i>Cyanoramphus novaezelandiae novaezelandiae</i>	red-crowned parakeet, kakariki
<i>Eudynamis taitensis</i>	long-tailed cuckoo, kōkōka
<i>Falco novaeseelandiae</i>	New Zealand falcon, karearea
<i>Gerygone igata</i>	grey warbler, riroriro
<i>Halcyon sancta vagans</i>	kingfisher, kotare
<i>Hemiphaga novaeseelandiae novaeseelandiae</i>	New Zealand pigeon, kereru
<i>Himantopus himantopus leucocephalus</i>	pieb stilt, poaka
<i>Hirundo tabitica neoxena</i>	welcome swallow
<i>Hymenolaimus malacorhynchus</i>	blue duck, whio
<i>Larus dominicanus</i>	black-backed gull, karoro
<i>Mohoua albigilla</i>	whitehead, popokatea
<i>Nestor meridionalis septentrionalis</i>	North Island kaka
<i>Ninox novaeseelandiae novaeseelandiae</i>	morepork, ruru
<i>Petroica macrocephala toitoi</i>	tomtit, miromiro
<i>Petroica australis longipes</i>	North Island robin
<i>Phalacrocorax carbo novaehollandiae</i>	black shag, kawau
<i>Phalacrocorax melanoleucos brevirostris</i>	little shag, kawapaka
<i>Phalacrocorax sulcirostris</i>	little black shag
<i>Podiceps rufopectus</i>	New Zealand dabchick, weiwēia
<i>Porphyrio porphyrio melanotus</i>	pukeko
<i>Porzana tabuensis</i>	spotless crane, puweto

<i>Prosthemadera novaeseelandiae</i>	tui
<i>Rhipidura fuliginosa placabilis</i>	North Island fantail, piwakawaka, tiwaiwaka
<i>Tadorna variegata</i>	paradise shelduck, putangitangi
<i>Vanellus miles</i>	spur-winged plover
<i>Zosterops lateralis lateralis</i>	silvereye, ahihihi

Introduced

<i>Alauda arvensis</i>	skylark
<i>Anas platyrhynchos</i>	mallard
<i>Branta canadensis</i>	Canada goose
<i>Callipepla californica</i>	California quail
<i>Carduelis carduelis</i>	goldfinch
<i>Carduelis chloris</i>	greenfinch
<i>Carduelis flammea</i>	redpoll
<i>Cygnus atratus</i>	black swan
<i>Emberiza citrinella</i>	yellowhammer
<i>Fringilla coelebs</i>	chaffinch
<i>Gymnorhina tibicen</i>	Australian magpie
<i>Meleagris gallopavo</i>	turkey
<i>Passer domesticus</i>	house sparrow
<i>Phasianus colchicus</i>	pheasant
<i>Platycercus eximius</i>	eastern whistler
<i>Prunella modularis</i>	hedge sparrow
<i>Sturnus vulgaris</i>	starling
<i>Turdus merula</i>	blackbird
<i>Turdus philomelos</i>	songbird

Reptiles

Indigenous

<i>Cyclodina aenea</i>	copper skink
<i>Hoplodactylus granulatus</i>	forest gecko
<i>Naultinus elegans</i>	concrete spotted gecko
<i>Oligosoma nigriplantare polydactylum</i>	common skink
<i>Oligosoma striatum</i>	striped skink

Introduced

<i>Litoria</i> sp. ⁶ (<i>L. aurea</i> or <i>L. longirostris</i>)	green frog or golden bell frog

Fish

Indigenous

<i>Anguilla australis</i>	short-finned eel
<i>Anguilla dieffenbachii</i>	long-finned eel
<i>Cheimarrichthys forsteri</i>	torrentfish
<i>Galaxias brevipinnis</i>	koaro
<i>Galaxias postvectis</i>	short-jawed kokopu
<i>Gobiomorphus basalis</i>	Cran's bully
<i>Gobiomorphus breviceps</i>	upland bully
<i>Gobiomorphus cotidianus</i>	common bully
<i>Retropinna retropinna</i>	common smelt

Introduced

<i>Oncorhynchus mykiss</i>	rainbow trout
<i>Salmo trutta</i>	brown trout
<i>Ictalurus nebulosus</i>	catfish

Invertebrates

Indigenous

<i>Deinacrida</i> "Mahoenui"	Mahoenui giant weta
<i>Paranephrops planifrons</i>	koura

Appendix 4

THREATENED AND LOCAL SPECIES IN TAUMARUNUI ECOLOGICAL DISTRICT

SCIENTIFIC NAME	COMMON NAME	NATIONAL PRIORITY FOR CONSERVATION MANAGEMENT ¹	NATIONAL STATUS ²
FAUNA			
Mammals			
<i>Mystacina tuberculata rhyacobia</i>	short-tailed bat	A	-
<i>Cbalinolobus tuberculatus</i>	long-tailed bat	B	-
Birds			
<i>Apteryx australis mantelli</i>	North Island brown kiwi	A	-
<i>Callaeas cinerea wilsoni</i>	North Island kokako	B	-
<i>Falco novaeseelandiae</i>	karearea (New Zealand falcon)	B	-
<i>Hemiphaga novaeseelandiae novaeseelandiae</i>	kereru (wood pigeon)	B	-
<i>Hymenolaimus malacorhynchus</i>	whio (blue duck)	B	-
<i>Nestor meridionalis septentrionalis</i>	North Island kaka	B	-
<i>Cyanoramphus auriceps auriceps</i>	yellow-crowned kakariki	C	-
<i>Podiceps rufopectus</i>	weweia (New Zealand dabchick)	C	-
<i>Botaurus stellaris poiciloptilus</i>	matuku (Australasian bittern)	O	-
Reptiles			
<i>Oligosoma striatum</i>	striped skink	A	-
Fish			
<i>Galaxias postvectis</i>	short-jawed kokopu	A	-
Invertebrates			
<i>Deinacrida "Mahoenui"</i>	Mahoenui giant weta	C	-

SCIENTIFIC NAME	COMMON NAME	NATIONAL PRIORITY FOR CONSERVATION MANAGEMENT ¹	NATIONAL STATUS ²
FLORA			
<i>Dactylanthus taylorii</i>	Pua o te reinga	A	Recovering <i>conservation dependent</i>
<i>Pittosporum turneri</i>		B	Declining
<i>Teucrium parvifolium</i>		C	Declining
<i>Thysanotus rodwayi</i>		-	Naturally uncommon <i>sparse</i>
<i>Ileostylus micranthus</i>		-	Declining

¹ National priorities for conservation management follows Molloy and Davis (1994). See p.26.

² The national status follows de Lange et al. (1999). See p.26.

Appendix 5

LIST OF COMMON NAMES USED IN THE TEXT

alligator weed	<i>Alternanthera philoxeroides</i>
barberry	<i>Berberis glaucocarpa</i>
black beech	<i>Nothofagus solandri</i> var. <i>solandri</i>
black maire	<i>Nestegis cunninghamii</i>
blackberry	<i>Rubus</i> sp. (<i>R. fruticosus</i> agg.)
bracken	rarahū: <i>Pteridium esculentum</i>
browntop	<i>Agrostis capillaris</i>
brush wattle	<i>Paraserianthes lophantha</i>
buddleia	<i>Buddleja davidii</i>
bush rice grass	<i>Microlaena avenacea</i>
catsear	<i>Hypochaeris radicata</i>
Chilean flame creeper	<i>Tropaeolum speciosum</i>
climbing spindle berry	<i>Celastrus orbiculatus</i>
cotoneaster	<i>Cotoneaster glaucophyllus</i>
creeping bent	<i>Agrostis stolonifera</i>
creeping buttercup	<i>Ranunculus repens</i>
eucalyptus	<i>Eucalyptus</i> sp.
gorse	<i>Ulex europaeus</i>
grey willow	<i>Salix cinerea</i>
hakeke	<i>Olearia ilicifolia</i>
Hall's totara	<i>Podocarpus hallii</i>
hangchange	<i>Gentostoma rupestris</i> var. <i>ligustrifolium</i>
harakeke	NZ flax; <i>Phormium tenax</i>
hard beech	<i>Nothofagus truncata</i>
hard fern	<i>Puccia scaberula</i>
heketara	<i>Olearia rani</i>
herb Robert	<i>Geranium robertianum</i>
heruheru	<i>Leptopteris superba</i>
Himalayan honeysuckle	<i>Leycesteria formosa</i>
hinau	<i>Elaeocarpus dentata</i> (incl. <i>E. d.</i> var. <i>obovatus</i>)
hooked sedge	<i>Uncinia species</i>

horoeaka	lancewood; <i>Pseudopanax crassifolius</i>
horopito	<i>Pseudowintera colorata</i>
houhere	lacebark; <i>Hoheria populnea</i> var. <i>lanceolata</i>
hukihuki	<i>Coprosma tenuicaulis</i>
hupiro	<i>Coprosma foetidissima</i>
irirangi	<i>Hymenophyllum demissum</i>
ivy	<i>Hedera helix</i>
Japanese honeysuckle	<i>Lonicera japonica</i>
Japanese walnut	<i>Juglans ailantifolia</i>
kahikatea	<i>Dacrycarpus dacrydioides</i>
kaikawaka	<i>Libocedrus bidwillii</i>
kaikomako	<i>Pennantia corymbosa</i>
kamahi	<i>Weinmannia racemosa</i>
kanono	<i>Coprosma grandifolia</i>
kanuka	<i>Kunzea ericoides</i> var. <i>ericoides</i>
kapuka	<i>Griselinia littoralis</i>
karamu	<i>Coprosma robusta</i>
kareao	supplejack; <i>Ripogonum scandens</i>
karetu	<i>Hierochloa redolens</i>
katote	<i>Cyathea smithii</i>
kiokio	<i>Blechnum novae-zelandiae</i> s.s.
kiwikiwi	<i>Blechnum fluviatile</i> agg.
kohuhu	<i>Pittosporum tenuifolium</i> subsp. <i>tenuifolium</i>
korokio	<i>Blechnum vulcanicum</i>
koromiko	<i>Hebe stricta</i> var. <i>stricta</i>
koropuka	<i>Gaultheria paniculata</i>
kotukutuku	fuchsia; <i>Fuchsia excorticata</i>
kowaowao	<i>Microsorium pustulatum</i>
lotus	<i>Lotus pedunculatus</i>
mahawe	<i>Asplenium flaccidum</i>
mahoe wao	<i>Melicytus lanceolatus</i> (incl. <i>M. l.</i> var. <i>latior</i>)
mahoe	<i>Melicytus ramiflorus</i> subsp. <i>ramiflorus</i>
makomako	wineberry, <i>Aristotelia serrata</i>
manatu	ribbonwood; <i>Plagianthus regius</i>

mangeao	<i>Litsea calicaris</i>
manaoa	silver pine; <i>Manoao colensoi</i>
manuka	<i>Leptospermum scoparium</i>
marsh thistle	<i>Cirsium palustre</i>
matai	<i>Prumnopitys taxifolia</i>
matukutuku	<i>Lycopodium scariosum</i>
mingimingi	<i>Leucopogon fasciculatus</i>
miro	<i>Prumnopitys ferruginea</i>
monkey musk	<i>Mimulus guttatus</i>
montbretia	<i>Crocasmia x crocosmiiflora</i>
mouku	<i>Asplenium bulbiferum</i> s.s.
mountain beech	<i>Nothofagus solandri</i> var. <i>cliffortioides</i>
mountain toatoa	<i>Phyllocladus alpinus</i>
northern rata	<i>Metrosideros robusta</i>
old man's beard	<i>Clematis vitalba</i>
ongaonga	<i>Urtica ferox</i>
pahautea	<i>Libocedrus bidwillii</i>
pakau	<i>Pneumatopteris pennigera</i>
pampas	<i>Cortaderia selloana</i>
papataniwhaniwha	<i>Lagenifera pumila</i>
parataniwha	<i>Elatostema rugosum</i>
pate	<i>Schefflera digitata</i>
peretao	<i>Blechnum colensoi</i>
petipeti	<i>Blechnum discolor</i>
pikopiko	<i>Polystichum richardii</i>
poataniwha	<i>Melicope simplex</i>
pokaka	<i>Elaeocarpus hookerianus</i>
ponga	<i>Cyathea dealbata</i>
porokaiwhiri	pigeonwood; <i>Hedycarya arborea</i>
Pua o te reinga	<i>Dactylanthus taylorii</i>
pukatea	<i>Laurelia novae-zelandiae</i>
puniu	<i>Polystichum vestitum</i>
purei	<i>Carex secta</i>
putaputaweta	<i>Carpodetus serratus</i>
radiata pine	<i>Pinus radiata</i>
ramarama	<i>Lophomyrtus bullata</i>

rangiora	<i>Brachyglottis repanda</i> s.s.
red beech	<i>Nothofagus fusca</i>
rereti	<i>Blechnum chambersii</i>
retoretore	<i>Azolla filiculoides</i> subsp. <i>rubra</i>
rewarewa	<i>Knightia excelsa</i>
rimu	<i>Dacrydium cupressinum</i>
rohutu	<i>Lophomyrtus obcordata</i>
selaginella	<i>Selaginella kraussiana</i>
selfheal	<i>Prunella vulgaris</i>
silver beech	<i>Nothofagus menziesii</i>
Spanish heath	<i>Erica lusitanica</i>
spearwort	<i>Ranunculus flammula</i>
swamp kiokio	<i>Blechnum novae-zelandiae</i> (wetland form; <i>B. minus</i> of New Zealand authors)
swamp plantain	<i>Plantago australis</i>
sycamore	<i>Acer pseudoplatanus</i>
tall fescue	<i>Festuca arundinacea</i>
tanekaha	<i>Phyllocladus trichomanoides</i> var. <i>trichomanoides</i>
tarata	<i>Pittosporum eugeniioides</i>
taurepo	<i>Rhabdodhamnus solandri</i>
tawa	<i>Beilschmiedia tawa</i>
tawheowheo	<i>Quintinia serrata</i> (incl. <i>Q. acutifolia</i> and <i>Q. elliptica</i>)
ti kouka	<i>Cordyline australis</i>
titoki	<i>Alectryon excelsus</i> var. <i>excelsus</i>
toctoe	<i>Cortaderia fulvida</i>
toro	<i>Myrsine salicina</i>
toropapa	<i>Alseuosmia macrophylla</i>
totara	<i>Podocarpus totara</i>
totorowhiti	<i>Dracophyllum strictum</i>
tradescantia	<i>Tradescantia fluminensis</i>
tree privet	<i>Ligustrum lucidum</i>
tuhara	<i>Machaerina sinclairii</i>
turepo	<i>Streblus heterophyllus</i>
waewaekaka	<i>Gleichenia microphylla</i>
waewaekoukou	<i>Lycopodium volubile</i>

wall lettuce	<i>Mycelis muralis</i>
watercress	<i>Nasturtium officinale</i>
whauwhaupaku	<i>Pseudopanax arboreus</i> var. <i>arboreus</i>
wheki ponga	<i>Dicksonia fibrosa</i>
wheki	<i>Dicksonia squarrosa</i>
wharariki	<i>Phormium cookianum</i>
white maire	<i>Nestegis lanceolata</i>
Yorkshire fog	<i>Holcus lanatus</i>

Appendix 6

EXISTING PROTECTED NATURAL AREAS OF TAUMARUNUI ECOLOGICAL DISTRICT

National Park

Whanganui National Park (part)

Size (ha):	2683 ¹
Grid Reference:	Many
Cons. Unit No.	70005
SSBI No.:	S19 H001
Administered by:	Department of Conservation
Source:	de Groot 1997.
Vegetation:	Podocarp-broadleaved forest
Description:	Several disjunct natural areas on the margins of the Whanganui River which together comprise a small portion of the Whanganui National Park. Uplifted Tertiary marine plain, deeply incised by erosion. Mostly good quality lowland forest, steep hill country, bluffs, ridges and river terraces. Brown kiwi, robin, kokako and blue duck.
Reference:	Department of Conservation 1997

Scenic Reserves

Aorangi Scenic Reserve

Size (ha):	1.02
Grid Reference:	R18 896 517
Cons. Unit No.	70452
Administered by:	Department of Conservation
Source:	Bayfield et al. 1986.
Vegetation:	Kahikatea-rimu-miro-matai-totara forest; kamahi forest; pasture.
Description:	Flat alluvial terrace covered with dense, good quality podocarp forest with a diverse understorey and groundcover including abundant podocarp regeneration.

Hautou Scenic Reserve

Size (ha):	3.74
Grid Reference:	S19 910 300
Cons. Unit No.	70254
Administered by:	Department of Conservation
Source:	Department of Conservation 1997.
Vegetation:	Lowland forest comprising tawa, titoki, manuka and treeferns.
Description:	Terraces, steep hill country, and rock bluffs.

Hawkins Wetland Scenic Reserve

Size (ha): 8.1
Grid Reference: S19 042 309
Cons. Unit No. 70809
SSBI No.: S19 H003
Source: de Groot 1997.
Administered by: Department of Conservation
Vegetation: Podocarp forest; raupo-Carex secta-Sphagnum reedland; manuka scrub.
Description: An oxbow on the Retaruke River containing a rare wetland type for this ecological district. This area has several wetland and forest types ranging from *Sphagnum* swamp to totara on dry terraces. Fauna include robin and spotless crane.

Herekawe Scenic Reserve (part)

Size (ha): 214.53¹
Grid Reference: S17 183 965
Cons. Unit No. S17-034, 035
Administered by: Department of Conservation
Source: Bayfield et al. 1986.
Vegetation type and habitat: Horoeka-kohuhu scrub; pasture; cliffs; tawa-hinau-rewarewa forest; tawa forest; northern rata/tawa forest; tawa-wheki forest; wetland.
Description: Moderately steep hill country with several sandstone bluffs on ignimbrite. *Olearia virgata* and *monoa* occur in this reserve.

Hikumutu Scenic Reserve

Size (ha): 11.87
Grid Reference: S19 135 440
Cons. Unit No. 70329
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Rimu/tawa forest; mahoe-kanono-pate/wheki-katote forest; Himalayan honeysuckle-bracken-rank pasture shrubland.
Description: Moderate to steep hill country including a forked ridge system and a small stream. Good quality forest with low numbers of adventive species.

Hikurangi Scenic Reserve

Size (ha): 122.66
Grid Reference: S18 095 670
Cons. Unit No. 70629
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Tawa-kamahi forest with rimu, matai, totara and miro.
Description: North-western slopes of Mt. Hikurangi, with gently rolling terrain at the base, to steep slopes near the summit. Pua o te reinga has been recorded here but there are no recent records.

Kaituna Scenic Reserve

Size (ha): 4.87
Grid Reference: S19 980 485
Cons. Unit No. 70337
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Tawa-kamahi forest with totara, matai, miro, hinau, rewarewa and several radiata pines
Description: River terrace which drops to the Whanganui River and is partially grazed.

Kaituna No. 2 Scenic Reserve

Size (ha): 3.17
Grid Reference: S19 980 486
Cons. Unit No. 70063
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland forest.
Description: Swampy river terrace.

Kauhangaroa Scenic Reserve

Size (ha): 153.22
Grid Reference: S19 065 330
Cons. Unit No. 70297
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: (Rewarewa)-tawa forest; rewarewa-kamahi/ponga forest; kamahi-kanuka-rewarewa forest; kamahi-manuka forest; manuka-whauwhaupaku/kiokio shrubland; manuka-mixed podocarp-mixed broadleaved forest; manuka/ pasture shrubland; pasture.
Description: Rolling to steep hill country. A diverse range of secondary forest types. Mature tawa forest dominates the upper slopes. *Lycopodium deuterodensum* occurs here, near its southern North Island limit. 5.6 ha of the reserve is pasture and is leased for grazing.

Kakahi Scenic Reserve

Size (ha): 6.85
Grid Reference: S19 140 490
Cons. Unit No. 70333
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Kahikatea forest; totara forest; grey willow/buddleia-blackberry treeland; (totara)-(kahikatea)/pasture.
Description: River terrace with small poorly drained area.

Kapuba Scenic Reserve

Size (ha): 13.44
Grid Reference: R18 865 650

Cons. Unit No. R18-017
 Administered by: Department of Conservation
 Source: Bayfield et al. 1986.
 Vegetation: Kahikatea forest; pasture; manuka/bracken fernland.
 Description: Mainly flat, this reserve contains a good example of kahikatea forest.
 The reserve is divided by the Stratford-Okahukura railway.

Kawautahi Scenic Reserve

Size (ha): 67.61
 Grid Reference: S19 122 405
 Cons. Unit No. 70294
 Administered by: Department of Conservation
 Source: Fuller & Edwards 1989.
 Vegetation: Rimu/tawa forest; (putaputaweta)-(mahoe)/wheki-katote forest;
 mahoe-pate/wheki-katote/rangiora-karamu forest; Buddleia-
 Himalayan honeysuckle-tutu/ pasture grass-kiokio shrubland;
 manuka/pasture shrubland.
 Description: There are two separated sections to this reserve, the first occurs on
 moderate to steep hill country, contains a catchment and has a
 heavily-logged valley floor. the second is a large papa bluff.

Kokakonui Scenic Reserve

Size (ha): 8.21
 Grid Reference: S19 973 418
 Cons. Unit No. 70277
 Administered by: Department of Conservation
 Source: Fuller & Edwards 1989.
 Vegetation: Tawa/ponga forest; (rimu)-(kahikatea)-(rewarewa)/hinau-kamahi-
 tawa forest; kahikatea-totara forest; (totara)/kahikatea forest;
 Juncus rushland.
 Description: River terrace with adjacent foothills rising from Kokakonui Stream.
 In the 1980's the understorey was severely damaged by stock.

Konini Scenic Reserve

Size (ha): 201.23
 Grid Reference: S19 110 330
 Cons. Unit No. 70331
 SSBI No.: S19 H018
 Source: Field assessment, current survey.
 Administered by: Department of Conservation
 Vegetation: Tawa/wheki forest; wheki/treefernland; pasture.
 Description: Moderate to steep hill country with some river terraces, this large
 isolated reserve has a long history of disturbance which is reflected
 in the current poor condition of the understorey and groundcover.
 Reference: Fuller & Edwards 1989.

Kopuba Road Scenic Reserve

Size (ha): 6.32
Grid Reference: R18 846 611
Cons. Unit No. 70454
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Rimu-kahikatea forest with totara, kamahi, tawa, mahoe, rewarewa and ponga; kamahi forest.
Description: Steep ridge with a thin strip of flat land bordering the Ohura River.

Kouturoa Scenic Reserve

Size (ha): 3.04
Grid Reference: S19 037 302
Cons. Unit No. 70291
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Kahikatea-rimu forest; totara forest; totara-putaputaweta-kaikomako/pasture grasses treeland.
Description: Steep to rolling hillslopes in the Retaruke Valley. Tall kahikatea forest dominates the lower slope, while pure totara forest is a feature of the upper slopes.

K.P. Malcolm Reserve

Size (ha): 41.21
Grid Reference: S19 990 313
Cons. Unit No. 99999
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: (Rewarewa)/tawa/mahoe-katote-whcki ponga-heketara forest; katote whcki forest; manuka/hard fern-bracken-pasture grasses shrubland; pasture.
Description: Catchment between two east-west running ridges with steep hills and some small silt-stone bluffs at the north-east rim. This area contains good quality tawa forest and was gifted to the Department of Conservation.

Kururau Scenic Reserve

Size (ha): 4.5
Grid Reference: S18 920 541
Cons. Unit No. 70659
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland forest.
Description: Roadside reserve along Kururau Road.

Lairdvale Scenic Reserve

Size (ha): 5.37
Grid Reference: S18 090 578
Cons. Unit No. 70631
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest comprising tawa, kamahi, rewarewa, mahoe, manuka and ponga and a few remnant emergent podocarps.
Description: Rolling to steep hill country.

Mangaorakei North Scenic Reserve

Size (ha): 17.44
Grid Reference: S19 980 375
Cons. Unit No. 70279
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Tawa forest; (mahoe-tawa)/whēki-katote forest; tawa-hinau-rimu-totara-kahikatea-miro forest; pasture-hard fern grassland (grazed).
Description: Moderately steep to steep hill slopes of secondary forest. Grazed by cattle and goats in the 1980's.

Mangaoturu Scenic Reserve

Size (ha): 3.03
Grid Reference: S19 930365
Cons. Unit No. 70182
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest comprising tawa, kamahi, rimu, mahoe, kahikatea, miro, matai, manuka and treefern.
Description: Small river terrace covered with lowland forest surrounded by pasture.

Mangapehi Scenic Reserve

Size (ha): 46.54
Grid Reference: S17 145 956
Cons. Unit No. S17-033
Administered by: Department of Conservation
Source: Bayfield et al. 1986.
Vegetation: Rimu/tawa forest; kahikatea forest; kamahi forest; houhere-kotukutuku-makomako forest.
Description: Steep south-facing sideslope near Benneydale.

Mangapehi Scenic Reserve/Stewardship Land (Part)

Size (ha): 975
Grid Reference: S17 190 940
Cons. Unit No. S17-064, 065, 066
Administered by: Department of Conservation
Source: de Groot 1997.

Vegetation: Podocarp-broadleaved forest.
Description: Rolling hill country covered in partially logged podocarp-broadleaved forest.

Manga Te Puhi Scenic Reserve

Size (ha): 81.34
Grid Reference: S19 130 285
Cons. Unit No. 60017
SSBI No. S19 H017
Source: Field inspection, current survey.
Administered by: Department of Conservation
Vegetation: Tawa-podocarp forest.
Description: Steep hill country. Used by kaka and kereru. Long-tailed bat is likely to be present.
Reference: Department of Conservation 1994

Mangatupoto Scenic Reserve

Size (ha): c.1
Grid Reference: S18 041 760
Cons. Unit No. S18-003
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Not known.
Description: Not known.

Matiere Scenic Reserve

Size (ha): 0.93
Grid Reference: S18 918 690
Cons. Unit No. 70365
Administered by: Department of Conservation
Source: Bayfield et al. 1986.
Vegetation: Kahikatea forest.
Description: *Lophomyrtus bullata*, *L. obcordata* and their hybrids are present.

Mihtrangi Scenic Reserve

Size (ha): 2.76
Grid Reference: S19 103 459
Cons. Unit No. 70299
SSBI No. S19 H023
Source: Field assessment, current survey.
Administered by: Department of Conservation
Vegetation: (Kahikatea)/kamahi-kahikatea/wheki ponga forest; kahikatea-totara/wheki ponga-wheki forest; kamahi forest; (manuka)/toetoe-kiokio grassland; (kahikatea)/putaputaweta-makomako/wheki-poataniwha treeland; manuka-whauwhaupaku-kohuhu/kiokio treeland; bracken-Japanese honeysuckle/Lotus-pasture grasses-kiokio fern-grassland.
Description: This reserve occurs on river terraces and hill country. The kahikatea forest shows good regeneration, particularly in steeper wetter

gullies and lower flats. *Thismia rodwayi* is present.
Reference: Fuller & Edwards 1989.

Motutara Scenic Reserve

Size (ha): 532.74
Grid Reference: S18 010 530
Cons. Unit No. 70351
Administered by: Department of Conservation
Source: Bayfield et al. 1986.
Vegetation: Tawa-hinau forest; rimu-totara-matai-kamahi-tarata-hinau forest; rimu-totara-miro-kamahi-horoeka-kahikatea forest; wheki-katote/bracken forest; bracken/ pasture fernland; mahoe-whauwhaupaku-rangiora-heketara/bracken scrub.
Description: The reserve includes almost the complete upper catchment of the Motutara Stream. Diverse range of flora and fauna present.

Ngamoturiki Scenic Reserve

Size (ha): 12.59
Grid Reference: S19 983 330 and 975 305
Cons. Unit No. 70282
SSBI No. S19 H009
Source: Field assessment, current survey.
Administered by: Department of Conservation
Vegetation: Kahikatea-totara forest; totara-matai forest; pasture; manuka-totara-horoeka shrubland.
Description: Two separate areas of podocarp forest above the Retaruke River.
Reference: Fuller & Edwards 1989.

Ngataumata Scenic Reserve

Size (ha): 3.09
Grid Reference: S19 961 300
Cons. Unit No. 70283
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Phormium cookianum-toetoe-manuka-karamu/Himalayan honey-suckle-Japanese honeysuckle/pasture-lotus grassland; kamahi/wheki/Helichrysum lanceolatum forest; manuka/wheki-mingimingi/pasture shrubland; totara-kamahi forest.
Description: Steep siltstone bluffs.

Ngutu Scenic Reserve

Size (ha): 0.78
Grid Reference: R18 874 527
Cons. Unit No. 70453
Administered by: Department of Conservation
Source: Bayfield *et al.* 1986.
Vegetation: Kahikatea treeland; pasture.
Description: Peninsula of river terrace surrounded on three sides by the Ohura

River. This area was extensively damaged by stock grazing in the early 1980's.

No. 3 Scenic Reserve

Size (ha): 10.57
Grid Reference: S18 058 544
Cons. Unit No. 70347
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic grasses, with scattered totara.
Description: This area is leased out for grazing.

No. 4 Scenic Reserve

Size (ha): 0.4
Grid Reference: S18 047 526
Cons. Unit No. 70345
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland scrub and shrubland.
Description: A small river terrace beside the Whanganui River.

No. 5 Scenic Reserve

Size (ha): 0.65
Grid Reference: S18 044 508
Cons. Unit No. 70346
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: Steep river terrace.

No. 6 Scenic Reserve

Size (ha): 4.65
Grid Reference: S19 037 481
Cons. Unit No. 70286
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Willow and treeferns.
Description: Riparian flats alongside Whanganui River.

No. 7 Scenic Reserve

Size (ha): 8.09
Grid Reference: S19 045 488
Cons. Unit No. 70287
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Tawa-kamahi forest with totara, miro, rata, matai, hinau, whauwhaupaku, mahoe and porokaiwhiri.
Description: Steep area along Hikumutu Stream which was formerly grazed.

Currently 3.2 ha is leased for grazing. The remaining area is covered in lowland forest.

No. 8 Scenic Reserve

Size (ha): 1.42
Grid Reference: S19 029 481
Cons. Unit No. 70285
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: River terrace along the Whanganui River, covered in willows.

No. 99 Scenic Reserve

Size (ha): 4.76
Grid Reference: S19 038 500
Cons. Unit No. 70336
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Tawa-kamahi forest with totara, matai, miro, kahikatea, porokaiwhiri and whauwhaupaku.
Description: Flat river terrace

No. 100 Scenic Reserve

Size (ha): 2.78
Grid Reference: S18 050 529
Cons. Unit No. 70352
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest with kahikatea, rimu, totara and pasture.
Description: Flat river terrace.

Ohinetonga Scenic Reserve

Size (ha): 141.53
Grid Reference: S19 170 430
Cons. Unit No. 60022
Administered by: Department of Conservation
Source: Department of Conservation 1994; Fuller & Edwards 1989.
Vegetation: Tawa forest; (rimu-kahikatea)/tawa forest; matai forest; totara-rimu forest; rimu-totara-kahikatea forest; kahikatea/kamahi-putaputaweta treeland; kamahi-putaputaweta-mixed podocarp forest; broadleaved scrub; bracken fernland; karetu (*Hierocbloë redolens*) grassland; mountain beech (*Nothofagus solandri* var. *cliffortioides*)-totara-(mixed podocarp) forest; pasture (fenced and grazed).
Description: Moderately steep river valley with terraces at the top and bottom of slopes. A submerged aquatic herbfield is present in Ohinetonga Lagoon. The reserve is used seasonally by kereru and kaka. *Thysania rodwayi*, is present.

Obuha Scenic Reserve

Size (ha): 6.1
Grid Reference: S19 045 383
Cons. Unit No. 70290
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Kahikatea-matai forest; totara forest; (kaikomako)/Coprosma rotundifolia/Diplazium australe-pasture shrubland; pasture.
Description: Flat river terrace. No regeneration of canopy species occurs because of heavy grazing and trampling by stock.

Obura Scenic Reserve

Size (ha): 12.04
Grid Reference: R18 846 547
Cons. Unit No. 70450
Administered by: Department of Conservation
Source: Bayfield 1986.
Vegetation: Kahikatea-rimu forest; pasture.
Description: Riparian flats and a moderately steep ridge, almost enclosed by a loop of the Mangaroa Stream.

Oio Scenic Reserve

Size (ha): 6.11
Grid Reference: S19 065 330
Cons. Unit No. 70295
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Matai-totara/wheki ponga-Raukua anomalous forest; (matai)-(totara)/hohere/wheki ponga forest; Carex/watercress-buttercup herbfield; pasture.
Description: This reserve comprises three river terraces with large bluffs. Matai-totara forest is dominant, this forest type was once extensive in the Whanganui headwaters. The bluffs are dominated by manuka, toetoe and wharariki.

Okahukura Scenic Reserve

Size (ha): 243.72
Grid Reference: S18 010 675
Cons. Unit No. 70358
SSBI No.: S18 H029 and S18 H016
Source: Field assessment, current survey.
Administered by: Department of Conservation
Vegetation: Rimu/tawa forest; kahikatea forest; totara-kamahi/pasture treeland; matai-totara forest; manuka/bracken fernland.
Description: This reserve comprises two discrete areas, the larger in a steep valley, and the smaller on a steep hillside. There is good regeneration of tawa, rewarewa and matai.
Reference: Bayfield *et al.* 1986

Oruatapu Scenic Reserve

Size (ha): 79.32
Grid Reference: S18 950 540
Cons. Unit No. 70354
SSBI No.: S18 H007
Source: Field assessment, current survey.
Administered by: Department of Conservation
Vegetation: Kahikatea forest; tawa-hinau forest; rewarewa/kamahi forest; kamahi-Himalayan honeysuckle shrubland.
Description: Steep hill country with some bluffs. The ridges are in tawa-hinau forest and rewarewa/kamahi, with kahikatea forest in the valley bottom.
Reference: Bayfield *et al.* 1986.

Orupe Scenic Reserve

Size (ha): 4.57
Grid Reference: S19 985 360
Cons. Unit No. 70281
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Tawa forest; (rewarewa)-(mamaku)/mahoe forest; (mahoe)-(heketara)/manuka/hard fern-pasture tree-grassland
Description: Small area of hill country with a steep bluff. In the 1980s this area was heavily grazed by stock and feral goats and the understorey was very sparse.

Oruru Scenic Reserve

Size (ha): 15.42
Grid Reference: S19 933 290
Cons. Unit No. 70184
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest comprising kamahi, kahikatea, tawa, rimu, totara, mahoe and porokaiwhiri; manuka-treefern scrub.
Description: Steep slope to flat peninsula.

Pairawahipi Scenic Reserve (part)

Size (ha): 350¹¹
Grid Reference: S19 020 200
Cons. Unit No. 70712
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Podocarp-broadleaved forest.
Description: Steep hill country in the Upper Retaruke River. Part of this reserve lies in Matemateaonga Ecological District

Paorae Scenic Reserve

Size (ha): 6.49
Grid Reference: R18 793 538
Cons. Unit No. 70449
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Kamahi forest; rimu-kahikatea forest.
Description: Moderately steep to steep hill country with a central ridge.

Papaotu Scenic Reserve

Size (ha): 11.33
Grid Reference: S19 950 295
Cons. Unit No. 70255
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Kamahi forest, tawa forest, secondary shrubland.
Description: Small reserve extending along the left bank of the Retaruke River

Parapara Scenic Reserve

Size (ha): 2.34
Grid Reference: S18 953 610
Cons. Unit No. 70356
Administered by: Department of Conservation
Source: Bayfield et al. 1986.
Vegetation: Kahikatea/tawa forest; tawa-kamahi forest; pasture.
Description: Rolling hill country with kahikatea/tawa forest in the gully, and kamahi/tawa forest dominant on the hillslopes and ridge.

Pokoera Scenic Reserve

Size (ha): 83.61
Grid Reference: S18 945 555
Cons. Unit No. 70355
SSBI No.: S18 H007
Source: Field assessment, current survey.
Administered by: Department of Conservation
Vegetation: Kahikatea-rimu-matai-totara-miro forest; tawa forest; rewarewa-kamahi forest.
Description: Very steep to rolling hill country with some cliff faces. Very good quality dense podocarp forest.
Reference: Bayfield *et al.* 1986

Piki Scenic Reserve (part)

Size (ha): 45¹²
Grid Reference: R18 835 663
Cons. Unit No. 70459
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Tawa forest; kamahi forest comprising kamahi, kahikatea, matai

and tawa.
Description: Steep hill country. Pied tit, kingfisher, kereru and tui all occur here.

Puawai Scenic Reserve

Size (ha): 17.78
Grid Reference: S19 176 478
Cons. Unit No. 70547
SSBI No.: S19 H025
Source: Fuller & Edwards 1989.
Administered by: Department of Conservation
Vegetation: Kahikatea-rimu/matai forest; totara-rimu forest; Himalayan honeysuckle-buddleia-blackberry-bracken shrubland; kamahi forest; pasture.
Description: This reserve comprises three disjunction areas, all within a kilometer of each other on undulating lahar plain and river terrace of Whakapapa River. Remnant podocarp forest occurs on two parts of the reserve whilst the third comprises a scrub-covered bank.

Pukeatua Scenic Reserve

Size (ha): 5.64
Grid Reference: S19 985 360
Cons. Unit No. 70280
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Rewarewa/tawa forest; pasture.
Description: A small tawa forest remnant at the top of a steep slope, surrounded by an area of manuka-kanuka shrubland.

Rangi Scenic Reserve

Size (ha): 332.73
Grid Reference: S19 980 650
Cons. Unit No. 70357
Administered by: Department of Conservation
Source: Bayfield et al. 1986.
Vegetation: Rimu/tawa-hinau forest; pukatea/tawa forest; kahikatea/tawa-kotukutuku forest; makomako/pasture shrub-grassland; wheki/pasture treeland.
Description: This reserve comprises two disjunct areas on steep dissected hill country. Three different habitat types are present: forest, cliffs and steep open slopes, and pasture. A diverse range of bird species are present including the NZ falcon.

Raurimu Scenic Reserve

Size (ha): 53.52
Grid Reference: S19 152 292
Cons. Unit No. 60018
Administered by: Department of Conservation
Source: Department of Conservation 1994.

Vegetation: Mixed podocarp forest.
 Description: Steep hill country with kereru, kaka, NZ falcon, short-tailed bat and long-tailed bat present. Mistletoe is present and Pua o te reinga may be present.

Raurimu Spiral Scenic Reserve

Size (ha): 71.04
 Grid Reference: S20 178 275
 Cons. Unit No. 60023
 Administered by: Department of Conservation
 Source: Department of Conservation 1994.
 Vegetation type: Podocarp forest; podocarp-broadleaved forest.
 Description: This is steep-sided hill country at the edge of ring plain. Kereru, kaka, long-tailed cuckoo and shining cuckoo use the reserve seasonally. Blue duck are present in the Piopiotea Stream. Pua o te reinga occurs in this reserve.

Retaruke Scenic Reserve

Size (ha): 524.26¹³
 Grid Reference: S19 025 260
 Cons. Unit No. 70292
 Administered by: QEII National Trust
 Source: Fuller & Edwards 1989.
 Vegetation: Tawa-rewarewa forest.
 Description: The reserve contains the headwaters of three small streams and Mangaopaturarua Stream, it is enclosed to the south and west by extensive papa bluffs which drop to a large level basin.

Roto Scenic Reserve

Size (ha): 4.6
 Grid Reference: R18 863 536
 Cons. Unit No. 70458
 Administered by: Department of Conservation
 Source: de Groot 1997.
 Vegetation: Lowland forest with kahikatea, tawa and kamahi.
 Description: Flat river terrace between Ohura River and Roto Road.

Rotokahu Scenic Reserve (part)

Size (ha): 250¹
 Grid Reference: S19 992 255
 Cons. Unit No. 70284
 Administered by: Department of Conservation
 Source: de Groot 1997; Fuller & Edwards 1989.
 Vegetation: Tawa/tawheowheo forest; black beech forest; silver beech forest (a number of associations); red beech (*Nothofagus fusca*) forest; kahikatea-rimu/tawa-treefern-mahoe forest and scrub; wheki ponga-wheki-(tawa)-(mahoe)/pasture forest; whauwhaupaku-manuka-mingimingi/manuka-pasture-bracken shrubland; *Carex secta*-raupo reed-sedgeland; pasture.

Description: Steep hill country with many steep bluffs and a waterfall. Lake Hawes is within the reserve. Taxa present include tawhewhewo, red beech, silver beech and possibly hard beech. The presence of red and silver beech are among the western most records of these species in the central North Island. *Dracophyllum traversii* reaches its southern limit of distribution in the North Island here.

Sec 18 Scenic Reserve

Size (ha): 285.22
Grid Reference: S19 930 250
Cons. Unit No. 70296
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest comprising tawa, kamahi, totara, miro, matai, rewarewa and hinau.
Description: Steep hills.

Sunshine Scenic Reserve

Size (ha): 16.080
Grid Reference: S18 067 544
Cons. Unit No. 70348
SSBI No.: S18 H020
Source: Field assessment, current survey.
Administered by: Ruapehu District Council/Department of Conservation
Vegetation: Totara-kahikatea-matai/mahoe forest; totara-matai-kahikatea forest; (kowhai)/mahoe-tarata forest; totara-kahikatea forest; redwood forest; Douglas fir forest; totara pole forest; mixed podocarp-broadleaved scrub and forest; manuka-totara shrubland.
Description: Rolling to steep mudstone hill country with some good quality podocarp forest.
Reference: Fuller & Edwards 1989

Tangitu Scenic Reserve

Size (ha): 138
Grid Reference: S17 020 750
Cons. Unit No. S18-002
Administered by: Department of Conservation
Source: Bayfield et al. 1986.
Vegetation: Kahikatea-miro-matai forest; tawa forest; pasture.
Description: Hill country with steep faces, a large basin and river terraces. Good quality tawa forest with mixed podocarp forest on the lower slopes.

Tapui Scenic Reserve

Size (ha): 38.07
Grid Reference: S19 055 488
Cons. Unit No. 70288
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Kahikatea-totara/tawa-hinau forest; broadleaved-mixed podocarp

forest; pole totara-kahikatea forest; pasture.

Description: River terrace and rolling to steep foothills rising from Hikumutu Stream. Several small catchments are contained within the reserve and form deep gullies. Pumice terrace and cliff communities are also present. Stock damage was present in the 198 through much of the reserve, although healthy understorey was present in some remnant podocarp stands.

Tatu Scenic Reserve

Size (ha): 4.69

Grid Reference: R18 784 512

Cons. Unit No. 70456

Administered by: Department of Conservation

Source: Department of Conservation 1997.

Vegetation: Podocarp forest comprising totara, rimu, and kahikatea; pasture.

Description: Small remnant podocarp forest on an alluvial flat. Fantail, grey warbler and kereru present.

Taumarutti Scenic Reserve

Size (ha): 0.59

Grid Reference: S18 010 675

Cons. Unit No. 70364

Administered by: Department of Conservation

Source: Fuller & Edwards 1989.

Vegetation: (Kahikatea)/totara forest; mixed podocarp treeland; shrubland; rank pasture; *Juncus articulatus* rushland; grazed pasture.

Description: Small steep bank and river terrace.

Te Rauateti Scenic Reserve

Size (ha): 5.26

Grid Reference: R18 815 522

Cons. Unit No. 70451

Administered by: Department of Conservation

Source: Department of Conservation 1997.

Vegetation: Tawa forest with kamahi, totara, rimu, matai, miro, kahikatea, rewarewa, mahoe, horoeke, wheki and ponga.

Description: Rolling to steep hill country.

Te Ruahine Scenic Reserve

Size (ha): 964.51

Grid Reference: S19 990 390

Cons. Unit No. 70278

Administered by: Department of Conservation

Source: Fuller & Edwards 1989.

Vegetation: (Rimu)/tawa forest; tawa-rewarewa/treefern forest; katote-wheki-mamaku forest.

Description: Steep ridges and gullies located in several tributaries of the Retaruke River. Good quality forest, with abundant emergent podocarps.

The Ratas Scenic Reserve

Size (ha): 7.64
Grid Reference: S19 170 500
Cons. Unit No. 70332
Administered by: Department of Conservation
Source: C. Ogle, Wanganui Conservancy, Department of Conservation pers. comm. 1999.
Vegetation: Kahikatea-totara forest with scattered rimu and matai. Divaricating shrubs are present in the understorey. Kanuka-totara is present on the terrace scarp and in addition there is a wetland dominated by harakeke and purei with cabbage trees and shrubs.
Description: River terrace along the Whanganui River, some terraces are periodically flooded. *Jovellana sinclairii*, an uncommon species in Taumarunui Ecological District is present.

Tunnel Hill Scenic Reserve

Size (ha): 23.06
Grid Reference: S18 915 510
Cons. Unit No. 70353
SSBI No.: S18 H002
Source: Field assessment, current survey.
Administered by: Department of Conservation
Vegetation: Tawa forest; kamahi-mahoe-tarata/Himalayan honeysuckle forest; Himalayan honeysuckle/pasture shrubland.
Description: Rolling to steep hill country. In the 198 there was good regeneration of most forest species in the understorey despite damage from grazing.
Reference: Bayfield *et al.* 1986.

Upper Retaruke Valley Scenic Reserve

Size (ha): 8.61
Grid Reference: S19 071 220
Cons. Unit No. 70298
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Kahikatea-rimu/kamahi-tawa forest (varies in dominance across the reserve); red beech-rimu forest; kamahi forest; (kaikomako)- (kahikatea)/pasture grass-bracken-blackberry grassland; raupo reedland; (manuka)/Sphagnum mossfield; *Carex-Juncus*-*Eleocharis*-buttercup-watercress herbfield; rank grassland.
Description: This reserve comprises four small blocks of land situated on flat terraces between the Upper Retaruke Road and the Upper Retaruke River. Small stands of remnant forest including a stand of red beech are scattered through the reserve. Most of the reserve is secondary kamahi forest. There is also an area of swamp. Blue duck have been observed on the river between two of the blocks.

Waiarata Scenic Reserve

Size (ha): 405.84
Grid Reference: R18 770 543
Cons. Unit No. 70448
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Tawa-kamahi forest.
Description: A steeply sloped basin which is the upper catchment of the Heao Stream. Pied tit and whitehead are present.

Waihuka Scenic Reserve

Size (ha): 249.18
Grid Reference: S17 060 820
Cons. Unit No. S17-073
Administered by: Department of Conservation
Source: Bayfield et al. 1986.
Vegetation: Rimu/kareao-tawa-mahoe forest; tawa forest; kahikatea/*Carex* tree-tussockland; wheki-katote forest; manuka-Spanish heath-bracken scrub; pasture.
Description: Steep hill country with many ridges and valleys. Notable plants are: *Brachyglottis kirkii*, *Epilobium pallidiflorum*, *Pseudowintera axillaris* and *Raukaua edgerleyi*.

Watpahi Scenic Reserve

Size (ha): 5.06
Grid Reference: S19 925 345
Cons. Unit No. 70183
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Tawa-kamahi forest with rimu, matai, rewarewa, miro, mahoe, horeka and treefern.
Description: Two small valleys in steep hill country. This is a good example of lowland forest and has diverse bird life.

Wattaka Scenic Reserve

Size (ha): 919
Grid Reference: S18 920 800
Cons. Unit No. S18-001
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Matai-miro-tanekaha-rimu forest; hard beech forest; rewarewa/kamahi forest; tawa forest; kamahi forest; manuka scrub.
Description: This reserve comprises a long high ridge with a stream valley. It is noted for its high diversity of indigenous plant species.
Reference: Bayfield *et al.* 1986

Waitewhera Scenic Reserve

Size (ha): 11.6
Grid Reference: R18 816 611
Cons. Unit No. 70460
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Kahikatea-tawa forest.
Description: Alluvial flat between the Tongaporutu-Mangaroa highway and Mangaroa River, with an oxbow lake. Bellbird, fantail, grey warbler, kereru, pukeko, silvereye and tui are present.

Waituhi-Kuratau Scenic Reserve (part)

Size (ha): 540
Grid Reference: T18 320 560
Cons. Unit No. 60130
Administered by: Department of Conservation
Source: Department of Conservation 1994.
Vegetation: Mixed podocarp-broadleaved forest; red tussock-monoao shrubland; bog pine-mountain toatoa forest.
Description: Hill country with moderately steep to very steep slopes. This area has both lowland forest and submontane forest. Kereru, kaka, long-tailed cuckoo, shining cuckoo, robin, and kakariki have been recorded. NZ falcon has been recorded near the reserve. Long-tailed bat is present.

Wall Scenic Reserve

Size (ha): 35.41
Grid Reference: S19 071 438
Cons. Unit No. 70293
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: (Rimu)/tawa forest; mahoe-porokaiwhiri/wheki forest; tawa-mahoe treeland; pasture.
Description: A steep to very steep area with many slips and exposed bare rock. This reserve has been highly disturbed from past burning, clearing, and grazing.

Whakapapa Gorge Scenic Reserve

Size (ha): 66.17
Grid Reference: S19 183 446
Cons. Unit No. 60021
Administered by: Department of Conservation
Source: Department of Conservation 1994; Fuller & Edwards 1989.
Vegetation: Rimu-kahikatea/tawa forest; pole rimu-totara forest; rewarewa/tawa/ponga forest; mixed broadleaved-podocarp shrubland; podocarp-mixed broadleaved-treefern scrub and forest; rank pasture; rimu-kahikatea-(mountain beech) forest.
Description: A long narrow steep-sided reserve along the Whakapapa River.

Kaka, long-tailed cuckoo, shining cuckoo, and blue duck have been recorded.

Whakapapa Island Scenic Reserve

Size (ha): 61.51
Grid Reference: S19 188 485
Cons. Unit No. 60019
Administered by: Department of Conservation
Source: Department of Conservation 1994.
Vegetation: Hall's totara forest; kanuka-manuka scrub.
Description: Flat pumice alluvium island at the confluence of the Whakapapa River and the Whanganui River. Long-tailed bat is present, and kereru have been recorded.

Recreation Reserve

Manunui Recreation Reserve

Size (ha): 27.95
Grid Reference: S18 105 555
Cons. Unit No. 70349
Administered by: Department of Conservation
Source: Field inspection, current survey.
Vegetation: Kahikatea/kahikatea-totara forest, with an understorey of divaricating shrubs including kanono, poataniwha and turepo.
Description: A flat camping ground on young alluvium, with a fenced stand of mature podocarp forest surrounded by grass. Several environmental pest plants are present including Japanese honeysuckle, tree privet, Chinese privet and ivy.
Reference: Department of Conservation 1997

Obinepane Recreation Reserve

Size (ha): 0.76
Grid Reference: S19 961 492
Cons. Unit No. 70270
Administered by: Department of Conservation
Source: de Groot 1997
Vegetation: Grass (mown) and native shrubs.
Description: River terrace beside Whanganui River.

Ongarue Recreation Reserve

Size (ha): c.1
Grid Reference: S18 085 740
Cons. Unit No. S18-015
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Not known.
Description: At the Ongarue township.

Owhango Recreation Reserve

Size (ha): 6.53
Grid Reference: S19 155 425
Cons. Unit No. 60168
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: The Owhango Domain is in this reserve.

Owhango Hall Recreation Reserve

Size (ha): 0.1
Grid Reference: S19 161 423
Cons. Unit No. 60170
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: The Owhango Hall is in this reserve.

Tatu Recreation Reserve

Size (ha): 0.13
Grid Reference: R18 785 513
Cons. Unit No. 70660
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Exotic vegetation.
Description: Flat section fronting Waro Road and abutting Paurua Stream.

Taumarunui Base Recreation Reserve

Size (ha): 0.25
Grid Reference: S18 058 575
Cons. Unit No. 70653
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Grass and totara trees.
Description: DOC Field Centre workshop and accommodation is on this reserve.

Taumarunui/Ranglora Recreation Reserve

Size (ha): 82.49
Grid Reference: S18 065 558
Cons. Unit No. 70654
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest comprising tawa, kamahi, totara, rimu, matai, miro, and mahoe.
Description: This reserve comprises moderately steep to steep hill country within the town boundary.

Quarry Reserve

Paraketu Road Quarry Reserve

Size (ha): 2.25
Grid Reference: S17 077 832
Cons. Unit No. S17-074
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: Not known.

Local Purpose Reserve

Kaitieke Rubbish Reserve Local Purpose Reserve

Size (ha): 0.22
Grid Reference: S19 062 315
Cons. Unit No. 70644
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: Small reserve set aside for rubbish disposal; adjacent to Mangaohae Stream.

Koromiko Local Purpose Reserve

Size (ha): 2.75
Grid Reference: S18 015 718
Cons. Unit No. 70636
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Not known.
Description: River terrace along Koromiko Stream.

Mangaorakei Local Purpose Reserve (gravel)

Size (ha): 4.86
Grid Reference: S19 966 335
Cons. Unit No. 70675
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Not known.
Description: Hill country with moderately steep to steep slopes.

Plantation Reserve Local Purpose Reserve

Size (ha): 0.02
Grid Reference: S18 057 552
Cons. Unit No. 70645
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Grass and exotic trees.
Description: Small narrow reserve in a residential area.

Quarry Local Purpose Reserve

Size (ha): 12.75
Grid Reference: S18 120 552
Cons. Unit No. 70634
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Not known.
Description: A cemetery and a quarry are in this reserve.

Tatu Cemetery Local Purpose Reserve

Size (ha): 1.2
Grid Reference: R19 782 508
Cons. Unit No. 70457
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Not known.
Description: Not known.

Wildlife Management Reserve

Mapara Wildlife Management Reserve

Size (ha): 1446.7
Grid Reference: S17 090 920
Cons. Unit No. S17-060,061
Administered by: Department of Conservation
Source: Innes & Flux 1999.; Bradfield & Flux 1996; Leathwick 1981.
Vegetation: Tawa forest and mahoe forest.
Description: A complex interspersed of tawa dominant forest and mahoe dominant forest on predominantly south-west facing country of moderate slope. This reserve contains c.100 North Island kokako and is one of 23 key management sites identified to improve the conservation status of kokako by 2020. Long-tailed bat, kereru, karakea and fernbird are also present.

Scientific Reserve

Te Matre Scientific Reserve

Size (ha): 10.83
Grid Reference: S19 035 448
Cons. Unit No. 70289
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Totara forest; pasture.
Description: This pole totara forest on flat to sloping river terraces is a prime example of what was once an extensive forest type on the alluvial soils of the North Island.

Conservation Park

Pureora Conservation Park (part)

Size (ha): 6360
Grid Reference: S18 300 660
Cons. Unit No. T17-001/012 T18 305 585 T17-001/013
Administered by: Department of Conservation
Source: Department of Conservation 1996.
Vegetation: Lowland forest; submontane forest; scrub and shrubland.
Description: Low lying, rolling to steep, broken hill country. Kaka, kokako, blue duck, kakariki, NZ falcon and long-tailed bat all occur in this reserve.

Conservation Area

Airstrip Conservation Area

Size (ha): 2.02
Grid Reference: S19 045 295
Cons. Unit No. T0172
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: A flat grazed area in the Retaruke River valley.

Depot Road Conservation Area

Size (ha): 0.11
Grid Reference: R19 886 305
Cons. Unit No. T0475
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Podocarp forest; pasture
Description: Pasture occurs on the river terrace. Podocarp forest is on the steep face.

Drain Reserve Conservation Area

Size (ha): 0.32
Grid Reference: S18 925 695
Cons. Unit No. T0342
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: This grazed reserve is in Matiere.

Echolands Conservation Area

Size (ha): 3.41
Grid Reference: S18 105 556
Cons. Unit No. T0632
Administered by: Department of Conservation
Source: Department of Conservation 1997.

Vegetation: Scrub, grass and blackberry.
 Description: River terrace along Whanganui River. This area is leased for grazing.

Falls Conservation Area

Size (ha): 0.75
 Grid Reference: R19 889 388
 Cons. Unit No. 70478
 Administered by: Department of Conservation
 Source: de Groot 1997.
 Vegetation: Grass with some kamahi, tawa, rangiora, rimu and rewarewa.
 Description: Steep river terrace along the Ohura River.

Hunua Conservation Area

Size (ha): 582.75
 Grid Reference: S19 065 420
 Cons. Unit No. 70043
 Administered by: Department of Conservation
 Source: de Groot 1997.
 Vegetation: Lowland forest comprising tawa, kamahi, rimu, rewarewa, hinau, and miro.
 Description: Steep dissected hill country area which was previously logged.

Kaitieke Conservation Area

Size (ha): 0.4
 Grid Reference: S19 062 317
 Cons. Unit No. 70171
 Administered by: Department of Conservation
 Source: Department of Conservation 1997.
 Vegetation: Exotic vegetation.
 Description: Grassed area used as a domain by the Kaitieke community.

Kakahi Conservation Area

Size (ha): 34.42
 Grid Reference: S19 180 498
 Cons. Unit No. 70165
 Administered by: Department of Conservation
 Source: de Groot 1997.
 Vegetation: Lowland forest with totara.
 Description: Flat river terrace and drained swamp. 8.5 ha of this reserve is leased for grazing.

Kara Conservation Area (part)

Size (ha): 535¹³
 Grid Reference: R18 800 644
 Cons. Unit No. 70013
 Administered by: Department of Conservation
 Source: Department of Conservation 1997.

Vegetation: Lowland forest
Description: Steep to very steep hill country.

Koiro Conservation Area

Size (ha): 2.33
Grid Reference: S19 915 425
Cons. Unit No. 70181
SSBI No.: S19 H001
Source: Field assessment, current survey.
Administered by: Department of Conservation
Vegetation: Tawa-kamahi forest with rimu, rewarewa, totara, matai, miro, horoeka, mahoe and treefern.
Description: Steep slope beside the Whanganui River.
Reference: Department of Conservation 1997

Koiro Farms Conservation Area

Size (ha): 41.84
Grid Reference: S19 940 463
Cons. Unit No. 70716
SSBI No.: S19 H002
Source: Department of Conservation 1997.
Administered by: Department of Conservation
Vegetation: Rewarewa forest; kanuka forest; tawa-broadleaved forest; manuka shrubland.
Description: Contiguous with Whanganui National Park.

Kokaka Conservation Area (part)

Size (ha): 270¹
Grid Reference: S19 010 265
Cons. Unit No. 70175
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland forest with manuka, ponga, mountain holly, black beech, tawa, kamahi and grass.
Description: Steep hill country covered in secondary forest which was once grazed. A good kiwi population.

Kouturoa East Conservation Area

Size (ha): 0.69
Grid Reference: S19 025 280
Cons. Unit No. 70173
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Tawa-kamahi forest with rimu, totara, horeka, matai, whauwhaupaku and treefern.
Description: Hill country with moderately steep to steep slopes.

Kouturoa West Conservation Area

Size (ha): 0.8
Grid Reference: S19 013 278
Cons. Unit No. 70174
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland scrub and shrubland.
Description: Road escarpment with some native species, surrounded by pasture.

Makokoti Conservation Area

Size (ha): 0.804
Grid Reference: R19 891 313
Cons. Unit No. 70476
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation type: Grass and scrub.
Description: River terrace at the boundary of Makokoti Stream and Whanganui River. This is the site of Makokoti Pa and a Maori burial ground.

Manata Conservation Area

Size (ha): 2.42
Grid Reference: S18 052 536
Cons. Unit No. 70344
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Grass and willows.
Description: Small area on a river flat which was once a gravel reserve. This reserve is leased out for grazing.

Marsack Conservation Area

Size (ha): 6.92
Grid Reference: S18 073 548
Cons. Unit No. 70340
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Grass and willows.
Description: Flat river terrace along the Whanganui River.

Neilsons Conservation Area

Size (ha): 674.11
Grid Reference: S19 950 328
Cons. Unit No. 70168
Administered by: Department of Conservation
Source: Fuller & Edwards 1989.
Vegetation: Tawa forest; black beech forest; manuka-treefern/pasture scrub; rimu-kahikatea forest.
Description: River terraces along the Retaruke River going up to steep bluffy hill country. *Ascarina lucida* occurs in the reserve. This is the only record of this species in the ecological district.

Nibonibo Conservation Area

Size (ha): 991.48
Grid Reference: S18 920 630
Cons. Unit No. 70308
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Tawa-kamahī forest with rimu, totara, matai, miro, black beech and rewarewa.
Description: A large area of rolling to steep hill country.

Oio Conservation Area

Size (ha): 0.63
Grid Reference: S19 064 327
Cons. Unit No. 70170
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Exotic vegetation; grass.
Description: Small river terrace which is grazed. Several large ti kouka are present.

Old River Bed Conservation Area

Size (ha): 6.4
Grid Reference: S18 073 548
Cons. Unit No. 70341
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic grasses.
Description: Flat river terrace, covered with a grazing licence.

Opatu Conservation Area

Size (ha): 242.37
Grid Reference: S19 905 520
Cons. Unit No. 70180
SSBI No.: S19 H001
Source: Field assessment, current survey.
Administered by: Department of Conservation
Vegetation: Tawa-kamahī forest with rimu, rewarewa, matai, miro, totara, mahoe and treefern.
Description: Steep to rolling country along the Whanganui River.
Reference: Department of Conservation 1997

Opura Conservation Area

Size (ha): 122.9
Grid Reference: R19 881 419
Cons. Unit No. 70477
SSBI No.: S19 H001
Source: Field assessment, current survey.
Administered by: Department of Conservation

Vegetation: Tawa-kamahi forest with totara, northern rata and matai; scrub.

Description: Steep hill country area. NI robin, kereru and long-tailed cuckoo are all present. North Island kiwi have been reported from this reserve.

Reference: Department of Conservation 1997.

Otunui Conservation Area

Size (ha): 129.11

Grid Reference: S18 975 590

Cons. Unit No. 70111

SSBI No.: S18 H013

Source: Field assessment, current survey.

Administered by: Department of Conservation

Vegetation: Tawa-kamahi forest with rimu, miro, totara, matai, rewarewa and hinau.

Description: Steep hillside and gully.

Reference: de Groot 1997

Paparoa Conservation Area

Size (ha): 1.66

Grid Reference: S19 965 480

Cons. Unit No. 70162

Administered by: Department of Conservation

Source: de Groot 1997.

Vegetation: Lowland forest comprising kamahi, kowhai and tawa.

Description: River escarpment.

Pukeatua Conservation Area

Size (ha): 277.61

Grid Reference: S19 993 355

Cons. Unit No. 70169

Administered by: Department of Conservation

Source: Fuller & Edwards 1989.

Vegetation: Kanuka/treefern-manuka-heketara-mahoe treeland; manuka/treefern/pasture treeland; totara-kahikatea-manuka forest

Description: Large swampy river terraces along the Keturake River, and rolling to steep dissected hill country. This reserve is contiguous with the Pukeatua Scenic Reserve. There is a diverse range of bird species.

Rangitatea Conservation Area

Size (ha): 3.23

Grid Reference: S19 148 493

Cons. Unit No. 70163

Administered by: Department of Conservation

Source: de Groot 1997.

Vegetation: Totara forest.

Description: Flat river terrace near the Whanganui River.

Reserve C Conservation Area

Size (ha): 3.46
Grid Reference: S19 067 536
Cons. Unit No. 70338
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland forest.
Description: Terraced hillside.

Reserve E Conservation Area

Size (ha): 23.07
Grid Reference: S18 070 535
Cons. Unit No. 70339
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic plantation of redwood and Douglas fir with some mixed shrubland-podocarp forest.
Description: Steep gully.

Roto Conservation Area

Size (ha): 5.46
Grid Reference: R18 863 535
Cons. Unit No. 70443
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland forest.
Description: Moderately steep to steep hill country along the Ohura River above Roto Road.

Saddler Conservation Area

Size (ha): 0.94
Grid Reference: S18 936 505
Cons. Unit No. 70343
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: A metal pit on a river terrace.

Service Road Conservation Area

Size (ha): 19.58
Grid Reference: S19 155 500
Cons. Unit No. 70179
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Grassland; kowhai treeland.
Description: Grassed river terrace along the Whanganui River with some kowhai on the escarpment.

Tabeke Conservation Area (part)

Size (ha): 1100¹⁵
Grid Reference: S19 950 210
Cons. Unit No. 70301
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest comprising tawa, kamahi, totara, miro, matai, hinau, rewarewa, northern rata, and mahoe.
Description: Steep to rolling hill country.

Tatu Conservation Area

Size (ha): 3.84
Grid Reference: R18 786 519
Cons. Unit No. 70444
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Not known.
Description: Not known.

Tawata Conservation Area

Size (ha): 0.03
Grid Reference: S19 913 406
Cons. Unit No. 70166
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Ponga.
Description: A river terrace covered in ponga, surrounded by Whanganui National Park.

Tongariro Conservation Area (part)

Size (ha): 7639.96¹⁶
Grid Reference: S19 260 350
Cons. Unit No. 60042
Administered by: Department of Conservation
Source: Department of Conservation 1994.
Vegetation: Mixed podocarp forest; mixed podocarp-broadleaved forest; ti-kouka forest; kaikawaka-Hall's totara forest; northern rata-tawa-rimu forest; kamahi forest; tawa-podocarp forest; red beech forest; kaikawaka-mountain toatoa forest.
Description: Only partly in Taumarunui Ecological District, this area comprises gorges, terraces and moderately steep to steep hill country. This area supports a large population of brown kiwi. Blue duck, kaka, kereru, NZ falcon, kakariki, robin, rifleman, fernbird, long-tailed cuckoo and shining cuckoo are all present. Long-tailed bat is also present, with the possibility of short-tailed bat. Pua o te reinga occurs here.

Tupapakuraa Conservation Area

Size (ha): 2.1
Grid Reference: S19 070 227
Cons. Unit No. 70177
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland scrub and shrubland comprising manuka, kanuka, treefern, mahoe and kamahi.
Description: Flat river terrace in the Retaruke River Valley between road and creek.

Upper Retaruke Conservation Area

Size (ha): 0.45
Grid Reference: S20 085 183
Cons. Unit No. 70131
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest comprising tawa, kamahi, rimu, miro, matai, hinau, rewarewa, totara and red beech.
Description: Flat roadside reserve with an abrupt drop to the stream boundary.

Watreka Conservation Area

Size (ha): 13.35
Grid Reference: S19 953 418
Cons. Unit No. 70167
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Kamahi-tawa forest with totara.
Description: Steep south-facing hillside.

Wattaanga Conservation Area (part)

Size (ha): 1404¹
Grid Reference: R18 680 550
Cons. Unit No. 70055
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest comprising tawa, kamahi, rimu, kahikatea and rewarewa; silver beech forest with regenerating rimu and kamahi (outside ecological district); hard beech forest.
Description: Most of this reserve lies within the North Taranaki Ecological District. The area within Taumarunui Ecological District is generally steep land. This reserve is notable for its extensive area of silver beech and *Peraxilla tetrapetala*, but both of these features lie within the North Taranaki Ecological District. Also present with the reserve are North Island kokako, kaka, NZ falcon, kiwi, kakariki, long-tailed bat, short-tailed bat, apion weevil, and striped skink. Many of these species are likely only to occur in North Taranaki Ecological District.

Waitea Conservation Area

Size (ha): 2.63
Grid Reference: S19 166 493
Cons. Unit No. 70164
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland forest with kahikatea, totara, porokaiwhiri and manuka.
Description: Flat wet river terraces.

Valley Road Conservation Area

Size (ha): 0.51
Grid Reference: S19 124 478
Cons. Unit No. 70178
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: Grassed river terrace alongside the Whanganui River.

Stewardship Area and Land

Erua Stewardship Area (part)

Size (ha): 3860¹⁷
Grid Reference: S20 120 140
Cons. Unit No. 60097
Administered by: Department of Conservation
Source: Department of Conservation 1994.
Vegetation: Mixed podocarp-broadleaved forest; tawa-podocarp forest; northern rata-rimu forest; manuka scrub; streamside herb-field.
Description: Only partially in Taumarunui Ecological District. This area is on the edge of volcanic ring plain with deep gorges incised into papa and comprises moderately steep to very steep slopes. The area supports brown kiwi, blue duck, kaka, long-tailed cuckoo, shining cuckoo, robin, kereru, kakariki, rifleman, NZ falcon, fernbird and long-tailed bat. The threatened plant *Poa o te ringi* also occurs here.

Haubungaroa Stream Stewardship Area (part)

Size (ha): 70
Grid Reference: T18 345 615
Cons. Unit No. T18-007
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Podocarp forest and shrubland
Description: A small portion of the area lies within the Taumarunui Ecological District and is contiguous with Pureora Conservation Park.

Hukapapa Stewardship Area

Size (ha): 18.72
Grid Reference: S19 162 359
Cons. Unit No. 60001
Administered by: Department of Conservation
Source: Department of Conservation 1994.
Vegetation: Tawa-podocarp forest; kahikatea forest; manuka scrub; toetoe-broadleaved scrub.
Description: Flat to gently rolling terraces.

Karaka Forest Stewardship Land (part)

Size (ha): 100¹⁸
Grid Reference: S17 965 845
Cons. Unit No. S17-053
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Podocarp-broadleaved forest.
Description: Hill country with short steep ridges covered with mixed podocarp-broadleaved forest, including kahikatea.

Mangaiti Road Stewardship Land

Size (ha): 2.74
Grid Reference: S17 070 895
Cons. Unit No. S17-059
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Not known.
Description: Not known.

Mangapehi-Ruapehu Forest Stewardship Lands

Size (ha): 1497.41
Grid Reference: S17 120 990
Cons. Unit No. S17-025, 026, 027, 028
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Podocarp-broadleaved forest and wetland vegetation
Description: Rolling hill country covered in forest with some swampy flats. This area contains high populations of fernbird and spotless crane, as well as NZ falcon and North Island robin.

Marginal Strips

Burland Road Marginal Strip

Size (ha): 52.21
Grid Reference: S19 137 537
Cons. Unit No. 60171
Administered by: Department of Conservation
Source: de Groot 1997.

Vegetation: Lowland scrub and shrubland.
Description: Marginal strip along the Whanganui River near Taumarunui.

Echolands Marginal Strip

Size (ha): 3.41
Grid Reference: S18 110 556
Cons. Unit No. 70633
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Grass; blackberry; bracken.
Description: River terrace.

Kakahi Marginal Strip

Size (ha): 0.86
Grid Reference: S19 155 502
Cons. Unit No. 60172
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: Marginal strip along the Whanganui River near Kakahi.

Kakahi Stream Marginal Strip

Size (ha): 0.1
Grid Reference: S19 166 486
Cons. Unit No. 70595
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland forest with tawa, matai, rimu, kahikatea and kamahi.
Description: River terrace and undulating lahar plain.

Makokoti Stream Marginal Strip

Size (ha): 1.504
Grid Reference: S19 905 315
Cons. Unit No. 70594
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland scrub and shrubland comprising bracken, manuka and grass.
Description: Flat river terrace contiguous to Whanganui National Park.

Mokau River Marginal Strip

Size (ha): c. 14.4
Grid Reference: S17 180 984
Cons. Unit No. S17-029, 031, 032
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Not known.

Description: Three areas of marginal strip along the upper reaches of the Mokau River.

Obura River Marginal Strip

Size (ha): c.28.8
Grid Reference: S18 994 713
Cons. Unit No. S18-004
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Not known.
Description: Not known.

Obura River Marginal Strip

Size (ha): c.2.8
Grid Reference: R18 850 630
Cons. Unit No. R18-018
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest.
Description: Riparian flats of Ohura River.

Obura River Marginal Strip

Size (ha): 6.4
Grid Reference: R19 852 420
Cons. Unit No. 70669
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Not known.
Description: Rolling hill country to river terrace.

Ongarue River Marginal Strip

Size (ha): 0.2
Grid Reference: S18 055 563
Cons. Unit No. 70593
Administered by: Department of Conservation
Source: Department of Conservation 1997.
Vegetation: Lowland forest.
Description: River terrace in Taumarunui township alongside the Ongarue River.

Ongarue River Marginal Strip

Size (ha): 3.35
Grid Reference: S18 030 640
Cons. Unit No. 70630
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Not known.
Description: River terrace along the Ongarue River.

Pungapunga River Marginal Strip

Size (ha): c.17.6
Grid Reference: S18 240 574
Cons. Unit No. .S18-014
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Not known.
Description: Not known.

Pungapunga River Marginal Strip

Size (ha): 3.03
Grid Reference: S18 160 543
Cons. Unit No. 70635
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Willows and grass.
Description: River terrace.

Taringamotu River Marginal Strip

Size (ha): c.8.4
Grid Reference: S18 210 610
Cons. Unit No. S18-013
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Mixed podocarp-broadleaved forest; indigenous scrub.
Description: Marginal strip of the Taringamotu River in an area of developed farmland.

Taringamotu River Marginal Strip

Size (ha): 21.2
Grid Reference: S18 052 585
Cons. Unit No. 70591
Administered by: Department of Conservation
Source: Department of Conservation 1997
Vegetation: Lowland scrub and grass.
Description: Three pieces of narrow marginal strip adjoining rural land.

Taumarunui Marginal Strip

Size (ha): 0.55
Grid Reference: S18 093 549
Cons. Unit No. 70592
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Exotic vegetation.
Description: River terrace alongside the Whanganui River.

Waimiha Stream Marginal Strips

Size (ha): c.2.8
Grid Reference: S17 208 920
Cons. Unit No. S17-067, 081
Administered by: Department of Conservation
Source: Department of Conservation 1996.
Vegetation:
Description: Two pieces of narrow marginal strip on opposite sides of the Waimiha Stream.

Whakapapa River Marginal Strip

Size (ha): 99.68
Grid Reference: S19 173 392
Cons. Unit No. 60155
Administered by: Department of Conservation
Source: Department of Conservation 1994.
Vegetation: Podocarp forest; whaririki-sedge cliff vegetation.
Description: Steep river gorge. Blue duck, NZ falcon, and common forest birds are present.

Whanganui No. 1 Marginal Strip

Size (ha): 24.3
Grid Reference: S19 043 495
Cons. Unit No. 70590
Administered by: Department of Conservation
Source: de Groot 1997.
Vegetation: Lowland scrub and shrubland.
Description: River terrace alongside the Whanganui River.

Open Space covenants

Boyrup Farms Open Space Covenant

Size (ha): 115.8
Grid Reference: S18 084 713, S18 085 695
Study Site No. Q11
Administered by: QEII National Trust
Source: de Groot 1997.
Vegetation: Podocarp-broadleaved forest; mixed indigenous shrubland.
Description: Rhyolite capped escarpment with some toe slopes. This covenant comprises two disjunct areas. This covenant has been approved and is proceeding towards registration.

Brough Open Space Covenant

Size (ha): 25.2
Grid Reference: S17 159 968, 161 967, 137 963
Study Site No. Q8
Administered by: QEII National Trust

Source: de Groot 1997.
 Vegetation: Totara-broadleaved forest.
 Description: Moderately steep to steep hill country. This covenant protects three separate areas of indigenous forest.

Connolly, Stmonds, Matiere Forests Ltd, Dickie Open Space Covenant

Size (ha): 182.8
 Grid Reference: R18 875 705
 Study Site No. Q12
 Administered by: QEII National Trust
 Source: R. Bishop, QEII National Trust pers. comm. 1999.
 Vegetation: Lowland forest.
 Description: Very steep hill country.

Dewes Open Space Covenant

Size (ha): 5
 Grid Reference: S18 028 780
 Study Site No. Q4
 Administered by: QEII National Trust
 Source: de Groot 1997.
 Vegetation: Podocarp forest (matai is common).
 Description: Riparian flats.

Donald Open Space Covenant

Size (ha): 2
 Grid Reference: S19 146 429
 Study Site No. Q1
 Administered by: QEII National Trust
 Source: de Groot 1997.
 Vegetation: Lowland forest.
 Description: Small example of forest beside Hikumutu Road with some mature podocarps.

Friel Open Space Covenant

Size (ha): 7
 Grid Reference: R18 840 655
 Study Site No. Q14
 Administered by: Not applicable.
 Source: R. Bishop, QEII National Trust pers. comm. 1999.
 Vegetation: Lowland forest.
 Description: Moderately steep to steep hill country. Covenant is deferred (waiting for finance).

Fullerton-Smith Open Space Covenant

Size (ha): 48.9
 Grid Reference: S18 981 745, 985 713, 005 722
 Study Site No. Q3

Administered by: QEII National Trust
 Source: de Groot 1997.
 Vegetation: Lowland forest comprising totara, rimu, matai, maire and treefern.
 Description: There are three areas in this covenant, two of which are alongside the Ohura River.

Hill Open Space Covenant

Size (ha): 4.15
 Grid Reference: S18 153 544
 Study Site No. Q2
 Administered by: QEII National Trust
 Source: de Groot 1997.
 Vegetation: Podocarp-broadleaved forest with a high proportion of matai.
 Description: Flat alluvial pumice terrace.

McQueen Open Space Covenant

Size (ha): 9
 Grid Reference: R18 855 580
 Study Site No. Q13
 Administered by: QEII National Trust
 Source: R. Bishop, QEII National Trust pers. comm. 1999.
 Vegetation: Lowland forest.
 Description: Moderately steep to steep hill country.

New Open Space Covenant

Size (ha): 10.06
 Grid Reference: S17 153 957, 157 964
 Study Site No. Q9
 Administered by: QEII National Trust
 Source: de Groot 1997.
 Vegetation: Lowland forest and buried forest.
 Description: This covenant comprises two discrete areas. One area comprises podocarp-broadleaved forest contiguous with Mangapohia Scenic Reserve. The other area protects a buried forest under Taupo pumice.

NZ Native Forest Restoration Trust Open Space Covenant

Size (ha): 212.57
 Grid Reference: S19 055 235
 Study Site No. Q16
 Administered by: QEII National Trust
 Source: R. Bishop, QEII National Trust pers. comm. 1999.
 Vegetation: Lowland forest.
 Description: Moderately steep to steep hill country. This covenant has been approved and is proceeding towards registration.

NZ Native Forest Restoration Trust Open Space Covenant

Size (ha): 16.89
Grid Reference: S19 082 225
Study Site No. Q17
Administered by: QEII National Trust
Source: R. Bishop, QEII National Trust pers. comm. 1999.
Vegetation: Lowland forest.
Description: River terraces. Covenant has been approved and is proceeding towards registration.

Reinhardt Open Space Covenant

Size (ha): 7.59
Grid Reference: S17 170 944
Study Site No. Q10
Administered by: QEII National Trust
Source: R. Bishop, QEII National Trust pers. comm. 1997.
Vegetation: Lowland podocarp broadleaved forest.
Description: Moderately steep to steep hill country just south of Benneydale.
Reference:

Stockman Open Space Covenant

Size (ha): 14.4
Grid Reference: S17 982 818
Study Site No. Q5
Administered by: QEII National Trust
Source: de Groot 1997.
Vegetation: Podocarp forest; tawa forest.
Description: This covenant is in three pieces (see also S17 982 820 and 986 815). The two lower areas nearest Tapuiwahine Road are dominated by mature podocarps, and the third is dominated by tawa.

Stuart McKenzie Trust Open Space Covenant

Size (ha): 6
Grid Reference: R18 805 609
Study Site No. Q15
Administered by: QEII National Trust
Source: R. Bishop, QEII National Trust pers. comm. 1999.
Vegetation: Lowland forest
Description: Moderately steep to steep hill country. Covenant has been approved (waiting for finance).

J. & A. Walker Open Space Covenant

Size (ha): 24.1
Grid Reference: S17 088 812
Study Site No. Q7
Administered by: QEII National Trust
Source: de Groot 1997.

Vegetation: Podocarp-broadleaved forest.
Description: Lowland forest on moderately steep to steep hill country.

J. & R. Downard Open Space Covenant

Size (ha): 43.9
Grid Reference: S17 089 803
Study Site No. Q7
Administered by: QEII National Trust
Source: R. Bishop, QEII National Trust pers. comm. 1999.
Vegetation: Podocarp-broadleaved forest.
Description: Lowland forest on moderately steep to steep hill country.

G. Thomas & C. McCraw Open Space Covenant

Size (ha): 3.26
Grid Reference: S17 088 808
Study Site No. Q7
Administered by: QEII National Trust
Source: R. Bishop, QEII National Trust pers. comm. 1999.
Vegetation: Podocarp-broadleaved forest.
Description: Lowland forest on moderately steep to steep hill country.

Appendix 7

DISTRIBUTION OF INDIGENOUS VEGETATION IN TAUMARUNUI ECOLOGICAL DISTRICT

APPENDIX 7.1: SUMMARY OF LANDFORMS AND BIOCLIMATIC ZONES (AREAS AND PERCENTAGES), TAUMARUNUI ECOLOGICAL DISTRICT

LANDFORM UNIT	BIOCLIMATIC ZONE				TOTAL	
	LOWLAND HA	% ¹	SUBMONTANE HA	% ¹	HA	% ¹
Gorge	473.8	0.2			473.8	0.2
Hill country - Gently rising slopes	3699.2	1.3			3699.2	1.3
Hill country - Moderately steep to steep slopes	209226.3	75.8	4853.5	1.8	214079.8	77.5
Hill country - Very steep slopes	25358.9	9.2	198.5	<0.1	25557.4	9.3
Riparian flats	15396.4	5.6			15396.4	5.6
Terraces	9748.6	3.5			9748.6	3.5
Undulating terrain - Lahar plain	5417.0	2.0			5417.0	2.0
Undulating terrain - Minor plateaus	1760.9	0.6			1760.9	0.6
TOTAL	271081.1	98.2	5052.0	1.8	276133.1	100.0

¹ Percentage of total area of ecological district.

APPENDIX 7.2: REPRESENTATION OF INDIGENOUS VEGETATION AND HABITAT CLASSES (AREAS [HA] AND PERCENTAGES) IN THE LOWLAND AND SUBMONTANE BIOCLIMATIC ZONES, TAUMARUNUI ECOLOGICAL DISTRICT.

VEGETATION AND HABITAT CLASSES	LOWLAND				SUBMONTANE				TOTAL			
	RAP	OTHER	TOTAL	PNA	RAP	OTHER	TOTAL	PNA	RAP	OTHER	TOTAL	
Indigenous forest	33997.5	1850.2	29511.4	65359.1	3961.2	470	160.5	4591.7	37958.7	2320.2	29671.9	69950.8
Scrub and shrubland	1736.5	3077.5	9464.5	14278.5	45	151	23.5	219.5	1781.5	3228.5	9487.8	14497.6
Inland wetland ¹	8.7	51.5	12.3	72.5					8.7	51.5	12.3	72.5
Inland water	2.5	1.5	545.2	549.2					2.5	1.5	545.2	549.2
TOTAL AREA (HA)	35745.2	4980.5	39535.4	80259.1	4006.2	621	183.8	4811	39751.4	5601.5	39717.2	85070.1
% OF ED	12.9	1.8	14.3	29.1	1.5	0.2	<0.1	1.7	14.4	2.0	14.4	50.8

¹ Information for the area of inland wetland that is neither a PNA nor a RAP has been derived from field survey, not from the LCDDB as is the case with other vegetation habitat classes.

PNA = Protected Natural Area (i.e. area with existing legal protection for conservation).

RAP = Recommended Area for Protection (this report - 36 sites).

APPENDIX 7.5: HISTORIC (1840) AND CURRENT INDIGENOUS VEGETATION COVER IN THE LOWLAND BIOCLIMATIC ZONE, TAUMARUNUI ECOLOGICAL DISTRICT

LANDFORM UNIT		VEGETATION AND HABITAT CLASSES											
		INDIGENOUS FOREST		INLAND WATER ¹		INLAND WETLAND ²		SCRUB AND SHRUBLAND		TUSSOCKLAND		TOTAL	
		HA	% ³	HA	% ³	HA	% ³	HA	% ³	HA	% ³	HA	% ³
Gorge	Historic	473.8	100.0									473.8	100.0
	Current	313.1	66.1					12.3	2.6			325.4	68.7
Hill country - Gently rising slopes	Historic	3699.2	100.0									3699.2	100.0
	Current	2422.7	65.5					81.2	2.3			2506.9	67.8
Hill country - Moderately steep to steep slopes	Historic	180586.7	100.0									180586.7	100.0
	Current	47211.3	26.2	168.2	<0.1	10.7	<0.1	11254.7	6.2	0.9	<0.1	58645.8	32.5
Hill country - Very steep slopes	Historic	53488.5	100.0									53488.5	100.0
	Current	13156.7	24.6	6.2	<0.1			2111.7	3.9	0.2	<0.1	15274.8	28.6
Riparian flats	Historic	14102.3	100.0									14102.3	100.0
	Current	811.6	5.8	341	2.4	32.8	0.2	323.8	2.3			1509.2	10.7
Terraces	Historic	9698.3	100.0									9698.3	100.0
	Current	906.8	9.4	33.8	0.3	26.2	0.3	498.9	4.2			1375.7	14.2
Undulating terrain	Historic	1111.7	100.0									1111.7	100.0
	Current	100.1	9.1			2.8	<0.1	76.8	7.4			179.7	16.2
Undulating terrain - Minor plateau	Historic	1873.8	100.0									1873.8	100.0
	Current	30.3	2.6					3.1	0.3			33.4	2.8
TOTAL (1840-2014)		269054.6	100.0									269054.6	100.0
SUPPLEMENT		53359.3	24.3	549.2	0.2	72.5	<0.1	14277.2	5.3	1.1	<0.1	68259.3	25.4

¹ The historic cover of inland water was not analysed because of the minor areas involved.

² The historic cover of inland wetlands was not analysed because of the minor areas involved.

³ % of total historic vegetation on the landform unit

APPENDIX 7.4: HISTORIC (1840) AND CURRENT INDIGENOUS VEGETATION COVER IN THE SUBMONTANE BIOCLIMATIC ZONE, TAUMARUNUI ECOLOGICAL DISTRICT

LANDFORM UNIT		VEGETATION AND HABITAT CLASSES					
		INDIGENOUS FOREST		SCRUB AND SHRUBLAND		TOTAL	
		HA	% ¹	HA	% ¹	HA	% ¹
Hill country - Moderately steep to steep slopes	Historic	4853.6	100.0			4853.6	100.0
	Current	4422.9	91.1	189.6	3.9	4612.5	95.0
Hill country - Very steep slopes	Historic	198.5	100.0			198.5	100.0
	Current	168.8	85.0	29.7	15.0	198.5	100.0
TOTAL	Historic	5052.1	100.0			5052.1	100.0
	Current	4591.7	90.9	219.3	4.3	4811.0	95.2

¹% of total historic vegetation on the landform unit

APPENDIX 7.5: PROTECTED AREAS AND RAPS (AREAS AND PERCENTAGES) IN THE LOWLAND BIOCLIMATIC ZONE, TAUMARUNUI ECOLOGICAL DISTRICT

LANDFORM UNIT		TOTAL AREA OF LANDFORM UNIT (HA)	PNA		RAP	
			HA	% ¹	HA	% ¹
Gorge		473.8	349.7	73.8	48.3	10.2
Hill country - Gently rising slopes		3699.2	2300.0	62.2	354.1	9.6
Hill country - Moderately steep to steep slopes		209226.3	26337.3	12.6	3426.4	1.6
Hill country - Very steep slopes		25358.9	5955.6	23.5	867.6	3.4
Pongaroa flats		15396.4	338.0	2.2	101.6	0.7
Terraces		9748.6	297.7	3.1	131.5	1.3
Undulating terrain - Low plain		5417.0	156.9	2.9	29.2	0.5
Undulating terrain - Minor plateaus		1760.9	10.0	0.6	21.8	1.2
TOTAL		271081.1	35745.2	13.2	4980.5	1.8

¹% of total area of landform unit

PNA = Protected Natural Area (i.e. area with existing legal protection for conservation).

RAP = Recommended Area for Protection (this report - 36 sites).

APPENDIX 7.6: PROTECTED AREAS AND RAPS (AREAS AND PERCENTAGES) IN THE SUBMONTANE BIOCLIMATIC ZONE, TAUMARUNUI ECOLOGICAL DISTRICT

LANDFORM UNIT	TOTAL AREA OF LANDFORM UNIT (HA)	PNA HA	% ¹	RAP HA	% ¹
Hill country - Moderately steep to steep slopes	4853.5	3846.2	79.2	621.0	12.8
Hill country - Very steep slopes	198.5	160.0	80.6		
TOTAL	5052.0	4006.2	79.3	621.0	12.3

¹ % of total area of landform unit

PNA = Protected Natural Area (i.e. area with existing legal protection for conservation).

RAP = Recommended Area for Protection (this report - 36 sites).

APPENDIX 7.7: AREAS AND PERCENTAGES OF MAJOR VEGETATION AND HABITAT CLASSES ACROSS ALL NATURAL AREAS, IN PROTECTED NATURAL AREAS (PNAS) AND IN RECOMMENDED AREAS FOR PROTECTION (RAPs) - TOTAL OF ALL BIOCLIMATIC ZONES

VEGETATION AND HABITAT CLASSES	TOTAL (HA)	PNA HA	% ¹	RAP HA	% ²
Indigenous forest	69950.8	37958.7	54.3	2320.2	3.3
Scrub and shrubland	14497.6	1781.5	12.3	3228.3	22.3
Inland wetlands	72.5	8.7	12.0	51.5	71.0
Inland water	549.2	2.5	0.5	1.5	0.3
TOTAL	85070.1	39751.4	46.7	5601.5	6.6

¹ % of vegetation and habitat class protected

² % of vegetation and habitat class recommended for protection

PNA = Protected Natural Area (i.e. area with existing legal protection for conservation).

RAP = Recommended Area for Protection (this report - 36 sites).

APPENDIX 7.8: AREAS AND PERCENTAGES OF MAJOR VEGETATION AND HABITAT CLASSES ACROSS ALL NATURAL AREAS, IN PROTECTED NATURAL AREAS (PNAS) AND IN RECOMMENDED AREAS FOR PROTECTION (RAPs) - LOWLAND BIOCLIMATIC ZONE

VEGETATION AND HABITAT CLASSES	TOTAL (HA)	PNA HA	% ¹	RAP HA	% ²
Indigenous forest	65359.1	33997.5	52.0	1850.2	2.8
Scrub and shrubland	14278.3	1736.5	12.2	3077.3	21.6
Inland wetlands	72.5	8.7	12.0	51.5	71
Inland water	549.2	2.5	0.5	1.5	0.3
TOTAL	80259.1	35745.2	44.5	4980.5	6.2

¹ % of vegetation and habitat class protected

² % of vegetation and habitat class recommended for protection

PNA = Protected Natural Area (i.e. area with existing legal protection for conservation).

RAP = Recommended Area for Protection (this report - 36 sites).

APPENDIX 7.9: AREAS AND PERCENTAGES OF MAJOR VEGETATION AND HABITAT CLASSES ACROSS ALL NATURAL AREAS, IN PROTECTED NATURAL AREAS (PNAS) AND IN RECOMMENDED AREAS FOR PROTECTION (RAPs) - SUBMONTANE BIOCLIMATIC ZONE

VEGETATION AND HABITAT CLASSES	TOTAL (HA)	PNA HA	% ¹	RAP HA	% ²
Indigenous forest	4591.7	3961.2	86.3	470.0	10.2
Scrub and shrubland	219.3	45.0	20.5	151.0	68.9
TOTAL	4811.0	4006.2	83.3	621.0	12.9

¹ % of vegetation and habitat class protected

² % of vegetation and habitat class recommended for protection

PNA = Protected Natural Area (i.e. area with existing legal protection for conservation).

RAP = Recommended Area for Protection (this report - 36 sites).

Appendix 8

OTHER SITES OF BIOLOGICAL SIGNIFICANCE IN TAUMARUNUI ECOLOGICAL DISTRICT

There are SSBI information sheets for all sites with SSBI numbers, and PNAP plot sheets for all sites marked with an *. Additional information is held by Department of Conservation, Wanganui Conservancy, for any of these sites. This information can be located using the SSBI number or the PNAP survey number.

1. *Kopaki Trig Forest**

PNAP Survey No: S17-33
Grid Reference: NZMS260 S17 105030
Area (ha): 140
SSBI No.: 300
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Podocarp-broadleaved forest in the northern part and regenerating shrubland to the south on a short steep ridge on rolling to steep hill country. Common forest birds are present.

2. *Mokau River Forest**

PNAP Survey No: S17-34
Grid Reference: NZMS260 S17 107008
Area (ha): 30
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa/rewarewa forest on the upper sideslopes of steep bluffs above Mokau River adjoining Mangapehi Forest (S17-025). Rewarewa and kamahi is present on sideslopes and a small area of manuka/totara scrub occurs on a sideslope crest.

3. *Kopaki Road Forest**

PNAP Survey No: S17-27
Grid Reference: NZMS260 S17 060980
Area (ha): 30
SSBI No.: 339
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa dominant forest with a few remnant emergent podocarps, on steep hill country close to Mapara. The forest canopy is intact and the understorey is in reasonable condition.

4. *Mangapehi Remnants**

PNAP Survey No: S17-28/37
Grid Reference: NZMS260 S17 080977
Area (ha): 60
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa dominates forest with rewarewa on rolling to steep hill country. This area has been logged for podocarps and is currently grazed. Two small kahikatea remnants on the flats are separate from the main area.

5. *Herekawe Scenic Reserve Extension**

PNAP Survey No: S17-35
Grid Reference: NZMS260 S17 170981
Area (ha): 175
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: This site adjoins Herekawe Scenic Reserve and two separate parts of the Mokau River marginal strip. The south-eastern slopes of this ridge above Mokau River are tawa dominated with hinau and rewarewa while the north-east slopes are in kiokio-manuka-bracken scrub. Several other shrubland types are also found in this area. The area has been considered for purchase in the past by DOC and has been recommended as being worthy of protection.

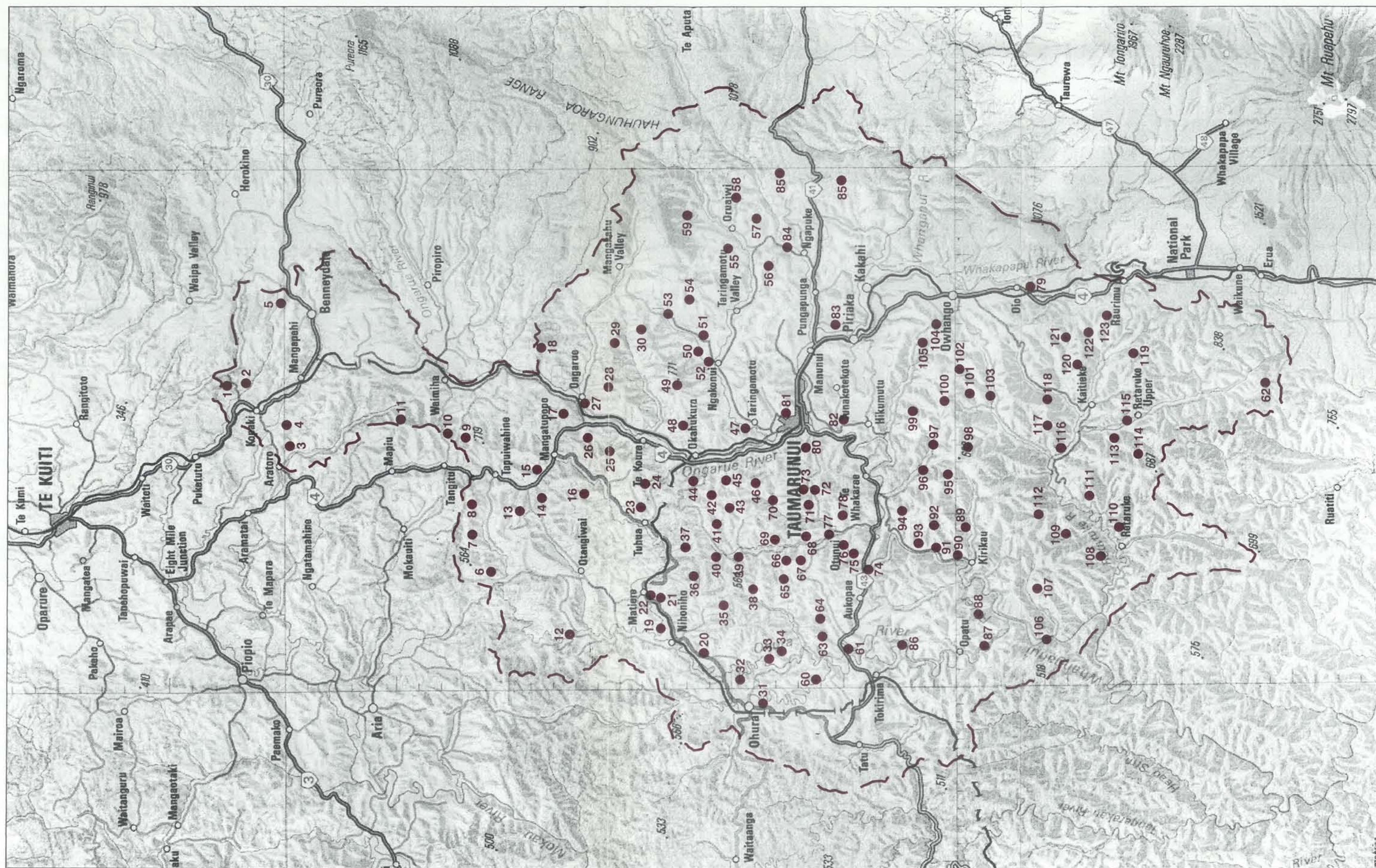
6. *Tapuiwahine Road Forest*

PNAP Survey No: S17-01
Grid Reference: NZMS260 S17 945815
Area (ha): 120
SSBI No.: Sq 26/44-1
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Logged and heavily browsed forest, on the steep upper slopes of a dissected ridgeline. Dominated by tawa with pukatea and hinau and some emergent rewarewa and rimu. Common forest birds are present.

7. *Mangataua Stream Forest*

PNAP Survey No: S17-02
Grid Reference: NZMS260 S17 980830
Area (ha): 90
SSBI No.: 329
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Heavily grazed, highly modified tawa-rewarewa forest occupying the upper parts of a steeply dissected ridge. Shrubland occurs on

FIGURE 7: LOCATION OF OTHER SITES OF BIOLOGICAL SIGNIFICANCE TAUMARUNUI ECOLOGICAL DISTRICT



the gullies. This long narrow block has become smaller during the last 10 years. Pied tit and bellbird are present.

8. Otamati Forest

PNAP Survey No: S17-04
Grid Reference: NZMS260 S17 015835
Area (ha): 60
SSBI No.: 330
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa dominant forest remnant with rewarewa and a few emergent podocarps, centred on Otamati Peak which is very steep, and contains a continuation of the bluffs in Otamati Scenic Reserve. This area has been logged for podocarps and is grazed. Pied tit are present and a North Island brown kiwi was recorded in about 1991. Half of this site is outside the Taumarunui Ecological District.

9. Paraketu Road Forest

PNAP Survey No: S17-05
Grid Reference: NZMS260 S17 064833
Area (ha): 60
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa dominant forest on steep to rolling hill country. The landowner applied to the Forest Heritage Fund in 1991 to protect and fence this block and DOC supported this application.

10. Mokauiti-Waimiha Road Forest

PNAP Survey No: S17-06
Grid Reference: NZMS260 S17 070852
Area (ha): 20
SSBI No.: 342
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: This area comprises the lower slopes of moderate hill country. Podocarps have been logged from this heavily grazed, tawa dominant forest remnant.

11. Mapara Stream Tributary Forest

PNAP Survey No: S17-08
Grid Reference: NZMS260 S17 070880
Area (ha): 130
SSBI No.: 341
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: A sprawling block of tawa forest and secondary broadleaved shrubland on rolling to steep hill country which rises steeply to a high ridge. Most of the podocarps have been removed from this

forest. Whitehead and NZ falcon have been reported from this site. The SSWI area of the same name is larger than the area discussed here.

12. Mangakabikatea Road Forest*

PNAP Survey No: R18-14
Grid Reference: NZMS260 R18 890747
Area (ha): 1.0
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Riparian flat
Description: A small forest comprising remnant kahikatea up to c.20 m on a riparian flat formed by the Waikaka and Mangakahikatea Streams. *Coprosma rotundifolia* and kahikatea saplings form a dense understorey. A road dissects the forest and the site has been further modified by grazing. An environmental pest plant, selaginella, is widespread. Common forest birds are present.

13. Mangapapa Road Forest

PNAP Survey No: S18-49
Grid Reference: NZMS260 S18 991785
Area (ha): 20
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Two small tawa dominant forest remnants with some emergent podocarps on either side of Mangapapa Road at the summit in steep hill country. The area is owned by Carter Holt Harvey Forests.

14. Davey Forest

PNAP Survey No: S18-50
Grid Reference: NZMS260 S18 010770
Area (ha): 50
SSBI No.: Sq 27/43
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa-totara forest with emergent rewarewa and hinau, at the top of a steep sideslope above the Ohura River. Most of the podocarps have been removed and the area appears to be grazed. Common forest birds are present.

15. Dewes Forest*

PNAP Survey No: S18-53
Grid Reference: NZMS260 S18 028770
Area (ha): 3
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Riparian flats
Description: Patches of heavily grazed totara dominant forest with kahikatea, matai and miro on a terrace of the Ohura River at the junction with

Ohinewhatihae Stream. Weeds including pines, crack willow, Japanese honeysuckle, blackberry, and montheria are abundant. Rushes and rank pasture also occur. Pied tit are present.

16. *Tangitu Scenic Reserve Extension*

PNAP Survey No: S18-47
Grid Reference: NZMS260 S18 020740
Area (ha): 30
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa dominant forest with several emergent podocarps occurring on a steep sideslope above the Ohura River adjoining Tangitu Scenic Reserve.

17. *Ongarue Forest*

PNAP Survey No: S18-54
Grid Reference: NZMS260 S18 073747
Area (ha): 110
SSBI No.: Sq 27/43-3
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa dominant forest with a few emergent podocarps and shrubland on top of a rolling plateau with some bluffs, just west of Ongarue. The vegetation is quite fragmented.

18. *Pureora Conservation Park Extension A*

PNAP Survey No: S18-55
Grid Reference: NZMS260 S18 130770
Area (ha): 500
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes; very steep slopes
Description: Logged forest of a similar type to adjacent Pureora Conservation Park, on a large area of rolling to steep country to the west of Pureora Conservation Park. This site is only partly in the Taumarunui Ecological District.

19. *Nihonibo Forest Fragments*

PNAP Survey No: R18-13
Grid Reference: NZMS260 R18 899671
Area (ha): 1.8
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Riparian flat
Description: Two small fragments of remnant kahikatea forest on a riparian flat formed by the Waikaka Stream. The forest is grazed, and the understorey is sparse.

20. Round Hill Wetland

PNAP Survey No: R18-07
Grid Reference: NZMS260 R18 875642
Area (ha): 2
SSBI No.: R18/H026
Source: Field inspection, current survey
Landform unit: Riparian flats
Description: Two small wetland areas on either side of Ohura Road, both of which have been modified by draining and stock grazing. The vegetation generally comprises scattered emergent ti kouka, kahikatea and crack willow over *Juncus effusus*, *J. gregiflorus* and pasture grasses with abundant thistles and blackberry. There is a small example of raupo reedland.

21. Waipapa Stream Forest A

PNAP Survey No: S18-41
Grid Reference: NZMS260 S18 918665
Area (ha): 55
SSBI No.: S18/H017
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Mostly tawa dominant forest with kahikatea, rimu, matai, rewarewa, pole totara and kamahi, on a long sideslope with many gullies, on the east side of Matiere Stream. The area is grazed by livestock, and goats are abundant. Pied tit and North Island robin are present.

22. Edwards Wetland*

PNAP Survey No: S18-43
Grid Reference: NZMS260 S18 929677
Area (ha): 2
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Hill country-very steep slopes
Description: An area of scrub dominated by grey willow with occasional ti kouka, and a small artificial pond with raupo reedland around the margins. Immediately adjacent to the wetland is a small treeland comprising kahikatea in association with tawa and hinau.

23. Coley Family Trust Land

PNAP Survey No: S18-44
Grid Reference: NZMS260 S18 994680
Area (ha): 25
SSBI No.: S18/H001
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Small tawa dominant forest remnant with miro, matai, rimu, kamahi, and occasional emergent northern rata, on steep hill

country adjacent to Ohaukura Scenic Reserve. North Island robin and whitehead are present, and kiwi were reported 10 years ago.

24. *Pukepoto Forest*

PNAP Survey No: S18-45
Grid Reference: NZMS260 S18 018692
Area (ha): 70
SSBI No.: S18/H030
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa dominant forest with emergent rimu, totara, miro, hinau and rewarewa, and some shrubland, on the steep upper slopes of Otaha Stream. This area has been partly logged. Goats are abundant and the understorey is sparse. Whitehead, pied tit and kereru are present.

25. *Te Roto Stream Forest*

PNAP Survey No: S18-48
Grid Reference: NZMS260 S18 040720
Area (ha): 300
SSBI No.: Sq 27/43-8
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes; very steep slopes
Description: Secondary shrubland along the ridges west of Ongarue River. Part of the area, although previously modified, has been logged during the last 10 years. Whitehead are present.

26. *Tunatahi Stream**

PNAP Survey No: S18-67
Grid Reference: NZMS260 S18 064727
Area (ha): 2
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: A small, highly modified scrub and shrubland on a stream flat and adjacent hillslope. Vegetation comprises mixtures of buddleia, Spanish heath and bracken with emergent grey willow in a mosaic with pasture. Manuka dominates the canopy on hillslopes over Spanish heath and occasional wharariki with scattered emergent totara and wilding radiata pine. *Pittosporum turneri* has been recorded from this site (Ecroyd 1991). However, the site has subsequently been cleared and burnt and *Pittosporum turneri* was not found during this survey.

27. *Ongarue Wetland**

PNAP Survey No: S18-66
Grid Reference: NZMS260 S18 084736
Area (ha): 0.25
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Riparian flat
Description: A small highly modified palustrine wetland on a riparian flat formed by the Ongarue River. Grey willow and crack willow are emergent over manuka with local areas of raupo and mixtures of *Carex geminata* with *Eleocharis acuta* and rank pasture grass. Adventive weed species including Japanese honeysuckle and blackberry are locally dominant.

28. *Uepango Stream Forest A*

PNAP Survey No: S18-56
Grid Reference: NZMS260 S18 080690
Area (ha): 800
SSBI No.: Sq 28/42-5
Source: de Groot 1997
Landform unit: Hill country-very steep slopes
Description: Large area of tawa dominant forest, with abundant rewarewa and mahoe, and local emergent matai, rimu and northern rata, on steep hill country. Most of the forest has been logged and some of the area may have been recently cleared or burnt. Shrubland occurs locally on the lower slopes.

29. *Uepango Stream Forest B*

PNAP Survey No: S18-60
Grid Reference: NZMS260 S18 140705
Area (ha): 300
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: A large area of logged tawa dominant forest with rewarewa and mahoe, occurring on the upper slopes of steep hill country.

30. *Te Putanga Stream Forest*

PNAP Survey No: S18-61
Grid Reference: NZMS260 S18 143680
Area (ha): 85
SSBI No.: Sq 28/42-3
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: A remnant of logged tawa/kamahi forest at the head of Te Putanga Stream. The forest is fenced to exclude grazing animals and the understorey is recovering well.

31. Maungaroa Stream Oxbow Wetland and Forest

PNAP Survey No: R18-10
Grid Reference: NZMS260 R18 824594
Area (ha): 1
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Riparian flat
Description: A small oxbow lake and riparian flat formed by the Maungaroa Stream. The lake is surrounded by pasture and *Juncus effusus* with local areas of raupo and purei. Tawa dominates the canopy of a small treeland with scattered titoki. This site has been heavily modified by sheep and cattle grazing, and adventive species are widespread.

32. MacClure Road Forest

PNAP Survey No: R18-06
Grid Reference: NZMS260 R18 850615
Area (ha): 25
SSBI No.: R18/H011
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa dominant forest remnant with scattered rewarewa, rimu and kahikatea. The site is heavily grazed and the understorey is sparse. The forest area has been considerably reduced in the last 10 years. Pied tit and kereru are present.

33. Mangabukabuka Stream

PNAP Survey No: R18-04
Grid Reference: NZMS260 R18 868588
Area (ha): 40
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-very steep slopes
Description: A small area of secondary forest in a very steep catchment.

34. Waipapa Stream Forest B

PNAP Survey No: R18-03
Grid Reference: NZMS260 R18 866577
Area (ha): 50
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes; very steep slopes
Description: This is steep hill country near the Ohura River and includes two small streams. Tawa dominant forest.

35. *Nihoniho Conservation Area Extension A**

PNAP Survey No: R18-05
Grid Reference: NZMS260 R18 895610
Area (ha): 700
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Hill country-very steep slopes
Description: A large area of forest on steep hill country occurring in the headwaters of several streams. Most of this site is covered with forest dominated by tawa but there are local areas where kamahi comprises a significant proportion of the canopy. Rimu and northern rata are locally emergent but confined to unlogged areas. On dry ridge and spur crests black beech forest is present, with some local areas dominated by hard beech. The lower slopes, adjacent to farmland, are dominated by manuka scrub modified by stock grazing. Kereru, whitehead, North Island robin and common forest birds are present.

36. *Nihoniho Conservation Area Extension B**

PNAP Survey No: S18-39
Grid Reference: NZMS260 S18 940650
Area (ha): 200
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes; very steep slopes
Description: This site comprises forest on steep hill country contiguous with the northern end of Nihoniho Conservation Area. A part of the site is currently the subject of an application to log the forest as part of a sustainable forest management plan. The application indicates that the vegetation cover within the site is dominated by forest characterised by rimu and tawa with rewarewa, hinaiu, matai, miro, totara and occasional kahikatea. Black and hard beech are noted along ridges. Indigenous fauna recorded include kereru, pied tit, tui and bellbird, while introduced animals include feral goats.

37. *Rangi Scenic Reserve Extension**

PNAP Survey No: S18-40
Grid Reference: NZMS260 S18 970660
Area (ha): 400
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-very steep slopes
Description: Rangi Scenic Reserve Extension comprises forest on steep to very steep hill country contiguous with the western border of Rangi Scenic Reserve. The majority of the site is currently the subject of an application to log the forest as part of a sustainable forest management plan. The application indicates that there are three major forest types present within this area.

1. Podocarp-tawa-broadleaved forest: in which rimu and tawa are the dominant species. The podocarp component also comprises matai, miro, totara and occasional kahikatea, while the rewarewa and hinau are the dominant broadleaved species with occasional black and hard beech along ridges.
2. Tawa forest: present in a small area. Other canopy components include rewarewa, totara and hinau.
3. Hard beech forest: of greater extent than the tawa forest, but still a relatively minor vegetation type. It occurs on some ridges and upper slopes with scattered rimu and rewarewa also present in the canopy.

The application also indicates that there are large areas of heavily modified forest and papa faces (Map 2) although there is no description of these areas in the text. It is noted that the most accessible areas have been previously logged, most recently in 1992. Indigenous fauna recorded include kereru, pied tit, tui and bellbird, while introduced animals include feral goats.

38. *Kapara Stream Bush B*

PNAP Survey No: S18-10
 Grid Reference: NZMS260 S18 940598
 Area (ha): 50
 SSBI No.: S18/H012 (part)
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa-hinai dominated forest with rewarewa and rimu on steep hill country in two catchments. North Island kiwi and pied tit are recorded from the area.

39. *Porrit Forest**

PNAP Survey No: S18-68
 Grid Reference: NZMS260 S18 955607
 Area (ha): 1.0
 SSBI No.: n/a
 Source: Field inspection, current survey
 Landform unit: Hill county-moderately steep to steep slopes
 Description: A very small remnant of kahikatea dominant forest up to c.20 m in height, bounded by two roads and pasture. Matai, rimu, totara and miro also occur in the canopy over pole podocarps, poataniwha and houhere. Ground cover comprises abundant *Coprosma rhamnoides* with adventive plants locally dominant on stream banks.

40. *Ararimu East Road Forest*

PNAP Survey No: S18-36
 Grid Reference: NZMS260 S18 958625
 Area (ha): 35
 SSBI No.: S18/H014
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes

Description: Small tawa dominant forest remnant with abundant kamahi, and scattered rimu, rewarewa and miro. The area contains a steep valley. Sheep and goats graze this site and there is little regeneration.

41. Otunui Stream Forest A

PNAP Survey No: S18-37
Grid Reference: NZMS260 S18 977625
Area (ha): 40
SSBI No.: S18/H015
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa dominant forest with abundant kamahi, and scattered rimu, miro, hinau and rewarewa, on a small steep catchment near the headwaters of Otunui Stream. This site is grazed by livestock. Possum damage to kamahi was observed.

42. Mahuri Road Forest A

PNAP Survey No: S18-70
Grid Reference: NZMS260 S18 008630
Area (ha): 12
SSBI No.: S18/H027
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: A small area of tawa forest on a small steep stream catchment trending north-west to south-east. Kamahi is common in the canopy and there are scattered emergent rimu and rewarewa. Secondary totara forest in association with kamahi occurs on lower slopes. Pied tit and North Island robin are present.

43. Mahuri Road Forest B

PNAP Survey No: S18-38
Grid Reference: NZMS260 S18 002623
Area (ha): 60
SSBI No.: S18/H028
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Isolated example of tawa dominant forest with kamahi, rewarewa and emergent rimu and northern rata, on steep hillslope in dissected hill country. The site is heavily grazed by goats and cattle. Whitehead are present. DOC has approved a personal use application for timber removal.

44. Opotiki Road Forest

PNAP Survey No: S18-57
Grid Reference: NZMS260 S18 018645
Area (ha): 190
SSBI No.: S18/H026
Source: Field inspection, current survey

Landform unit: Hill country-moderately steep to steep slopes; very steep slopes
 Description: A steep area of hill country close to Rangi Scenic Reserve that has been partially logged and developed in the past. Emergent rimu occurs over tawa dominant forest with rimu, rewarewa, scattered matai and totara occurring over c. 70% of the site on upper hillslopes. Kamahi and totara forest occurs on valley and lower slopes, with scattered emergent rimu, matai and rewarewa. Kiwi have been reported from the site (SSBI Site No. S18/H026, unpublished data held by DOC Wanganui.)

45. *State Highway 4 Forest*

PNAP Survey No: S18-71
 Grid Reference: NZMS260 S18 022622
 Area (ha): 16
 SSBI No.: S18/H032
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa dominates the canopy in association with totara, hinau, kamahi and black maire on a steep south-east facing hillslope. There is scattered emergent kahikatea, rimu and matai. Secondary totara is common on ridges. Manuka scrub, with scattered wheki, occurs on lower hillslopes in the south of the site.

46. *Okathae Forest*

PNAP Survey No: S18-15
 Grid Reference: NZMS260 S18 016595
 Area (ha): 170
 SSBI No.: S18/H024
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: An area of forest, parts of which have been logged, occurring in steep hill country and covering parts of several catchments. The forest canopy comprises tawa and hinau with scattered emergent rimu which become locally common on ridge crests. There are areas in the south-west which have been cleared previously and now comprise a mosaic of pole totara forest and manuka, mahoe, totara and tarata scrub and shrubland. Kereru and pied tit were recorded.

47. *Robertson Forest**

PNAP Survey No: S18-69
 Grid Reference: NZMS260 S18 055596
 Area (ha): 2.0
 SSBI No.: n/a
 Source: Field inspection, current survey
 Landform unit: Riparian flat, terraces
 Description: A small area of kahikatea dominant treeland on terraces formed by the Taringamotu River. Totara and matai occur in the canopy with scattered kowhai. Totara is locally dominant along the top of scarps. The site is extensively grazed resulting in a sparse

understorey and a ground cover comprising mainly scattered ferns. Common forest birds are present.

48. *Okahukura Forest*

PNAP Survey No: S18-58
Grid Reference: NZMS260 S18 060650
Area (ha): 150
SSBI No.: S18/H031
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Okahukura Forest occurs in moderately steep hill country and mostly comprises secondary vegetation. Around 60% of the site is dominated by manuka scrub and shrubland, with minor components of wheki, totara and tarata also present in the canopy and occasional emergent rewarewa. In the remainder of the site, generally the southern basin catchment, forest dominated by tawa in association with totara and emergent rimu predominates. On stream terraces within this forest type there are abundant emergent podocarps and kowhai.

49. *Hikurangi Scenic Reserve Extension* *

PNAP Survey No: S18-59
Grid Reference: NZMS260 S18 105660
Area (ha): 400
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: This site is contiguous with Hikurangi Scenic Reserve. It comprises the upper south facing slopes extending around to the north facing slopes where the site extends down on to the lower slopes. Most of the vegetation is secondary and grazed, both by stock and feral goats.

Treefernland dominated by wheki in association with mahoe and makomako occurs over about one-third of the site and this is present on both north and south facing upper slopes.

Scrub dominated by kanuka in association with wheki, and emergent rewarewa, totara and tawa also covers about one-third of the site and is present on the lower north facing slopes. There are local areas where totara is locally dominant in the canopy.

A mosaic of forest dominated by tawa in association with rewarewa and wheki-mahoe-kareao scrub covers about another third of the site and is present on south facing slopes to the west. Wheki is locally dominant in the scrub type, particularly in gullies and on the toeslope. There are numerous areas where the canopy thins and the groundcover is dominated by pasture.

Tawa forest occurs on the upper slopes just below the summit plateau. Other minor canopy components include totara, hinau and rimu.

The summit plateau is dominated by scrub comprising horopito in association with wheki and kapuka. There are local areas of grassland dominated by pasture species, most notably where the transmitters are located.

Kereru and common forest birds are present.

50. *Piawa Wetland**

PNAP Survey No: S18-22

Grid Reference: NZMS260 S18 127637

Area (ha): 12

SSBI No.: Sq 28/42-8

Source: Field inspection, current survey

Landform unit: Terraces

Description: A pond formed by the damming of a stream. Raupo reedland and *Carex geminata* sedgeland occur on swampy flats upstream of the pond. Downstream of the dam there is another small area of raupo reedland with occasional purei. Paradise shelduck, welcome swallow, and pukeko are present. Spotless crane have been previously recorded from this site (SSWI Site No. Sq28/42-8, unpublished data held by DOC Waikato.)

51. *Upokomati Stream Wetland**

PNAP Survey No: S18-23

Grid Reference: NZMS260 S18 132637

Area (ha): 1

SSBI No.: Sq 28/42-10

Source: Field inspection, current survey

Landform unit: Terraces

Description: This area is a small wetland dominated by raupo with scattered *Carex secta*, toetoe, ti kouka, manuka, *Juncus effusus* and pasture. Pukeko, mallard, and paradise shelduck are present.

52. *Hikurangi Wetland**

PNAP Survey No: S18-21

Grid Reference: NZMS260 S18 118625

Area (ha): 1

SSBI No.: Sq 28/42-7

Source: Field inspection, current survey

Landform unit: Terraces

Description: An area of wetland on a gully floor and gently sloping toe slopes. At the upstream end it comprises raupo reedland with occasional emergent grey willow and a local area of harakeke. Blackberry vineland is present on the margins of the raupo reedland, and becomes quite extensive in places, particularly where the site narrows. On the gully floor in the middle of the site, raupo and blackberry with occasional purei comprise the vegetation cover. The downstream end is dominated by vineland characterised by blackberry in association with raupo, occasional harakeke and a few emergent *Coprosma propinqua* subsp. *propinqua*.

53. Mangakabu Road Wetland*

PNAP Survey No: S18-26
Grid Reference: NZMS260 S18 154660
Area (ha): 2
SSBI No.: Sq 28/42-2
Source: Field inspection, current survey
Landform unit: Terraces
Description: Grey willow covers most of this wetland with exotic herbs and grasses in the understorey. There is scattered *Carex secta* and harakeke, and a small area of raupo reedland with harakiki, toetoe, *Carex* and *Juncus*. Blackberry is invading some of the area. Spotless crane and fernbird are present.

54. Hall Forest

PNAP Survey No: S18-25
Grid Reference: NZMS260 S18 170645
Area (ha): 40
SSBI No.: Sq 28/42-12
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Rewarewa-tawa dominant forest with some rimu, kahikatea and miro on a steep area in the middle of a watershed.

55. Tutuetti Forest

PNAP Survey No: S18-29
Grid Reference: NZMS260 S18 208610
Area (ha): 35
SSBI No.: Sq 29/42-2
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: A steep, narrow area alongside the Tutuetti Stream. Totara, manuka and *Pseudopanax colensoi* form secondary forest. Larger trees are present on the steeper slopes.

56. Rangitehi Forest

PNAP Survey No: S18-28
Grid Reference: NZMS260 S18 193570
Area (ha): 135
SSBI No.: S18/H037
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Three remnant forest fragments in close proximity, occurring on ridges and moderately steep to steep hillslopes. The forest is characterised by tawa with local areas of emergent rimu, kahikatea and miro; manatu occurs locally. The understorey is heavily grazed. Kereru and karearea are present.

57. *Pungapunga River Forest*

PNAP Survey No: S18-33
Grid Reference: NZMS260 S18 235575
Area (ha): 200
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: A forest remnant present on hill country above the Pungapunga River. The forest canopy most probably comprises kamahi and hinau in association with broadleaved species.

58. *Eastward Road Forest*

PNAP Survey No: S18-32
Grid Reference: NZMS260 S18 248598
Area (ha): 50
SSBI No.: Sq 29/41-5
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Logged forest dominated by tree ferns, with some emergent totara, tawa, and hinau. The site, on rolling to steep hill country, is heavily modified. Kiwi have been reported in this area.

59. *Pureora Conservation Park Extension B*

PNAP Survey No: S18-31
Grid Reference: NZMS260 S18 240635
Area (ha): 150
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes; very steep slopes
Description: A broadleaf canopy with some rimu, northern rata and emergent rimu and miro on steep valley slopes adjoining Pureora Conservation Park.

60. *Mangaroa Stream Forest*

PNAP Survey No: S18-72
Grid Reference: NZMS260 R18 843554
Area (ha): 8
SSBI No.: R18/H013
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Small area of logged tawa forest on steep hill country with a small artificial freshwater pond formed by a dam in the north-east of the site. Tawa forest covers c. 70% of the site with emergent rimu, rewarewa and occasional emergent kahikatea, matai and totara on lower slopes. Tawa over pasture grass treeland forms a mosaic with tawa over wheki, *Coprosma rhamnoides* and hard fern scrub on southern slopes where heavy grazing and logging occurs. A small area of pole podocarp totara forest occurs adjacent to the artificial pond.

61. *Awaroa Forest**

PNAP Survey No: R18-09
Grid Reference: NZMS260 R18 874 525
Area (ha): 2.0
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Riparian flat
Description: A small, highly modified podocarp forest remnant on a riparian flat formed by the Whanganui River. Kahikatea up to 22 m in height dominates the canopy with abundant rimu, and totara. Scattered matai also occur in the canopy, with tawa locally dominant. Heavy grazing has resulted in a sparse understorey with a ground covering generally comprising pasture. Kereru and common forest birds are present.

62. *Erua Road Forest*

PNAP Survey No: S20-01
Grid Reference: NZMS260 S20 070165
Area (ha): 400
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Podocarp-broadleaf forest and shrubland on dissected hill country at the headwaters of the Retaruke River. This area has an easier contour than most of the land in the district.

63. *Taumona River Forest*

PNAP Survey No: R18-02
Grid Reference: NZMS260 R18 880543
Area (ha): 140
SSBI No.: R18/H012
Source: Field inspection, current survey
Landform unit: Hill country-very steep slopes
Description: Secondary forest occurring over several small catchments in very steep hill country. The canopy comprises varying mixes of kamahi, tawa and matai in association with rewarewa and occasional rimu. A few emergent northern rata are present, and North Island kiwi have been reported from this site (SSBI Site No. R18/H012, unpublished data held by DOC Wanganui.)

64. *Kururau Stream Forest*

PNAP Survey No: R18-01
Grid Reference: NZMS260 R18 900540
Area (ha): 70
SSBI No.: R18/H010
Source: Field inspection, current survey
Landform unit: Hill country-very steep slopes
Description: Secondary kamahi forest on steep hill country with local remnant

rimu and tawa at stream heads. Kahikatea and matai become more common on lower slopes adjacent to the Kururau Stream.

65. *Kapara Stream Bush A*

PNAP Survey No: S18-09
Grid Reference: NZMS260 S18 934584
Area (ha): 130
SSBI No.: S18/H012 (part)
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: A relatively large area of recently logged forest in the headwaters of Kakahi stream. Most of the forest comprises tawa and hinau with occasional emergent northern rata and black beech on dry ridges. Rimu and tawa have been recently removed from the canopy through logging. Local areas of forest dominated by tawa and kahikatea in association with pukatea are present in stream gullies. North Island kiwi have been reported from this site (SSBI Site No. S18/H012, unpublished data held by DOC Wanganui), and common forest birds are present.

66. *Te Paiaka Stream Forest*

PNAP Survey No: S18-11
Grid Reference: NZMS260 S18 950576
Area (ha): 15
SSBI No.: S18/H011
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa-kamahahi dominant forest with rimu, totara and rewarewa, on a steep south facing sideslope above Te Paiaka Stream. The area is partially fenced and is partially grazed. North Island kiwi are reported from the area.

67. *Otunui Stream Forest B*

PNAP Survey No: S18-08
Grid Reference: NZMS260 S18 950562
Area (ha): 50
SSBI No.: S18/H008
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: A relatively small area of unlogged forest on the north facing steep hillslopes of a tributary to the Otunui Stream. Forest characterised by tawa and rimu, in association with totara, dominates the site, with local areas of kamahahi and rewarewa emergent over hinau and whauwhaupaku scattered throughout. On the river terraces, forest dominated by kahikatea in association with rimu and occasional matai grades into shrubland on stream banks.

68. Otunui Stream Forest C

PNAP Survey No: S18-07
Grid Reference: NZMS260 S18 965557
Area (ha): 35
SSBI No.: S18/H009
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Forest, modified by logging and grazing, occurs on the upper slopes of a small steep catchment. The canopy is dominated by tawa in association with rewarewa, rimu, totara and matai. Canopy gaps are dominated by wheki, and there is also an area of totara with kahikatea and occasional matai emergent over broadleaved shrubs on a stream terrace. North Island kiwi have been reported from this site (SSBI Site No. S18/H009, unpublished data held by DOC Wanganui.)

69. Otunui Stream Forest D

PNAP Survey No: S18-12
Grid Reference: NZMS260 S18 965574
Area (ha): 95
SSBI No.: S18/H010
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: A reasonably large area of heavily grazed forest occurring in the upper headwaters of several catchments in steep hill country. The forest generally comprises tawa with elements of kamahi and hinau in the canopy and occasional emergent rimu and rewarewa. Secondary kahikatea, matai and rimu are present in stream gullies and totara is present on ridge crests. North Island kiwi have been reported from this site (SSBI Site No. S18/H010, unpublished data held by DOC Wanganui.)

70. Whakamaro Stream Forest

PNAP Survey No: S18-14
Grid Reference: NZMS260 S18 000580
Area (ha): 100
SSBI No.: S18/H038
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: An area of logged and grazed forest located in steep hill country. The majority of the forest cover is dominated by tawa with a minor hinau component and emergent rewarewa and occasional rimu. There are numerous canopy gaps with mahoe and wheki, wheki being most dominant in stream gullies. Black beech occurs locally on ridge crests, while on flats next to the stream the forest canopy comprises kahikatea and matai in association with pokaka and black maire. Kereru and pied tit are present.

71. *Otubtrakau Stream Forest A*

PNAP Survey No: S18-13
Grid Reference: NZMS260 S18 988550
Area (ha): 70
SSBI No.: S18/H006
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: The area comprises an entire catchment and some adjoining land in steep hill country. Tawa dominant forest with rimu, totara, matai, rewarewa and local kamahi. Kahikatea is dominant on stream terraces. There has been some logging on lower slopes but the upper slopes are unmodified. The surrounding land has been bought by Carter Holt Harvey to plant pines. Pied tit and kereru are present.

72. *Otubtrakau Stream Forest B*

PNAP Survey No: S18-73
Grid Reference: NZMS260 S18 000546
Area (ha): 14
SSBI No.: S18/H021
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Steep north facing hillslope and bluffs bounded by pine plantation and Kururau Road. Rimu/tawa-rewarewa-hinau forest occurs on the upper hillslopes and ridges. Manuka-wheki-mahoe shrubland occurs on the steep lower hillslopes. Manuka-wharariki rockland is present on the bluffs and very steep banks.

73. *Otubtrakau Stream Forest C*

PNAP Survey No: S18-74
Grid Reference: NZMS260 S18 000550
Area (ha): 60
SSBI No.: S18/H022
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: The main cover comprises tawa forest in association with kamahi and heketara and emergent scattered rewarewa, rimu and totara. Kahikatea, matai and houhere are abundant on stream terraces.

74. *Whanganui River Terrace Forest**

PNAP Survey No: S18-05
Grid Reference: NZMS260 S18 940503
Area (ha): 15
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Terraces
Description: Secondary kanuka scrub on a relatively large river terrace formed by the Whanganui River. A small remnant example of podocarp forest

dominated by kahikatea and rimu up to 20 m, occurs in the western corner of the terrace.

75. *South Meremere Forest*

PNAP Survey No: S18-02
Grid Reference: NZMS260 S18 959504
Area (ha): 35
SSBI No.: S18/H004
Source: Field inspection, current survey
Landform unit: Hill country-very steep slopes
Description: Steep upper slopes of a small tributary of the Whanganui River. Tawa-hinau dominated forest with scattered rewarewa, rimu and matai. Several areas of secondary vegetation dominated by treefern. The area has several small landslide scars. New Zealand falcon, whitehead and morepork are present.

76. *Meremere Stream Forest*

PNAP Survey No: S18-03
Grid Reference: NZMS260 S18 962517
Area (ha): 25
SSBI No.: S18/H005
Source: Field inspection, current survey
Landform unit: Hill country-very steep slopes
Description: Tawa dominant forest with emergent rewarewa, hinau and black maire; and on lower slopes adjacent to the stream kahikatea dominant forest over pole podocarps, poataniwha, turepo and pate. Wheki and wheki ponga dominate the canopy gaps. This site, which occurs on a small, steep sideslope on the north side of Meremere Stream, is grazed. Birds are abundant and include pied tit, whitehead and morepork.

77. *Otunui Stream*

PNAP Survey No: S18-06
Grid Reference: NZMS260 S18 961537-970513
Area (ha): 20
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Terraces
Description: A marginal strip adjacent to the Otunui Stream and including part of the Whakamaro Stream margin. The site mainly comprises steep bluffs with some small terraces and is characterised by shrubland with occasional emergent trees.

78. *Motutara Scenic Reserve Extension*

PNAP Survey No: S18-04
Grid Reference: NZMS260 S18 985521
Area (ha): 80
SSBI No.: n/a
Source: de Groot 1997

Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa dominant forest in association with braodleaf with shrubland in the gullies. Steep dissected slopes with some dry bluffs on the north side of Oruawhiro Stream. This site adjoins Motutara Scenic Reserve.

79. *Bullians Forest**

PNAP Survey No: S19-48
 Grid Reference: NZMS260 S19 170350
 Area (ha): 20
 SSBI No.: n/a
 Source: Field inspection, current survey
 Landform unit: Undulating terrain-lahar plain
 Description: Secondary scrub and forest on the Waimarino lahar plain, and adjoining terraces and terrace scarps formed by the Whakapapa River. Scrub is the main vegetation type occurring over most of the site and in canopy gaps. Wheki and horopito are dominant with a few emergent tawa and rimu. Small forest remnants are dominated by tawa with occasional pole totara and rimu. The site is very fragmented and heavily grazed, resulting in a sparse understorey and ground cover. Common forest birds are present.

80. *Pongabura Road Forest*

PNAP Survey No: S18-16
 Grid Reference: NZMS260 S18 046557
 Area (ha): 75
 SSBI No.: S18/H023
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Fragmented secondary forest and scrub on moderately steep to steep hill country.
 Totara forest covers c.75% of the site in association with shrub manuka. The canopy comprises a dense stand of pole totara and is present on the western slopes. Kamahi is locally abundant on the slopes, while on stream terraces there are local areas of kerwhai with kahikatea. Where the power transmission lines pass through this vegetation type, scrub is dominated by houhere in association with manuka, tarata and wheki. Totara forest is present on the eastern slopes with abundant kahikatea.

81. *Rangaroa Stream Forest*

PNAP Survey No: S18-75
 Grid Reference: NZMS260 S18 068566
 Area (ha): 21
 SSBI No.: S18/H025
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa forest with scattered emergent remnant kahikatea, rimu, matai is the predominant cover. Totara is dominant on ridges and

groves of kamahi are locally common. Kahikatea becomes more common adjacent to streams. This forest forms a scenic backdrop to Taumarunui township and has a high number of recreational users.

82. *Makokomiko Gully Wetland**

PNAP Survey No: S18-19
 Grid Reference: NZMS260 S18 060513
 Area (ha): 15
 SSBI No.: S18/H018
 Source: Field inspection, current survey
 Landform unit: Terraces
 Description: An area of wetland occurring in a long and narrow dendritic gully system, comprising a relatively large area of open water with small areas of raupo reedland on the margins. Australasian bittern and spotless crane were reported present in 1980 (SSBI Site No. S18/H018, unpublished data held by DOC Wanganui) but they were not recorded during the current survey and are unlikely to be present now.

83. *Burnand Road Wetland**

PNAP Survey No: S18-20
 Grid Reference: NZMS260 S18 138518
 Area (ha): 5
 SSBI No.: n/a
 Source: Field inspection, current survey
 Landform unit: Terraces
 Description: This site comprises terraces with a narrow incised gully. The terraces have been planted in pines, while the gully is dominated by grey willow and blackberry over assorted native sedges and exotic herbs.

84. *Pungapunga Wetland*

PNAP Survey No: S18-76
 Grid Reference: NZMS260 S18 206359
 Area (ha): 1
 SSBI No.: S18/H036
 Source: Field inspection, current survey
 Landform unit: 2
 Description: This area comprises a mosaic of raupo reedland (in association with purei and emergent crack willow) and kahikatea-dominant treeland over pasture.

85. *Puketapu 3A**

PNAP Survey No: S18-34/35
 Grid Reference: NZMS260 S18 270560, 280510
 Area (ha): 5550
 SSBI No.: n/a
 Source: de Groot 1997; aerial photographs 1997

Landform unit: Hill country-moderately steep to steep slopes, very steep slopes
 Description: This site comprises two large areas of hill country linked by Waituhi Kuratau Scenic Reserve. The northern area is contiguous with Waituhi Kuratau Scenic Reserve and Pureora Conservation Park, and comprises the headwaters of Hauwai Stream. The southern area is contiguous with, and connects together, Waituhi Kuratau Scenic Reserve, Puketapu 3A RAP and Tongariro Conservation Area. Several small catchments in steep hill country comprise the landform of the southern area. The vegetation is secondary, the result of extensive logging throughout this site, and generally comprises scrub characterised by various mixes of rewarewa, wheki, mahoe, whauwhaupaku, rangiora, kamahi, totara, putaputaweta, and horoeka. Occasional emergent rimu, miro, kahikatea, and totara are present, remnants from the original forest cover. Small remnant areas of tawa forest are present.

86. *Obura River*

PNAP Survey No: R19-03
 Grid Reference: NZMS260 R19 873470
 Area (ha): 3
 SSBI No.: R19/H018
 Source: Field inspection, current survey
 Landform unit: Riparian flats
 Description: A long, narrow strip (c.3 km long) adjacent to the Ohura River. Around 80% of the area comprises willow, while a further 15% comprises kowhai. Mature plane trees are locally abundant. Avifauna present at this site include black shag, grey duck, mallard, white-faced heron and pukeko. Extensive siltation has occurred over recent years, significantly reducing available loafing habitat for waterfowl.

87. *Toktrima Road Forest*

PNAP Survey No: R19-01
 Grid Reference: NZMS260 R18 870406
 Area (ha): 25
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: This site comprises forest on the hillslope, above a tributary to the Ohura River.

88. *Harangi Forest*

PNAP Survey No: R19-02
 Grid Reference: NZMS260 R19 890420
 Area (ha): 100
 SSBI No.: S19/H001 (part)
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: An area of forest on steeply dissected hill country between Opatu

and Opura Conservation Areas. The canopy comprises tawa in association with kamahi and occasional totara with occasional emergent rimu and rewarewa. Canopy gaps are dominated by wheki in association with mahoe, mapou, tawa, wheki ponga and heketara. Black beech is scattered on ridge crests. Kereru, North Island robin, whitehead and common forest birds are present.

89. *Kokakonui Scenic Reserve Extension*

PNAP Survey No: S19-26
 Grid Reference: NZMS260 S19 969417
 Area (ha): 8
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Terraces
 Description: Heavily modified and grazed forest remnant dominated on the upper slopes by tawa and ponga, and on the lower slopes by kahikatea and totara. The area contains some river terraces and slopes above the terraces and adjoins Kokakonui Scenic Reserve.

90. *Makoura Stream Forest A*

PNAP Survey No: S19-27
 Grid Reference: NZMS260 S19 947430
 Area (ha): 20
 SSBI No.: S19/H005 (part)
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa dominant forest remnant with emergent rimu, and mixtures of rimu, kamahi, rewarewa, hinau, mahoe and titoki with kahikatea and matai common in gullies and wheki ponga shrubland in canopy gaps. Kiwi have been reported, in and whitehead are present.

91. *Ruataniwha Stream Forest*

PNAP Survey No: S19-28
 Grid Reference: NZMS260 S19 947442
 Area (ha): 60
 SSBI No.: S19/H005 (part)
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa dominant forest and shrubland, on the lower slopes adjoining a small part of Whanganui National Park. Similar vegetation to that present in Makoura Stream Forest A. Kiwi have been reported from this area.

92. *Makoura Stream Forest B*

PNAP Survey No: S19-29
 Grid Reference: NZMS260 S19 970445
 Area (ha): 180
 SSBI No.: S19/H005 (part)
 Source: Field inspection, current survey

Landform unit: Hill country-moderately steep to steep slopes
 Description: A long sideslope adjacent to Makoura Stream. The vegetation on this site is similar to that present in Makoura Stream Forest A, but there are several emergent northern rata; wheki ponga shrubland generally occurs in canopy gaps. Kiwi have been reported from this area.

93. *Paparoa Road Forest*

PNAP Survey No: S19-30
 Grid Reference: NZMS260 S19 955457
 Area (ha): 90
 SSBI No.: S19/H007
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: This area, on an upper slope draining into the Whanganui River, contains modified tawa dominant forest in rather poor condition. Rewarewa and some rimu are emergent with kamahi, binu and titoki in the canopy. There are extensive areas of kanuka shrubland.

94. *Pationui Forest*

PNAP Survey No: S19-32
 Grid Reference: NZMS260 S19 985470
 Area (ha): 110
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Logged, tawa dominant broadleaf forest and shrubland on the hillslopes above a tributary of the Te Maire Stream. It is dissected by logging tracks but appears to be in relatively good condition.

95. *Waipapa Trig Forest*

PNAP Survey No: S19-31
 Grid Reference: NZMS260 S19 005432
 Area (ha): 110
 SSBI No.: S19/H015
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa dominant forest and shrubland with rewarewa and some emergent matai and rimu, on steep hill country at the head of a small tributary stream of the Kokakonuio Stream. Feral goat browse has resulted in a relatively sparse understorey. Rifleman are present.

96. *Te Maire Stream Remnant Forest*

PNAP Survey No: S19-53
 Grid Reference: NZMS260 S19 014457
 Area (ha): 2
 SSBI No.: S19/H014
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes

Description: A small podocarp treeland on a gently undulating stream terrace. The site is heavily grazed. Most of the site comprises kahikatea-matai-rimu-totara treeland which is heavily grazed. Kahikatea-kamahi forest occurs on wet gully floors and adjacent hillslopes. Kereru and pied tit are present. Small areas of pine plantation amongst the treeland are not included in this site.

97. *Te Maire Scientific Reserve Extension*

PNAP Survey No: S19-34
 Grid Reference: NZMS260 S19 036444
 Area (ha): 4
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: A steep north-facing slope adjacent to Te Maire Scientific Reserve. Podocarp forest dominated by totara with some kahikatea, rimu and matai. Pied tit are present.

98. *Te Ruabine Scenic Reserve Extension*

PNAP Survey No: S19-33
 Grid Reference: NZMS260 S19 030410
 Area (ha): 90
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa dominant forest, from which podocarps have been removed, occurs on the ridges. Shrubland occurs in the gullies. Adjacent to the west end of Te Ruahiune Scenic Reserve.

99. *Hikumutu Stream Tributary Forest*

PNAP Survey No: S19-35
 Grid Reference: NZMS260 S19 067460
 Area (ha): 25
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa dominant forest from which podocarps have been removed. A small steep catchment in dissected hill country.

100. *Hunua Conservation Area Extension A*

PNAP Survey No: S19-36
 Grid Reference: NZMS260 S19 071443
 Area (ha): 15
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: A small remnant of broadleaf forest in good condition, on steep dissected hill country adjacent to Wall Scenic Reserve, from which it is separated by a strip of pasture.

101. Hunua Conservation Area Extension B

PNAP Survey No: S19-37
Grid Reference: NZMS260 S19 090415
Area (ha): 250
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Logged tawa-kamahi forest with rimu, hinau and miro, on rolling to steep hill country. This site adjoins Hunua Scenic Reserve and the vegetation in both areas is similar.

102. Hunua Conservation Area Extension C

PNAP Survey No: S19-38
Grid Reference: NZMS260 S19 109425
Area (ha): 55
SSBI No.: n/a
Source: de Groot 1997
Landform unit: Hill country-moderately steep to steep slopes
Description: Logged and grazed, highly modified example of tawa dominant forest on steep slopes. Several landslide scars are present.

103. Kawautahi Stream*

PNAP Survey No: S19-39
Grid Reference: NZMS260 S19 087397-065395
Area (ha): 20
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Terraces
Description: A narrow strip of manuka shrubland, with small local stands of emergent pole rimu with scattered totara and kahikatea occurs alongside the Kawautahi Stream. Mainly bluffs but including some small river terraces.

104. Mibirangi Forest

PNAP Survey No: S19-54
Grid Reference: NZMS260 S19 130438
Area (ha): 9
SSBI No.: S19/H024
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Tawa comprises the canopy in association with rewarewa and hinau with scattered emergent rimu. Kereru are present.

105. Hikumutu Road Forest

PNAP Survey No: S19-41
Grid Reference: NZMS260 S19 129448
Area (ha): 30
SSBI No.: S19/H022

Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Modified tawa dominant forest with kamahi, hinau and mahoe; and treefern shrubland with a ground cover mainly of grass. The site has been heavily logged for podocarps. Small stands of black wattle occur adjacent to Hikumutu Road. Pied tit are present.

106. *Tawhata Forest and Scrub*

PNAP Survey No: R19-04
 Grid Reference: NZMS260 R18 860380
 Area (ha): 2100
 SSBI No.: n/a
 Source: Aerial photographs, current survey
 Landform unit: Hill country-moderately steep to steep slopes; very steep slopes
 Description: A large block of modified primary forest on steep hill country contiguous with the Whanganui River. Secondary scrub occurs on riparian terraces and lower hillslopes.

107. *Rangitaea Conservation Area Extension*

PNAP Survey No: S19-25
 Grid Reference: NZMS260 S19 925355
 Area (ha): 75
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa dominant forest with kamahi and podocarps, and local secondary shrubland on the ridge tops and in the gullies. The site is steep dissected hill country with many small slips, near the headwaters of a small stream adjoining Waipihiki Scenic Reserve.

108. *Neilsons Conservation Area Extension A*

PNAP Survey No: S19-04
 Grid Reference: NZMS260 S19 935307
 Area (ha): 120
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-very steep slopes
 Description: This site comprises dissected hills and bluffs above the Retaruke River, and adjoins Neilsons Conservation Area and Oruru Scenic Reserve. Tawa dominant forest with emergent podocarps, rewarewa, and northern rata. Black beech occurs on the ridges

109. *Neilsons Conservation Area Extension B*

PNAP Survey No: S19-05
 Grid Reference: NZMS260 S19 956333
 Area (ha): 50
 SSBI No.: n/a
 Source: de Groot 1997

Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa dominant forest with some emergent podocarps. Shrubland occurs on the north-facing bluffs on the southern boundary of the site. The site lies between Neilsons Conservation Area and Orupe Scenic Reserve.

110. Retaruke Forest

PNAP Survey No: S19-02
 Grid Reference: NZMS260 S19 972290
 Area (ha): 100
 SSBI No.: S19/H004
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Podocarp-broadleaf forest situated on dissected hill country at the head of a small stream. Beech may occur on the ridges.

111. Owairua Forest

PNAP Survey No: S19-07
 Grid Reference: NZMS260 S19 993320
 Area (ha): 20
 SSBI No.: S19/H010
 Source: Field inspection, current survey
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Most of this very steep hillside area comprises tawa dominant forest with emergent rewarewa, rimu, matai, totara and mahoe, with secondary pole kahikatea common on stream terraces, and occasional remnants of kahikatea, rimu and matai. Manuka/wheki shrubland with emergent totara occurs locally. Local areas of grazed pasture occur on terraces and margins in the upper areas.

112. Pukeatua Conservation Area Extension

PNAP Survey No: S19-06
 Grid Reference: NZMS260 S19 980350
 Area (ha): 170
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Rolling to steep area adjoining Pukeatua Conservation Area. Forest has been cleared from most of the site but secondary vegetation is establishing. Some of the vegetation comprises tawa dominant forest. Manuka-kanuka shrubland occurs west of the ridge.

113. Smiths Forest

PNAP Survey No: S19-55
 Grid Reference: NZMS260 S19 036302
 Area (ha): 6
 SSBI No.: S19/H008
 Source: Field inspection, current survey

Landform unit: Hill country-moderately steep to steep slopes
 Description: A small forest remnant on a gentle south facing hillslope. Totara, kahikatea and miro are emergent over a tawa canopy. Kereru are present.

114. Retaruke Scenic Reserve Extension

PNAP Survey No: S19-14
 Grid Reference: NZMS260 S19 025275
 Area (ha): 85
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Tawa-rewarewa forest, similar to the vegetation in the adjoining Retaruke Scenic Reserve. This site is on steep hill country in the headwaters of a small stream. North Island robin and New Zealand falcon are present.

115. Kauhangaroa Scenic Reserve Extension

PNAP Survey No: S19-15
 Grid Reference: NZMS260 S19 055290
 Area (ha): 275
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: The vegetation is very similar to that of the adjoining Kauhangaroa Scenic Reserve with rewarewa/tawa forest in the basins, kamahi on the ridges, and some areas of secondary manuka shrubland. It occurs on a steep dissected sideslope.

116. Upokoara Forest A

PNAP Survey No: S19-10
 Grid Reference: NZMS260 S19 031344
 Area (ha): 60
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: Dissected hill country in the Retaruke Catchment. Largely secondary forest and shrubland with several examples of remnant forest along the ridgeline.

117. Upokoara Forest B

PNAP Survey No: S19-11
 Grid Reference: NZMS260 S19 053348
 Area (ha): 40
 SSBI No.: n/a
 Source: de Groot 1997
 Landform unit: Hill country-moderately steep to steep slopes
 Description: An isolated example of podocarp-broadleaf forest in good condition, with a closed canopy. It appears to be fenced.

118. Oio Stream Terrace Forest*

PNAP Survey No: S19-19
Grid Reference: NZMS260 S19 077347
Area (ha): 2
SSBI No.: n/a
Source: Field inspection, current survey
Landform unit: Terraces
Description: This site comprises a narrow river terrace covered with totara, rimu and kahikatea dominant forest and treeland. The site is not fenced and is grazed.

119. Kurua Road Scrub and Shrubland

PNAP Survey No: S19-53
Grid Reference: NZMS260 S19 100254
Area (ha): 650
SSBI No.: n/a
Source: Aerial photographs, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: A large area of regenerating scrub and shrubland with mature, possibly primary forest on the least accessible steep catchments.

120. Konini Scenic Reserve Extension A

PNAP Survey No: S19-20
Grid Reference: NZMS260 S19 100320
Area (ha): 100
SSBI No.: S19/H018
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Forest, partially modified by logging, burning and grazing, occurring on dissected hill country adjoining Konini Scenic Reserve. The canopy comprises tawa in association with northern rata, rimu, rewarewa and minor components of hinau, kamahi and porokaiwhiri. There are local areas of shrubland characterised by makomako in association with horoeka and mahoe in gullies. An area of pasture extends up the main gully. Indigenous avifauna present include karearea, pied tit, North Island robin and numerous whitehead.

121. Konini Scenic Reserve Extension B

PNAP Survey No: S19-21
Grid Reference: NZMS260 S19 130330
Area (ha): 300
SSBI No.: S19/H018
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Logged tawa dominant forest with scattered emergent rimu and matai. Hinau, kamahi and porokaiwhiri are common in the canopy. There are large areas of shrubland, and grass clearings are common

throughout. Whiteheads are abundant and N.Z. falcon, pied tit and North Island robin are present. This site is in the headwaters of the Oio Stream (east branch) and Konini Stream and adjoins Konini Scenic Reserve.

122. *Koporonga Stream Forest*

PNAP Survey No: S19-22
Grid Reference: NZMS260 S19 137316
Area (ha): 45
SSBI No.: S19/H019
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Koporonga Stream Forest comprises a partially developed, steep sideslope on the right bank of the Koporonga Stream with many small gullies. Tawa dominant forest with very occasional emergent rimu, matai, kamahi, rewarewa, hinau and miro constitutes the predominant cover of the site, with makomako, mahoe and mahoe wao locally common in stream gullies. The entire site has been heavily grazed and is quite modified.

123. *Eastwood Forest*

PNAP Survey No: S19-24
Grid Reference: NZMS260 S19 147302
Area (ha): 80
SSBI No.: S19/H021
Source: Field inspection, current survey
Landform unit: Hill country-moderately steep to steep slopes
Description: Forest characterised by emergent rewarewa over a dense canopy of tawa in association with hinau and kamahi dominates this site. The forest is heavily grazed and stock tracks are a common throughout with hard fern fernland and pasture dominating canopy gaps. In the southern catchment various monospecific scrub and shrubland types are present including areas of horopito scrub, wheki scrub and makomako scrub and shrubland.

Appendix 9

LIST OF FIELD SURVEY SITES

PNAP SURVEY NO.	NAME	GRID REFERENCE NZMS260	FIELD INSPECTION UNDERTAKEN	RAP NO.	OTHER SITES OF NO. BIOLOGICAL IMPORTANCE
S17-29/30	Mangapehi Forest	S17 068992	Y	1	
S17-9, 10, 16, 18, 19, 25, 26	Mapara Wildlife Management Reserve Extension	S17 059959 063965 085939 110940 073926 106876 106860	Y Y Y Y Y Y Y	2	
S17-20	Porootarao Forest	S17 149930	Y	3	
S17-22	Mangapehi Scenic Reserve Extension	S17 175935	Y	4	
S17-21	Mangataringa Stream	S17 145906	Y	5	
R18-07	Fife Forest	R18 864645	Y	6	
S18-42	Waiapa Stream Wetland	S18 918679	Y	7	
S18-52	Heayns Forest	S18 017780	Y	8	
S18-46	Gemmell Forest	S18 015722	Y	9	
S18-62	Mangakahu Stream	S18 185700	Y	10	
S18-30	Tuhua	S18 220660	Y	11	
S18-24	Haitana Swamp	S18 153643	Y	12	
S18 27	Taringamotu Swamp	S18 175605	Y	13	
S18-63	Picket Ridge Wetland (SSBI/S18 H033)	S18 169590	Y	14	
S18-65	Taringamotu River	S18 228620	Y	15	
T18-01	Haubungaroa	T18 320600	Y	16	
S18-35 (part)	Puketapu 3A	S18 300540	Y	17	

APPENDIX 9: LIST OF FIELD SURVEY SITES (CONTINUED)

PNAP SURVEY NO.	NAME	GRID REFERENCE NZMS260	FIELD INSPECTION UNDERTAKEN	RAP NO.	OTHER SITES OF NO. BIOLOGICAL IMPORTANCE
S18-34/35 (part)	Puketapu 3A	S18 300540	Y	17a	
S18 34/35	Puketapu 3A	S18 270560 & X ¹⁹ S18 280510		17b	
S18-18	Karakia Swamp (SSBI S18/H019)	S18 024506	Y	18	
S18-49	Manunui	S18 105555	Y	19	
S19-40	Hikumutu Stream	S19 033470 to Y S19 099462		20	
S19-43	Piriaka Lookout Forest	S19 137494	Y	21	
S19-46	Percy Wetland	S19 160482	Y	22	
S19-45	Kakahi Stream Forest	S19 168468	Y	23	
S19-42	Whakapapa Gorge Scenic Reserve Extension	S19 183460	X	24	
S19-47	Owhango Forest	S19 155441	Y	25	
S19-03	Oio Road Wetland	S19 937293	Y	26	
S19-51	Retaruke River Terrace Forest	S19 975320	Y	27	
S19-52	Liley Wetland	S19 989339	Y	28	
S19-8,9	Kawautahi Stream Forest	S19 024342	Y	29	
S19-44	Rotokahu Scenic Reserve Extension	S19 975265 & Y S19 975245		30	
S19-18	Oio No. 1 Road Forest	S19 085335	Y	31	
S19-12	Sturgeon Wetland	S19 043316	Y	32	
S19-17	Te Rimu Station Forest	S19 084310	Y	33	
S19-16	Mathieson Wetland	S19 062263	Y	34	
S19-23	Todd Wetland (SSBI S19/H020)	S19 156320	Y	35	

APPENDIX 9: LIST OF FIELD SURVEY SITES (CONTINUED)

PNAP SURVEY NO.	NAME	GRID REFERENCE NZMS260	FIELD INSPECTION UNDERTAKEN	RAP NO.	OTHER SITES OF NO. BIOLOGICAL IMPORTANCE
S19-50	Tepure Stream Forest	S19 183460	Y	36	
S17-33	Kopaki Trig Forest	S17 105030	Y		1
S17-34	Mokau River Forest	S17 107008	Y		2
S17-28/37	Mangapehi Remnants	S17 080977	Y		4
S17-35	Herekawe Scenic Reserve Extension	S17 170981	Y		5
R18-14	Mangakahikatea Road Forest	R18 890747	Y		12
S18-53	Dewes Forest	S18 028770	Y		15
R18-13	Nihoniho Forest Fragments	R18 899671	Y		19
R18-07	Round Hill Wetland (SSBI R18/H026)	R18 875642	Y		20
S18-41	Waipapa Stream Forest A (SSBI S18/H017)	S18 918665	Y		21
S18-43	Edwards Wetland	S18 929677	Y		22
S18-44	Coley Family Trust Land (SSBI S18/H001)	S18 994680	Y		23
S18-45	Pukepoto Forest (SSBI S18/H030)	S18 018692	Y		24
S18-67	Tunatahi Stream	S18 064727	Y		26
S18-66	Ongarue Wetland	S18 084736	Y		27
R18-10	Maungaroa Stream Oxbow Wetland and Forest	R18 824594	Y		31
R18-06	MacClure Road Forest (SSBI R18/H011)	R18 850615	Y		32
R18-05	Nihoniho Conservation Area Extension A	R18 895610	Y		35
S18-39	Nihoniho Conservation Area Extension B	S18 940650	X ²⁰		36

APPENDIX 9: LIST OF FIELD SURVEY SITES (CONTINUED)

PNAP SURVEY NO.	NAME	GRID REFERENCE NZMS260	FIELD INSPECTION UNDERTAKEN	RAP NO.	OTHER SITES OF NO. BIOLOGICAL IMPORTANCE
S18-40	Rangi Scenic Road Extension	S18 970660	X ¹		37
S18-10	Kapara Stream Bush B	S18 940598	Y		38
S18-68	Porrit Forest	S18 955607	Y		39
S18-36	Ararimu East Road Forest (SSBI S18/H014)	S18 958625	Y		40
S18-37	Otunui Stream Forest A (SSBI S18/H015)	S18 977625	Y		41
S18-70	Mahuri Road Forest A (SSBI S18/H027)	S18 008630	Y		42
S18-38	Mahuri Road Forest B (SSBI S18/H028)	S18 002623	Y		43
S18-57	Opotiki Road Forest (SSBI S18/H026)	S18 018645	Y		44
S18-71	State Highway 4 Forest (SSBI S18/H032)	S18 022622	Y		45
S18-15	Okaihac Forest (SSBI S18/H024)	S18 016595	Y		46
S18-69	Robertson Forest	S18 055596	Y		47
S18-58	Okahukura Forest (SSBI S18/H031)	S18 060650	Y		48
S18-59	Hikurangi Scenic Reserve Extension	S18 105660	Y		49
S18-22	Piawa Wetland	S18 127637	Y		50
S18-23	Upokomati Stream Wetland	S18 132637	Y		51
S18-21	Hikurangi Wetland	S18 118625	Y		52
S18-26	Mangakahu Road Wetland	S18 154660	Y		53
S18-28	Rangitichi Forest (SSBI S18/H037)	S18 193570	Y		56
S18-72	Mangaroa Stream Forest (SSBI R18/H013)	R18 843554	Y		60

APPENDIX 9: LIST OF FIELD SURVEY SITES (CONTINUED)

PNAP SURVEY NO.	NAME	GRID REFERENCE NZMS260	FIELD INSPECTION UNDERTAKEN	RAP NO.	OTHER SITES OF NO. BIOLOGICAL IMPORTANCE
R18-09	Awaroa Forest	R18 874525	Y		61
R18-02	Taumona River Forest (SSBI R18/H012)	R18 880543	Y		63
R18-01	Kururau Stream Forest (SSBI R18/H010)	R18 900650	Y		64
S18-09	Kapara Stream Bush A (SSBI S18/H012, part)	S18 934584	Y		65
S18-11	Te Paiaka Stream Forest (SSBI S18/H011)	S18 950576	Y		66
S18-08	Otunui Stream Forest B (SSBI S18/H008)	S18 950562	Y		67
S18-07	Otunui Stream Forest C (SSBI S18/H009)	S18 965557	Y		68
S18-12	Otunui Stream Forest D (SSBI S18/H010)	S18 965574	Y		69
S18-14	Whakamaro Stream Forest (SSBI S18/H038)	S18 000580	Y		70
S18-13	Otuhirakau Stream Forest A (SSBI S18/H006)	S18 988550	Y		71
S18-73	Otuhirakau Stream Forest B (SSBI S18/H021)	S18 000546	Y		72
S18-74	Otuhirakau Stream Forest C (SSBI S18/H022)	S18 000550	Y		73
S18-05	Whanganui River Terrace Forest	S18 940503	x ²¹		74
S18-02	South Meremere Forest (SSBI S18/H004)	S18 959504	Y		75
S18-03	Meremere Stream Forest (SSBI S18/H005)	S18 962517	Y		76
S19-48	Bullians Forest	S19 170350	Y		79
S18-16	Pongahura Road Forest (SSBI S18/H023)	S18 046557	Y		80

APPENDIX 9: LIST OF FIELD SURVEY SITES (CONTINUED)

PNAP SURVEY NO.	NAME	GRID REFERENCE NZMS260	FIELD INSPECTION UNDERTAKEN	RAP NO.	OTHER SITES OF NO. BIOLOGICAL IMPORTANCE
S18-75	Rangaroa Stream Forest (SSBI S18/H025)	S18 068566	Y		81
S18-19	Makokomiko Gully Wetland (SSBI S18/H018)	S18 060513	Y		82
S18-20	Burnand Road Wetland	S18 138518	Y		83
S18-76	Pungapunga Wetland (SSBI S18/H036)	S18 206359	Y		84
S18-31/35	Puketapu 3A	S18 270560 & x ¹ 280510			85
R19-03	Ohura River (SSBI R19/H018)	R19 873470	Y		86
R19-02	Harangi Forest (SSBI S19/H001)	R19 890420	Y		88
S19-27	Makoura Stream Forest A (SSBI S19/H005)	S19 947430	Y		90
S19-28	Ruataniwha Stream Forest (SSBI S19/H005)	S19 947442	Y		91
S19-29	Makoura Stream Forest B (SSBI S19/H005)	S19 970445	Y		92
S19-30	Paparua Road Forest (SSBI S19/H007)	S19 955457	Y		93
S19-31	Waipapa Trig Forest (SSBI S19/H015)	S19 005432	Y		95
S19-53	Te Maire Stream Remnant Forest (SSBI S19/H014)	S19 014457	Y		96
S19-39	Kawautahi Stream	S19 087397- 065395	Y		103
S19-54	Mihirangi Bush Forest (SSBI S19/H024)	S19 130438	Y		104
S19-41	Hikumutu Road Forest (SSBI S19/H022)	S19 129448	Y		105
S19-02	Retaruke Forest (SSBI S19/H004)	S19 972290	x ²²		110

APPENDIX 9: LIST OF FIELD SURVEY SITES (CONTINUED)

PNAP SURVEY NO.	NAME	GRID REFERENCE NZMS260	FIELD INSPECTION UNDERTAKEN	RAP NO.	OTHER SITES OF NO. BIOLOGICAL IMPORTANCE
S19-07	Owairua Forest (SSBI S19/H010)	S19 993320	Y		111
S19-55	Smiths Forest (SSBI S19/H008)	S19 036302	Y		113
S19-19	Oio Stream Terrace Forest	S19 077347	Y		118
S19-20	Konini Scenic Reserve Extension A (SSBI S19/H018)	S19 100320	Y		120
S19-21	Konini Scenic Reserve Extension B (SSBI S19/H018)	S19 130330	Y		121
S19-22	Koporonga Stream Forest (SSBI S19/H019)	S19 137316	Y		122
S19-24	Eastwood Forest (SSBI S19/H021)	S19 147302	Y		123
S17-32	Unnamed No. 1	S17 085029	Y		
R18-12	Unnamed No. 2	R18 888652	Y		
R18-15	Unnamed No. 3	R18 889772	x ¹		
R18-11	Unnamed No. 4	R18 920614	Y		
R18-08	Unnamed No. 5 (SSBI R18/H008)	R18 875502	Y		
S18-51	Unnamed No. 6	S18 016789	Y		
S18-64	Unnamed No. 7	S18 145613	Y		
S18-17	Unnamed No. 8	S18 040531	Y		
S18-01	Takurangi Bush ²³ (SSBI S18/H003)	S18 935522	Y		
S18-77	Whatawhata Bush ² (SSBI S18/H034)	S18 090575	Y		
S19-49	Unnamed No. 10	S19 167313	Y		
n/a	Tunnel Hill Scenic Reserve (also known as Aukopae Bush in SSBI records) (SSBI S18/H002)	S18 915510	Y		

APPENDIX 9: LIST OF FIELD SURVEY SITES (CONTINUED)

PNAP SURVEY NO.	NAME	GRID REFERENCE NZMS260	FIELD INSPECTION UNDERTAKEN	RAP NO.	OTHER SITES OF NO. BIOLOGICAL IMPORTANCE
n/a	Oruatapu and Pokoera Scenic Reserves (SSBI S18/H007)	S18 953550	Y		
n/a	Otunui Conservation Area (also known as Otunui State Forest in SSBI records) (SSBI S18/H013)	S18 975590	Y		
n/a	Okahukura Scenic Reserve (also known as Otahu Scenic Reserve in SSBI records) (SSBI S18/H016)	S18 997683	Y		
n/a	Sunshine Scenic Reserve (SSBI S18/H020)	S18 068542	Y		
n/a	Okahukura Scenic Reserve (SSBI S18/H029)	S18 013675	Y		
n/a	Opatu Conservation Area, Whanganui National Park Opura Conservation Area, Koiro Conservation Area (known as Harangi Bush in SSBI records) (SSBI S19/H001)	S19 905410	Y		
n/a	Koiro Farms Conservation Area (SSBI S19 /H002)	S19 940464	Y		
n/a	Hawkins Wetland (SSBI S19/H003)	S19 042309	Y		
n/a	Whanganui National Park (known as Koiro Trig Bush in SSBI records) (SSBI S19/H006)	S19 942458	Y		
n/a	Ngamoturiki Bush (SSBI S19/H009)	S19 990313	Y		
n/a	Whanganui National Park (known as Te Maire Remnant Bush in SSBI records) (SSBI S19/H011)	S19 994493	Y		
n/a	Whanganui National Park (known as Te Atuaruru Forest in SSBI records) (SSBI S19/H012)	S19 020475	Y		

APPENDIX 9: LIST OF FIELD SURVEY SITES (CONTINUED)

PNAP SURVEY NO.	NAME	GRID REFERENCE NZMS260	FIELD INSPECTION UNDERTAKEN	RAP NO.	OTHER SITES OF NO. BIOLOGICAL IMPORTANCE
n/a	Te Maire Scientific Reserve (known as Putanga Stream Bush in SSBI records) (SSBI S19/H016)	S19 035448	Y		
n/a	Manga te Puhi Scenic Reserve (SSBI S19/H017)	S19 130287	Y		
n/a	Hikumutu Scenic Reserve (known as Miharangi Bush in SSBI records) (SSBI S19/H023)	S19 135440	Y		
n/a	Puawai Scenic Reserve (SSBI S19/H025)	S19 176478 & 177487	Y		
n/a	Konini Scenic Reserve (known as Konini Stream Forest in SSBI records) (SSBI S19/H018)	S19 125328	Y		
n/a	Tapui Scenic Reserve (SSBI S19/H013)	S19 055488	Y		

¹ Access denied or owners not located.

² This is the name that was given to the site during the SSBI survey in 1985 but the forest in S18-01 has recently been cleared, and in S18-77 severely reduced in extent.

Appendix 10

EVALUATION ASSESSMENT SHEET

Site no.
Area
Altitudinal range

Grid reference
Ecological district
Date

	Primary
	Modified primary
	Secondary
	Exotic
	Induced

Landscape Diversity		
Bioclimatic Zone	No. of land types	No. of vegetation types

EVALUATION CRITERIA	L	M	H
Present versus past extent: Relative extent of vegetation type remaining in ecological district compared with that in 1840 reconstruction. H 0-10% vegetation type remaining in ecological district M 10-30% vegetation type remaining in ecological district L 30-100% vegetation type remaining in ecological district			
Landscape and ecological diversity: H An altitudinal sequence; or multiple vegetation types, land types, and bioclimatic zones M Spans more than 1 bioclimatic zone or more than 2 land types L Single feature (includes 1 land type, in 1 bioclimatic zone, and 1 or more vegetation types)			
Naturalness: Involves the assessment of the degree an area (for example vegetation ecosystem) has been free from the effects of human disturbance and intervention. An assessment of the indigenous content of the area. H Low-level or nil human disturbance (includes secondary vegetation established following natural disturbance) M Moderate level of human disturbance (for example relatively good quality secondary vegetation developed following human disturbance, low levels of selective logging 20 or more years earlier) L Exotic/induced/heavily logged			
Size of area (ha)¹: Compared to mean size of remaining areas of natural areas in ecological district.			
Shape of area (ha)¹: H Primarily compact, no major constrictions M Irregular or convoluted L Highly convoluted or discontinuous			
Surrounding landscape: H Part of a continuous natural landscape M Part of a semi-continuous natural landscape/one of many discrete natural areas - some linkages L Very isolated from other areas			
Fragility and threat: H High level of threat, likely to destroy or substantially degrade/damage the vegetation or habitat M Threats present but low likelihood of occurrence; vegetation relatively resilient or able to recover from threatening process L No threats known			
Representativeness¹: Combination of above criteria; above rankings used as guide to evaluate representativeness. H Best, relatively large, good quality example; only example of type which was formerly more extensive M Similar to other areas that occur elsewhere in the ecological district L Degraded, small, better quality examples exist elsewhere in the ecological district.			

¹ The values for **representativeness** and **size of area** will differ for each Ecological District depending on the extent of remaining indigenous vegetation.

Ecological Assessment Sheet (Page 2)

Secondary criteria

☐ None known

Known notable features

Distribution limits
Nationally rare vegetation types
Taxa endemic to ecological district
Features rare in district (include. only known site for taxa in ecological district)
SSWI rank (from existing information)
Other

Threatened and local plants (Cameron *et al.* 1995)

Class	Number
extinct	
critical	
endangered	
vulnerable	
rare	
insufficiently known	
local	

Wildlife

Molloy *et al.* (1994)

Category	Number of Wildlife Species
A	
B	
C	
I	
O	
M	

Bell (1986)

Category	Number of Wildlife Species
Extinct	
Presumed extinct	
Endangered	
Threatened	
Rare	
Regionally threatened	
Occasionally rare	

Justification

[illegible]

Appendix 11

GLOSSARY OF TECHNICAL TERMS

Adventive

Arriving from outside and self-establishing; in contrast to native.

Alluvial Terrace

Refer to Landform.

Bioclimatic Zone

One of the categories used in classifying natural climate and related biota. It refers to the broad distribution of vegetational zones along altitudinal gradients where a particular climatic regime dictates the character of the natural ecosystem.

Two bioclimatic zones are recognised within the Taumarunui Ecological District. Refer to text, Section 3.

Bluff

Refer to landform.

Buffer

A zone surrounding a natural area which reduces the effect of external influences upon the features within the natural area, for example vegetation such as modified forest/scrub or a stream.

Buffering

Refer to Recommended Area for Protection Selection Criteria.

Canopy

The layer or layers formed by the uppermost crown or their parts. The concept is applicable to any kind of vegetation. In forests it includes lianes and epiphytes.

Category 'A', 'B', 'C' or 'O' Priority Species for conservation Management

Refer to National Priority for Conservation Management.

Communities

A collection of populations of animals and plants that occur naturally together in a common environment of any size.

Conservation dependent

Refer to Threatened and Uncommon Plant Classification.

Conservation Value

The relative merit of a natural feature within a regional or national context (for example within an ecological region or ecological district).

Declining

Refer to Threatened and Uncommon Plant Classification.

Diversity

The range of the natural physical and biotic components in the landscape including species, communities, ecosystems, landforms, soil 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 factors.

Ecological District

A local part of New Zealand where geological, topographical, climatic and biological features and processes, including the broad cultural pattern, interrelate to produce a characteristic landscape and range of biological communities. New Zealand has been subdivided into 268 such districts, setting the level for assessing the representativeness of major ecosystem types.

Ecological Region

A group of adjacent ecological districts with closely related ecological characteristics, or, in some cases, a single very distinctive ecological district. New Zealand has been subdivided into 85 such regions.

Ecological Unit

Any combination of vegetation types (or suite of interrelated types), plus the landform it occurs on, for example, kahikatea forest on riparian flats, tawa-kamhi forest on hillcountry-moderately steep to steep slopes. Other important attributes of the unit such as the bioclimatic zone (for example montane, coastal) may be added to the name.

The concept of ecological units has been designed to give specific meaning to the Reserves Act 1977 phrase “all classes of natural ecosystems ...”. Ecological units are used in the survey phase to determine the biological and physical composition of the study areas.

Endemic

Occurring naturally in, and restricted to, a particular country, region or locality. Refer to Indigenous.

Exotic

Introduced from abroad.

Fernland

Refer to Vegetation Structural Class.

Forest

Refer to Vegetation Structural Class.

Gorge

Refer to Landform.

Grassland

Refer to Vegetation Structural Class.

Gully

Deep incision into hillslope as a result of fluvial action.

Gully Floor

Refer to Landform.

Habitat

The part of the environment in which a plant or animal lives. An organism usually has adaptations which allow it to live in that particular part of the environment, and it may be more or less restricted to that habitat.

Herbfield

Refer to Vegetation Structural Class.

Hillslope

Refer to Landform.

Hillslope Seepage

Refer to Landform.

Hilltop Plateau

Refer to Landform.

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.

Induced

Native vegetation established after destruction or disturbance of the previous cover, and which may dominate for many decades, but is essentially different from the original vegetation, for example bracken fernland, manuka scrub.

Landform

All the physical, recognisable, naturally formed features of land, having a characteristic shape, for example hill, valley or alluvial fan. In the PNA Programme, classification of a landform emphasises its ecological significance rather than its geomorphological or geological significance.

Landform Definitions (after Moore 1969, Soons and Selby (1982), Bayfield and Benson (1985) and interpretation by the authors) :

Alluvial Terrace - Flat to gently sloping area of alluvium of variable height above river level. May be periodically flooded.

Bluff - Very steeply sloping to vertical rock face at inland locations.

Gorge - A steep-sided narrow drainage-way cut into bedrock.

Gully - Deep incision into hillslope as a result of fluvial action.

Hillslope - Slope unit on which drainage lines are predominantly parallel.

Hillslope Seepage - Swamp zone on hillside.

Hilltop Plateau - An extensive, level or mainly level area of elevated land occurring on the summit of a hill.

Ox-bow Cut-off - A lake or pond formed when a meandering river, having bent in almost a complete circle, cuts across the narrow neck of land between the stretches and leaves a backwater.

Ridge - The top (often acute angled) of a divide between two drainage ways.

Riparian Flat - Flat area associated with river, over which the river course is unconfined (or was unconfined prior to construction of stopbanks).

Scarp - A steep slope or cliff along the margin of a plateau or terrace.

Spur - a secondary division of ridges, generally perpendicular to the line of the ridge and dividing two gullies, often acute angled.

Toe-slope - the gentle, evenly sloped, lower most section of a hillslope; usually adjoining terrace or flat.

Undulating Plain - an extensive area of gently undulating land.

Wetland - a poorly-drained area in which permanent or periodic standing water is a feature.

Landform Unit

An area over which there is a recurring pattern of topography, soils and vegetation. A change in pattern determines the landform unit boundary (Christian 1957). For the purposes of this study, geology and topography were the criteria used to define landform units. Defined in text (Section 3).

Lowland Zone

See Bioclimatic Zone.

National Priority for Conservation Management

Rankings indicating the relative priority for conservation management of indigenous flora and fauna as determined by Molloy and Davis (1994). The terms used have the following definitions:

Category A - Highest priority threatened species.

Category B - Second priority threatened species.

Category C - Third priority threatened species.

Category I - Species about which little information exists, but based on existing evidence, are considered to be threatened.

Category O - Species which are threatened in New Zealand but which are known to be secure in other parts of their range outside New Zealand.

Category M - Species that are rare or localised, and of cultural importance to Maori.

Native

Not known to have been introduced by human agency.

Natural Area

A place characterised by indigenous species or ecosystems, or a place or landform not or scarcely modified from an indigenous condition.

Some natural areas will be identified as suitable for evaluation of ecological quality and representativeness, and hence also be study areas. Some of these may be of sufficient quality to become Recommended Areas for Protection. In some instances one natural area may embrace more than one study area.

or :

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.

Natural Diversity

Refer to Recommended Area for Protection Selection Criteria.

Naturalness

Degree to which ecological units/communities/ecosystems retain their original character. Refer to Original Natural Ecosystem.

Also refer to Recommended Area for Protection Selection Criteria.

Ox-bow Cut-off

Refer to Landform.

Pattern

Refer to Recommended Area for Protection Selection Criteria.

Primary

Native vegetation which has never been logged or cleared in any part.

Protected Natural Area (PNA)

A legally protected area, characterised by indigenous species or ecosystems, in which the principal purpose of management is retention of the indigenous state.

Rarity

Refer to Recommended Area for Protection Selection Criteria.

Recommended Area for Protection (RAP)

An area identified as a high priority for protection because it contains the best example or good examples of its type or class of natural ecosystem and/or landscape in an ecological district. More than one area may require identification in certain circumstances.

A RAP is intended to be the basis for a proposal for a new protected natural area that would supplement the existing system of protected natural areas to make it more fully representative of New Zealand's ecological diversity

Recommended Area for Protection Selection Criteria

Selection criteria are used for identifying Recommended Areas for Protection in the PNA Programme: present versus past extent, diversity and pattern, naturalness, size,

shape of area, representativeness, rarity and special features, buffering and connectivity, viability, and fragility and threat. These are defined in the text (Section 3.9). The identification and evaluation of the key representative natural areas in all ecological districts is the principal objective of the PNA Programme.

Recovering

Refer to Threatened and Uncommon Plant Classification.

Reedland

Refer to Vegetation Structural Class.

Representative

Refer to Recommended Area for Protection Selection Criteria.

Ridge

Refer to Landform.

Riparian Flat

Refer to Landform.

Rushland

Refer to Vegetation Structural Class.

Scarp

Refer to Landform.

Scrub

Refer to Vegetation Structural Class.

Secondary

Secondary native vegetation, seral regrowth after destruction or disturbance.

Sedgeland

Refer to Vegetation Structural Class.

Semi-coastal Zone

Refer to Bioclimatic Zone.

Site

Refer to Recommended Area for Protection Selection Criteria.

Size and Shape

Refer to Recommended Area for Protection Selection Criteria.

Shrubland

Refer to Vegetation Structural Class.

Spur

Refer to Landform.

SSBI

Site of special biological importance.

Study Area

A tract of land with indigenous vegetation delineated as suitable for survey in rapid field inventory in order to identify the ecological patterns and the natural diversity of an ecological district.

It is an arbitrary unit, defined appropriate to circumstances - it may be defined by the boundary of a remnant forest stand; a catchment; a legal title; or in largely undifferentiated environments by grid squares or other manageable, arbitrarily bound areas.

Submontane Zone

See Bioclimatic Zone.

Succession

The process of change in the appearance, composition and structure of a community, usually over a number of years. Change may occur as a result of biotic factors, or site factors, or both.

Surrounding Landscape

Refer to Recommended Area for Protection Selection Criteria.

Tephra

A collective term for all the unconsolidated, primary pyroclastic products of a volcanic eruption, including both pyroclastic flow and airfall deposits.

Terrace Slope

Refer to Landform.

Terrestrial

Free water has an insignificant role in the ecological character of these areas.

Threatened and Uncommon Plant Classification

Nationally threatened species are those whose national presence in the wild is threatened and which are in danger of national extinction. The categories applied to these species (de Lange *et al.* 1999) are:

Declining - Taxa that are numerically abundant but which are either under threat from serious adverse factors throughout their range, or occur as widely scattered, typically small populations, many of which are undergoing declines through loss of reproductive ability, recruitment failure, predation, or through other processes of often subtle habitat change.

Recovering -Taxa whose populations are either: (1) naturally restricted to susceptible habitats (e.g., offshore islands), where their survival is utterly dependent on continual rigid conservation measures (e.g., rodent control), or (2) taxa whose populations were once under serious threat and, as a result of past conservation intervention (e.g., goat eradication), have shown the capacity to recover naturally without further management measures.

Conservation dependent: Taxa whose survival is now dependent on the continuation of existing conservation measures.

Toe-slope

Refer to Landform.

Treefernland

Refer to Vegetation Structural Class.

Treeland

Refer to Vegetation Structural Class.

Tussockland

Refer to Vegetation Structural Class.

Undulating Plain

Refer to Landform.

Vegetation Structural Class

Vegetation classification based on the type of plant which is dominant in the canopy, for example forest, reedland. These are based on Atkinson (1985), with the following definitions :

Grassland - Vegetation in which the cover of grass in the canopy is 20-100% and in which the grass cover exceeds that of any other growth form or bare ground. Tussock-grasses are excluded from the grass growth-form.

Fernland - Vegetation in which the cover of ferns in the canopy is 20-100% and in which the fern cover exceeds that of any other growth form or bare ground. Treeferns >10 cm dbh are excluded as trees (cf. FOREST).

Forest - Woody vegetation in which the cover of trees and shrubs in the canopy is >80% and in which tree cover exceeds that of shrubs. Trees are woody plants >10 cm dbh. Treeferns >10 cm dbh are treated as trees.

Reedland - Vegetation in which the cover of reeds in the canopy is 20-100% and in which the reed cover exceeds that of any other growth form or open water. Reeds are herbaceous plants growing in standing or slowly-running water that have tall, slender, erect, unbranched leaves or culms that are either hollow or have a very spongy pith. Examples include *Typha*, *Bolboschoenus*, *Schoenoplectus tabernaemontani*, *Eleocharis sphacelata*, and *Baumea articulata*.

Rockland - Land in which the area of residual bare rock exceeds the area covered by any one class of plant growth-form. Cliff vegetation often includes rocklands. They are named from the leading plant species when plant cover > 1%, for example [koromiko] rockland.

Rushland - Vegetation in which the cover of rushes in the canopy is 20-100% and in which the rush cover exceeds that of any other growth form or bare ground. Included in the rush growth form are some species of *Juncus* and all species of *Sporadanthus*, *Apodasmia*, and *Empodisma*. Tussock-rushes are excluded.

Scrub - Woody vegetation in which the cover of shrubs and trees in the canopy is >80% and in which shrub cover exceeds that of trees (cf forest). Shrubs are woody plants <10cm dbh.

Sedgeland - Vegetation in which the cover of sedges in the canopy is 20-100% and in which the sedge cover exceeds that of any other growth form or bare ground. Included in the sedge growth form are many species of *Carex*, *Uncinia*, *Isolepis*, and *Bolboschoenus*. Tussock-sedges and reed-forming sedges (cf. reedland) are excluded.

Shrubland - Vegetation in which the cover of shrubs in the canopy is 20-80% and in which the shrub cover exceeds that of any other growth form or bare ground. It is sometimes useful to separate tussock-shrublands as a sub-class for areas where tussocks are >20% but less than shrubs. (Note: the term scrubland is not used in this classification.)

Treeland - Vegetation in which the cover of trees in the canopy is 20-80%, with tree cover exceeding that of any other growth form, and in which the trees form a discontinuous upper canopy above either a lower canopy of predominantly non-woody vegetation or bare ground, for example mahoe/bracken treeland. (Note: Vegetation consisting of trees above shrubs is classified as either forest or scrub depending on the proportion of trees and shrubs in the canopy.)

Tussockland (including flaxland) - Vegetation in which the cover of tussocks in the canopy is 20-100% and in which the tussock cover exceeds that of any other growth form or bare ground. Tussocks include all grasses, sedges, rushes, and other herbaceous plants with linear leaves (or linear non-woody stems) that are densely clumped and > 10 cm height. Examples of the growth form occur in all species of *Cortaderia*, *Gabnia* and *Phormium*, and in some species of *Chionochloa*, *Poa*, *Festuca*, *Rytidosperma*, *Cyperus*, *Carex*, *Uncinia*, *Juncus*, *Astelia*, *Aciphylla* and *Celmisia*. It is sometimes useful to separate flaxland as a subclass for areas where species of *Phormium* are dominant.

Vineland - Vegetation in which the cover of unsupported (or artificially supported) woody vines in the canopy is 20-100% and in which the cover of these vines exceeds that of any other growth form or bare ground. Vegetation containing woody vines that are supported by trees or shrubs is classified as forest, scrub or shrubland. Examples of woody vines occur in the genera *Actinidia*, *Clematis*, *Lonicera*, *Metrosideros*, *Muehlenbeckia*, *Ripogonum*, *Vitis* and others.

Waterfield - Vegetation in which the cover of open water exceeds that of area covered by any one class of plant growth-form.

Vegetation Type

A term which includes the dominant canopy species and structural class of an area of vegetation, for example rimu/tawa-kamahi forest, *Isolepis nodosa*/*Muehlenbeckia complexa* sedge-vineland.

In addition, cover values and tiers are included, i.e.

tawa over 50% cover of the double underlined species

tawa between 25-49% cover of the underlined species

tawa between 5-24% cover of non-underlined species

(tawa) less than 5% cover of the bracketed species

(rimu)/tawa indicates less than 5% cover of rimu emergent over a canopy of tawa

tawa-hinau indicates tawa and hinau occur in the same tier

⇔ mosaic

Viability

Refer to Recommended Area for Protection Selection Criteria.

Vineland

Refer to Vegetation Structural Class.

Wetland

Refer to Landform.

Appendix 12

TAUMARUNUI ECOLOGICAL DISTRICT PNAP FIELD SURVEY FORM 1999

STUDY AREA NAME		PNAP SURVEY NO.	
RECORDER		DATE	
NZMS260		GRID REF.	
LAND TYPE		AERIAL PHOTO	
BIOC. ZONE		ALTITUDE RANGE	
		SSBI	

OWNERSHIP (Address/Phone)	LANDOWNER'S ATTITUDE/COMMENTS

Vegetation Dynamics	☐ Primary	☐ Secondary	☐ Modified	☐ Predominantly exotic	☐ Don't Know
	H	M	L	Don't Know	Notes
Present versus past extent					
Landscape diversity					
Naturalness					
Size of area (ha)					
Shape of area					
Surrounding landscape					
Representativeness					
Rarity, special features					
Long term viability					
Fragility and threat					

Threats	Current (NLMH)	Future (NLMH)	Comments	
Grazing			Is it grazed?	By what?
Weeds				
Wild Animals				
Drainage				
Erosion				
Fire				
Clearance				
Topdressing				
Other				
Requirements				
Fencing			Is it fenced?	
Protection				

BIRDS	OTHER FAUNA

1. Degree of Impact: 2. Likelihood of Occurring



ECOLOGICAL UNITS WITHIN THE NATURAL AREA

Vegetation Type		% Cover	Canopy Height	Landform
ECOL. PATTERN		FLORA		
NOTES: Notes (record impression of site), references. Other values: (Landscape, cultural, recreational, educational, economic, historical, spiritual etc) (LMH) (also consider potential damage).				
				WEEDS



Appendix 13

LETTER TO LANDOWNERS

ECOLOGICAL SURVEY OF NATURAL AREAS

Dear landowner/manager/resident,

Have you ever wondered what special natural values are on your property? Now may be your chance to find out.

From May to September, the Department of Conservation will be undertaking a field survey for the Protected Natural Areas Programme, within the area known as the Taumarunui Ecological District.

The Protected Natural Areas Programme, or PNAP for short, is a nation-wide programme that was set up 15 years ago to find out how well parks and reserves protect the range of native plants, animals and landscapes which occur in our country and give NZ its own special character. Many types of native vegetation and landscape are already protected in national parks and other reserves, but many others, such as lowland forests and wetlands, are not.

Very little is known about the full range of species that may be present in the Taumarunui Ecological District, although there are records of threatened species, such as short-tailed bats and several varieties of parasitic plants.

The aim of the PNAP is to identify deficiencies in the protected area system on a district by district basis, determine whether “missing” features are to be found in unprotected areas and, **subject to wishes of the landowner concerned**, consider an appropriate form of protection for these sites. **It must be stressed that there is no obligation on the part of landowners or the Crown to protect areas recommended for protection – the survey simply identifies sites as being significant and worthy of protection.**

An experienced survey team has been contracted by DoC to carry out a “fact finding” mission, to let us know just what’s out there. The survey will result in a report of all significant natural areas found by the survey team, more detailed information on different landscape types within this ecological district and a species list.

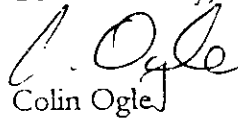
A fact sheet outlining the purpose of this survey with a map of the intended survey area is also available, along with names of local DoC staff for you to contact if you have any queries.

The survey team is reliant on landowner goodwill in order to survey the district, and we’d appreciate your help. The time the survey team will need to be on your property will vary according to property size. The survey team will contact you for access permission and to discuss their proposed activities. Please feel free to contact your local DoC office if you’d like more information on their report.

Staff are pleased to discuss any further queries you have.



Yours sincerely,



Colin Ogle

DoC Conservancy Advisory Scientist

WANGANUI

Ph:06-3452402

Appendix 14

PAMPHLET TO LANDOWNERS

June 1999

Taumarunui Ecological District

PROTECTED NATURAL AREAS PROGRAMME

From May to September 1999 the Department of Conservation (DoC) is surveying and updating information on ecologically significant areas in Taumarunui Ecological District (ED). The survey has been contracted to **Wildland Consultants Limited** who will visit a number of properties within this area, and catalogue the significant natural features. The Taumarunui ED centres around Taumarunui township, stretching north beyond Benneydale and southwards past Raurimu. If you live within these boundaries (see map overleaf) you may well be approached by our survey team.

Why are we doing this survey?

DoC has a responsibility under the Reserves Act (1977) to ensure "the preservation of representative samples of all classes of natural ecosystems and landscapes which, in their aggregate, gave New Zealand its own recognisable character". The Protected Natural Areas Programme (PNAP) was established in 1983 as a way of meeting this requirement. It's likely that existing protected natural areas (including national parks, covenanted land, reserves and conservation land administered by the department) do not protect all types of landscape within the Taumarunui ED. For example, there are few lowland forests and wetlands in reserves at present.

As a basis for the PNAP, New Zealand was divided into 268 ecological districts, each characterised by its own geology, topography, climate, biology and culture. Almost all of the Wanganui Conservancy has already been surveyed, and the largest area not yet looked at is Taumarunui ED. Little is known about the full range of species that may be present although there are records of threatened species including short-tailed bats and dactylanthus.

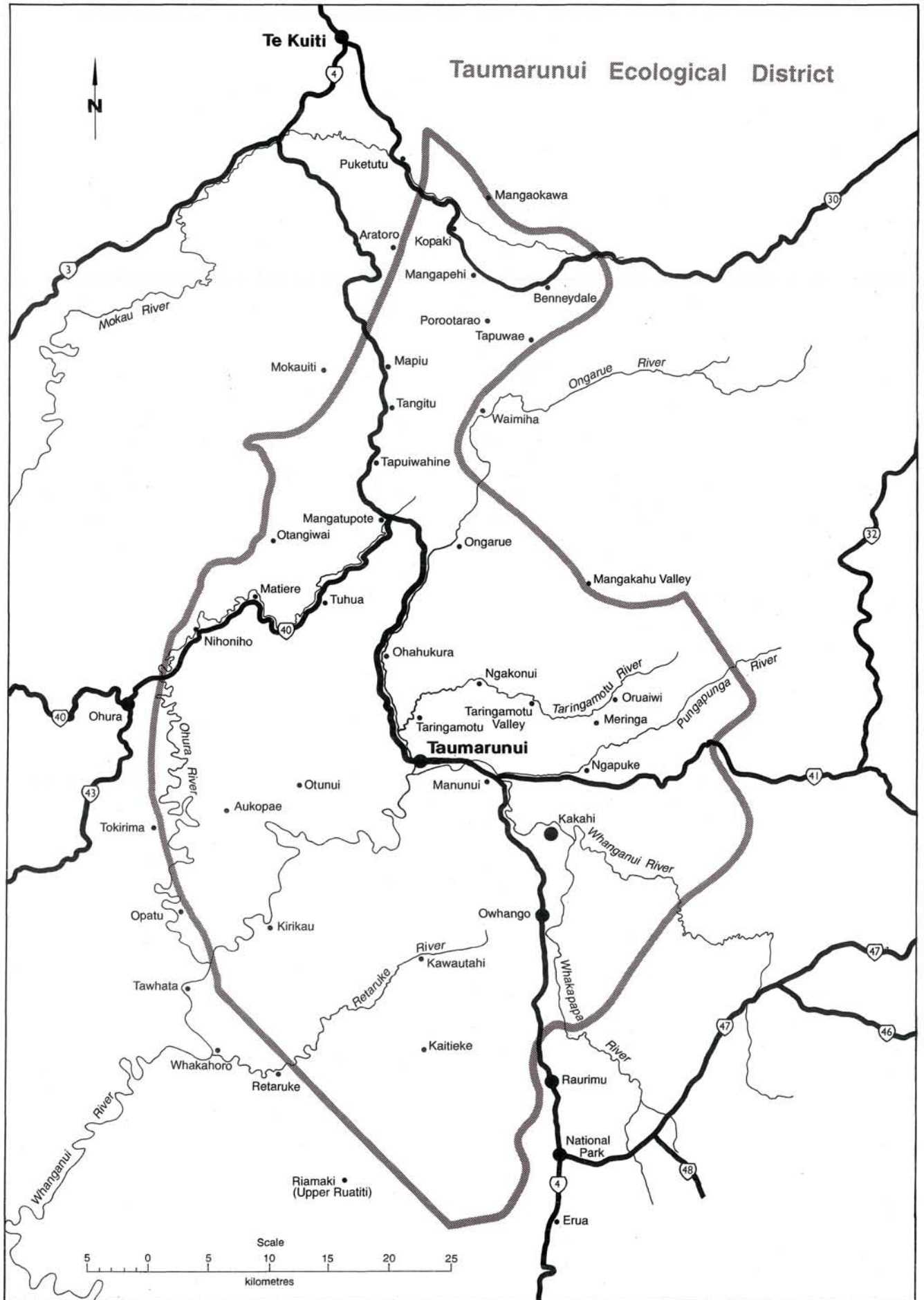


Short-tailed bat
Photo: C.R. Veitch



Department of Conservation
Te Papa Atawhai

MAP: TAUMARUNUI ECOLOGICAL DISTRICT



Taumarunui Ecological District sprawls over 241,000 hectares, about half of which is in Wanganui Conservancy, a third in Waikato, and the remainder in Tongariro/Taupo Conservancy. It comprises hill country and river terraces including much of the upper Whanganui River system and northern parts of Whanganui National Park.



Flower - head of Dactylanthus taylorii Photo: A. Holzappel

Frequently asked questions

Where to from here?

Once the survey is complete, the information will be collated and given to DoC. The report will be published and will include Recommended Areas for Protection (RAP). These are areas which the survey team feels are the most representative examples of ecosystems still unprotected in the Taumarunui ED. Landowners with RAPs will receive a draft copy of relevant parts of the report before it's published. Once the survey report is published, it can provide a useful resource document detailing areas of significant natural areas.

What does it mean to me, as a landowner, if DoC recommends part of my property for protection (RAP)?

You will be contacted by the department and invited to discuss protection options for the RAP. However, the ultimate decision on whether to protect a natural area rests with the landowner.

Am I legally obliged to follow any recommendation for land protection?

No. Land protection on private property is voluntary. If a landowner chooses to protect formally a piece of land identified by DoC as special, then DoC (along with other agencies such as Nature Heritage Fund, Nga Whenua Rahui, and QEII National Trust) can help. This includes fencing and control of animal and plant pests. However, there are many measures a landowner can take, independently of DoC, to protect ecologically valuable sites and species. DoC staff are pleased to provide advice and support to farmers/landowners who wish to follow this course.

What's in it for me?

DoC and landowners have one very important thing in common and that's a love for the land. Many landowners appreciate knowing more about particular ecosystems (such as a wetland) on their property and whether there are any rare or threatened species there. Some landowners accompany the survey team in order to swap information. Legal protection may be an option for some landowners, and doesn't need to involve a change of ownership, rather a covenant with conditions agreed by the owner. For many people there is satisfaction in contributing towards the preservation of New Zealand's natural heritage.

What are the OSH requirements?

Occupational Health and Safety requirements are on everyone's minds these days and we've considered them with regard to the survey team being on your property.

As an employer, the department has a duty to take all practicable steps to ensure the safety of its staff undertaking any work. This duty includes situations where work is carried out by departmental staff or its contractors at places owned or controlled by other people. The contract survey team has its own health and safety plan.

In these circumstances the landowner also has duties in relation to the safety of visitors, but these are much more limited than are the employer's responsibilities. Landowners must warn authorised visitors to their properties about significant, out of the ordinary hazards known to the landowner that could arise from work activities being carried out on their properties. This duty arises where property owners give express permission for visitors to enter properties and relates only to work related hazards. It would not include natural or environment hazards.

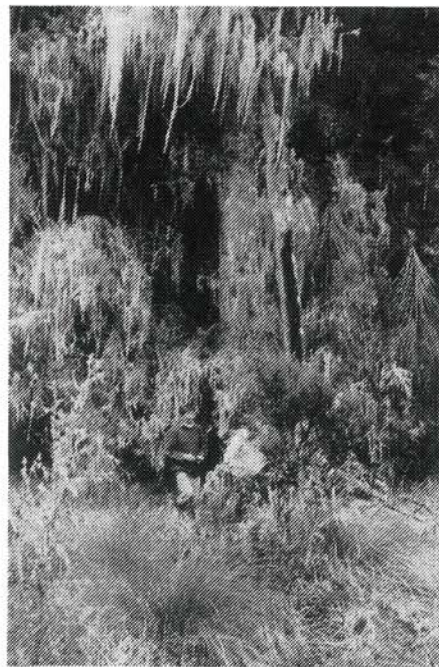
Contact list

Your nearest DOC office or one of the following people:

- Graeme Bell, Taumarunui Field Centre
Manager, Ph (07) 895 8201
(email: gbell @ doc.govt.nz)
- Phil Bradfield, Maniopoto Area Office,
Ph (07) 878 7297
(email: pbradfield @ doc.govt.nz)
- Sarah Beadel, Wildland Consultants Ltd,
Ph (07) 345 9017 or 025 - 924476
(wildland @ wave.co.nz)

Survey Team

James Bibby, Cate Ryan, Phil Grove, Sarah Beadel, Willie Shaw



*Inspection of Retaruke River Wetland,
now a protected natural area.*

