WAIRARAPA
LANDSCAPE STUDY 2010

Landscape Character Description

Report August 2010

Boffa Miskell

ACKNOWLEDGEMENTS

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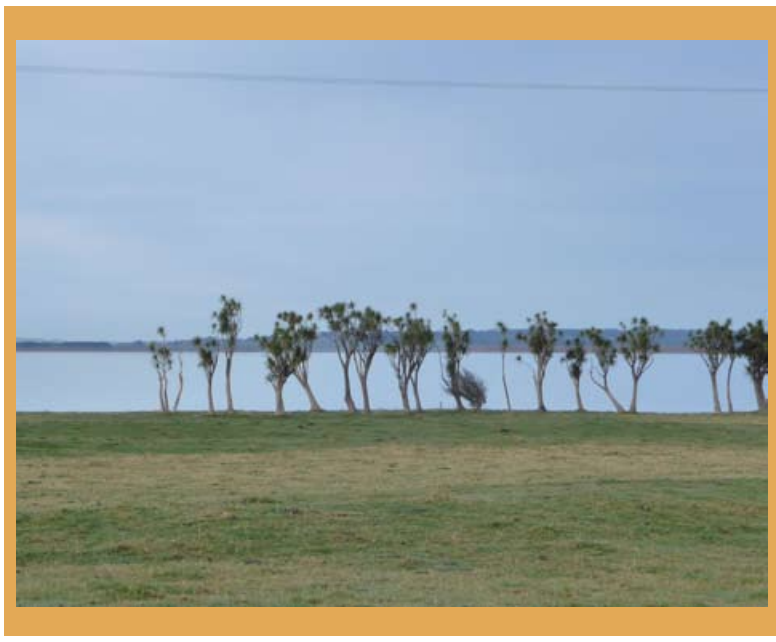

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CONTENTS

Kaiwhata River mouth

SECTION A: BACKGROUND

BACKGROUND

INTRODUCTION

This *Wairarapa Landscape Character Description* documents stage two of the three-part *Wairarapa Landscape Study*, a comprehensive landscape assessment of the Masterton, Carterton and South Wairarapa districts.

The flow chart opposite shows the study's three-stage structure; each stage informs the next. The spatial information gathered in Stage One was used for this Stage Two landscape character description. In turn, the character description will be used as the basis for Stage Three.

STUDY AREA

The study area encompasses the combined area of the Masterton, Carterton and South Wairarapa districts, referred to, for the purposes of the study, as the Wairarapa (refer to map, p11).

The study area does not, however, include the urban areas. These areas have been excluded due to the greater density of urban residential and commercial development, where the character is heavily dependent on the scale, age and design of the building stock, together with the pattern and scale of streets, and the location and extent of open space. Assessment of urban character is, therefore, carried out in much greater detail than for the wider landscape and does not come within the scope of this study.

PURPOSE OF THE *WAIRARAPA LANDSCAPE STUDY*

The *Wairarapa Landscape Study* has been initiated to assist in developing planning measures for managing landscape change in the Wairarapa District. All landscapes are dynamic; they continually change as a result of natural processes and changing land uses. However, people and groups can have conflicting views about the nature and rate of change that is acceptable in some landscapes, so regional and local councils seek to enable divergent views to be considered and addressed through planning provisions.

Policies 24 and 26 in the *Proposed Wellington Regional Policy Statement* (Proposed RPS) require that the region's outstanding natural features and landscapes (ONFs and ONLs), and significant amenity landscapes (SALs), be identified in district and regional plans. While the *Proposed Wairarapa Combined District Plan* does identify 'outstanding landscapes' and 'outstanding natural features', these were not identified as part of a comprehensive assessment. The *Wairarapa Coastal Strategy*, produced in 2002, involved a landscape and ecology assessment of the entire Wairarapa coastal area, but a similar level of assessment has not been carried out over the whole district. The *Wairarapa Landscape Study* has been commissioned to remedy this situation and to provide the basis for implementing the RPS policies mentioned above.

Cabbage trees along the western margin of Lake Wairarapa

WAIRARAPA LANDSCAPE STUDY METHODOLOGY

STAGE 1:
WELLINGTON REGIONAL LANDSCAPE ATLAS

COMMISSIONED BY GWRC

GIS database of the region's spatial landscape information

Collation of information required for landscape description including data verification, consistent accessible formatting and provision of 3-D modeling/ presentation tool

Partial implementation of Method 49. Database completed April 2009 and available for use in Stages 2 & 3

STAGE 2:
WAIRARAPA LANDSCAPE CHARACTER DESCRIPTIONS

'THIS DOCUMENT'

COMMISSIONED BY GWRC

Land typing

GIS analysis

Aerial reconnaissance and photography

Field Survey

Identification of landscape character areas, mapping and descriptions

Verification of character descriptions by Steering Group

Finalisation of landscape character descriptions

Implementation of method 49 completed

STAGE 3:
RECOMMENDED ONL/ ONF AND SALS

'WORK PROGRAMME 2010'

COMMISSIONED BY MASTERTON, CARTERTON AND SOUTH WAIRARAPA DISTRICT COUNCILS

Preliminary identification of landscape values

Initial consultation with stakeholders and community

Mapping and documentation of potential outstanding natural features and landscapes, and significant amenity landscapes

Consultation to confirm that identification of Outstanding Natural Landscapes/ Outstanding Natural Features and Significant Amenity Landscapes reflects community values

Landscape Management Issues:
Identification of potential threats to landscape values
Identification of landscape outcomes desired by the community

Implementation of Policies 24 and 26 completed

FUTURE STAGES

Development of objectives, policies and rules and incorporation into the district plan

PURPOSE OF THE WAIRARAPA LANDSCAPE CHARACTER DESCRIPTION

In the Proposed RPS, one of the methods for implementing policies 24 and 26 (mentioned above) is method 49, which requires the Wellington Regional Council, together with city and district councils, to: *"Develop and disseminate a regional landscape character description that describes and categorises the region's landscapes to assist with identifying outstanding natural features and landscapes, and significant amenity landscapes."*

The overall purpose of method 49 is to provide a comprehensive and consistent inventory of the region's landscapes for local authorities to use as the starting point for implementing policies 24 and 26. This *Wairarapa Landscape Character Description* document provides the landscape inventory for the Wairarapa part of the region. As stated earlier, its purpose is to provide the basis for identifying outstanding natural features and landscapes, and significant amenity landscapes in Stage Three of the Wairarapa study.

WHAT IS LANDSCAPE CHARACTER AND CHARACTERISATION?

Landscape character is defined as "*a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse* "[1]. Put simply, landscape character is that which makes an area unique.

New Zealand has been referred to as a land of '*little landscapes*'[2] . That is, there is considerable variation in New Zealand's landscape over relatively short distances and areas. These 'little landscapes' are distinct from one another and they more often than not occur in regional patterns. Within a region, communities identify with 'their' landscapes and often refer to them as having a particular combination of attributes and features that give them a distinctive 'character' [3].

Understanding landscape character is important because landscape character not only influences how we interact with and feel about the places where we live, work and play – it influences our culture and our imaginations. Conversely, we seek to shape the landscape to meet our needs. It is by paying proper regard to the existing character of our landscapes that informed and responsible decisions can be made regarding their management. We can endeavour, through understanding how places differ, to ensure that future development will be sensitive to location, and will contribute to environmental, social and economic objectives[4].

'Landscape characterisation' is the term used for the process of identifying, mapping and describing character areas. Each character area has a distinguishing combination of biophysical and cultural factors that makes it distinctive from adjacent character areas. Characterisation provides a sound descriptive and analytical basis for the understanding of landscape diversity and change; it also provides a context for the evaluation of 'special landscapes' such as outstanding natural landscapes and significant amenity landscapes. In turn, the recognition of these special landscapes provides the basis and justification for managing them in a particular way.

1 Landscape Character Network web site. www.landscapecharacter.org.uk
2 pp33-41, Our Changing 'Natural' Landscapes, by John Hayward, & Kevin O'Connor.. in New Zealand, Where are You?(1981), Wellington, New Zealand Institute of Landscape Architects.
3 Ibid
4 Landscape Character Network web site. www.landscapecharacter.org.uk

Scientists and other specialists such as geologists, ecologists, climatologists, categorise the landscape for different purposes relating to their specific disciplines and there is a wealth of information available from their work. Landscape characterisation draws upon that work, aiming to bring it together in a way that is meaningful to non-scientific people and relates to the way people experience the landscape.

Essentially, landscape character is the interrelationship of three broad factors – landform, land cover and land use. Within these broad factors there are many variables; for instance, land cover can include a myriad of vegetation types and built forms. The way these varied factors combine produces areas of distinctive character. As with most regional and district landscape studies, the *Wairarapa Landscape Study* classifies the study area into a series of landscape character 'units', by analysing these factors. It is a pragmatic approach which enables the complexity of often extensive and highly diverse areas of land to be described in a way that communities can readily recognise.

DISTRICT BOUNDARIES

HOW WILL THE LANDSCAPE CHARACTER DESCRIPTION BE USED?

The landscape character description will be used as a basis of the next, Stage Three, evaluation phase of the study (refer to flowchart, p9). The evaluation phase involves the value judgments that are required to identify and assess outstanding natural features and landscapes, and significant amenity landscapes.

The landscape character descriptions can also be used in a number of other ways, including:

- Providing a spatial framework for helping to develop district-wide policy in documents such as the District Plan, the Long Term Council Community Plan or Long Term Community Consultation Plan;
- Providing a resource document about the Wairarapa landscapes to assist landowners/applicants in preparing assessments of environmental effects (AEEs) and resource consent applications;
- Helping to assess development potential, (i.e. identifying appropriate areas for managed development / growth on the urban fringes and in rural environments);
- Informing the siting, scale and design of particular types of development, such as rural residential development, wind farms, industrial areas, etc;
- Contributing to landscape capacity studies, to identify areas suited to the supply of land for housing, rural activities and forestry use;
- Providing spatial information relevant to ensuring that local policies and practices are consistent with regional and national policy initiatives;
- Providing a base line against which future landscape change and the effect of landscape protection and management measures in the district plan can be monitored;
- Informing work on special areas, such as mapping and the rationale for having special policies for those areas.

LANDSCAPE DESCRIPTION METHODOLOGY

The methodology for carrying out the Wairarapa Landscape Study is summarised in the flow diagram shown on page 9. The different stages and various steps involved are shown. Stage One, the collation of spatial information within the Wellington Regional Council's geographic information system (GIS) database, was carried out in 2009.

Stage Two, (this landscape character description) has involved the the following steps:

- analyse the landscape through review of GIS data, maps, aerial and land-based photographs, and field survey;
- identify character areas and their boundaries;
- map the landscape character areas; and
- describe each character area objectively.

In describing each character area, the aim is to create a mental image of that area through words, maps and photographs – and evoke a sense of what sets that area apart from any other.

The descriptions mention sites or features within landscape character areas that are significant components of the wider landscape, such as a geological formation, a stand of native forest, a stretch of coastline or an historic feature. These sites and features have often been identified by various specialists as having some particular importance. Communities, too, identify with them and seek to recognise them in some way – through naming them, featuring them in art and literature, or assigning a special status or protection.

It should be noted, however, that the descriptions are not intended to assign value to sites, features or character areas. That will be addressed in Stage Three of the study. Nor will any particular courses of action be prescribed at any stage of the study in terms of value or how areas should be managed; that will be addressed once all three stages of the *Wairarapa Landscape Study* are complete.

MAPPING LANDSCAPE CHARACTER AREAS

Landscape character areas are mapped to communicate their location and general spatial extent. However, the varied factors discussed above that distinguish one character area from another do not conveniently stop and start at a particular point or boundary. Consequently the mapping lines should be considered as 'zones of transition' rather than precise lines that mark absolute points of change between adjacent character areas.

The boundaries for this character study are mostly based on topographical features such as the tops of escarpments, ridgelines or hills, or waterways. Ridgelines form natural boundaries to visual catchments (as experienced from the ground) and, as such, are often logical boundaries for character areas, but that is not to say every ridgeline is a boundary to a character area. Nor is the top or bottom of a ridge or hill always the boundary for a character area; in some locations, such as where the plains adjoin the hills, the toe and lower slopes of the hills have been included in the plains character areas because they are an integral part of those local environments.

As noted earlier, urban areas and settlements have been excluded from the study area. The character area boundaries simply skirt around these urban areas, though the proximity of urban development can influence the character of the adjoining landscapes.

Each of the character areas has been assigned a one-word name. These are simply labels to distinguish one character area from another; there has been no attempt to assign names that encapsulate the full extent of all localities in each character area. For example, the Flat Point character area extends further than just the environs of Flat Point but the label will assist people to visualise the general geographic location of the whole character area.

DATA SOURCES

Use of spatial data through geographic information systems (GIS) has been integral to this study. GIS is a powerful tool used for analysing, visualising and mapping spatial and non-spatial digital geographic data. GIS systematically organises graphic data to enable a person reading an electronic map to select or deselect specific information about the area under review.

Data from Greater Wellington Regional Council's *Wellington Region Geodatabase*[5], was the primary source of data for this study. The Geodatabase was commissioned specifically for the landscape characterisation description project, prescribed in Method 49 of the Wellington Regional Policy Statement to be undertaken throughout the region.

The maps from the *Wellington Region Geodatabase* used in this study are: Geology, Geopreservation Sites, Soils, Elevation, Slope, Identified 'protected' natural areas, Identified Maori Cultural and Heritage Sites, and topographical features.

Landcare Research Limited undertook a land types assessment specifically for the Wairarapa Landscape Study, which provided an important additional database. The land types boundaries were digitised and included as a separate GIS information layer for the study.

The maps presented in this report, based on sources other than *Wellington Region Geodatabase* are:

- Land Cover – Land Cover Database, version 2 (LCDB 2) from Terralink;
- Land Types - mapped by Landcare Research and digitised by Boffa Miskell Limited;
- Landscape Character Areas - created by Boffa Miskell Limited.

These maps, together with a brief description of each map are included in Appendices 2-10 at the end of this report. Further information and details on each map can be obtained by interrogating the datasets in the *Wellington Region Geodatabase*.

Appendix 1, contains brief outline of Wairarapa's Maori and European history, and land use - past and present.

5 Wellington Regional Landscape Atlas Prepared by Isthmus Group for Greater Wellington Regional Council, May,2009.

NAMING

It is acknowledged that many places in the Wairarapa have both Maori and English names. In some cases, the Maori name in common usage may differ from the original spelling, or preferred spellings may differ between iwi which can lead to some confusion. The approach adopted in this report is to consistently use the LINZ Topo50 map series naming, and note in brackets the Maori name preferred by local iwi. For simplicity, the Maori name will be noted only once, where it first occurs on any given page.

The following glossary includes the English - Maori translations for common place names throughout the Wairarapa.

GLOSSARY

BULL HILL	**AORANGI MAUNGA**
CASTLEPOINT	**RANGIWHAKAOMA**
FLAT POINT	**TE UNU UNU**
GLADSTONE CLIFFS	**TE ANA O PARAKAWHITI**
KAIWHATA RIVER	**KAIHOATA RIVER**
LAKE ONOKE & WAIRARAPA	**WAIRARAPA MOANA**
MASTERTON	**WHAKAORIORI**
MOUNT BARTON	**TUHIRANGI MAUNGA**
MOUNT BRUCE	**PUKAHA**
MOUNT HECTOR	**PUKEMOUMOU**
MOUNT HOLDSWORTH	**TARATAHI**
MOUNT ROSS	**HIKAPU MAUNGA**
NGAWI POINT	**TE KAWAKAWA/ BLACK ROCKS**
ROCKY POINT	**MATAKITAKI A KUPE**
RUAKOKOPUTUNA	**RUAKOKOPATUNA**
SEVENTY MILE BUSH	**TE TAPERE NUI O WHATONGA**
SUICIDE ROCK	**TE RERENGA O TE AOHURUHURU**
TE KAUKAU	**TE KAKAU**
THE SAILS OF KUPE	**NGA RA A KUPE**
THE WAKA	**NGA WAKA A KUPE**
WELLINGTON	**TE WHANGANUI O TARA**

Western Lake Road, Rimutaka Ranges

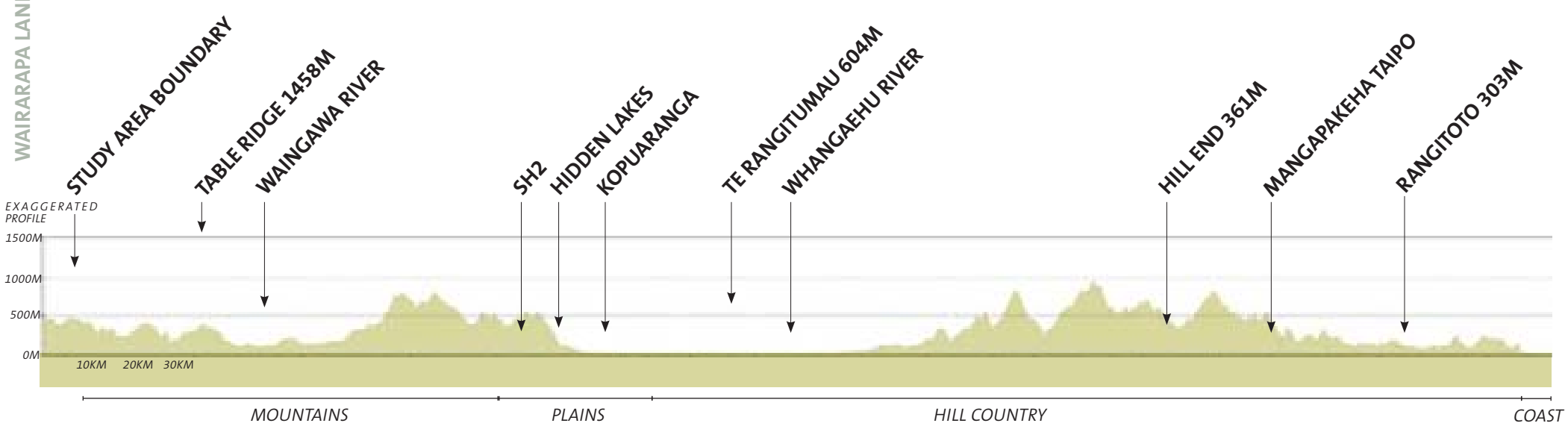
SECTION B: LANDSCAPE CHARACTER DESCRIPTIONS

BROAD LANDSCAPE TYPES

This section begins with a description of each of the four broad landscape types in the Wairarapa followed by descriptions of each of the 32 landscape character areas identified. Each landscape character area description includes a map, photographs, narrative and a summary of key landscape characteristics.

The Wairarapa comprises four broad, readily identifiable landscape types which are described in the following section:

- Ranges (Tararuas, Rimutakas and Aorangi);
- Plains
- Hill Country
- Coast.



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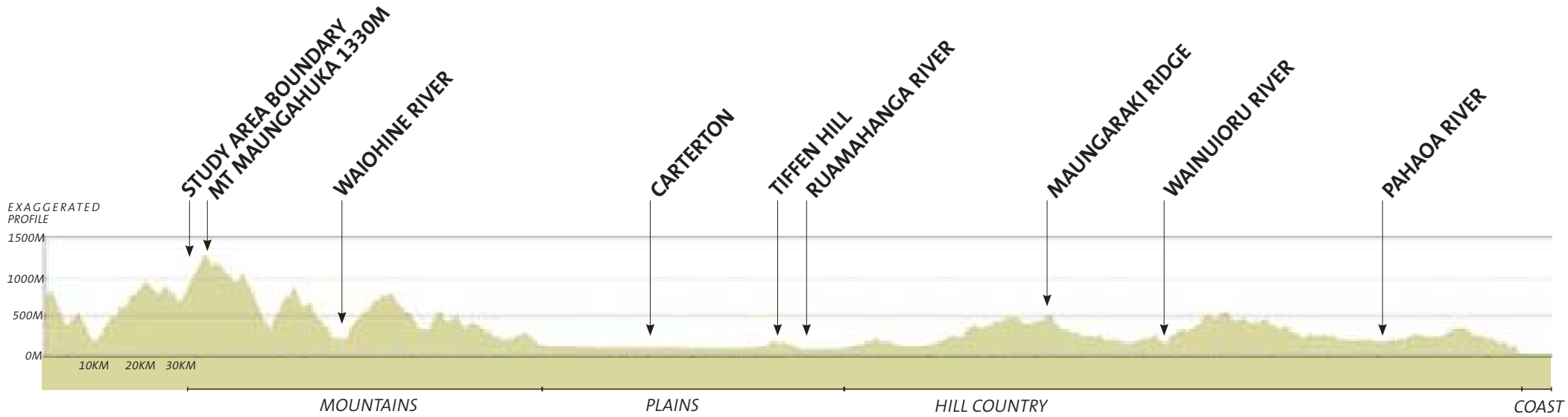

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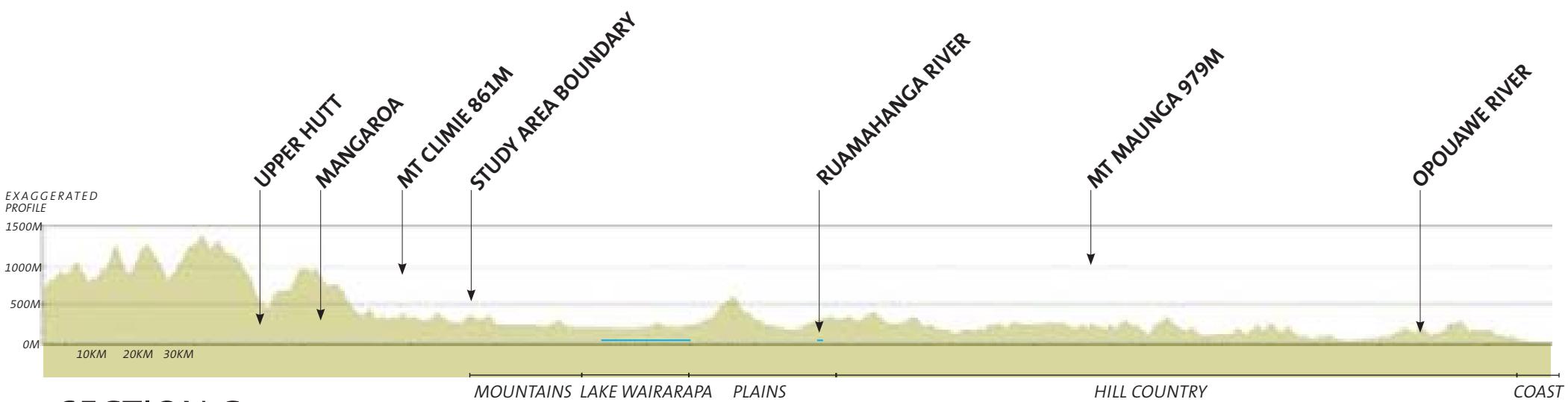

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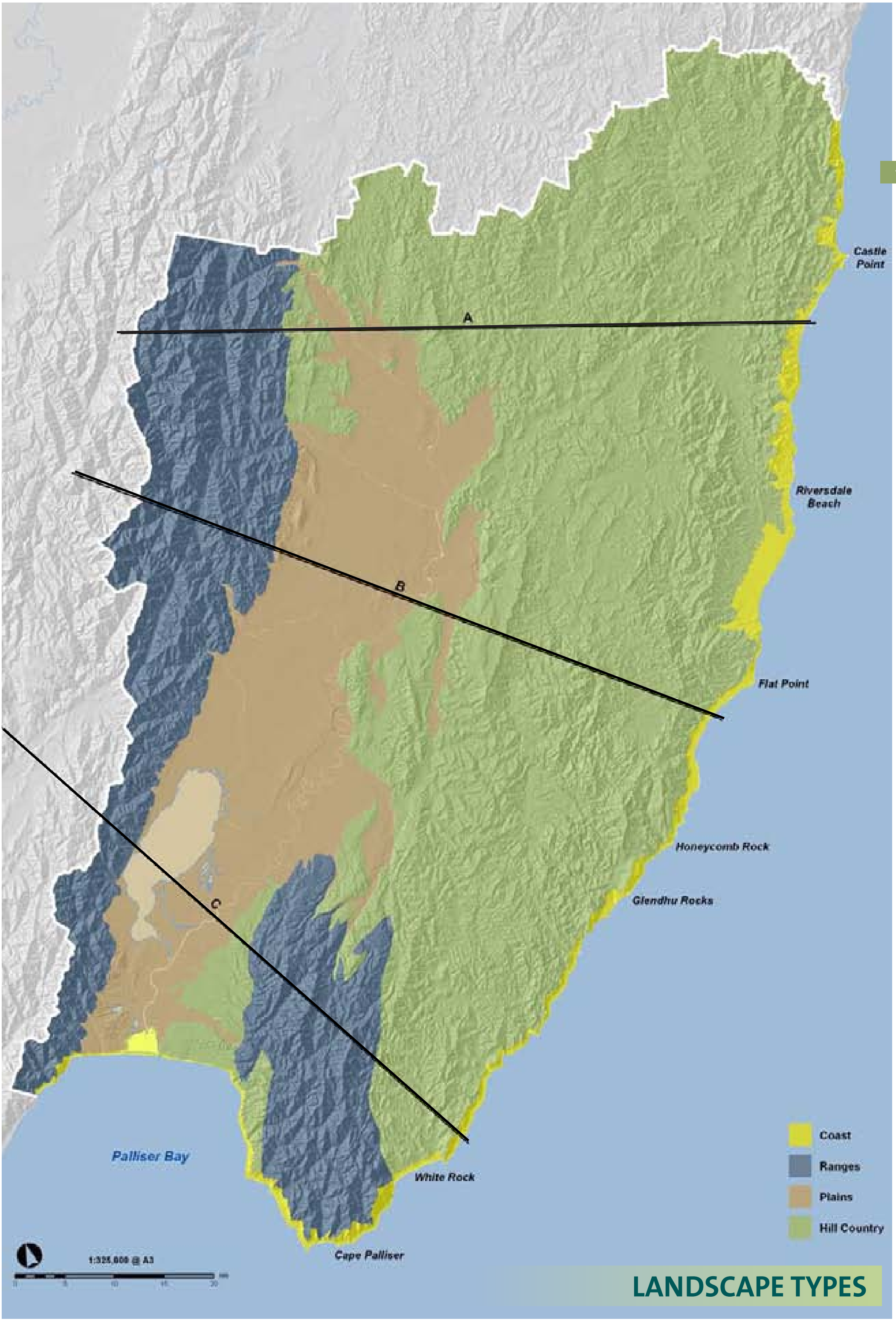


LANDSCAPE TYPES

RANGES

The axial mountains of the Tararua and Rimutaka Ranges clearly define the western edge of the Wairarapa while the Aorangi Range forms a large mass on the south-eastern corner.

The Tararua and Rimutaka Ranges provide a fairly sharp and abrupt definition to the plains and lowlands. They are steep and mostly clad in native forest and form a strong and distinctive boundary to the Wairarapa and separate it from adjoining territorial districts of Upper Hutt, Hutt City and Kapiti Coast.

Aligned northeast-southwest, these steep ranges are primarily composed of greywacke and contain a series of steep-sided streams that drain into Lake Wairarapa in the south (Rimutaka Range) or the tributaries of the Ruamahanga River system (i.e. Waiohine, Waingawa and Waipoua Rivers) in the north (Tararua Range).

The Tararua and Rimutaka Ranges occupy around 14% of the Wairarapa land area. Much of the ranges are protected in the Tararua and Rimutaka Forest Parks, which are administered and managed by the Department of Conservation. The Tararua Forest Park is extensive with at least half of it lying in adjoining districts to the north and west.

The Tararua and Rimutaka Ranges are dominant elements of the Wairarapa landscape, forming a backdrop and formidable physical boundary, which has had a profound influence on settlement, land use and development. The ranges are largely responsible for the Wairarapa developing and retaining its identity as separate and distinctive from its western neighbours.

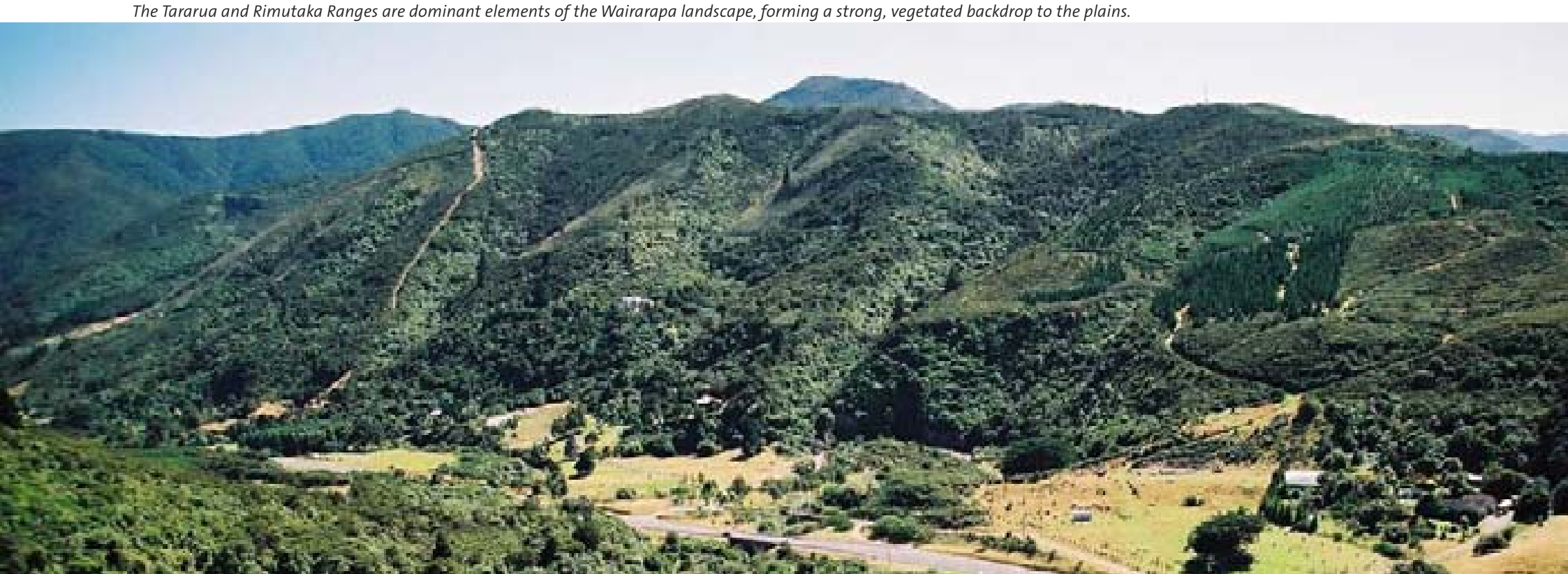
A broken line of foothills that extend along the base of the ranges provide a transition between the steep native forest-clad ranges and the Wairarapa Plains. These foothills vary in width; they form a wide distinctive band in the northern part of the district whereas in the south they are much narrower and discontinuous. The foothills have been mostly cleared and are farmed or in places are reverting back to native vegetation.

The West Wairarapa Fault which can be seen clearly in many places as a 'scarplet', extends along the foothills. The fault forms the eastern margin of the Rimutaka Range; a single fault line runs along the western shores of Lake Wairarapa and north-eastwards as far as the Waingawa River and then it splits into a series of faults, which pass through Mauriceville. At the Waiohine River, the fault has cut through a series of river terraces, which mark the down-cutting of the river.

The higher and more northern Tararua Ranges have a relatively moist climate with an annual rainfall of between 1600-1800+mm, the lower elevation Rimutaka Ranges have a lower rainfall of 1200+ mm and the Aorangi Ranges rainfall varies from 1200-2400+ depending on elevation. In many places along the foothills, early European settlers established their homesteads and farming operations and in recent times rural residential subdivision has been established in places.

While the original native forest on the foothills was cleared for agriculture, the gullies contain 'fingers' of young secondary native regeneration that connect to the native forest on the mid and upper hill slopes. Parts of the western foothills are included in the Rimutaka and Tararua Forest Parks. The Aorangi Range forms a prominent hard rock landmass, most of which is included in the Haurangi Forest Park. While the Aorangi Range occupies less than 7% of the land area of the Wairarapa, it has a formidable presence and forms a distinctive backdrop to the southern plains. It comprises dissected steep to very steep slopes with extensive areas of native forest. On the forest margins, areas that were formerly cleared have reverted to native and exotic scrub with grazing on some of the lower pasture-covered slopes.

The Tararua and Rimutaka Ranges are dominant elements of the Wairarapa landscape, forming a strong, vegetated backdrop to the plains.



PLAINS & LOWLANDS

The Wairarapa valley has been formed by downwarping along the West Wairarapa Fault. The valley is open at its southern end, forming Palliser Bay, between the Rimutaka Range on the west and the Aorangi Range on the east. In the past, the sea occupied this southern part of the valley but in recent times the Ruamahanga River built up a dam across the seaward end of the depression, forming Lake Onoke and converting Lake Wairarapa into a freshwater lake.

The Ruamahanga River and its tributaries are a dominant feature of the plains, and have essentially created them through deposition of river gravels.

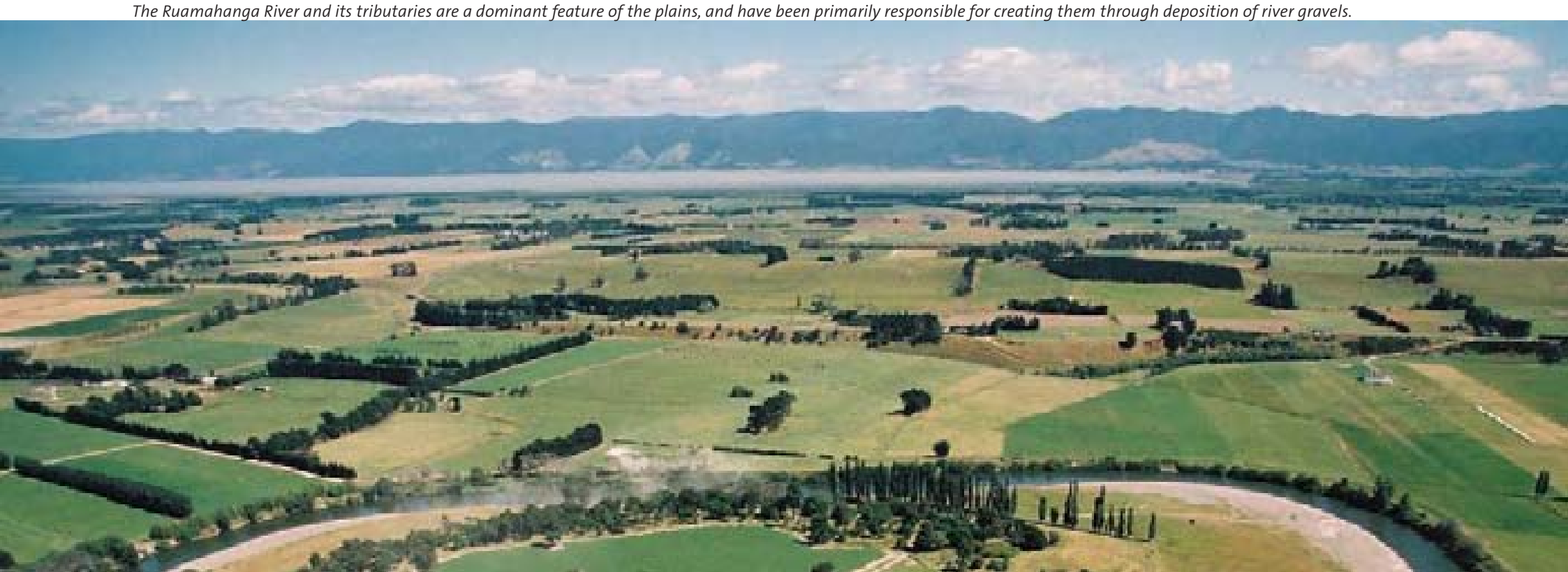
River gravels and alluvium form the underlying geology. The fertility and ease of development for agriculture meant that the plains and lowlands were readily developed for agriculture and they have been extensively modified. The plains are intensively grazed, with areas in horticultural crops declining during the past decade, apart from the areas in grapes around Martinborough and Gladstone, and also more recently north of Masterton. The majority of the towns and settlements in the Wairarapa are located on the plains.

The plains, which occupy around 20% of the land area of the Wairarapa, can be broadly subdivided into two, the northern plain comprising flat, gently undulating to rolling land most of which is intensively grazed with shelterbelts, amenity plantings and small areas of native forest remnants. The northern plain is also where most of the Wairarapa towns are located (Featherston, Greytown, Carterton, Masterton) and consequently a smaller subdivision and settlement has occurred around each of these towns.

The southern plain is dominated by Lake Wairarapa, which covers approximately 8000ha. Martinborough and the small coastal settlement of Lake Ferry are the only substantial settlements in the southern plains. Drainage and reclamation of the margins and swamps located around the periphery of the lake have been converted to farmland, which is intensively grazed. Realignment of the Ruamahanga River and construction of flood protection measures, especially continuous stopbanks have contained the river and in places affected its visibility from surrounding areas.

The southern plains have several sizable remnants of the once extensive kahikatea forest that was prevalent throughout the plains, together with groups of scattered kahikatea, which are not generally found in the northern part.

The Ruamahanga River and its tributaries are a dominant feature of the plains, and have been primarily responsible for creating them through deposition of river gravels.



HILL COUNTRY

Hill country dominates the Wairarapa in terms of land area, covering around 60% and together with the Aorangi Ranges enclose the plains. The broad tract of hill country wraps around the northern and eastern edges of the plains and in the northwestern corner, west of the Waipoua River. The hill country extends beyond the study area into the Tararua District in the north and also eastward to the coast.

There is considerable variation in this hill country in terms of the underlying geology, elevation, and steepness, which in turn has significantly influenced land use. There is also considerable variation in vegetation cover from extensive areas in pasture, to large tracts of exotic forestry, smaller woodlots, to large areas of remnant and regenerating native forest, and areas of exotic scrub.

Moving eastwards between the relatively narrow band of rolling hill country along the edges of the plains and the coast, there is a wide swathe of steep to very steep hill country. Characterised by alternating sandstone and mudstone and jagged sharp hill-slope summits, much of the Wairarapa's radiata pine forests have been established on this hill country. Much of it is also in pasture and is farmed with extensive areas of regenerating secondary native vegetation and reverted scrubland on the upper steeper slopes. The hill country is drained by numerous streams and waterways often in steeply dissected gullies and narrow valleys, some of which drain eastwards and others to the west.

In places, massive bodies of erosion-resistant sandstone known locally as 'taipo' are prominent landscape features, and form a distinctive backdrop to the scrublands and pasture on the mid and lower hill slopes. Areas of limestone are also present; many of these limestone areas lie on the western periphery of the hill country, adjacent to the plains.

A band of varying width of gently rolling hill country is located along the northern and eastern edge of the plains. These areas have long been cleared and are grazed, although in recent times there have been changes in land use, especially in the vicinity of the towns with rural residential subdivision in many places. However, each of these subdivisions generally comprises only five or so allotments. In addition, rarely have these subdivisions entailed construction of a new public road. Instead, they are accessed by rights-of-way off existing roads.

The hill country generally receives less rainfall (1000-1400mm) than the ranges and typically, there is a summer dry period.

On the hill country there is considerable variation in vegetation cover from extensive areas in pasture, to large tracts of exotic forestry, smaller woodlots, to large areas of remnant and regenerating native forest, and areas of exotic scrub, as shown here in the Kaiwhata River Valley.

COAST

The Wairarapa coast is a distinctive broad landscape type that occupies a narrow fringe of land along virtually the entire coastline. It comprises uplifted marine terraces, which are frequently dissected, steep escarpments, alluvial fans and smaller areas of dunes. The features along the coast are many and varied, from the spectacular 160m high cliffs at Castlepoint (Rangiwhakaoma), the alternating sandstone and mudstone beds at Whakataki, prominent limestone reefs (Castlepoint and White Rock), the cobblestone beds at Uruti Point, honeycomb rock formations along the Glenburn coast, to the huge slab of sandstone that is Kupe's Sail.

Large farm landholdings, many of which were established in the early days of European settlement, occupy the uplifted marine terraces and coastal flats and also extend inland on to the adjoining eastern hill country. There are few roads to the coast and so much of it is relatively isolated. However, there are several small and distinctive settlements, most of which have a small permanent population; some such as Ngawi and Castlepoint, were established as small commercial fishing bases, whilst others such as Riversdale, were originally developed as a coastal holiday settlement.

In recent times, there has been considerable pressure in places for larger scale coastal subdivision and the small clusters of traditional small-scale baches are being replaced by many extensive subdivisions of large holiday homes, many of which are often very urban in character.

Thirty two character areas have been identified and are described and mapped in the following pages. The character area descriptions are ordered according to the broad landscape types that they loosely fall within. However, the boundaries of the character areas do not necessarily align with those of the broad landscape areas.

Castlepoint is well known for its lighthouse, horse races on the beach, and 160-metre-high Castle Rock. The reef, lagoon, sand dunes and Castle Rock form the Castlepoint scenic reserve.

WAIRARAPA CHARACTER AREAS

RANGES

PLAINS AND LOWLANDS

NORTHERN AND EASTERN HILL COUNTRY

COAST

LANDSCAPE CHARACTER AREAS

TARARUA - RIMUTAKA RANGES

The Tararua-Rimutaka character area includes the steep, forested Rimutaka and Tararua Ranges which provide strong visual and spatial separation between the Wairarapa and the neighbouring Hutt Valley and Kapiti Coast. The Tararuas cover 3,168 square kilometres from the Manawatu Gorge 100km south to SH2 (Rimutaka Hill Road, north of Upper Hutt), while the Rimutaka Ranges extend from the SH2 to Turakirae Head.

Although lower than the Tararua Range to the north, the Rimutaka Range is still formidable, with peaks from 700 to 940 metres high. It consists of parallel ranges interspersed with deep river valleys. The western extent of the character area is defined by the territorial boundary, whilst the eastern extent is determined by an abrupt change in slope where the ranges abut either the plain or the more gently rolling and farmed foothills (below 350m asl).

The predominant land type is western greywacke (Land Type 4, 5) which is characterised by a faulted and heavily dissected and uplifted landscape with narrow, sinuous undulating terraces and gravel choked riverbeds. With each major movement of the fault (associated with an earthquake) the land to the west has been both uplifted and displaced to the north-west (relative to the plains side of the faultline).

The Tararua Ranges (north of of SH2) are typically higher in elevation and have greater rainfall than the Rimutaka Ranges to the south. The slope is steep (26-35˚) to very steep (>35˚), with the elevation ranging from approximately 5m asl to 1529m asl at the peak of Mount Hector (Pukemoumou).

The Waiohine Faulted Terraces are a significant feature, marking the movement of the West Wairarapa fault over the last 35,000 years. They are partially protected in a scientific reserve on the southeast margin of the Tararua Forest Park.

The steep, largely inaccessible terrain and moist soil conditions support an extensive and diverse variety of native flora and fauna. At low altitude the dominant vegetation type is lowland podocarp/tawa or podocarp/kamahi forest, and as elevation increases this changes to montane podocarp/beech, then subalpine pure beech (forming a sharp treeline), then to alpine tussock grasslands.

Many of the peaks and streams along the Tararua Ranges were named by Kurahaupo people and are still used today. The mountains connected the tribes on both sides and this is evident in tribal whakapapa (genealogy) and migrations for food such as Otaki hapu travelling to Wairarapa Moana for tuna. A myriad of tracks through the mountains reinforce the relationships between people on both sides. A number of camps, papakainga and pa were situated on the foothills of the ranges .

Three-quarters of the Tararua Range falls within the Tararua Forest Park which was established as the first of a series of forest parks in 1954. Extending from the Pahiatua Track in the north, to the Rimutaka Saddle on SH2 in the south, the 116,535 ha park is now the largest conservation park managed by DoC in the North Island, and provides the people of Wellington (Te Whanganui o Tara), Wairarapa, Horowhenua and Manawatu with an outstanding variety of tramping, hunting and walking opportunities. The park has a very important role in conserving the indigenous biodiversity of the lower North Island.

The 22,000 ha Rimutaka Forest Park encompasses much of the Rimutaka Range. Easily accessible from Wellington (Te Whanganui o Tara), the area is popular with trampers and hunters. A rail route established in 1878 between the Hutt Valley and Featherston carried passengers up the steep incline from the Rimutaka summit to Featherston until the opening of the Rimutaka rail tunnel in 1955. DoC and Greater Wellington Regional Council now jointly manage the rail land from Kaitoke to Cross Creek as a recreational and historic area. Beech forest dominates much of the range, joined by podocarps at lower altitudes.

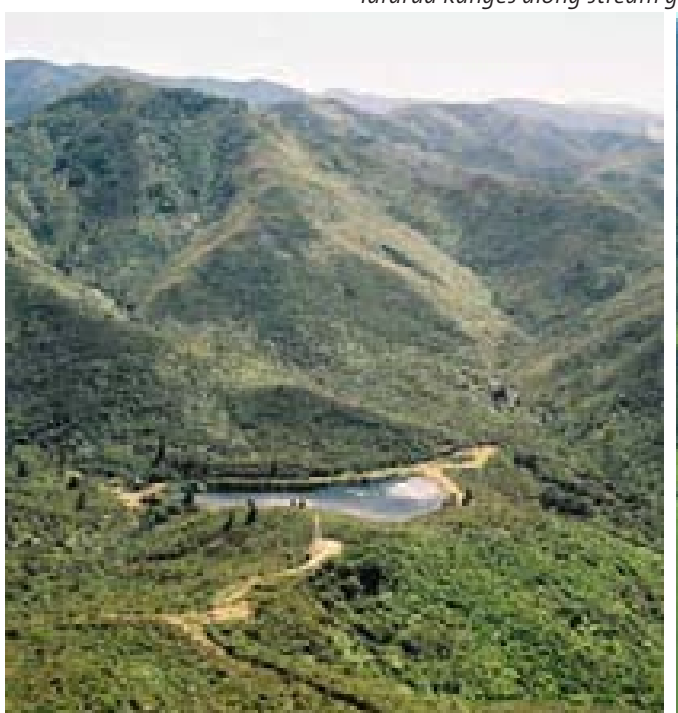
During the early years of European settlement, the catalyst for the exploration of the Tararua Range was the need to survey the plains to the east and west of the range for occupation by new settlers. This required triangulation using sight lines from the highest peaks (on which were placed 'trigs').

Due to the steep and densely forested terrain, the Ranges themselves are difficult to access and aside from the occasional tramping hut have remained undeveloped.

KEY LANDSCAPE CHARACTERISTICS

- Waiohine Faulted Terraces
- Cross Creek railway settlement
- Orongorongo (816 metres)
- Mount Holdsworth (Taratahi) (1470m)
- Mount Hector (1529m) tallest peak in the Tararuas
- Mt Mathews (949m) tallest peak in the Rimutaka
- Tararua Forest Park
- Rimutaka Forest Park
- Cone Hut, Field Hut, Rimutaka Rail Trail (heritage sites)

Left: West of Carterton, exotic pine forest and regenerating native forest on the foothills;Tararua Ranges beyond densely-clad in native forest. Middle: Reservoirs located in the high rainfall ranges. Right: Fingers of native vegetation extend from the Tararua Ranges along stream gullies to the plains.



MOUNT HOLDSWORTH

MOUNT HECTOR

TARARUA RANGE

SH2

RIMUTAKA RANGE

MOUNT MATTHEWS

Otaki River

Waikanae Beach

Paekakariki

Upper Hutt

Lower Hutt

Greytown

Carterton

Masterton

Featherston

Lake Wairarapa

Palliser Bay

1:225,000 @ A3

WESTERN RANGES

AORANGI RANGES

Also known as the Haurangi Range, the Aorangi Ranges are the southernmost mountain range in the North Island and extend more than 20 kilometres north from Cape Palliser. Mt Ross (Hikapu Maunga) (983m) in the northern block of the ranges is the highest point. Aorangi means 'cloudy skies', (it can also relate to special peaks on islands in the Pacific Ocean. When early people arrived in New Zealand they named peaks Aorangi to remember their homelands. The name can also relate to the closeness to the gods on mountains where the air is clear and the world is illuminated as opposed to the shadows that fall upon the land below) alluding to frequent southerly squalls that assail the bleak Wairarapa Coast. The greater portion of these mountains is covered in native forest which is protected and set aside for public recreational use as part of the Aorangi / Haurangi Forest Park.

The park and surrounding area feature some dramatic landforms. They include the Putangirua Pinnacles which is a popular tourist attraction. Access to the rugged Aorangi Range and the network of tracks within Aorangi Forest Park is gained via several major streams. Several of these routes are across private land and require landowner permission.

The predominant land type is eastern greywacke (Land Type 6) and is characterised by steep (26-35˚) to very steep slopes, sinuous terraces and floodplains, coastal cliffs and slumping along the southern coast. Elevation varies from 5.0m asl to 981m (Mt Ross). The landforms are raw and weathered, particularly the coastal escarpments which are subjected to strong desiccating north-westerlies and salt laden south-westerly winds. Key peaks include: Mangatoetoe (855m), Mt Barton (Tuhirangi Maunga) (899m), Kaiwhiri (807m), Mt Mabel (785m), Bull Hill (Aorangi Maunga) (863m), Te Maunga (979m), and Makara (778m).

The southern block of indigenous forest (7730 ha) was gazetted as a State Forest in 1900 and the northern block was added in 1936. The country between the two forest blocks was farmed, but stock was removed in June 1974 when the New Zealand Forest Service took over management and exotic species were planted to control erosion. The area was gazetted as a forest park in 1978.

Vegetation has been modified by fire, wild animals and grazing stock, while land clearance and logging have impacted on the foothills, coastline and river headwaters. Beech forest dominates the north of the range with hinau and matai characterising the hardwood forests and lower altitudes. Mahoe dominates on the moister soils in gully heads and on stream banks with fuchsia, makomako, heketara, kohuhu, titoki, rewarewa, rimu, and miro among other species present.

The shrublands of the river terraces and coastal foothills are generally dominated by tauhinu while elsewhere manuka and kanuka are the prevalent species at low altitude. Small areas of sub-alpine shrubland occur on the higher peaks.

Much of the Ranges is covered in native forest, some patches of original forest remain but most of it is advanced secondary native forest.

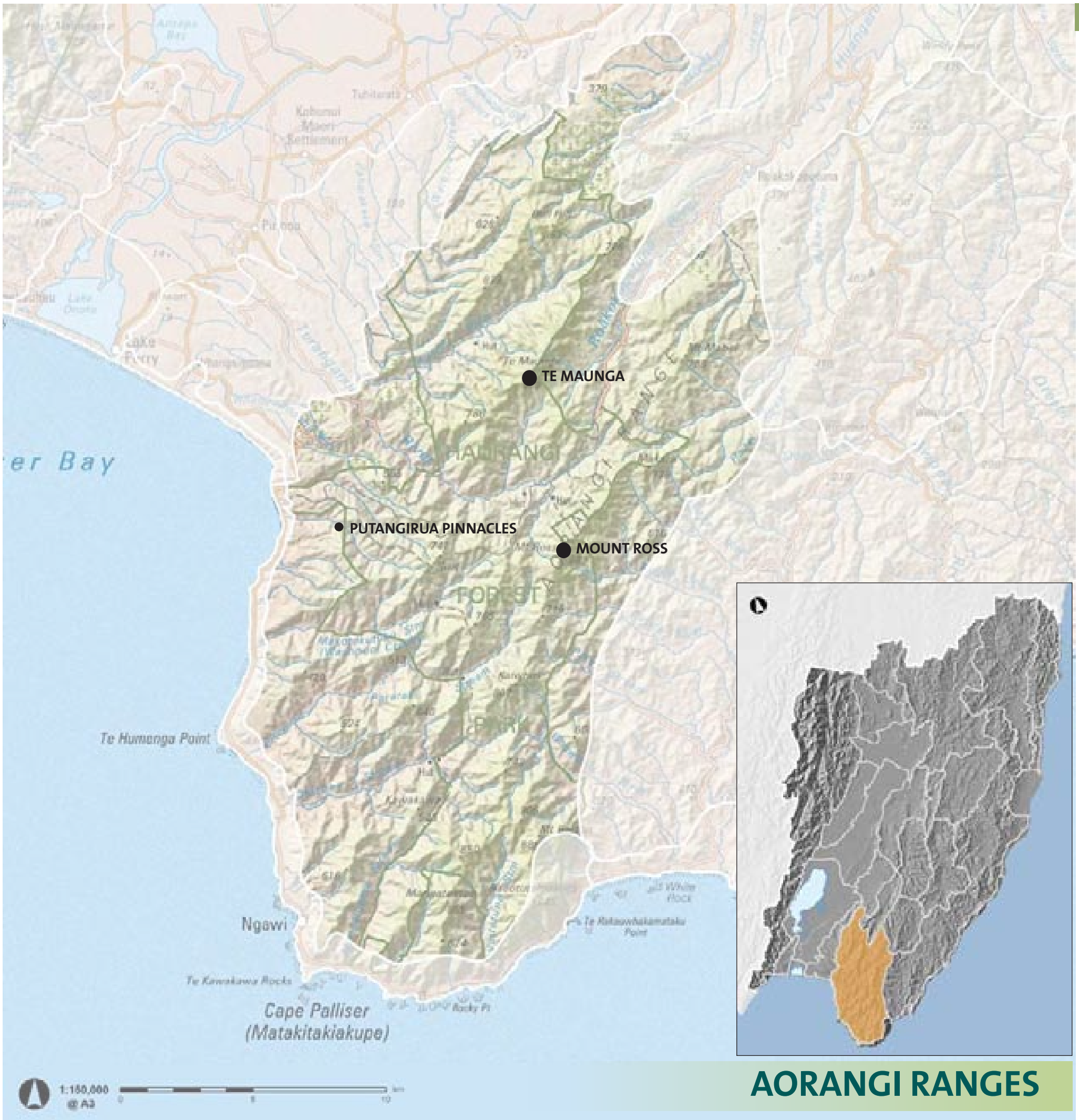
Given the topography, the area is largely inaccessible except by foot. The area is relatively remote, and uninhabited aside from tramping huts. The forest park is popular with recreational hunters and trampers but there are also short walks with spectacular views (e.g. to the Putangirua Pinnacles). Access to the higher and more rugged parts of the park is via several major streams. Several of these routes are across private land and require landowner permission.

Aorangi Forest Park contains sites of early Maori occupation, including the Putangirua pa site.

KEY LANDSCAPE CHARACTERISTICS

- Rugged, weathered, steep topography, coastal winds
- Important recreational resource
- Sense of remoteness
- Extensive areas of native regenerating bush, with beech forest on upper slopes
- The dramatic Putangirua Pinnacles – an example of badlands erosion
- The highest peak - Mt Ross (983m)
- Maori heritage sites are commonplace alongside streams inland from the coast because as well as shelter these places provided important access points to the forest for food and other resources

Left: The southern end of steep ranges were cleared for grazing and now support small native remnants and regenerating native scrub. Ngawi in foreground. Right: The rugged, steep and complex topography is largely inaccessible and remains covered in forest, (native forest, regenerating native forest, exotic pine plantations).



The Putangirua Pinnacles is one of the best examples in New Zealand of badlands erosion and earth pillar formation. The Putangirua Stream has exposed this ancient layer of gravels to the erosive forces of rain and floods. Where cemented silts or rocks within the gravel beds prove more resistant than the underlying sediments, spectacular individual pinnacles or "hoodoos" are formed.

NORTHERN PLAINS

The Northern Plains character area takes in the northern part of the plains, and includes semi-enclosed valleys and lowlands around the base of the Tararua Ranges and Mauriceville West, the plains south of Mount Bruce (Pukaha), and Kopuaranga down to the boundary which includes the plains and hills at Matahiwi, to just north of Opaki. Whilst the land is largely flat, a series of undulating river fans and terraces aligned in a north-south direction are identifiable. These have been formed through ongoing deposition of gravels and are frequently offset by active faults in the west. The scale and immediacy of the Tararuas mean that they have a strong presence, and they provide a sense of enclosure to the plains.

The rounded, discrete landform of Tirohanga (306m) is a distinctive feature within the south-eastern extent of the character area. The Hidden Lakes, two small freshwater lakes in the hills above Kopuaranga, are another distinctive feature and landmark within the northern plains. The lakes were formed during the 1855 earthquake which triggered a large landslide that temporarily blocked the Ruamahanga River and destroyed the pa on the hill and papakainga downstream .

The Ruamahanga River, the ancestral river of Maori, is an important natural feature which is relatively unmodified (such as with stopbanks in the mid and lower reaches of the river); the channel however has gradually been pushed to the east by the alluvial deposits of the Tararuas. The soil is stony, and stacked boulders are commonly seen in paddocks or used to construct dry stone walls.

The distinctive peak of Te Rangitumau (603m), although located within the neighbouring Mauriceville character area, forms a highly recognisable feature from within the northern plains.

Rainfall is relatively high due to its proximity to the ranges. Mature, exotic amenity plantings of poplar and oak are extensive, whilst small scale pine woodlots and shelterbelts are common place. Apart from the 942 hectare of native forest at Mount Bruce, of which only a small portion is located in the Masterton (Whakaoriori) District, and some scattered totara on the plains, there are few remaining areas of native vegetation in the Northern Plains.

Local Maori called this area Te Kauru which can be translated to mean ‘the source’. The name refers to the upper-Ruamahanga catchment that snakes out of the Tararua Mountains south of Pukaha. This area was heavily forested and constituted the southern extent of the Seventy Mile Bush (Te Tapere Nui o Whatonga). Oral histories state that Maori used the forest as a source of food; for medicine, to learn about the forest and as a place to live. Stories are told of the forest being so dense that torches were used in daytime to help navigate the routes north.

Settlement is characterised by scattered, established farms and landholdings typically larger than 10 hectares. Land use is dominated by sheep and beef farming, and structures within the landscape relate to farming operations (e.g. hay sheds, stock yards). Landscape change is minimal and gradual in comparison to the neighbouring character area around Masterton. The alignment of roads and railway lines is based on a modified grid pattern which reflects the flat topography of the plains and historic settlement patterns.

Hidden Lakes and the Ruamahanga River

Low hills, areas of scattered native forest remnants and groups of native trees fringe much of the northern plains.

KEY LANDSCAPE CHARACTERISTICS

- Largely flat to undulating topography, some elevated landforms
- Scattered settlement, larger landholdings, well established sheep and beef farmsteads
- Extensive exotic amenity plantings
- Isolated totara remnants on river terraces
- Proximity to Tararua Ranges
- Significance of landforms to Tangata Whenua: Tirohanga, Hidden lakes, views to Te Rangitumau
- Mt Bruce remnant of 70 mile bush

The distant skyline of the Tararua Ranges is a defining feature of the northern plains.

MOUNT BRUCE

HIDDEN LAKES

KOPUARANGA

TIROHANGA

MASTERTON

Carterton

1:150,000
@ A3

NORTHERN PLAINS

Mature shelter belts are a feature of the plains. Te Rangitumau, is a prominent land mark.

MASTERTON

The Masterton (Whakaoriori) Plains character area is defined largely by the intensification of land use patterns, which radiate out from the centre of Masterton. This 'halo' has been subject to increasing development pressure as the town has grown, pushing rural-residential development to the edges of the plains and surrounding foothills.

This area has a long history of Maori occupation and has been a major settlement since early times. Migration routes out to the coast and the convergence of three main rivers connected it to other major food sources e.g. Lake Wairarapa. The original name was Whakaoriori which refers to the bird chorus prevalent in these parts. The earliest known pa site is Matewera west of Masterton which can be traced back to the early 15th century. The Westside of town had rich swamp soils and were used for large extensive gardens.

In 1853, a group of Wellington (Te Whanganui o Tara) and Hutt Valley workingmen, led by Cooper, Joseph Masters, formed a Small Farm Association, and petitioned Governor Grey for land upon which to establish their settlement. Following negotiations with local chief Te Korou, a piece of land on the banks of the Waipoua River was purchased, and on May 21 1854, the first settlers from the Association arrived on the site of the new township of Masterton. It has grown from a rural service town to a diverse community that has brought with it an increasing requirement for choice in terms of size of land holdings and opportunities for different types of living environments.

The outer edge of the Masterton Plains reflects an abrupt change in lot size and is approximately bounded by the Waingawa River in the south, the Tararua Ranges and northern plains to the north and west, and the low-lying hills behind Te Ore Ore to the east.

The alignment of roads and railway lines is based on a modified grid pattern which reflects the flat topography of the plains and historic settlement patterns.

A number of rivers, such as the Ruamahanga, Waipoua, and Waingawa, flow through the area and have had an important role in shaping the land. The resulting topography is flat to undulating, being characterised by river terraces and alluvial gravel fans. An isolated river terrace immediately north of the town (167m), is distinctive as it provides contrast with the general flatness of the surrounding plains. The Masterton Plains comprises stoney and free-draining gravels (Land Type 2), which also cover the northern central plains. The foothills flanking the plains are moderately steep, and largely comprised of limestone.

When compared to the northern plains, which are dominated by sheep and beef farming, the Masterton Plains has a much more diversified and small scale pattern of land use including vineyards, orchards, olive groves and rural residential allotments. There is a distinct rural-residential fringe around the town, with landholdings typically of 1-10 hectares. Rural-residential properties appear to be well established in Kaituna, with

Well established rural-residential development extends up either side of the Waingawa River valley, along Norfolk and Upper Plain Roads.

Recent rural-residential subdivision is occurring on the low lying hills north of Lansdowne, on the northern outskirts of Masterton. This activity has resulted in extensive amenity planting being established.

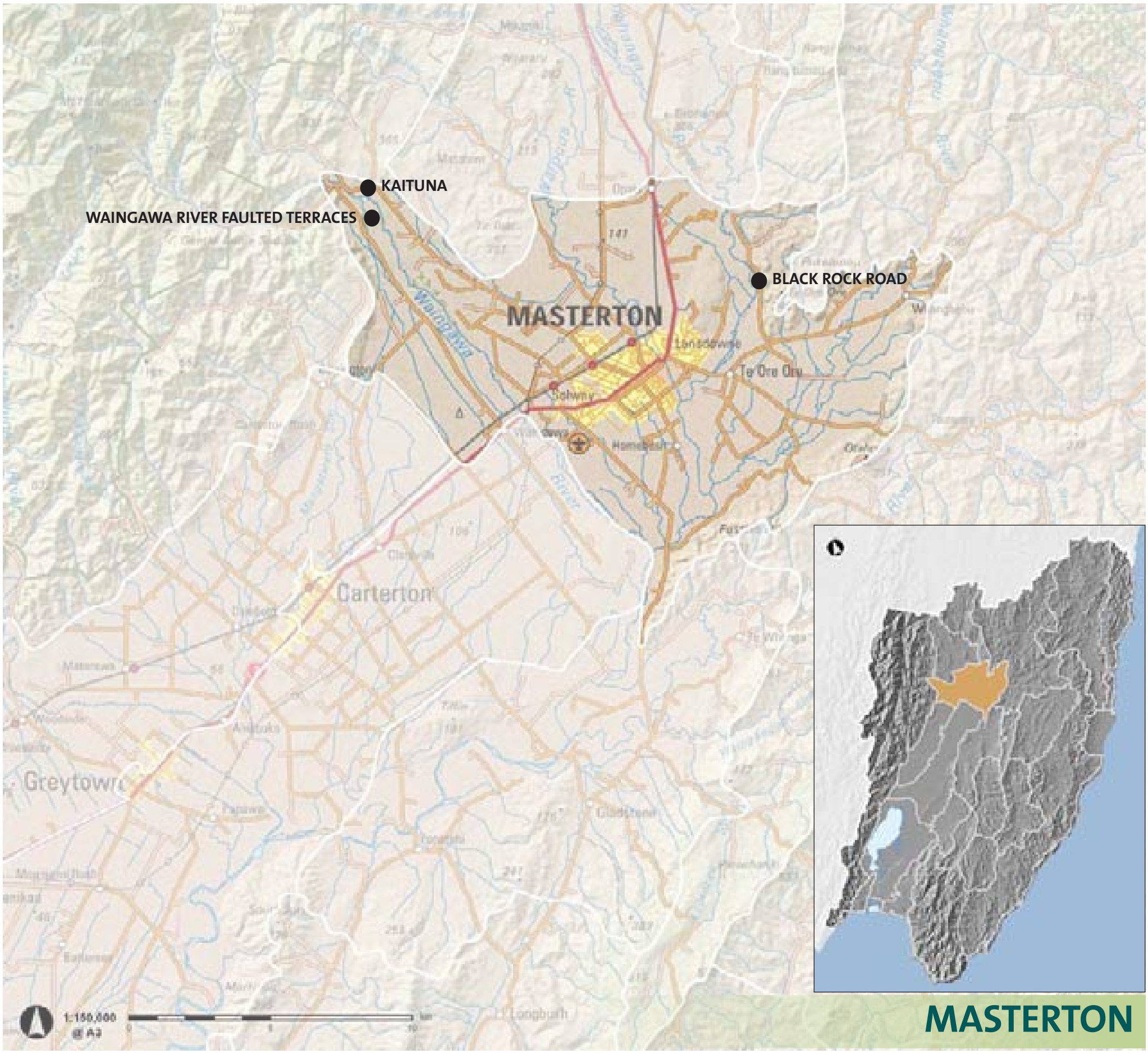
more recent subdivision activity focused around the toe of Fosters Hill/ Te Ore Ore (Black Rock Road), at Opaki, and Lansdowne,(elevated terrace immediately north of the town).

Amenity plantings (ash, oak, pine, willow and poplar) in both the old and newer rural-residential areas have transformed the appearance of these areas, creating park-like settings and a high level of visual amenity. In addition, there are groups and also substantial blocks of totara forest remnants scattered throughout the area, particularly around Kaituna. In places, there is a proliferation of small scale orchards, vineyards and olive groves.

KEY LANDSCAPE CHARACTERISTICS

- Flat to rolling topography – alluvial terraces
- Diversified, small scale pattern landuse with rural-residential on the fringe
- Extensive amenity plantings
- The various local rivers – Ruamahanga, Waipoua, and Waingawa Rivers which have influenced character of the area
- Waingawa River faulted terraces

The low lying hills around Te Ore Ore are desirable for rural-residential development. A number of new subdivisions are evident along Black Rock Road, which have been well integrated through careful siting and extensive amenity plantings.



MASTERTON

The view from Te Ore Ore (246m) and the Black Rock Road subdivision reveals the diversified and small scale pattern of land use around Masterton, which includes sheep and beef farming, dairying, orchards, vineyards, olive groves and rural residential allotments.

WESTERN PLAINS

The Western Plains character area includes the plains and lower foothills that abut the Tararura Ranges to the west. To the east SH2 forms the approximate boundary, Featherston to the south and Wiltons Road to the north. A number of waterways traverse the Western Plains from west to east, bringing with them sediment from the ranges which have formed the characteristic alluvial fans, terraces and floodplains. The topography is generally flat to gently undulating, with free-draining soils and significantly higher rainfall than the Central Plains due to the proximity to the Tararua Ranges. The area is particularly frosty in the winter.

The Tararuas form a dominant backdrop to the western plains due to their immediacy and scale. The Waiohine Faulted Terraces along the West Wairarapa Fault are a significant geological feature; and remnants of the old braided river floodplains are readily identifiable and preserved within grazing land.

The western plains were used as a walkway for Maori travelling along the western foothills of the Tararua range towards Te Whanganui o Tara. While Maori know of the trails, remnant kahikatea stands point to the previous state of the land which contained wetlands and therefore food for travelers.

The area is characterised by well established rural-residential enclaves with landholdings typically between 1 and 10 hectares. There are several recent rural-residential developments, particularly near the main trunk railway line east of Featherston, Greytown and Carterton (eg Belvedere Subdivision). Outside of rural-residential enclaves, landholdings are typically greater than 10 hectares and characterised by sheep and beef farming.

The alignment of roads and railway lines is based on a modified grid pattern which reflects the flat topography of the plains and historic settlement patterns.

Land cover is dominated by pasture but most rural residential properties are extensively planted with exotic amenity species such as ash, willow, oak and poplar. In places, such near Fernside/ Woodside (north of Featherston) and Cobden Road (Carrington), there are several native forest remnants (mainly kahikatea and totara).

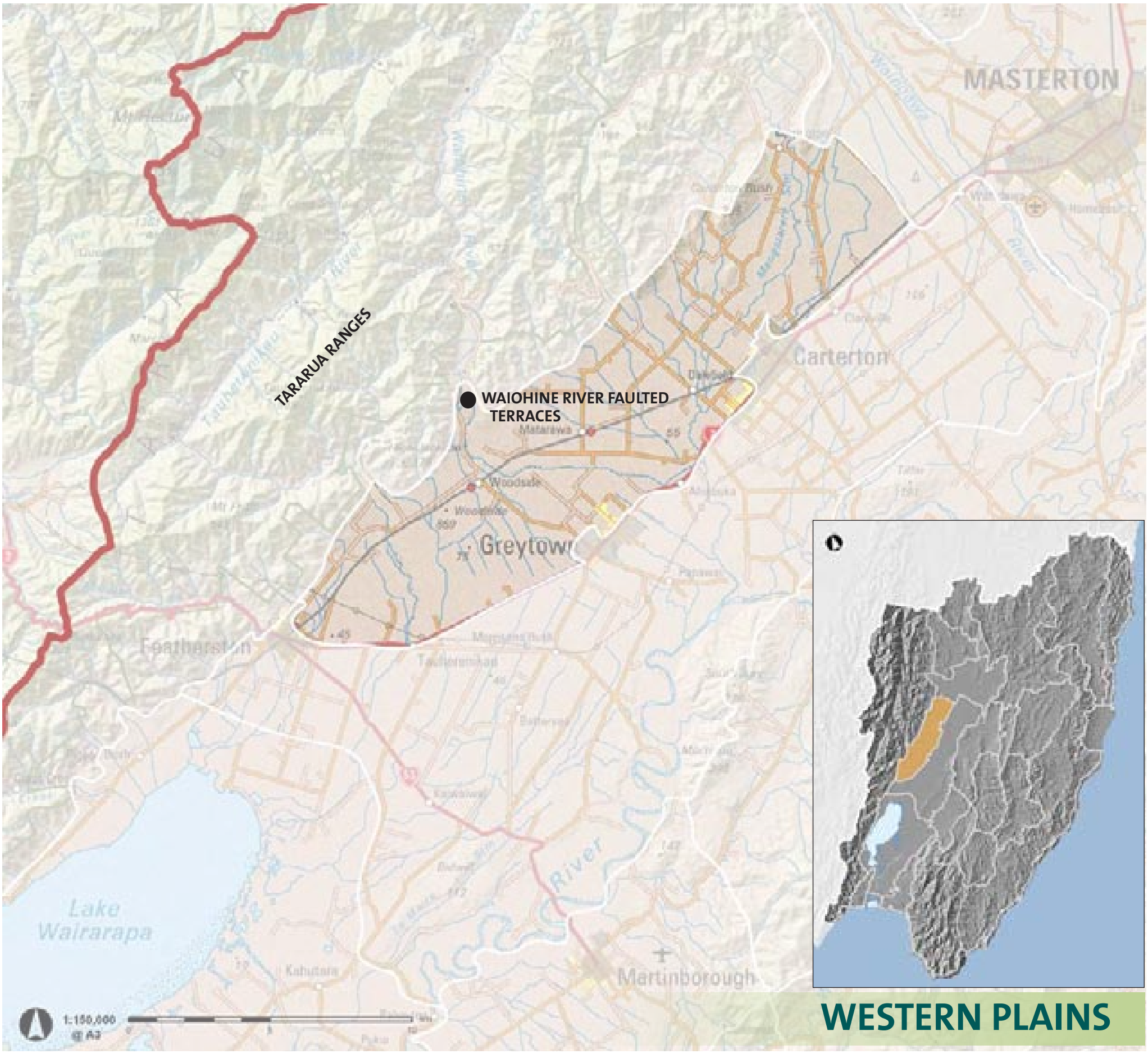
The Tauherenikau River meanders across the western plains north of Fernside. Although pasture is the dominant land cover, exotic shelterbelts are common, and there are several kahikatea and totara remnants.

The Tararua Ranges form an imposing backdrop to Featherston, due to their scale and proximity.

KEY LANDSCAPE CHARACTERISTICS

- Climatic conditions – more rain, frost, more sheltered when compared to the Central Plains character area
- Tararua Ranges prominent due to their scale and proximity
- Established sheep and beef farmsteads and rural-residential areas, some evidence of recent rural-residential development
- Some sizable native remnants
- Extensive amenity and shelterbelt planting
- West Wairarapa Fault, evidenced by Waiohine River

The low-lying hills at Carrington, north-west of Carterton, form the boundary between the Western Plains and the Tararua Ranges character areas.



WESTERN PLAINS

View from the Waiohine Gorge Road looking east, shows the extensive patchwork of pastoral land use and mature shelterbelts on the Western Plains.

CENTRAL PLAINS

The Central Plains are defined as the area from Featherston to just south of the Waingawa River and Masterton (Whakaoriori). Morrison ridge (191m) defines part of the eastern boundary, and to the west, the boundary is defined by State Highway 2. The townships of Featherston, Greytown, and Carterton all lie within the Central Plains character area. The northern part of the character area is also known as the Taratahi Plains. Like the adjoining Western Plains character area, the Central Plains consists of flat to gently undulating, free-draining, old and recent gravel fans, terraces and floodplains, but with lower rainfall it is drier than the western and southern plains. There is a greater sense of openness to the Central Plains landscape compared to the Western Plains because of its distance from the Tararua Ranges. To the east, the distinctive profile of the Nga Waka - a - Kupe and Maungaraki Ranges are prominent landmarks and backdrops.

The Ruamahanga River is a dominant feature in this character area. It meanders tightly, hugging the eastern side of the plains due to the large quantities of gravel which have been swept down from the Tararua Ranges.

The alignment of roads lines is based on a modified grid pattern which reflects the flat topography of the plains and historic settlement patterns.

Land use is quite diversified and includes dairy, sheep and beef farming, scattered areas of market gardening, and orchards. This includes the the region's biggest pipfruit grower and packhouse, JR Orchards Ltd, located on Pah Road (east of Greytown). Some arable farming occurs in this area with irrigation systems on some of these properties. Land cover is dominated by grazed pasture and shelterbelts; whilst amenity plantings are less extensive than on the western plains. Indigenous vegetation is very limited and insignificant, limited to some distinctive stands of kanuka, and small isolated lowland forest remnants such as the 13 hectare Trenair (Lowes Bush) broadleaf remnant, and occasional groups or single trees.

Land parcels on the plains tend to follow a regular, linear pattern, with drainage ditches and shelter belts creating a distinctive patchwork. The area is characterised by well established rural and rural-residential enclaves with some evidence of recent rural residential development. Smaller landholdings around the fringe of the urban areas between 1 and 4 hectares characterise the area with a larger scale and less dense settlement pattern further from the towns. Transmission line pylons are also present and in some places are prominent elements in this flat landscape.

In pre- European times the central plains area was dominated by waterways and wetlands and so with the exception of elevated places was used mainly for temporary camps by people walking through the main valley. The area was valued because of the bountiful supply of animal and plant food sources found within the patchwork of swamps, streams and forests. The Ruamahanga River was used for transporting people and goods the length of the valley when bulk items were required to be moved between pa that were built on rises near the banks of the river. As modification of the land occurred following European settlement Maori started to build marae such as Papawai at Greytown and Puanani at Carterton, often becoming involved in agriculture and other introduced industry in those locations.

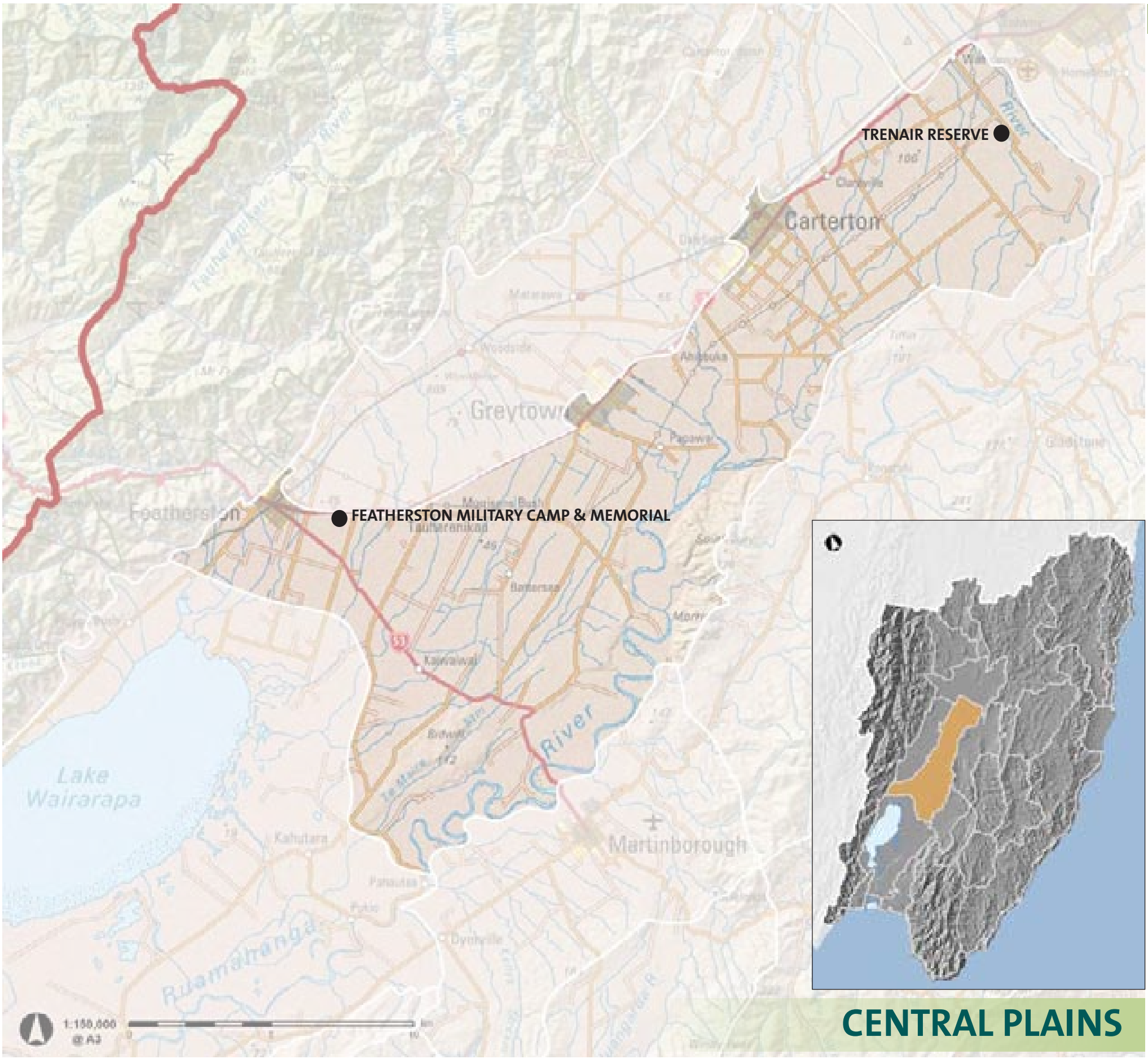
While there is very little native vegetation present on the Central Plains, those that remain are important in terms of their contribution to landscape charcter and biodiversity. This isolated 13 hectare broadleaf forest remnant is located at Trenair, south of Masterton.

Carterton is in the Central Plains character area; there is a greater sense of openness and more abrupt transition between residential and rural land use around the perimeter of the town than occurs in the Western Plains.

KEY LANDSCAPE CHARACTERISTICS

- Flat to gently undulating topography
- Climatic conditions – drier than the western plains
- Sheep and beef farming, dairying, large scale orchard operation, pockets of rural-residential development on fringe of towns
- Very little native vegetation present
- Distinctive backdrops of the Waka and Maungaraki Ranges.

The Nga Waka a Kupe forms a prominent element in the view from many parts of the Central Plains, including the uplifted marine terrace 4km north-west of Masterton.



CENTRAL PLAINS

Left: While transmission lines transverse from Featherston to Waingawa, they form a prominent element in the Central Plains character area due to the flat topography and absence of tall vegetation. Right: Land parcels on the outskirts of Carterton tend to follow a regular, linear pattern, with drainage ditches and shelter belts creating a distinctive patchwork.

GLADSTONE

The Gladstone character area includes the low-lying hills and valleys which fringe the eastern edge of the central plains. It includes the lower Maungaraki slopes, Tiffen Hill and Morrison Hill (295m). The area is defined by the Ponatahi Hills, the slopes up to the first lower ridge of the Maungaraki Range, the toe of Fosters Hill, and the Ruamahanga River. The low hills enclose the Gladstone and Ponatahi areas and together form an important backdrop to the Central Plains Character area. The area has been under increasing rural-residential development pressure due to its proximity to the towns of Martinborough, Greytown, Carterton and Masterton (Whakaoriori), and opportunities for an elevated position and views over the plains.

Land Type 10 is dominant and expressed in the distinctive limestone strike ridges, and readily erodible dip and scarp slopes. The area also includes Land Type 9, soft rock mudstone, which is manifest in the smooth rounded form of the Morrison and Ponatahi Hills.

The topography ranges from flat to gently undulating and hilly topography on the lowlands; elevation ranges from approximately 40m asl to around 400m asl.

The area contains a number of Maori place names which point to long Maori association. A number of highly visible features such as Hurunui o Rangi marae and urupa are further pointers. Not so apparent are Maori land blocks, discreet urupa, pa sites and post European homesteads. The prominent cliffs (Te Ana o Parakawhiti) near the Gladstone Inn are associated with the famous legend of the taniwha Ngarara Huarau.

Tiffen Hill (191m) is a distinctive landform, readily identifiable by its gently sloping, relatively symmetrical profile, and its physical separation from the lowlands. Tiffen Hill's distinctive profile is supported by current management practices which have left it grazed, largely free of structures, and with limited tree planting. A 16-lot subdivision was approved on part of Tiffen in 2009, which has not been developed to date.

A tall concrete tower which is part of the Kourarau Dam and Power Scheme is located on the hills east of Gladstone along the Tupururpuru-Te Wharau Road. The upper dam and reservoir were formed in 1925 by the construction of an earth dam in the Kourarau Stream.

Vegetation is largely pasture set within a complex mosaic of small scale, mature exotic woodlots, willows along waterways, and extensive plantings of poplar, eucalypt and conifer, particularly around new rural-residential clusters. Small areas of grapes and small scale cropping are evident in the Ponatahi Valley.

Land uses are predominantly sheep and beef farming, with small established rural settlements on the plains, interspersed with more recent rural-residential development on the lowlands. The rural-residential development tends to occur in clusters on the lower slopes below 350m, particularly near Gladstone.

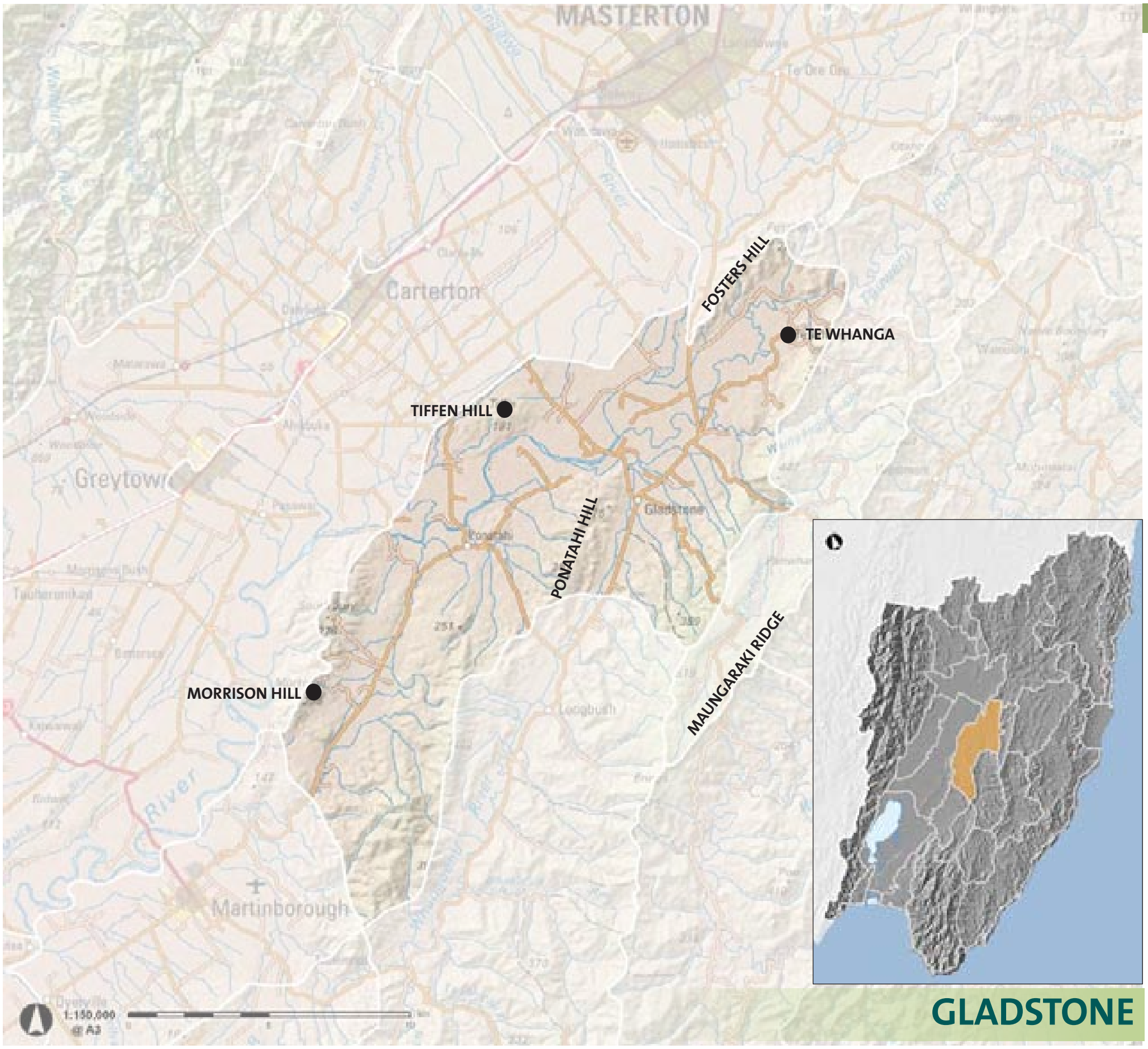
The lack of structures and vegetation on Tiffen hill reveals its gently sloping profile.

Fosters Hill encloses the Gladstone valley to the north, and forms an important backdrop to the Taratahi Plains. Mature pine woodlots are extensive within the character area, particularly around Te Whanga.

KEY LANDSCAPE CHARACTERISTICS

- Rural-residential development on the low lying hills
- Low-lying hills form an important backdrop to Gladstone and the Central Plains
- Diverse mosaic of vegetation, extensive exotic amenity plantings
- Willow lined Ruamahanga River
- Lower slopes form part of the Maungaraki Range.
- Gladstone Cliffs

From the Martinborough- Masterton Road a band of low-lying hills enclose Gladstone to the east. There are enclaves of recent rural-residential development on the lower slopes, typically below 350m.



GLADSTONE

In recent years there has been pressure for rural residential development on the footslopes around Gladstone, which are within commuting distance of the main settlements, have elevated views of the plains and rural amenity. These new properties bordering Te Wharau Road enjoy expansive views of Tiffen Hill, the Ponatahi Hills and Central Plains.

MARTINBOROUGH

The Martinborough landscape has been shaped by the Ruamahanga and Huangarua Rivers. The Martinborough landscape character area comprises the plains and lowlands around the town. The boundaries are the Ruamahanga River to the west, the toe of the Aorangi Ranges to the south, the Huangarua River to the north east, the toe of the Ponatahi hills to the north and a band of low-lying sandstone hills that separate the Martinborough character area from the Huangarua Valley, to the east.

Harris (164m) is the highest point of the lowland ridge south of Martinborough, and provides a backdrop to the town. The ridgeline from The Waka (Nga Waka a Kupe) to Windy Peak forms a distinctive backdrop to this landscape.

The Huangarua and Ruamahanga River corridors are relatively wide, and demarcated by extensive willow planting. The Ruamahanga River terrace, acts as a 'threshold' for access into the township from State Highway 53.

Land Type 1 (southern central plains), is predominant in the flatter parts of the character area and evident in the shallow stony soils, and loess deposited by the rivers. The more steeply sloping topography on the Ponatahi and Harris lowlands are included in Land Type 9, comprising soft rock mudstone and sandstone.

Land use has changed significantly in recent years, with rapid conversion from predominately sheep and beef farming to large areas of vineyards and olive groves. The area has low rainfall, and hot, dry summers, making it an ideal microclimate for the establishment of these land uses. On the plains, vegetation forms a linear patchwork of vineyards, olive groves, pasture, and amenity planting. Native vegetation is largely absent, except for some patches of regenerating kanuka within the lowland gullies.

The low hills around Martinborough were used by Maori for papakainga, one such example was Huangarua as per the name of the river. There are also pa, urupa, and post- European contact villages.

As the area has become renowned for its vineyards, a bustling tourism industry has developed around it. Annual attractions such as Toast Martinborough, the Martinborough Fair, and 'Round the Vines' are popular and have helped to develop tourism in the area.

A considerable amount of rural-residential development around the town has occurred in more recent years. Subdivision down to 1-4 hectares can occur on the south-eastern boundary, while all other areas are zoned Rural Special, and subdivision can occur down to a minimum of 4 hectares.

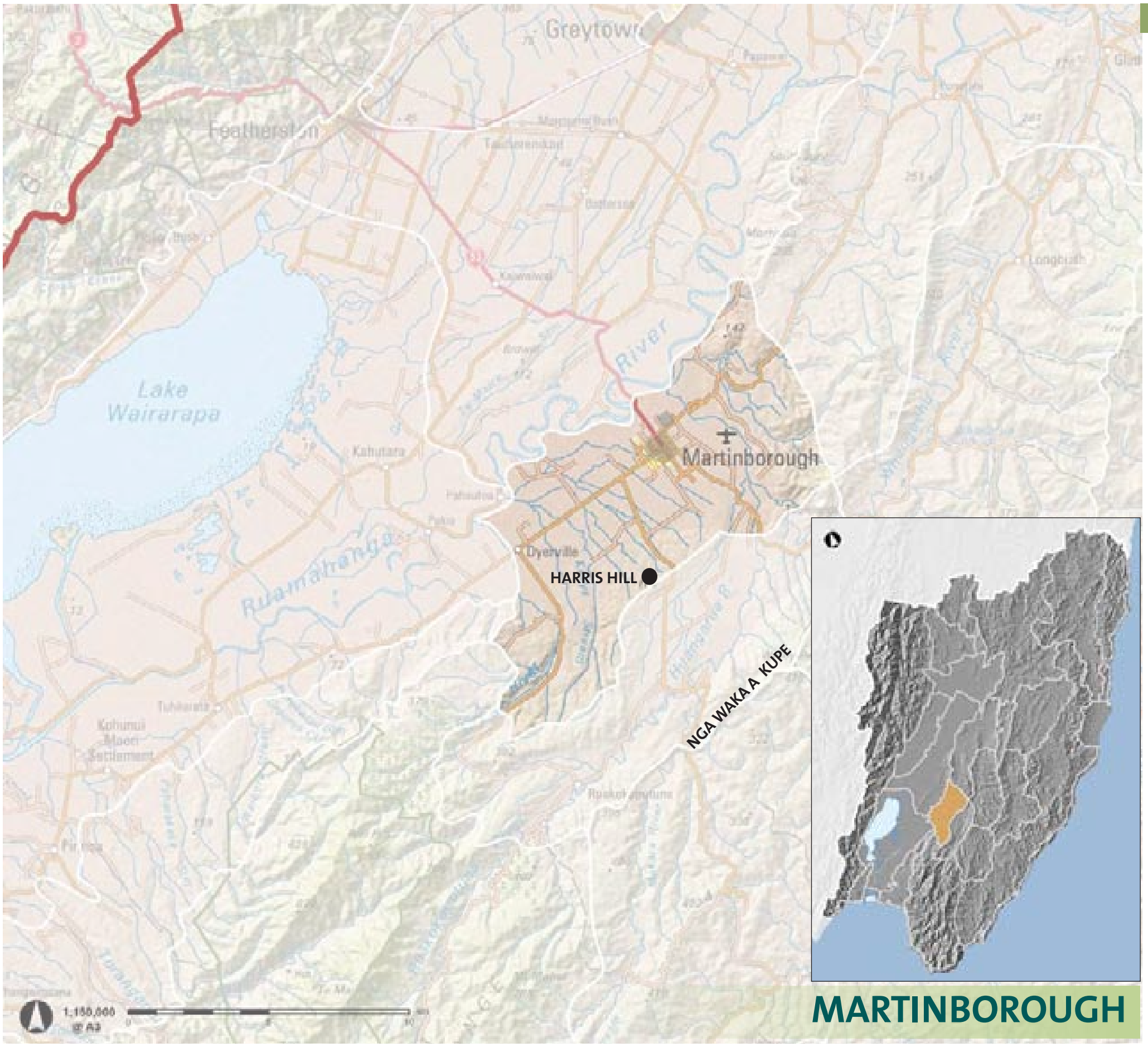
Martinborough has become renowned for its vineyards, which are extensive and suited to the shallow stony soils and long, dry summers.

Martinborough has become a desirable visitor destination, fuelling a number of upmarket rural-residential developments around the outskirts of the town, such as Martinborough Estate.

KEY LANDSCAPE CHARACTERISTICS

- Changing land use – extensive vineyard development and olives
- Flat to steep topography – linearity of lots of parcels on the plains
- Lowlands (Harris), Nga Waka a Kupe and Windy Peak form backdrop to Martinborough
- Patchwork of vegetation – pasture/ vineyards dominant
- Ruamahanga and Huangarua Rivers
- Hot, dry summers, free draining stony soils
- Tourism

The distinctive profile of Nga Waka a Kupe forms an iconic backdrop to the township of Martinborough.



MARTINBOROUGH

Land uses around Martinborough have diversified considerably in recent years and aside from the vineyards, include market gardening and olive groves.

HUANGARUA

The Huangarua character area consists of the basin and valleys east of Martinborough, including the catchments of the upper Huangarua and Ruakokoputuna (Ruakokopatuna) Rivers, and Blue Rock Stream. The upper Ruakokoputuna River features a large limestone cave -the Ruakokoputuna Chasm, and in the wider vicinity are a number of interesting limestone caves and limestone landforms, the most dramatic of which is Haurangi Bluff.

The northern end of the Huangarua River terraces is relatively wide and flat, creating a distinct basin between the enclosing hills. The river flats narrow at the southern end where the Ruakokoputuna River flows into the Huangarua River down a narrow steep-sided river valley. A distinctive 'tongue' of low sandstone hills encloses the basin on the west and separates it from Martinborough and the plains beyond. The eastern side of the character area is defined by the higher limestone ridge that includes Windy Peak (475m) and the 'The Waka' (Nga Waka a Kupe) landforms. The Waka landforms are a highly recognisable landmark that are identifiable from Martinborough and many parts of the southern plains.

The northern part of the area has a gentle topography of flat undulating river plains and rolling hills. To the south, where the character area adjoins the Aorangi foothills, the hills become higher and steeper (high point 390m). The eastern limestone slopes have a generally gentle gradient with a steep escarpment traversing the lower slopes.

Huangarua was a Maori papakainga (village) and a number of pre and post- European Maori settlements can be found in the area. The Waka east of Martinborough is perhaps the most known significant site in this area.

Pastoral farming is the dominant use of the area on both the river flats and the hills. Areas of vineyard have been established on the Ruakokoputuna River terraces in the southern part of the character area. There are mature pine shelter belts on the grazed rolling hills and terraces and small exotic woodlots and amenity tree planting. Native vegetation is sparse and generally restricted to patches in some gullies and on steeper higher slopes to the south.

The rural settlement pattern is typically aligned to the road layout with well established farmsteads enclosed with mature amenity planting. There is some evidence of recently built dwellings in the area. White Rock Road is the main route through the area. Ruakokopatuna and Blue Rock Roads provide access to the valleys and higher land in the south and Te Muna Road links the area to the north.

The Blue Rock glow worm caves and the Ruakokoputuna Chasm are well known visitor attractions in the area.

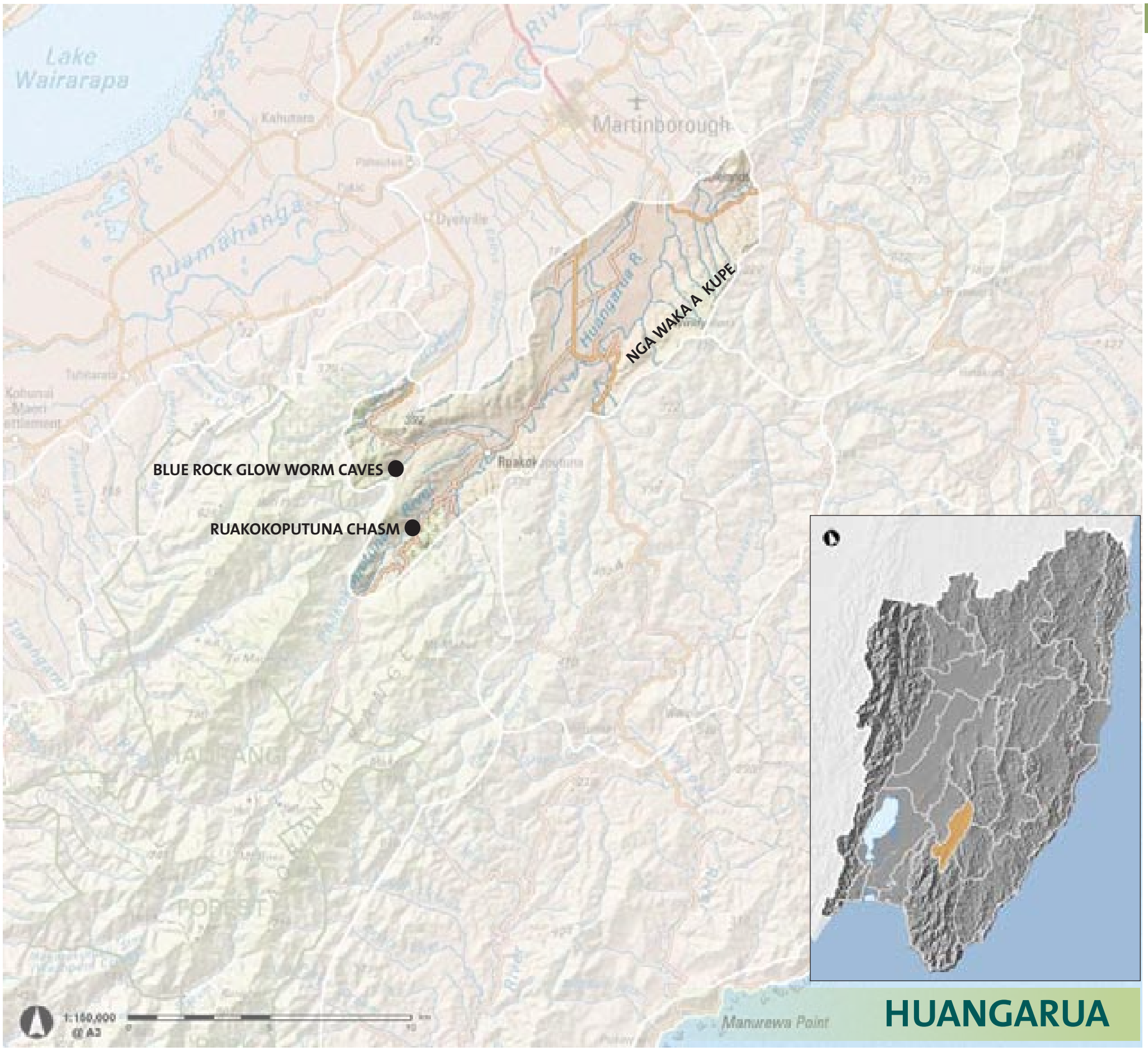
Vineyards on the river flats at Ruakokoputuna are a relatively recent land use in an area where sheep and beef farming is the dominant and long - established activity.

While secluded from the wide and expansive Wairarapa Plains, the broad (northern) end of the valley still seems a relatively open and uncluttered landscape.

The Nga Waka a Kupe landform is a prominent backdrop to both the Huangarua Valley and the wider plains to the west. Shelterbelts and woodlots break up the valley floor. Below: The Blue Rock Road valley at the southern end of the character area is narrower and more enclosed by higher hills than the basin to the north.

KEY LANDSCAPE CHARACTERISTICS

- The Waka (Nga Waka a Kupe) Landform
- Blue Rock Glow worm caves
- Broad secluded valley
- Ruakokoputuna Chasm
- Haurangi Bluff



The low hills of the western side of this character area (the hills separating the Huangarua valley and Martinborough) have gentle rounded tops with steep-sided gullies often with stands of semi-mature kanuka.

SOUTHERN PLAINS

The Southern Plains is characterised by low-lying flood plains, the Ruamahanga River, Lake Wairarapa and the Kahutara dunes - a belt of sand dunes located between Lake Wairarapa and the Ruamahanga River. It is defined approximately by Lake Onoke to the south, Lake Ferry Road to the east, and SH53 to the north. The extensive hinterland around this large freshwater lake is periodically inundated by flood waters. Prior to the Ruamahanga River diversion (opened 1968) and flood control barrage (opened 1974), the hinterland was permanently water-logged and originally supported an extensive wetland. Lake Wairarapa and its associated wetlands and scattered forest remnants are the largest wetland system in the lower North Island. The area is considered to be of national and international importance for indigenous plant and animal communities.

The Southern Plains around Lake Onoke have a low density of settlement and are extensively grazed.

While the diversion and floodgates and subsequent drainage measures transformed the hinterland, its flood-prone nature makes it largely unsuitable for more intensive development other than extensive grazing. There are remnant wetlands and native forest in places along the margins of the lake, but generally vegetation clearance and establishment of pasture and grazing occurs right up to the lake margin.

Lake Wairarapa is spiritually and traditionally important to Maori as an area for gathering food and fibre, including: eel, fish, waterfowl, and plant material, including flax and raupo. This area's section of the Ruamahanga River was as important to iwi as the lake and many early reserves associated with urupa and marae were located there.

The diverse habitats in the Lake Wairarapa wetlands have been recognised as a potential international RAMSAR site. Almost 100 bird species have been recorded over the past two decades, including some international migratory birds. The majority of the wetlands are protected as either conservation areas or wildlife and scenic reserves, managed by the Department of Conservation. Fish and Game New Zealand owns and manages an area of wetland for game birds, and the Lake Domain recreation reserve is managed by the South Wairarapa District Council. The area offers many activities, including game bird hunting, fishing, and bird watching.

The Ruamahanga River diversion has made thousands of hectares of land available for farming. However, because it is still susceptible to occasional flooding, the area is not suited to more intensive development.

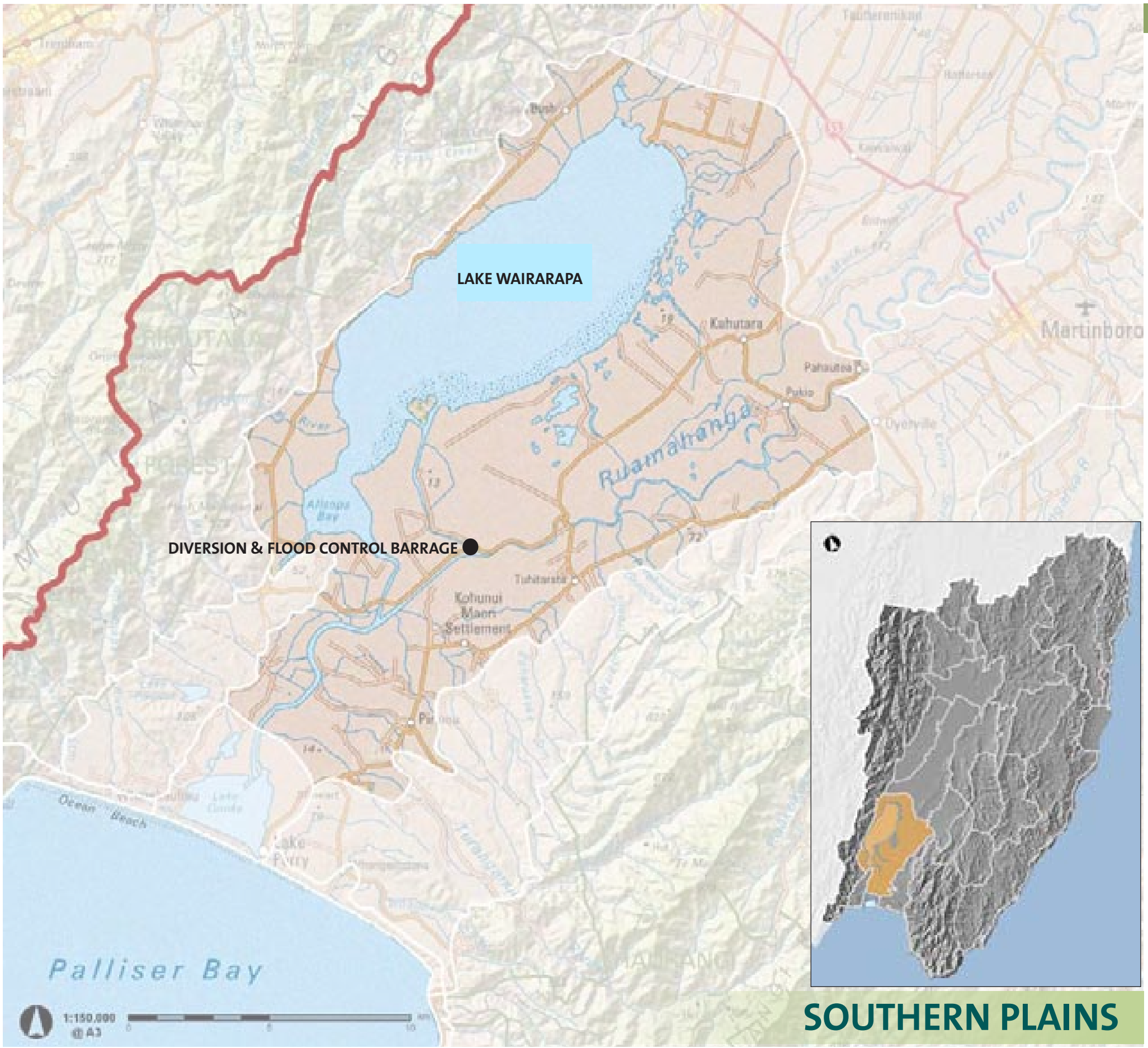
This area consists of fertile plains and river terraces. Land Type 1 is predominant, and is evident in the fine grain silt, sand and gravels which have been deposited on the floodplain from upstream from the ranges. Whilst pasture is the most common type of land cover, there are widespread plantings of poplar, dense plantings of willow along the Ruamahanga River channel, as well as scattered kahikatea remnants and stands of cabbage trees. The area is largely frost free, with moderate rainfall. Land use is dominated by sheep and beef farming, and extensive dairying, which is well established in the southern plains, and some small scale cropping. Widespread use of large scale boom irrigators is evident.

Settlement in the area is sparse, consisting mainly of farmsteads, clusters of farm buildings and the small settlement of Pirinoa and Kahutara.

KEY LANDSCAPE CHARACTERISTICS

- Fertile, low-lying flood plains
- Lake Wairarapa & wetland margins
- Established dairy operations, pastoral land use dominant
- Fragmented kahikatea remnants
- Sparse settlement – constrained by flooding
- The Ruamahanga River bringing silt from the north
- Kahutara dunes

From Ponui Ridge the Southern Plains are defined by the Southern Lowland character areas to the east and west.



Left: The margins of Lake Wairarapa are largely devoid of indigenous forest, with the exception of small patches of remnant vegetation which hint at the original extent of forest cover betweeen the Rimutaka Ranges and the western margin of the lake. Right: The lower reaches of the Tauherenikau River.

SOUTHERN LOWLANDS

The Southern Lowlands character area includes the 'Turanganui lowlands' (below approx. 200 asl) on the lower Aorangi Ranges bounded by Lake Onoke and Pirinoa to the north; and the 'Pounui lowlands' (below approx. 200 asl) encompassing Wharekauhau and Lake Pounui, to the south of Lake Wairarapa (Alsops Bay). Topography and land cover is characterised by a transition between the flat, extensively grazed southern plains and the steep to very steep forested ranges. The ranges on both sides of the plains provide a dominant backdrop to the lowlands.

The Turanganui and Pounui lowlands are former marine terraces with yellow-brown earths. The main differences between the two are that the Pounui lowlands tend to be significantly wetter and frostier than the Turanganui lowlands, and they are also more deeply dissected, whereas the Turanganui lowlands are more gently rolling.

The Turanganui lowlands are a combination of Land Types 1 and 9, incorporating the broad, undulating central plains land type with the soft rock mudstone and sandstone hill country. The slopes are flat to gently undulating, with narrower, steep gullies along the transition between the Turanganui lowlands and Aorangi character areas.

Vegetation on the lowlands is a mosaic of regenerating native bush, with large continuous even-aged stands of kanuka on the upper slopes, and isolated pine plantations and grazing on the mid to lower slopes.

The Pounui lowlands are Land Type 1, forming a continuation of the central plains land type. Topography varies from gently undulating near the plains to the steeper and more dissected gullies and ridges near the border with the Rimutaka/ Aorangi Ranges character areas.

Lake Pounui is located within the Rimutaka foothills, within 5km of the Palliser Bay Coast, and is surrounded on three sides by rolling hills. Remnant native bush, dominated by black and hard beech is extensive to the north and west of the lake. Scattered podocarps such as matai and rimu also occur on the lower foot slopes. Lake Pounui is of regional significance as a habitat for fish, birds, and invertebrates. It has been extensively studied by Victoria University and is protected by a QE2 National Trust open space covenant.

The settlement pattern across the lowlands is characterised by scattered, well established homesteads, interspersed with more recent rural-residential subdivision such as a subdivision on the lowlands east of Lake Pounui. The lowlands have been a desirable place as a weekend getaway, being within comfortable driving distance of Wellington (Te Whanganui o Tara) whilst being remote enough to provide an 'isolated' rural experience. There are a number of small hospitality businesses in the area, some such as Whangaimoana (Maori for "hospitality by the sea") having significant heritage value. Another is an exclusive retreat,

The Southern Lowlands are characterised by a steep, deeply incised coastal escarpment, and a uplifted marine terrace (Wharekauhau Country Estate).

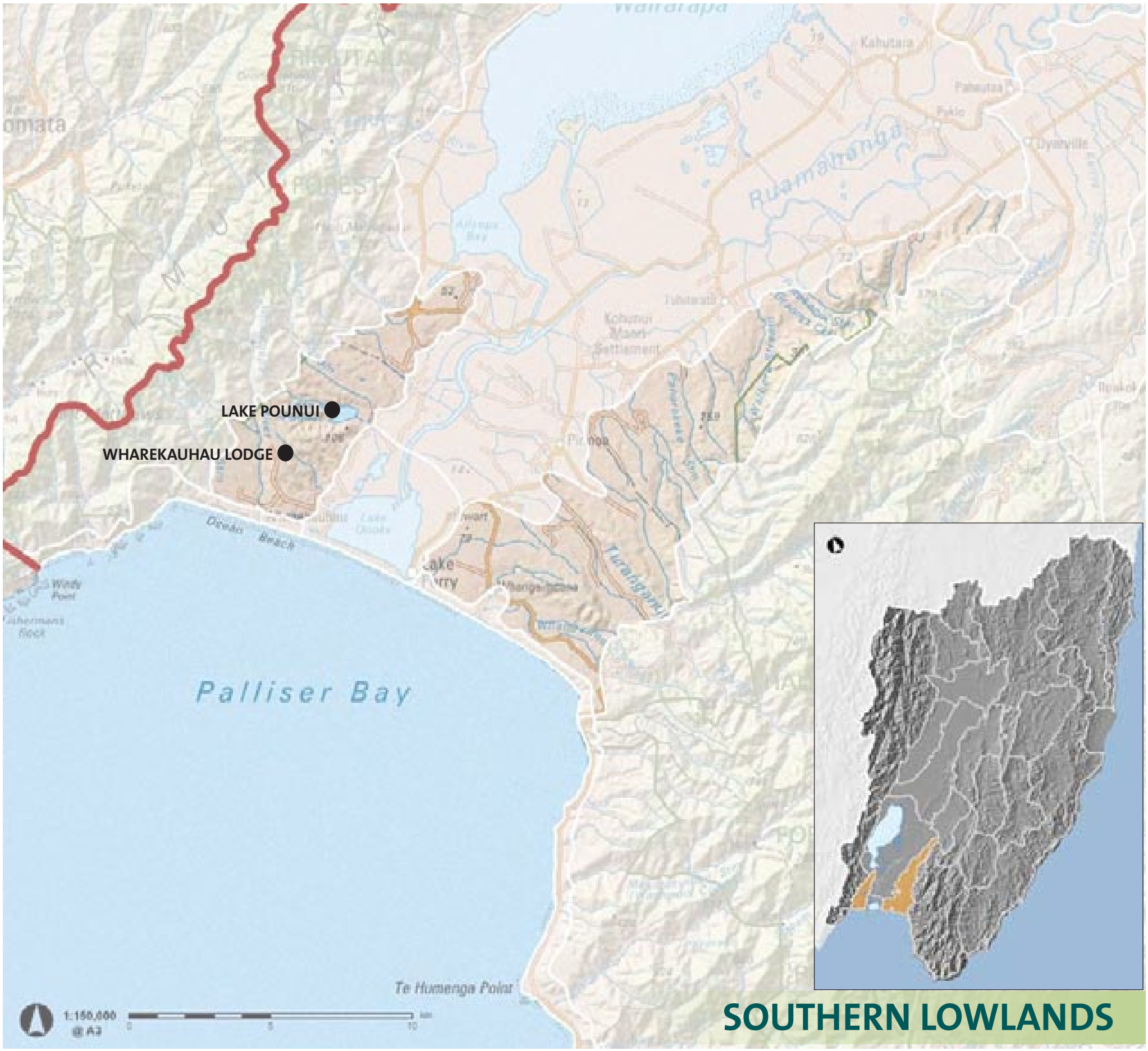
Wharekauhau Lodge and Country Estate, located on the uplifted coastal terraces west of Lake Onoke.

As with other areas that include significant waterways and native remnants this landscape provided seasonal resources for hapu that had established rights within the area. In particular the Turanganui lowlands have several historic Maori sites in the coastal vicinity and alongside the southern waterways. For pre-European Maori, this area was a corridor they occupied and also a passage between the forested and coastal areas. The remains of a house dated to 1180AD, the oldest known structure of its kind in New Zealand was unearthed by archaeologists in the Omoekau valley.

KEY LANDSCAPE CHARACTERISTICS

- Transition between the flat, extensively grazed southern plains and the steep to very steep forested ranges
- Ranges provide a dominant backdrop
- Former marine terraces and a dramatic coastal escarpment
- Lake Pounui has high ecological, scientific and scenic values
- Mosaic of vegetation, including significant native remnants
- Scattered, well established homesteads and exclusive country retreats, interspersed with more recent rural-residential subdivision
- Maori historical sites

Lake Pounui is nestled within the lower Rimutaka foothills; over 284 hecatres of native vegetatin, including the lake itself are protected by a QE2 covenant.



Left: The Southern Lowlands (western side) are extensively vegetated, including large fingers of remnant vegetation which extend down from the Rimutaka Ranges. Right: The Southern Lowlands (eastern side) also include significant fingers of remnant vegetation, which provide connectivity between the Aorangi Forest Park and the Southern Plains.

MAURICEVILLE

The Mauriceville character area lies in the north-western part of the Wairarapa and comprises the valleys and hills associated with Mauriceville, Mauriceville West, the Kopuaranga River and the ridgeline and western slopes of the Te Rangitumau landform. This character area encloses and provides a backdrop to the eastern side of the adjoining Northern Plains landscape character area.

The Te Rangitumau Ridge and its rounded highpoint (604m) is an imposing and distinctive landform in the local area and provides a highly recognisable reference point from further afield, especially the northern plains and Masterton (Whakaoriori) and environs. The northern boundary of the Wairarapa Landscape Study traverses the summit of Bruce Hill (710m) and is the highest point of this particular character area.

Te Rangitumau, the associated low hills and valleys, and the eastern slopes of the Kopuaranga River valley, are predominantly limestone (Land Type 10), and are characterised by rounded spurs and ridges. West of the Kopuaranga River the geology of the hills is soft base rock, predominantly mudstones and sandstones (Land Type 9), but there are also pockets of limestone. This generally soft country is susceptible to erosion and stabilisation planting has been established in some steep gullies and on some slopes.

The hills and valleys are predominantly open grazed pasture land with bare ridges and upper slopes, which clearly reveal the underlying landform. Erosion planting of hybrid willows is evident on some steeper slopes. Amenity exotic tree planting and woodlots are confined to the base of the valleys, and around farmsteads. Stands of mostly even-aged kanuka and areas of regenerating native vegetation occur in some gullies. With the exception of the native podocarp-broadleaf forest remnant on Bruce's Hill, there is very little mature native vegetation in this character area.

Te Rangitumau is the ancestral mountain for Maori of the central and upper Ruamahanga River valley. Several important papakainga and pa sites are located within this area. The Kopuaranga valley was heavily cultivated and was also the location of the main pre-European track going north towards Eketahuna and other northern villages.

European settlement and clearance of the native forest known as Seventy Mile Bush (Te Tapere Nui o Whatonga) began in the early 1860s. A temporary camp for settlers at Kopuaranga, known as the

The lime works at Mauriceville utilise the building that was once the Mauriceville Dairy factory.

'Scandinavian Camp', provided short term accommodation for the Danes, Swedes, Norwegians and other settlers, who came to the area under a New Zealand government subsidised scheme to farm, clear the bush or build the road to Napier. A predominantly Scandinavian settlement was established at Mauriceville West when the railway was constructed through the Kopuaranga River valley. Mauriceville became the focus of the community and remains so today with the lime company and school currently located there.

KEY LANDSCAPE CHARACTERISTICS

- Te Rangitumau landform, local landmark and identity in Wairarapa
- 1860s Scandinavian settlement at Mauriceville West

Left: The smooth rounded hills and ridgetops that dominate the character area express the underlying limestone geology. Right: Pastoral farming is the dominant land use. The hilltops are generally bare of woody vegetation with tree planting concentrated near the base of valleys.

MAURICEVILLE WEST

TE RANGITUMAU

MASTERTON

1:150,000 @ A2

MAURICEVILLE

Left: Mauriceville village has remained the focus of the community, and was first established as a rail-head on the Wairarapa-Napier railway line providing transport for timber and dairy products from the area. Middle: Memorial to the Scandinavian pioneers that first settled Mauriceville West. Right: The distinctive shape and physical presence of Te Rangitumau make it a prominent landmark throughout the northern Wairarapa plains area.

WHANGAEHU - TAUWERU

The Whangaehu and Tauweru character area includes the river catchments of the Whangaehu and the Tauweru Rivers, extending from the study area boundary in the north, to the Wairarapa Plains near Te Whanga in the south. The western boundary is defined in the north by the steep eastern scarp and slopes of Te Rangitumau (603m) and in the south by the lower ridges of Fosters Hill and the high point Otahoua (351m). The dissected hills to the east range from 350-500m and separate this character area from the Tinui-Whareama catchments. The Bideford, Whangaehu and Tauweru communities are included in this area.

This hill country is a complex of hills and valley systems, that drain into the two main rivers. The predominant land type is soft rock mudstone and sandstone hill and steeplands (Land Type 9). These softer materials result in gentle and rounded hills, ridges and spurs, and can be prone to erosion; there is some evidence of this in places. They also indicate a limestone resource and explain the presence of extraction operations such as Tauweru Quarry. The softer materials are interspersed with areas of harder material (Land Types 7 and 8) which are evident as steeper hills with sharper ridges and spurs.

The Whangaehu and Tauweru character area is significant to Maori as they are the main northern and eastern gateways to Masterton (Whakaoriori). Thus settlements, wahi tapu and mahinga kai areas are found around the valleys going to and from the coast and northern Wairarapa.

The primary land use is pastoral farming. The hills and valleys are predominantly grazed pasture with relatively bare tops and upper slopes clearly revealing the underlying topography. Areas of recent erosion are evident and erosion stabilisation planting is also evident on some of the steeper faces. The hilly farmland is interspersed with substantial tree planting, particularly in some gullies, in the base of the river valleys, and around farmsteads. The trees are a combination of shelter, and amenity planting in association with dwellings, small production woodlots and remnants of native vegetation.

The slopes either side of the valley north of Bideford have large areas of exotic pine plantations, including Tividale, Awaroa and Ngaumu forests on the eastern hills. There is very little exotic forestry elsewhere, with the exception near Dreyer's Rock at the northern end of the Whangaehu valley and southeast of Tauweru at Big Hill. Smaller plantations and exotic woodlots are scattered throughout the area.

Native forest remnants are few and are typically associated with regenerating native vegetation which together remain in steep gullies and on steeper slopes. One important collection of remnants, the 334 ha Rewanui property, is owned by the Montford Trimble Trust Foundation and is located on the Masterton-Castlepoint Road, 23 kilometres east of Masterton.

Several roads that connect to other areas pass through this character area: the Whangaehu Valley Road to Alfredton in the Tararua district; Masterton-Castlepoint Road to Tinui and beyond to the coast; and the Masterton-Stronvar Road to Wainuioru. The area is one of rural settlement that is closely based on the roading network. The area is well established as a rural area with little sign of recent subdivision for residential purposes.

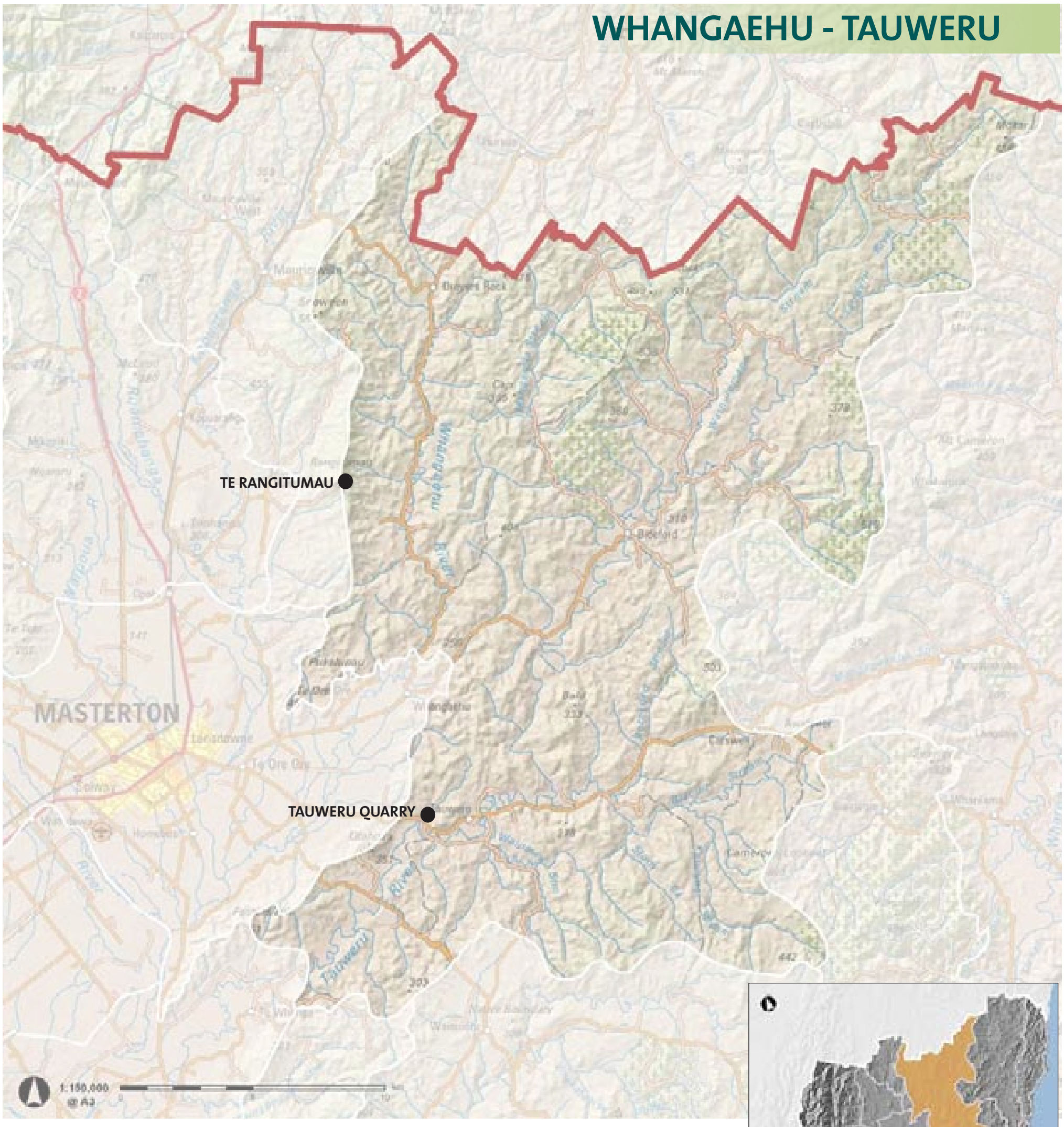
KEY LANDSCAPE CHARACTERISTICS

- River valley environment
- Well established and long settled rural community
- Limestone resource
- Rewanui bush remnants

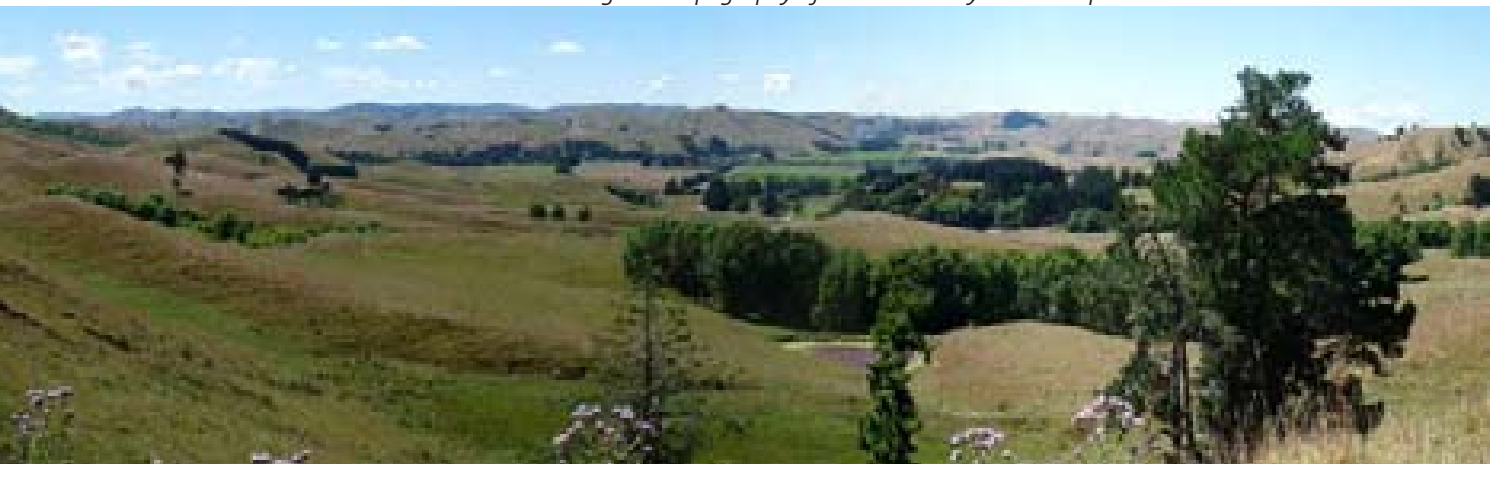
Farmsteads located in the base of the valleys surrounded by mature amenity and shelter trees are a common feature of the character area.

Large areas of exotic forestry in the Bideford valley contrast with the predominantly bare open hilltops that dominate the area. Below: Castlepoint – Masterton Road: Trees are often prevalent in the gullies and on the lower slopes, with willow common in the river beds, regenerating native scrub occurs in some gullies and on some steeper slopes.

WHANGAEHU - TAUWERU



From the Central Limeworks on Stronvar Road: The gentle topography of Tauweru valley and river plain.



TINUI - WHAREAMA

The Tinui-Whareama character area comprises the catchments of the Whareama and Tinui Rivers and the Mangapakeha Stream, including the enclosing hills, slopes and valley floor. River valleys tend to be broader and more open in the south, but together, these catchments drain a large inland area at the northeastern extent of the study area and run more or less parallel to the coast. The valley system is separated from the coast by a low range of forested hills. The Whareama River extends along the length of the character area and discharges to the sea 8-9km north of Riversdale Beach. A small part of the northern tip of the character area drains northward into Tararua District catchments.

Mt Misery (371m) is the highest point in the area and separates the Whareama and Tinui valleys. Low, gently rolling hills enclose the broad valley floor. The flood plains that extend from Tinui Village to the coast vary in width, and are narrower at the northern end. They provide a relatively large area of flat fertile land that largely characterises the area. The middle and lower parts of the catchment, while enclosed by hills, are open and spacious and contrast with the dissected surrounding hill country.

The Tinui and Mangapakeha Taipo are two distinctive geological features and are prominent and notable landmarks. Their jagged vertical rock formations rise abruptly (300m) above the surrounding land. Mature pines are well established around the lower parts of the Tinui Taipo, and their dark green conical forms help to accentuate the taipo. Due to their close proximity to the Masterton-Castlepoint Road, the taipo are highly visible and are well recognised features of the landscape.

The Tinui and Mangapakeha Taipo were used as geographical markers by Maori. A story regarding seasonal eel fishing includes both Taipo. Otherwise the area was passed through and resources exploited during annual migrations.

Grazed pasture is the dominant vegetation on both the flats and the hills. Sheep and beef farming are the dominant land uses. Pine and eucalypt production forest has been established on some of the steeper slopes and willows line the river courses along parts of the valleys. There are areas of mature amenity tree planting, especially in association with dwellings and farmsteads. Small patches of regenerating native scrub, and small native bush remnants are also evident throughout.

Settlement is well established with farmsteads and associated mature tree planting, woolsheds and stockyards aligned along the main roads which follow the valley floors. The landholdings are generally large on the hill country with smaller properties on the better land in the base of vallies.

The ANZAC Memorial Cross near the summit of the Tinui Taipo, just north of Tinui village, adds another dimension to the significance of the taipo. It is claimed that the first ANZAC service in New Zealand was held in 1916 at the Church of the Good Shepherd in Tinui.

Tha Mangapakeha Taipo are a memorable and distinctive feature from the Masterton-Castlepoint Road.

The Tinui Taipo is geologically significant and highly visible from Tinui Village and environs; the ANZAC memorial cross near its summit, the first such memorial in Australasia, adds heritage value to this site.

KEY LANDSCAPE CHARACTERISTICS

- Tinui Taipo (369m)
- Mangapakeha Taipo (376m)
- Broad flat valley floors enclosed by hills

The broad flat river plains of the Whareama Valley are a key feature of this character area.

TINUI TAIPO

CHURCH OF THE GOOD SHEPHERD

MANGAPAKEHA TAIPO

Castle Point

Riversdale Beach

TINUI - WHAREAMA

MAUNGARAKI

The Maungaraki landform is a classic limestone hill with a gently sloping dip slope on the west, and a much steeper scarp on the east. The scarp is referred to as the Pariwhariki Escarpment and is a topographical feature of the neighbouring character areas (Wainuioru and Hinakura). The Maungaraki Range provides a substantial backdrop to the Gladstone area and is an identifiable feature from across the plains.

The Maungaraki character area includes the main ridge and upper part of the western dip slope together with the lower secondary ridge (much of which lies between 200m and 500m). The main ridge's distinctiveness is due to its long flat near horizontal profile and its height. The main ridge's elevation is relatively even across its 17km length varying from 501m at its northern end to the highest point Eringa 575m at the south. Eringa in itself is also a highly visible and recognisable landform from many locations throughout the plains. The secondary ridge, which runs parallel to the main ridge but at a lower elevation, is seen as the dominant ridgeline from the Gladstone area below. From the toe of the slopes the secondary ridge partially obscures the higher main ridge from view. However, from locations further out in the plains the main Maungaraki Ridge is seen on the skyline. Consequently, this character area provides the overall backdrop and forms the skyline to the wider plains. By contrast, the lower slopes, included in the Gladstone and Ponatahi character areas, provide the immediate hill backdrop to the plains and immediately adjacent valley floors.

The Kourarau Stream valley is a secluded and elevated valley enclosed between the two ridges and drains to the upper Kourarau Dam that is contained behind the secondary ridge adjacent to Te Wharau Road. Te Wharau Road passes through the saddle between two high points of the main ridge Pariwhariki (537m) and Maungaraki (531m). The secondary ridge is more defined at its southern end (519m), breaking down into a series of hills and stream gullies north of the Kourarau Dams.

The rounded undulating to hilly landforms typical of the underlying limestone dominate the area. Steep slopes are few and where they occur they are associated with the ridges, rock outcrops, escarpments and the sides of gullies.

A special Maori connection is found in the famous legend of the taniwha Ngarara Huarau from Kourarau and his sister Parakawhiti after whom the prominent cliffs to the south of the Gladstone tavern are named. The alternative name for the taniwha is mokonui, another name for moa, which may point to the giant bird being found in the area when early people first stayed there. The names Eringa and Te Wharau are taken from a pa and papakainga.

The hills are primarily grazed pasture, relatively bare of woody vegetation. There are several pockets of native broadleaf-hardwood forest remnants remaining, often associated with regenerating kanuka, in the base of gullies (for example below the lower Kourarau Dam).

The area is a sparsely settled rural area accessed by three roads. Admiral Road passes through the area linking the Hinakura and Ponatahi Valleys. Te Wharau Road, the busiest road, also passes through the area linking the coast at Flat Point (Te Unu Unu) and Glenburn with the plains in the west. Te Awa Road provides access to the slopes at the northern end from Te Whanga.

The Kourarau Dam is a reservoir for the Kourarau Power Scheme consisting of two small power stations commissioned in the early 1920s.

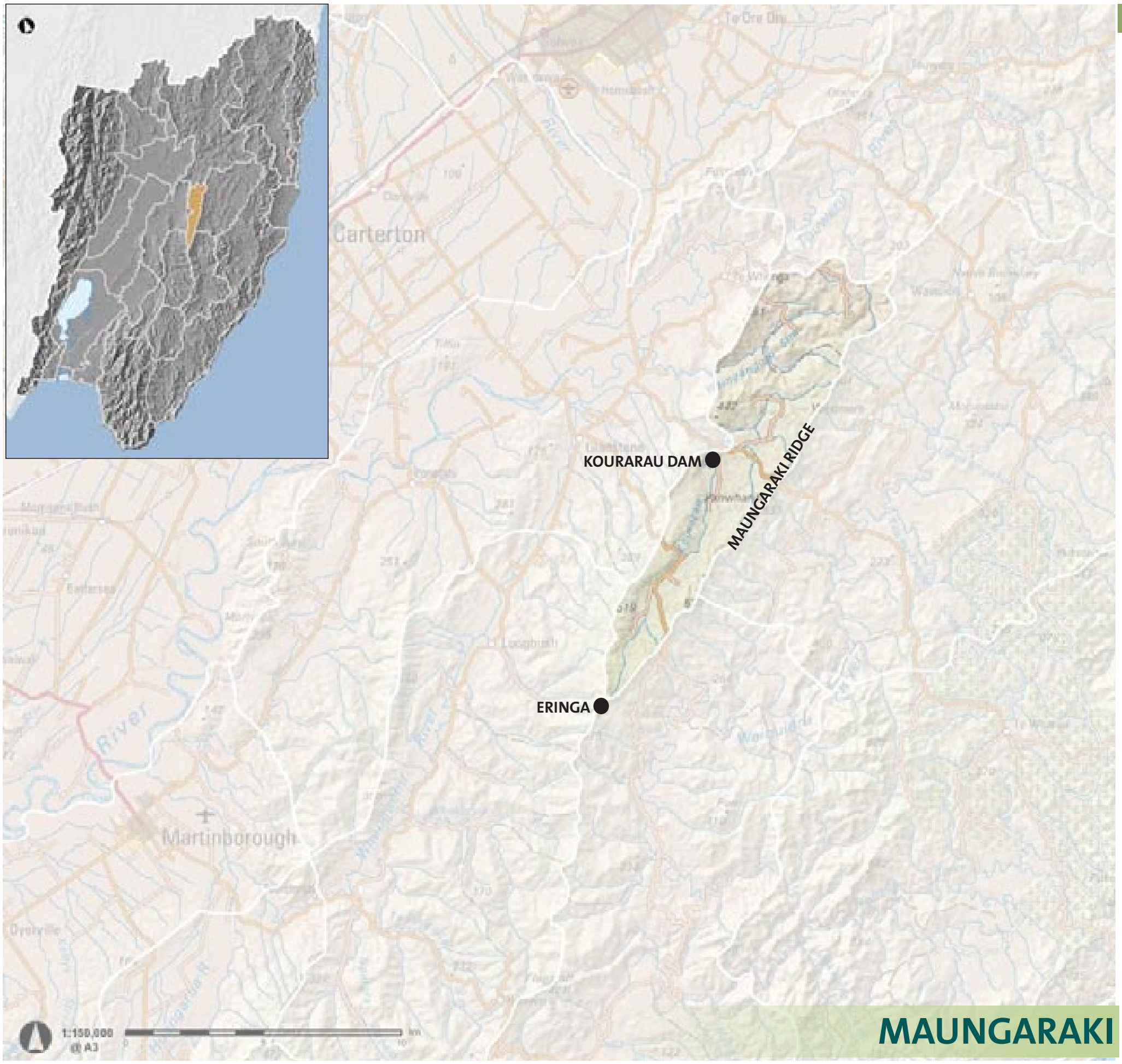
NOTABLE CHARACTERISTICS

- Elevated rounded limestone hills and valleys
- Long flat Maungaraki Ridge/skyline
- Eringa (575m)
- Kourarau Power Scheme

From the Gladstone Plains the secondary ridge forms the skyline with the higher main ridge obscured from view.

Tha Kourarau Stream valley perched between the main Maungaraki Ridge and the secondary ridge is elevated above the plains. Small native forest remnants remain in places.

Below: The long and virtually horizontal Maungaraki Ridge forms a distinctive skyline with the high point, Eringa, marking the end of the ridgeline and this character area (right of photograph)..



The secondary ridge that forms this skyline encloses the eastern side of the Gladstone Plains. The tall concrete structure is part of the Kourarau Power Scheme.

WAINUIORU

The Wainuioru character area is an elevated basin lying between the more densely settled outskirts of Masterton (Whakaoriori) and the eastern hill country that become more rugged and isolated heading towards the coast. It comprises the valleys and low hills of the upper Wainuioru River catchment, with the floor of the basin being approximately 200m asl rising to 300m in places. The basin is enclosed by the Maungaraki Range in the west and the dissected hill country in the east. The eastern scarp slope of the Maungaraki ridge, known as the Pariwhariki escarpment, is a dominant landform on the south-western corner of the basin rising to 536m.

The distinctive taipo, Te Maipa and Pukekowhai, are highly visible from Stronvar Road in the northern part of the character area and provide prominent reference points.

The Wainuioru area contains several fine examples of pre- European Maori pa sites whose earthworks have survived modification by machinery and stock grazing. Valleys within the area were used for walking between the inland areas and the coast. Numerous artefacts have been found in the area.

The area is fairly uniform, with open, low, rolling, pasture-covered hills. The only steep topography is confined to the banks and terraces of down cut rivers and the prominent Pariwhariki escarpment. Sheep and beef farming are the dominant land uses, with some deer farming and one or two alternative crops such as small olive groves. One large area of pine forestry near Stronvar lies within the character area, relatively close to the extensive Ngaumu forest on the hill country to the east. Small pine and eucalyptus woodlots are scattered throughout the basin. Exotic amenity and shelter trees such as poplar and eucalyptus are also present throughout. Some scattered patches of kanuka remain on steeper slopes or in gullies but there are few remnants of native forest.

Given the 'easy' topography, this area appears long settled, with well established scattered dwellings which are often surrounded with mature exotic trees and amenity plantings. There is very little evidence of recent subdivision.

The school, community hall and fire station at the junction of the Masterton-Stronvar Road and Westmere Road provide a community focus to this well settled and mature rural landscape.

The eastern side of the Maungaraki Range (and Pariwhariki escarpment) encloses the southern Wainuioru valley.

The Te Maipa and Pukekowhai taipo near Stronvar are distinctive and memorable features of the area.

KEY LANDSCAPE CHARACTERISTICS

- Open rolling country
- Te Maipa and Pukekowhai Taipo near Stronvar

Left: Native forest remnants remain on the dissected hill country at the fringe of the exotic forest at Stronvar. Right: Farmsteads nestled amongst mature exotic trees contrasting with the relatively bare pastured hills, a pattern that typifies this long settled rural area.

MAUNGARAKI RIDGE

TE MAIPA

PUKEKOWHAI TAIPO

WAINUIORU

Flat to undulating river flats are enclosed by relative low rolling hills, giving this secluded valley a sense of openness.

LONGBUSH

The Longbush character area includes the valley and enclosed by the Ponatahi Hills(440m) to the west and the slopes at the southern end of the Maungaraki Range (400-500m) that skirt around the back of the Windy Peak Ridge. The hill/valley character area is a transitional area between the plains and the more rugged hill country to the east. The Gladstone, Central Plains and Martinborough character areas wrap around the north and west sides of the Longbush Character area and the Hinakura, Tuturumuri, and Huangarua character areas bound the eastern and southern sides.

Longbush Road follows the valley floor and provides a connection between Gladstone and Martinborough with Hinakura Road providing acess to the coast via Hikawera, near the ridgetop in the south east corner of the character area.

The slopes of the Maungaraki Range were used extensively as pa locations, while several urupa are located in the area. Papakainga were located near Tablelands. The remains of the Uwhiroa swamp provide clues as to one of the attractions that drew Maori to Longbush.

Relatively soft mudstones and sandstones make up the hill country (Land Type 9). This geological base is reflected in the smooth rounded forms of the hills and ridgetops which are a feature of the area, and clearly recognisable under the grazed pasture. The steep-sided gullies, often supporting regenerating native vegetation, provide a distinctive separation between the rounded ridges and spurs. The relatively broad and undulating valley floor, supports a patchwork of paddocks and shelterbelts.

Erosion is occurring on some of the steeper slopes and planting of exotic erosion stabilisation species is a common feature on the steeper land. Grazed pasture dominates the area which is interspersed with shelterbelts, exotic woodlots and occasional exotic forestry blocks and small areas of grapes have recently been established. Amenity planting of exotic tree species is established around farmsteads.

The broad valley and low rounded hills combine to create a semi-enclosed medium scale landscape. The 'easy' topography means that this area has been long settled with well established farmsteads situated along the valley floor and roads. Buildings are generally not prominent as they are nestled into the folds of the hills and typically surrounded by trees. There is little evidence of recent subdivision.

The smooth grazed hills interspersed with clusters of trees give the appearance of a well managed rural landscape. There are no settlements in this character area but it is closely associated with the Martinborough, Gladstone and Ponatahi communities.

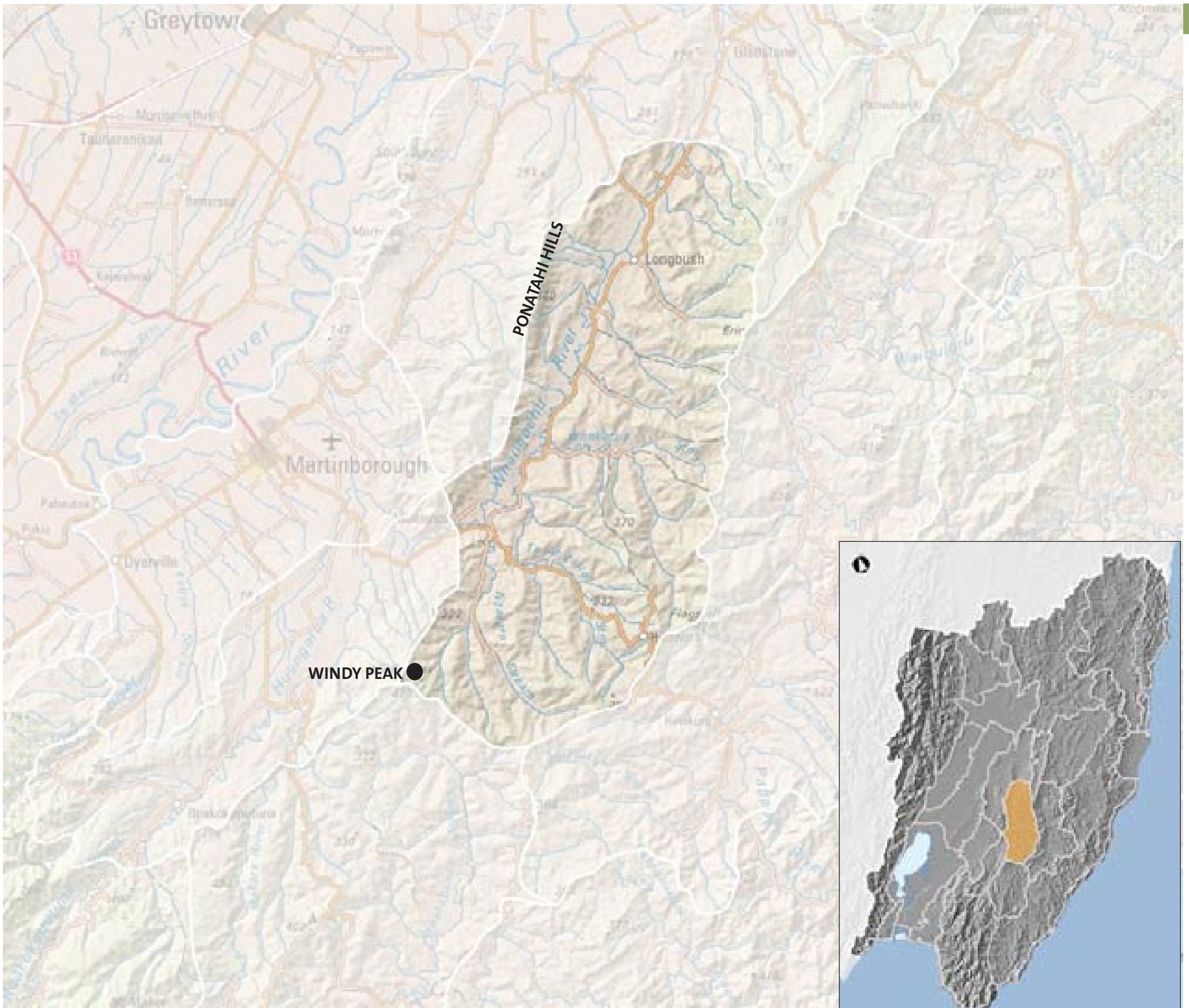
The broad and undulating valley floor supports a patchwork of farmsteads, typically set within well established amenity planting.

Kanuka on steeper land and in some gullies, together with pine woodlots, are common in the area.

NOTABLE FEATURES

- Smooth rounded grazed pasture hills & valleys
- Uwhiroa swamp

Grazed pasture is the prominent land cover on the rolling hills. From this point on (Millars Road looking east), the distinctive Maungaraki Range provides the backdrop.



LONGBUSH

The smooth grazed hills interspersed with clusters of trees give the appearance of a well managed rural landscape.

HINAKURA

The Hinakura character area is an inland river valley system and elevated basin between the high rugged coastal hill country and the Maungaraki Ridge. This area encompasses the valleys and hills of the lower catchment of the Wainuioru River and the mid-catchment of the Pahaoa River. The Wainuioru River runs into the Pahaoa River and together the rivers combine to form a single valley system that largely defines the area. The meandering river channels have formed a distinctive pattern on the valley floor, creating discrete areas of flat land between the winding river channels. The valley at the southern end of the area has a relatively wide floor and gently sloping toe slopes that together create a distinct basin, compared to the narrower river valley of the north. The north-western corner of the character area is defined by the southern end of the Maungaraki Ridge scarp.

A complex of rolling to steep hill country flanks both sides of the valley. The dissected hills of the western side are predominantly mudstone/ sandstone (Land Type 9) and generally comprise more gentle slopes and rounded features than the harder and more jagged rock types on the eastern side (Land Type 7). The rugged eastern side of the valley is higher and steeper, with distinctive rocky outcrops, which are not dissimilar to the adjoining Coastal Hill landscape character area to the east.

The valley floor descends from approximately 100m asl in the north to about 40m at the Hinakura Hall in the south. The hills on both sides that rise to about 400m enclose the valley. The meandering river and valley floor is broken near the middle of the character area where the Wainuioru River diverts around the eastern side of Tawhanga, a 400m hill, via a winding steep sided gorge complex.

Hinakura was named after a Maori woman. The story of Hinakura highlights a settlement pattern of tangata whenua in that she eventually met her loved one after they missed a rendezvous with each other. The story takes place between the coast at Pahaoa, through Hinakura and further west to Huangarua (Martinborough).

The traditional Maori walkway from the villages in and around the Martinborough area to the East Coast used the Pahaoa River to connect to the sea .

The hills and valley floor are predominantly used for extensive grazing but there are continuous tracts of kanuka and native forest remnants associated with gullies and steeper land. Small areas of pine forestry and woodlots of other exotic tree species are scattered throughout the valley.

The European settlement pattern is sparse with farmsteads scattered along the bottom of the valley and along the road which traverses this area. This road, which is known by different names along its length (Clifton Grove Road/Wainuioru Road/Ngakonui Road/Moeraki Road) provides access from both the northern and southern ends of the valley. The Hinakura Hall, located at the southern end, marks the centre of this sparsely populated extensively farmed area.

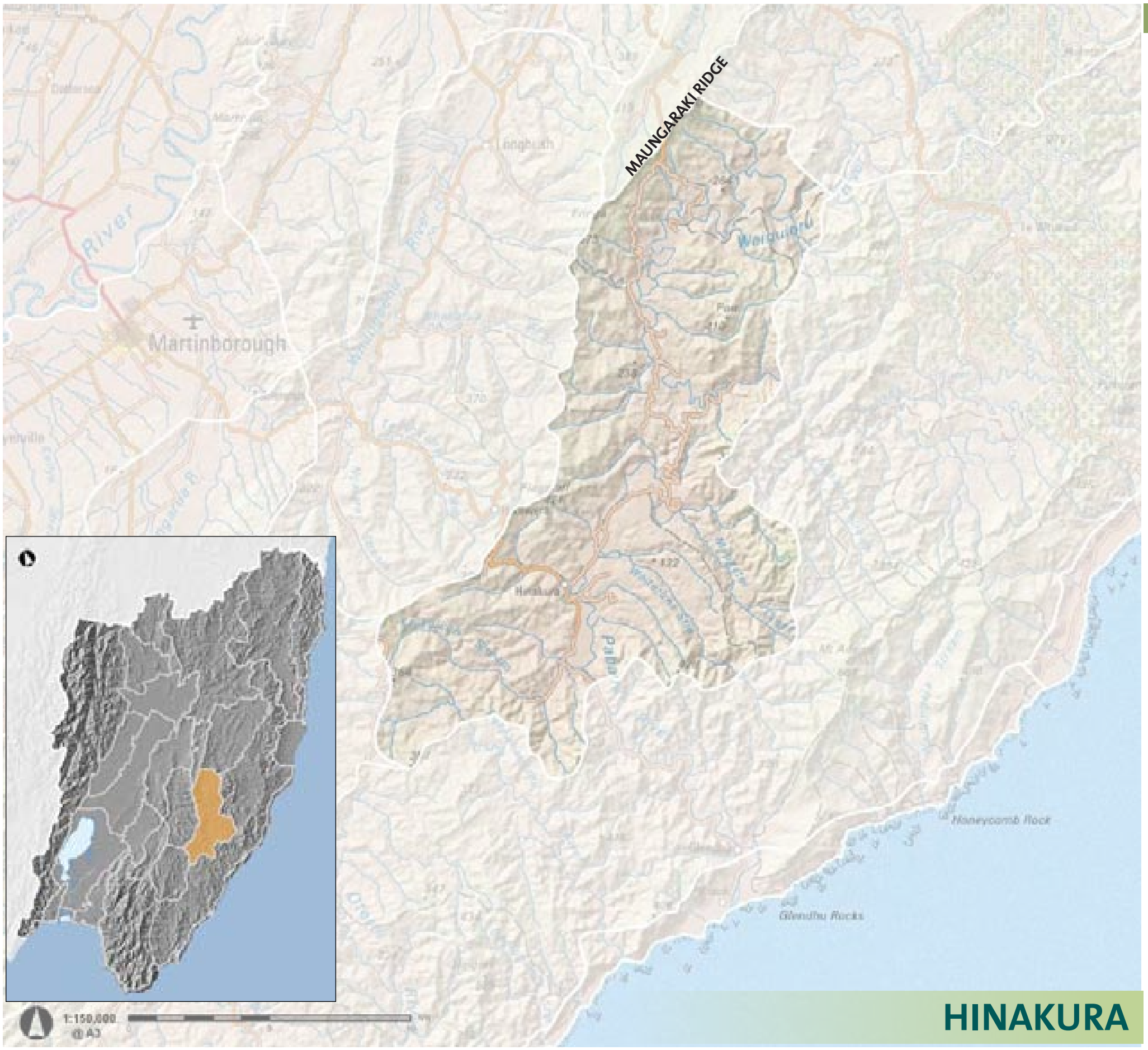
Native forest remnants remain on some of the flood plains in the base of the valley.

View down the valley with the green and fertile river flood plains nestled amongst the hills.

KEY LANDSCAPE CHARACTERISTICS

- Inland isolated valley, with distinct basin in the south, sparsely settled with extensive grazing
- Meander floodplains and down-cut river.

The Pahaoa River meanders through the wide basin at the southern end of the valley. There is dense tree cover in the down-cut river beds.



HINAKURA

From the summit of the Maungaraki Range (Admiral Road) looking east, the Maungaraki Valley is a complex of steep to rolling hills, extensive pasture and relatively dense tree cover. The higher and rugged eastern hill country can be seen beyond.

TUTURUMURI

The Tuturumuri character area comprises the Big Hill ridgeline (where the Hau Nui windfarm is located) and associated slopes either side. The area includes the upper tributaries of the Awhea River (east of the ridge) and the Makara River that drains to the Huangarua River (west of the ridge). This character area is part of the more gentle lower hills that lie between the rugged coastal hills to the east and the plains and lowlands to the west.

The area is bounded by the Aorangi Ranges to the south, the coastal hill country to the east and the Ponatahi and Hinakura character areas to the north. The western edge of the area is defined by the ridgeline that includes Windy Peak (475m) and The Waka (Nga Waka a Kupe) landform which together form a distinctive backdrop to Martinborough. The Waka area is also easily distinguishable from the eastern side of the landform.

This character area is a medium scale rural landscape. The underlying geology of the northern part of the area, including Windy Peak and 'Nga Waka a Kupe', is soft mudstone/sandstone (Land Type 9) which is reflected in the rounded nature of the ridgetops and spurs. The southern portion comprises a harder rock type which is more jagged in nature with steeper slopes.

The Whakapuni Stream runs into the Awhea River and together these form the main valley toward Tuturumuri and the sea beyond. The narrow valley floor of accumulated alluvial material is lined in places with willow trees. White Rock Road follows the base of the river valley with several bridges crossing the river as it winds its way down the valley.

Grazed pasture is the dominant land cover on the often steep hill slopes, which are bare in terms of tree cover. The western side of the main river valley has a denser cover of trees than the east, comprising exotic pine plantations and regenerating native scrub. The Makara River valley is primarily grazed pasture with pockets of regenerating native vegetation in the gullies. A mix of exotic trees is generally associated with the base of the river valley and farmsteads and dwellings. There is little native forest but there are areas of regenerating native scrub. Small exotic woodlots are scattered throughout the area. The only large area of exotic plantation occurs on the hills north of Tuturumuri. These exotic plantations are interwoven with areas of regenerating native vegetation that extend further west to the Aorangi Range. Erosion mitigation planting has been established in places, particularly on the steeper slopes and gullies of the softer and more erosion prone northern areas.

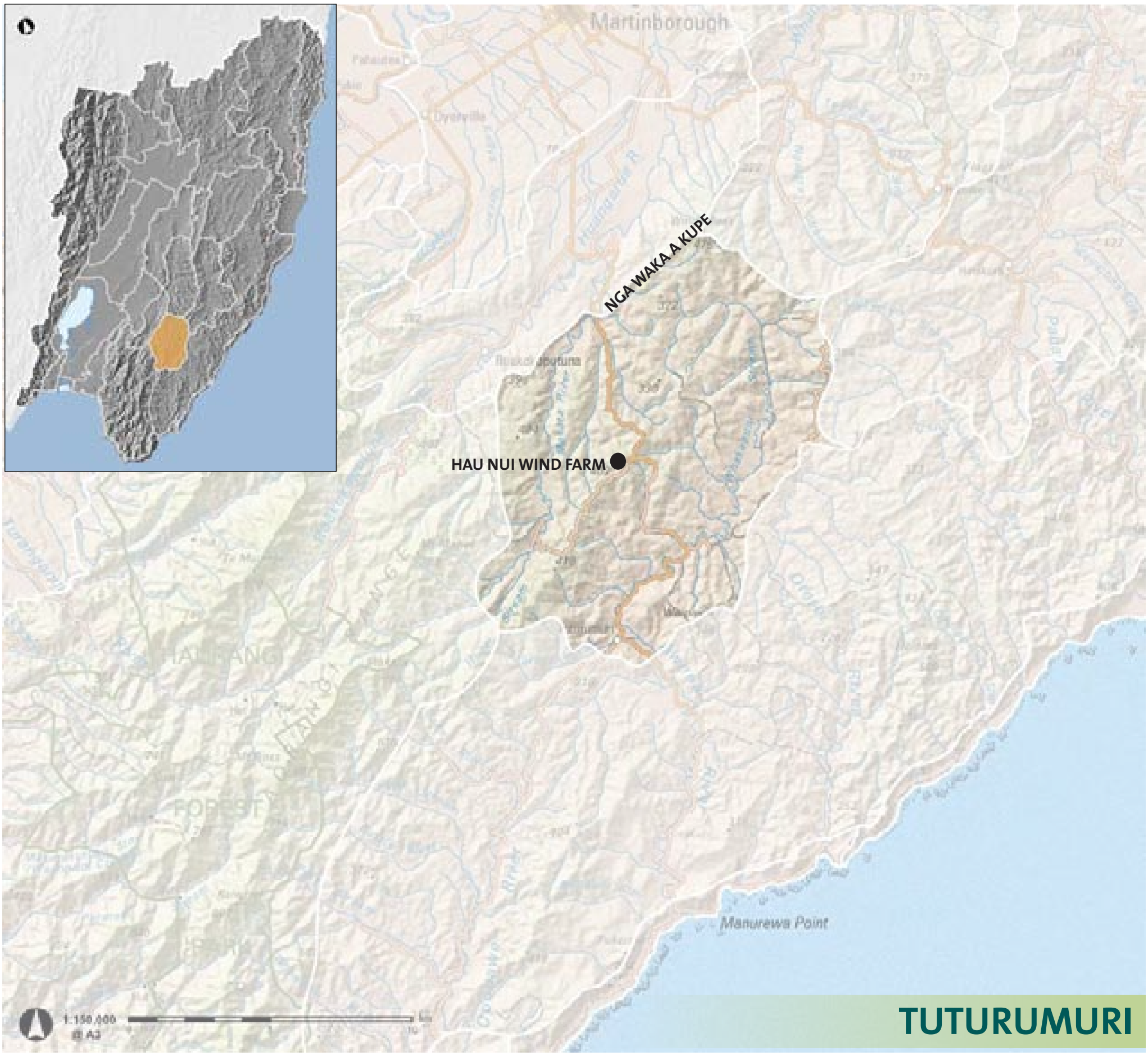
The ridge with the Nga Waka a Kupe landform forms part of the western boundary of the Tuturumuri character area.

The settlement pattern is sparse, with rural dwellings aligned along the roads in the valley floor, with the school at Tuturumuri the community centre.

KEY LANDSCAPE CHARACTERISTICS

- The Waka (Nga Waka a Kupe) Landform
- Enclosed valley floor with linear settlement pattern.

From near the Hau Nui windfarm, the high jagged forms of the coastal hills to the east are silhouetted as a distinctive skyline. Exotic woodlots and areas of kanuka are common on slopes such as those in the foreground



TUTURUMURI

Left: The Awhea River winds its way through the hills toward the sea. White Rock Road and farmsteads are located on the narrow river plains. Willows and poplars line the river bed in places, and erosion tree planting is common in many of the steep gullies. Right: The character area adjoins the Aorangi Ranges in the south east corner where large areas of native and exotic forest are located. Hau Nui wind farm middle left of photograph.

COASTAL HILL COUNTRY

This large character area includes the generally steep to very steep, highly dissected and forested hills and ranges that run parallel to the coast from Mangapakeha in the north to the edge of the Aorangi Range in the south. Despite its size (90km long and 5-14km wide), this character area recognises the largely homogeneous nature of the topography, land use and land cover.

Land Types 7 and 8 predominate and are expressed as a complex of jagged ridges, taipo, and steep narrow valleys, and coalescing colluvial /alluvial footslope fans. The range of taipo south of Stronvar including the peaks Te Maipa (511m) and Pukekowhai (517m), are notable features of the area and are highly visible / prominent when viewed at close quarters from Stronvar Road (Wainuioru character area).

The northeast-southwest alignment of this hill country is a product of the faulting and geologically 'restless' nature of the eastern hill country. Elevation of most ridges varies between 300 and 500m with Mt Adams, just inland from Glendhu Rocks, the highest peak at 663m.

The fragmented and rugged topography and consequent sparse settlement pattern characterise the area, which is generally isolated from the more populated areas to the west. Public road access within the character area is limited to roads that access the coast at Homewood, Flat Point (Te Unu Unu), Glendhu Rocks, Tora and White Rock.

The area also includes the coastal foothills, seaward ridges and slopes that descend to the coastal edge between Flat Point and White Rock.
Several rivers cut through the hills from the interior to the coast. The largest of these, the Kaiwhata, Pahaoa, Awhea, Oterei and Opouawe Rivers, each drain large interior catchments. The associated narrow river valleys also provide road access through the hills to the coast. These river valleys have a distinctly 'wild' and remote feel.

The Kaiwhata River (Kaihoata River) catchment comprises large areas of exotic forest inland of Homewood. The Pahaoa River drains a very large inland catchment that commences northeast of Masterton (Whakaoriori) as the Wainuioru River, and terminates at Glendhu Rocks via a steep sided winding gorge flanked with advanced regenerating native vegetation. The Department of Conservation manages three rare and sizable forest remnants in the Coastal Hill Country - The Tora Bush Scenic Reserve (550 ha); Rocky Hills Sanctuary Area (400 ha); and Rewa Bush Stewardship (1300 ha).

The Opouawe River differs from the other rivers, in that it carries coarse greywacke gravels brought down from the Aorangi Ranges. Both the Awhea and Opouawe Rivers frequently flood and have built up narrow floodplains of alluvial deposits enclosed by steep slopes. The plains become wider toward the coast. By contrast, the Awhea River Valley has a higher level of domestication and a wider valley and valley floor than the other river valleys. Its more accessible nature and associated settlement pattern have resulted in a greater degree of 'domestication',

The coastal hills are high, rugged and substantially covered with a mix of both native and exotic forest.

characterised by areas of exotic vegetation and amenity planting in association with dwellings and farmsteads.

The northern part of the character area (north of Glenburn Station) is dominated by extensive production pine forests, much of which are contained within the Ngaumu Forest. The southern part has extensive areas of kanuka-dominated native shrubland/treeland and large tracts of secondary native forest on steep faces and in narrow valleys.

Pastoral farming is a significant landuse within the character area, particularly on the more gentle hills and foothills along the coastal margin (Flat Point, Glenburn, Glendhu, Te Awaiti, Tora and White Rock) the river valleys (Kaiwhata and Opouawe), and also on the inland fringes of the Wainuioru basin.

There are only a few Maori sites of significance in this area although there are known migration routes that connected the inland valley to coastal sites.

This character area encompasses the inner reaches of both early and latter Maori populations that could be described as predominantly coastal. The hills and valleys of the area supported flora and fauna that were used extensively for food, shelter and implements.

KEY LANDSCAPE CHARACTERISTICS

- Rugged, steep and high hills with extremely fragmented topography.
- Extensive production pine forestry
- Extensive areas of regenerating native shrubland and forest
- Isolated interior and sparsely settled
- Three sizable & rare forest remnants
- Te Maipa Taipo (Stronvar)
- The Tora Bush Scenic Reserve, Rocky Hills Sanctuary, Rewa Bush Stewardship Area

Left: Dense native forest extends to the top of the high and jagged rocky ridges of some of the coastal ranges. Right: Production pine forestry occupies large areas of the coastal hills, much of which were originally cleared of native forest to make way for pasture.

REWA BUSH CONSERVATION AREA
TE MAIPI
PUKEKOWHAI
ROCKY HILLS
TE WHARAU
ROCKY HILLS SANCTUARY
MT ADAMS
TORA BUSH SCENIC RESERVE
TORA

COASTAL HILL COUNTRY

Left: Several rivers drain large catchments within the coastal hills and eventually discharge to the coast. The Pahaoa River gorge has steep banks densely vegetated with regenerating native forest. Right: The coastal hills are sparsely settled with the resident population mostly associated with pastoral farming, which still occupies some of the character area. The Kaiwhata River farmland, predominantly comprises of grazed pasture and a substantial scattering of remnant native vegetation.

WHAKATAKI HILLS

Running parallel to the coast in the northeast corner of the Wairarapa, this range of hills separates the Whakataki-Castlepoint coast from the inland Whareama-Tinui valley system. The area extends from the Mataikona River, (the northern boundary of the Masterton District), to the Whareama River mouth, south of Castlepoint (Rangiwhakaoma). The topography and land use in this character area is very similar to that of the 'coastal hills character area' to the south. The Whakataki character area has been identified as a separate area from the coastal hills in the south, due to the distinct separation provided by the broad Whareama-Tinui River valley.

The main body of the range is steep, dissected hill country rising to 500m at its highest point; but most commonly with hilltops of approximately 300m. A narrow margin of hill country between the main range and the coast composed of softer mudstones has a more rounded and gentle topography, and lower elevations than the main range. Several short river catchments, such as the Whakataki River, drain to the coast and dissect this low and rounded hill country.

The hill country is substantially vegetated with forest and scrub, with smaller areas of the lower coastal hills and inland slopes used for grazed pasture. Large areas of pine plantation (Ngaumu Forest) interspersed with small areas of native forest remnants typify the area. Regenerating native scrub and exotic scrub also cover large areas of the steeper and higher slopes. Pastoral farming is also a significant landuse within the character area, particularly on large stations along the coastal terrace and in river valleys.

Mount Percy Bush is the only substantial area of native bush in the character area. This substantial 1,369 ha block of advanced secondary growth is located on the steep coastal slopes south of Mataikona. A small part of the remnant is protected by a QEII Covenant, with the remainder identified by Department of Conservation as a Recommended Area for Protection.

The steep, relatively isolated forested hill country is sparsely settled with dwellings and farmsteads in the bottom of the narrow valleys adjacent to roads. The Tinui-Castlepoint Road is the only public access across the ranges in the north and the road to Otahome provides access to the coast in the south.

KEY LANDSCAPE CHARACTERISTICS

- Large areas of pine plantation and regenerating native vegetation.
- Mt Percy
- Mt Percy Bush remnant

The steep dissected hills provide an immediate backdrop to the coast at the northern end of the study area.

The character area is largely covered with native and exotic forest and scrub, with some areas of pastoral farming.

Mt Percy is the most substantial native forest remnant in the character area, located on the steep slopes south of Mataikona.

The road to Castlepoint: Production pine forest has a continual cycle of harvesting and replanting with recently harvested areas appearing as visually prominent in the landscape.

MATAIKONA

MT PERCY BUSH

NGAUMU FOREST

Castlepoint

Castle Point

Riversdale Beach

WHAKATAKI HILLS

CASTLEPOINT

The Whakataki / Castlepoint (Rangiwhakaoma) character area includes the coastal strip from Castlepoint to the northernmost extent of the Wairarapa study area, near Mataikona. The narrow coastal platform consists of a smooth, sweeping sandy beach with a gravel access road located between the beach and the foot of the coastal hills. The transition between the coastal platform and wider coastal setting is well defined, with the coastal hills rising steeply from the coastal platform. The predominant land type is eastern coastal fringe and uplifted marine terraces (Land Type 11).

Castlepoint Reef and Scenic Reserve is a unique landscape. The main elements are the dominant rock landform called the 'castle', the lagoon, and the lighthouse which sits on a long curvilinear reef. The distant ridgelines of the Wairarapa hill country provide a distinctive backdrop and sense of scale for the lighthouse and Castle Rock landform. Castlepoint Reef and Scenic Reserve has well documented ecological, heritage and geological values.

Other geological features of note in the area are the Whakataki coast tongue and groove erosion patterns, Suicide Rock (Te Rerenga o te Aohuruhuru) and the Mataikona dunes and shore platform. The latter consist of a dramatic 100m landslide and a rock platform eroded in a distinctive parallel crest-trough pattern.

The area has a mild, dry climate, the highest average air temperature in the Wairarapa, and a long growing season. Westerly winds prevail. Sea breezes often occur in coastal areas on warm summer days. High temperatures are frequent in summer, which may be accompanied by strong dry foehn winds from the northwest. Vegetation within the coastal setting is varied. Where the coastal hills drop steeply to meet the coastal platform, the vegetation is either pasture or regenerating native scrub. There are also large tracts of pine forestry, which extend from the hills to the beach. Indigenous coastal forest is absent, but isolated patches of native vegetation, in the form of dune shrubland and wetland species, occur at various points along the coast.

This area is rich in Maori history and occupation due to the abundance of seafood, migration links inland and access to freshwater. Kupe is said to have chased the great Wheke (Octopus) of Muturangi to a cave beneath the reef at Rangiwhakaoma (Castlepoint). Whatonga, captain of the Kurahaupo waka established his marae there called Matira and a number of tribes have been associated with this area over a long period of time; of note are Te Hika o Papauma, Ngai Tara and Hamua. There are a number of pa sites between Mataikona and Whakataki that sit above the current road level. Rangiwhakaoma was also a safe haven for waka. The large dune system north of Castlepoint Beach is a well-known urupa (cemetery).

With its fossil-rich limestone reef and magnificent 162 metre high Castle Rock, Castlepoint is one of the most spectacular sites along the Wairarapa coastline.

There is a long history of farming in the Castlepoint area, and sheep and beef farming are still the dominant landuses. Many of these old stations remain intact, except for the coastal strip which has been subdivided off to meet the demand for holiday houses. The Mataikona bech settlement features traditional baches which are setback from the coast, preserving the intervening sand dunes and interdune wetlands.

Most of the area is accessible via a gravel, public road, which follows the coastal platform for most of its length. Castlepoint is the largest settlement within the character area and has long been a weekend retreat for Wairarapa families and for visitors from further afield. Castlepoint was Wairarapa's original port, a significant link in the chain for the early wool trade until the early 20th century when road access was established. It is popular for holidays and fishing, and has a safe swimming beach and tidal lagoon.

KEY LANDSCAPE CHARACTERISTICS

- Main settlement is Castlepoint
- Long history of farming – sheep and beef
- Traditional baches – transient population
- Steep coastal hills abruptly meet beach
- Castlepoint Reef & Scenic Reserve and Mataikona dunes
- Mataikona beach settlements
- Suicide Rock

The Whakataki River mouth forms a broad, fertile valley, and has a long history of farming.

MATAIKONA

SUICIDE ROCK

WHAKATAKI

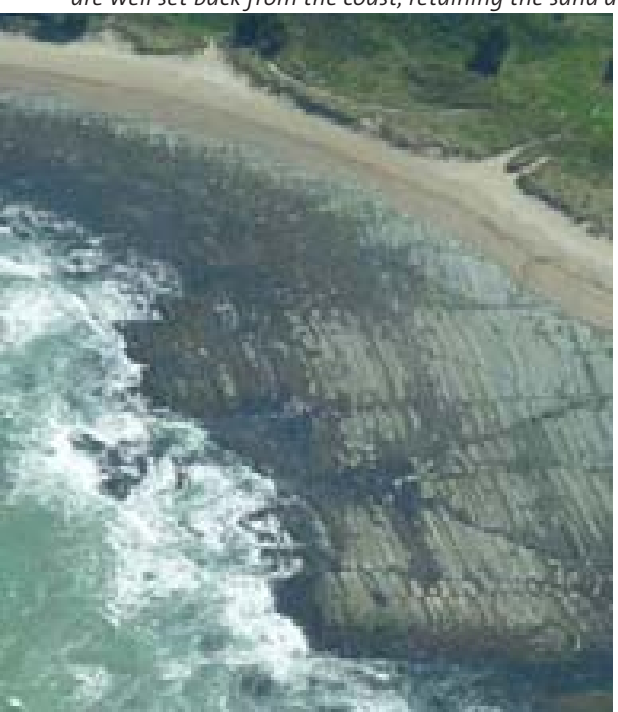
CASTLEPOINT

Castle Point

1:150,000 @ A3

CASTLEPOINT

Left: The Whakataki Miocene Flysch is a series of deeply incised parallel lines which form a 'tongue and groove' pattern. Middle: The traditional baches along the Mataikona coast are well set back from the coast, retaining the sand dunes and interdune wetlands. Right: The sand bar across the Castlepoint lagoon provides access to the historic lighthouse.



RIVERSDALE

The Whareama / Riversdale character area includes the coastal strip from Riversdale to just south of Castlepoint (Rangiwhakaoma). The coastal platform is predominantly a sandy beach, interspersed with short lengths of rocky shoreline and offshore reefs. The coastal setting is characterised by coastal flats (low dunes and wetlands) with rolling duneland topography up to approximately 100m asl. However, at Otahome, the transition between the coastal platform and coastal setting is more definite, being defined by the steeper escarpment along the uplifted terraces. At the river mouths, such as the Whareama River mouth, the river has carved a wide, relatively flat coastal platform, and the coastal influence extends further inland.

The area has low rainfall and strong north-westerly winds, which leave it prone to drought. Vegetation within the coastal setting is varied, with a thin ribbon of land adjacent to the coastal platform supporting a more historic pattern of coastal native shrubland. Extensive grazing typically occurs across the uplifted terraces, right down to the ribbon of native coastal vegetation along the coastal platform. There are small blocks of pine forestry and shelterbelts between Riversdale and Whareama. The large and relatively unmodified south Riversdale dunes and wetlands have regionally important native vegetation with pingao, spinifex, sand coprosma and sand daphne on fragile small dune systems and the unusual occurrence of matagouri.

The Whareama River mouth and associated dunes are considered one of the more intact areas of coastal wetland and duneland along the Wairarapa Coast. The Whareama River is regionally significant as the only tidal river estuary along this coast.

Maori kainga are located in many places along this coastline. They were typically located near good fishing spots, easy access and freshwater hence places such as Otuhaumi (Otahome), Waimimiha, Whareama, and Motukairangi (Riversdale). Evidence suggests that these places were used over many centuries. Most were seasonal as tribes spent the summer months collecting and drying food for winter.

A cluster of pa and garden sites are found on both sides of the Whareama River estuary. Maori buried their beloved in coastal dunes along this area thus bones are often uncovered even today.

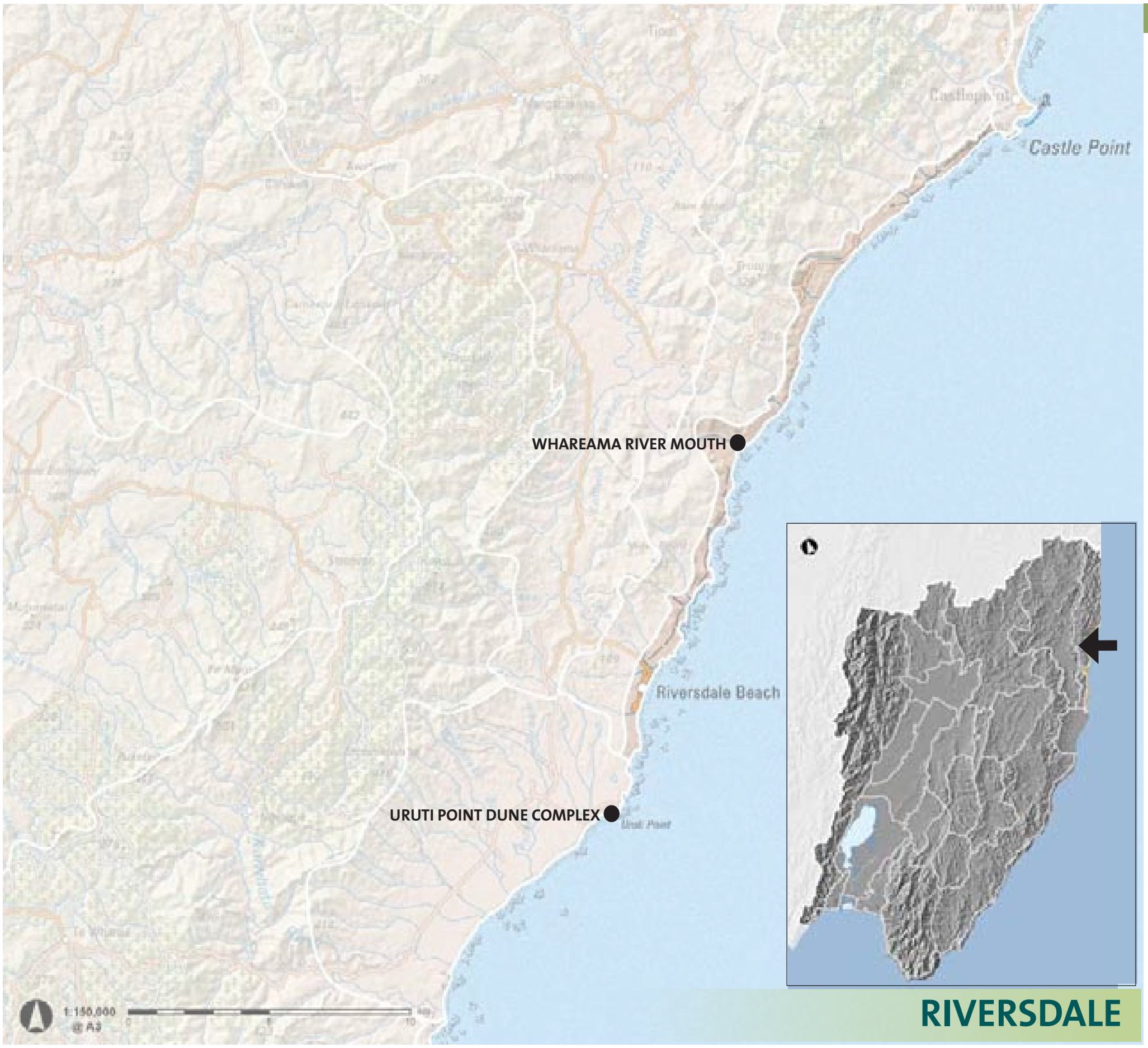
Riversdale, the largest beach settlement in the Wairarapa, was developed in the late 1950s. Riversdale has around 250 houses, 60 of these are permanent residents, and the number of visitors swells to around 2000 during the summer holiday period. Whilst settlement has been traditionally limited to the immediate coastal edge, subdivision of the terraces above the settlement was recently approved and the roads and infrastructure built. As dwellings are developed on these elevated sites the character of Riversdale will change, in a not dissimilar way to small beach settlements in other parts of New Zealand, where large areas of new residential development have occurred outside the boundaries of the original settlement.

At the Whareama River mouth, the coastal platform is wide and extends inland. It is a stark, dramatic landscape, and a popular spot for fishing.

KEY LANDSCAPE CHARACTERISTICS

- Drought prone
- Sandy shore, short stretches of gravels
- Much of coast is inaccessible by formed road
- Riversdale is the largest holiday settlement on the Wairarapa coast
- Coastal vegetation is diverse with a narrow ribbon of historical native vegetation near the shore, and grazing further inland.

Historically the Riversdale settlement has occurred on the coastal platform and includes extensive, mature plantings of macrocarpa, nolfolk pine and pohutukawa.



RIVERSDALE

Left: Subdivision was approved in 2007 for a 127-Lot subdivision on the terraces behind the current Riversdale settlement. Middle: Stock ponds are scattered along the terraces on Castlepoint Station at Otahome. Right: The pattern created by the shelterbelts near the Whareama River contrasts with the underlying landform.

HOMEWOOD

The Homewood character area comprises distinctive and well defined broad (4-5km) coastal plains and uplifted terraces not found elsewhere on the Wairarapa Coast. This location is the only coastal character area defined by a range of steep coastal hills (350-400m) to the west. Approximately 12km in length, the area extends from Uruti Point in the north to the Kaiwhata River (Kaihoata River) in the south.

A series of broad terraces resulting from uplift of the seabed over the past 125, 000 years extend inland from Uruti Point. Approximately 3.5 km of the Uruti Point Dunes lie within this character area and extend 600m inland at Uruti Point. Uruti Point Dune complex is classified as an 'indigenous threatened environment' by the Department of Conservation. This complex is one of the largest duneland systems on the Wairarapa Coast, stretching from 3 km south to 1km north of Uruti Point. The dunes include foredunes, slacks, rear dunes, and an estuary.

The coastal edge of the character area is a combination of sand and gravel beaches, rocky outcrops, uplifted shore platforms and low wave cut cliffs. Exposed sandstone and mudstone shore platforms being eroded by the wind and waves are a special feature of Uruti Point. The erosion process has revealed the slumping and folded formation process of the soft rock, now expressed as abstract surface textures and patterns. The fossil forest at the Kaiwhata River mouth is another notable geological feature. More than 20 totara trees from forests inundated by rising sea levels more than 7000 years ago have been buried and are now being re-exposed by the sea.

This area was significant to Maori because of the abundance and variety of food from the sea, coastal streams, wetlands, and kahikatea forests. The last remaining coastal podocarp remnant forest along the entire East Coast can be found at Okautete Reserve. Nearby is the historic church Manga Moria which is the last standing example of a church of the Seven Rules of Jehovah religion. A pa and urupa are located at the mouth of the Kaihoata (Kaiwhata) River.

Homewood Road provides access to the flats from both the northern and southern ends. From the road there are wide expansive sea views across the farmed terraces.

The coastal platform east of Homewood Road gradually slopes down toward the coast and comprises flats and undulating land, stream gullies and old coastal terraces. West of Homewood Road, the gently sloping, undulating to rolling pasture foothills and slopes form the toe and lower slopes of the steep and high coastal hills, which bound the Country Hills character area. These forested hills have a significant distant presence on the Homewood character area.

Historic Maunga Moria Church at Okautete, Homewood, was opened around 1900.

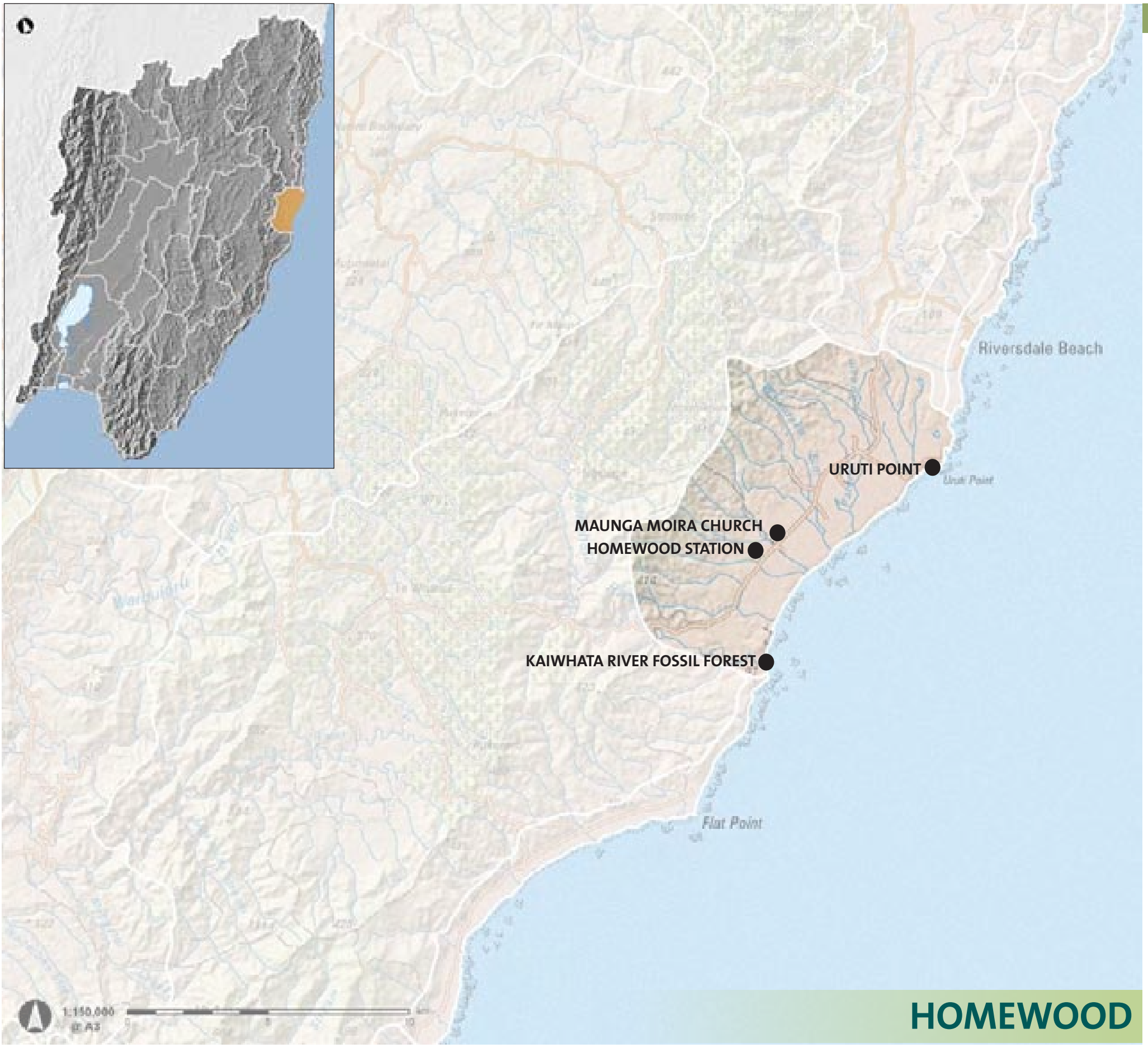
The plains and terraces are predominantly grazed pasture with a distinctive pattern of mature shelterbelts, small exotic woodlots, and scattered patches of remnant native vegetation. The rounded foothills are also predominantly grazed with fingers of regenerating native vegetation and native forest extending down from the steeper and higher slopes above. In places, small areas of exotic production forest have been established on the lower slopes. The steep upper slopes to the ridge top are densely vegetated with a mixture of regenerating exotic scrub and indigenous broadleaf forest.

Most dwellings and farm buildings are located inland of Homewood Road with most of it occurring at the southern end of the area including the church, school and cluster of dwellings and farm buildings of Homewood Station.

KEY LANDSCAPE CHARACTERISTICS

- Relatively large area of flat land well defined by surrounding hills.
- Expansive views toward the sea across the gently inclining coastal terrace.
- The Uruti Point Dune complex is a significant ecological site
- A mature and long established rural landscape in a dramatic coastal location.
- Coastal features: Uruti Point Dunes, eroding shore platforms, Kaiwhata River fossil forest.

The open and flat coastal plains and terraces slope gently toward the coast.



HOMEWOOD

Left: The partially eroded uplifted seabed terraces extend inland from Uruti point. Right: Homewood coastal plains are the only broad coastal platform in the Wairarapa that lie immediately adjacent to the coast. The plains are enclosed by the forested hills 4-5 km inland.

FLAT POINT

The Flat Point (Te Unu Unu)/ Glenburn character area extends from north of Glenburn Station to approximately 4km north of Flat Point. The shore is characterised by a narrow sand and gravel beach. The broad coastal platform known as the 'coastal flats' is up to 1km wide and provokes a feeling of openness, especially when compared to the adjoining coastal character areas. A public road provides access to the length of the area, running approximately parallel with the shore.

Steep hills and coastal escarpment up to around 300m a.s.l provide a strong backdrop to the coastal flats. These hills are heavily dissected, with the toeslopes providing an abrupt transition between the flats and hills. The coastal flats topography is flat to gently undulating, with some low dune formations.

Land Type 11 is predominant along the coastal platform and expressed in the dune complexes and inter-dunal wetlands which occur intermittently along the coastal flats. The hills that form the backdrop are Land Type 8, comprised of steep hard rock with a greywacke base.

Sites of geological significance include Flat Point reef, and the Te Unu Unu Stream mouth.

This part of the Wairarapa is significant to tangata whenua because of important oral histories and the range and extent of heritage sites in the area. Two sites rate a special mention, the first is Waikekeno near Glenburn Station which is arguably one of the most impressive pa sites remaining today with its stone wall formations and pitted ridgelines. The other is Te Unu unu which was renamed Flat Point by Captain Cook in 1770.

The coastal flats comprise a mosaic of rough pasture and are grazed. At the northern end, inter-dunal wetlands areas are dominated by reeds, with coastal grasses and small scale forestry plantations on the stable inland dunes. Scattered groups of native trees such as karaka and cabbage tree remain in some gullies and near the toe of the coastal escarpment and are remnants of Maori settlement. There are mature pine shelterbelts and amenity tree planting associated with the station farmsteads.

The area is remote and is sparsely populated with a recently developed settlement at Flat Point. In 2009, Stage 2 of an 80-lot subdivision has been approved for Flat Point. Historically occupation was based around large sheep stations and proximity to freshwater streams. Land use is still characterised by extensive pastoral farming but there is increasing development pressure for holiday houses along the coastal platform, including occasional baches on the coastal side of the road.

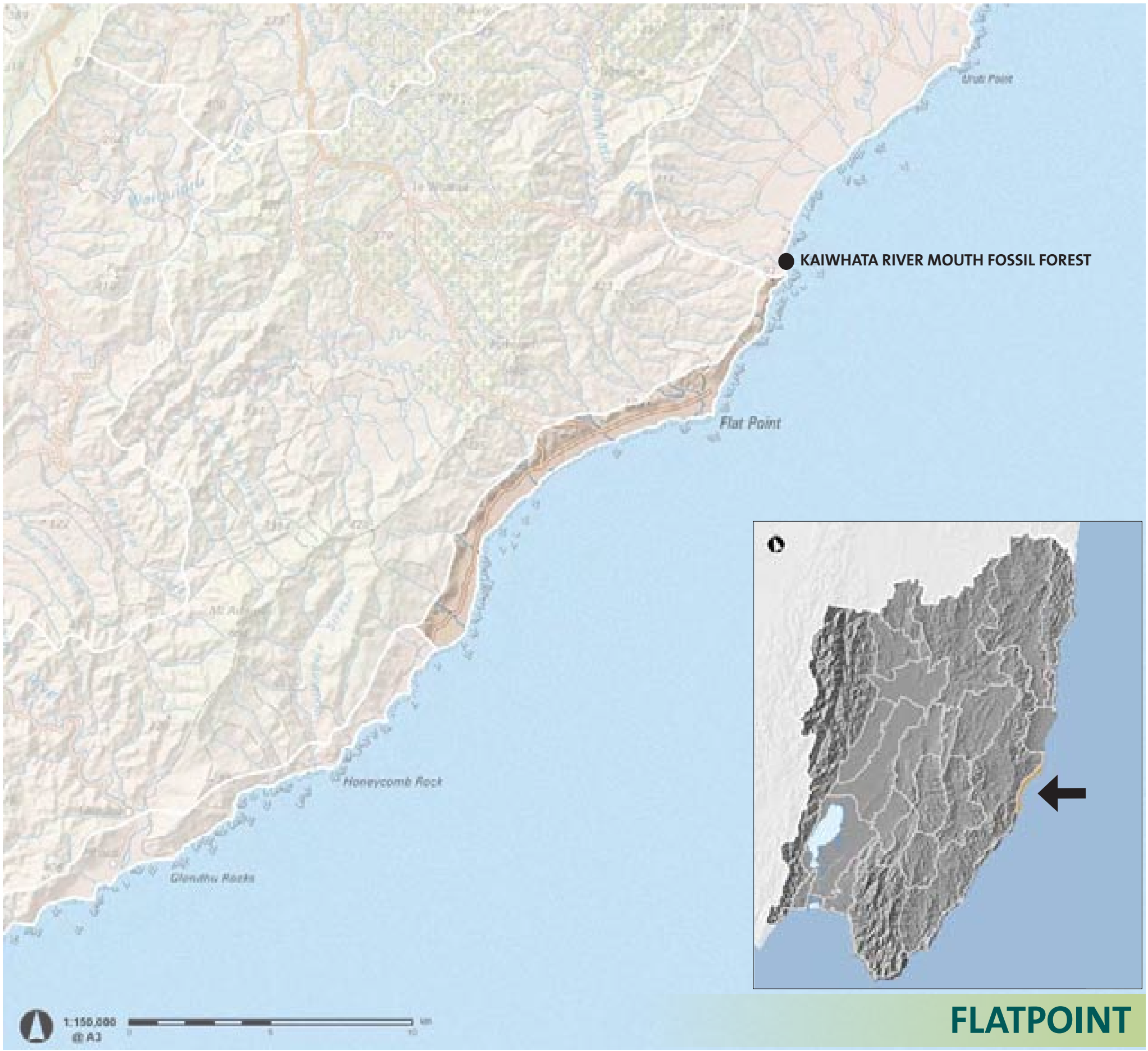
Subdivision at Flat Point has introduced holiday houses into the farming landscape, a pattern which has occurred in many places along the Wairarapa Coast.

A lone cabbage tree is one of the few reminders of the indigenous coastal forest which preceded extensive sheep and beef farming in the area.

KEY LANDSCAPE CHARACTERISTICS

- Broad coastal flats, with road access
- Long history as sheep stations
- Maori history and urupa sites
- Recent development pressure and subdivision at Flat Point

Left: A public road provides access along the length of the coast, and aside from the fences and power lines, the area feels remote, undeveloped and rugged. Right: Remnant vegetation is generally limited to small stands of kanuka in the gullies and scattered cabbage trees on the coatal platform.



FLATPOINT

A number of new holiday houses have been constructed within the new 80-lot subdivision at Flat Point.

GLENDHU

The Honeycomb Rocks / Glendhu character area is long and narrow, running from Te Awaiti to Glenburn Station. The shoreline comprises a sandy beach, interspersed with rocky outcrops which extend well out to sea. The coastal platform is flat to undulating and is relatively narrow, and is significantly wider near the Pahaoa River mouth. The hillslopes behind the coastal platform are steep, and in the range of 250-350m asl. The toeslopes of the coastal hills are irregular and have been incised by various tributaries such as the Awhea, Rerewhakaaitu and Oterei Rivers.

Land Type 11 is predominant and expressed in the steep coastal hills, sand and gravel beaches and remnant wetlands.

The Pahaoa River estuary is a stark and distinctive landscape. The river valley is wide and expansive, providing distant views inland to the eastern hill country. A sand bar, punctuated by large jagged rocks known as the Glendhu Rock, is located at the river mouth.

Honeycomb Rock is a distinctive geological feature located approximately 5km south of Glenburn. Once an offshore stack, Honeycomb Rock has been left marooned as a result of geological uplift processes. The rock is composed of quartz-rich sandstone of the Late Cretaceous period (about 90 million years ago) and is named after the pitted weathering pattern on sheltered faces. There are a number of other significant geological features near Honeycomb Rocks, including: layers of conglomerate, volcanic dykes, and concretions. Other sites of geological and ecological value include Kairingaringa Reef and Pahaoa Scientific Reserve.

The climate is characterised by hot, dry summers. Regenerating scrub is dominant on the steep coastal hill slopes, but the flatter more fertile areas around the river mouths are grazed. The land between the shoreline and coastal hills, is characterised by hardy dune species (native and exotic) and some patches of remnant inter-dune wetlands.

Largely uninhabited compared to the character areas to the north and south, inhabited areas include the farming stations at Pahaoa and Glenburn. The station at Pahaoa was established as early as 1842. There has been no recent development in the area. A public walking track connects Pahaoa River mouth with Glenburn.

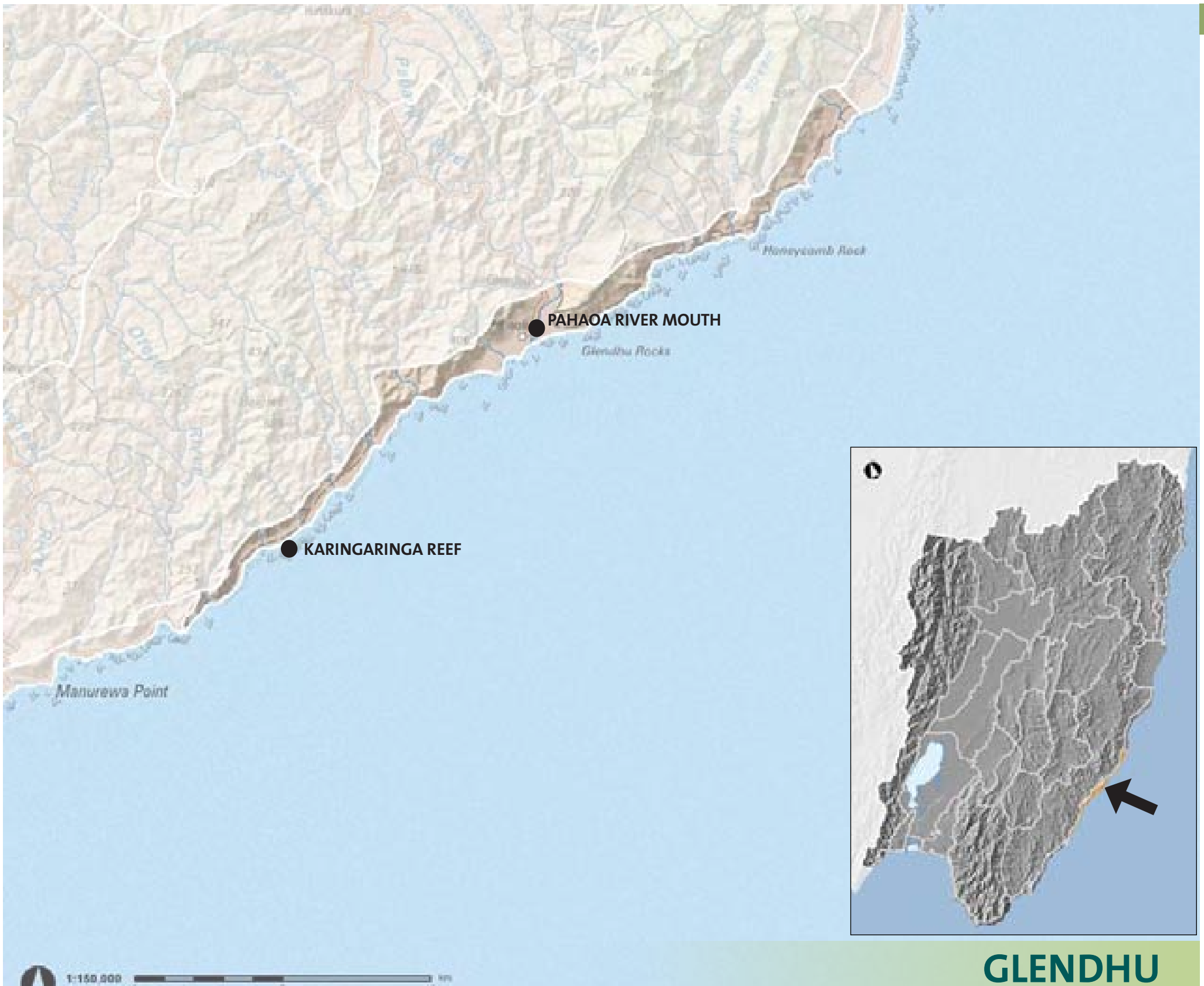
There are several identified heritage sites relating to Maori occupation located within the character area. They relate to a diverse range of heritage sites including: pa sites, middens/ ovens, stone walls, burial sites, karaka groves and terraces. The greatest concentrations of heritage sites occur around the Okoropunga Stream mouth, the Pahaoa River mouth and the rocky reefs. The Pukaroro Maori reserve at the northern end of Te Awaiti station is arguably the largest most significant and well preserved historic Maori site in the entire Wellington region.

Honeycomb Rock comprises of quartz - rich sandstone of Late Cretaceous age. It takes its name from the remarkable cell - like weathering pattern seen on its faces.

KEY LANDSCAPE CHARACTERISTICS

- Steep hills form backdrop to coastal platform
- The openness of the Pahaoa River Estuary
- Stark and raw landscape – few trees
- Remote and isolated, only two inhabited areas accessible by public road
- Long farming history – many of the steeper coastal hills are regenerating with indigenous vegetation
- A number of geological features – Honeycomb Rock, Glendhu Rocks, Kairingaringa Reef
- Pukaroro Maori reserve

The distinctive rock formations at Glendhu comprise of alternating layers of hard white limestone and mudstone.



GLENDHU

Left: There is a long history of farming in the area. Whilst steeper parts of the coastal hills support young exotic scrub and native regeneration, while the flats around Pahaoa River mouth are still grazed. Right: Farm buildings are typically set within mature amenity and shelter plantings.

TORA

The Tora[1] character area lies between the Oterei River (Te Awaiti Station) in the north and Te Kaukau (Te Kakau) Point in the south. The topography along this part of the coast consists of narrow, flat, 200-500m wide uplifted marine benches, which are abruptly defined by steep to very steep coastal escarpments and hill slopes rising up to 250-350m high. The coastal platforms between Manurewa Point and Te Kaukau (Kakau) Point are an identified geological feature known as the Pukemuri Stream Marine Benches.

The predominantly rocky shore is interspersed with small gravel and sand beaches. The Oterei River mouth marks the end of the coastal road in the north and the Tora Road provides the only access inland via the Awhea River Valley to Tuturumuri and beyond.

The flat coastal platforms support rough grazed pasture. The steep escarpments and slopes are predominantly pasture with one large area of regenerating coastal forest on the slopes behind the Tora Station farmstead (RAP 47 Tora Coastal Bush and Tora Bush Scenic Reserve). Regenerating native scrub and remnant native trees are scattered along the slopes of the character area including karaka groves near the Oterei River. A 2.0 ha area at Manurewa Point is fenced as a reserve.

Parts of the narrow coastal platform has a relatively dense rural residential settlement pattern compared to many other parts of the Wairarapa coast. The coastal platform north of the Awhea River has recently seen an increase in residential development with approximately 40 residential lots currently consented and established. While dwellings have been built on some of the new lots, many of the lots are still unsold and/or yet to be developed. All the residential lots are on the inland side of the road. The recent subdivision has started to change the character along this stretch of coastline but this will become much more apparent once dwellings have been built on all of the allotments that have been consented. Recent subdivision south of the Awhea River has been small scale and incremental.

There are several identified heritage sites relating to Maori occupation such as middens, terraces, stone walls, pa sites and dendroglyths. Erosion seems to have affected some of the heritage sites along the coastal platform in this area with several being buried well under the surface. Identified European heritage sites include a WWII observation post and the 1926 wreck of the Opua.

Distinctive headland and rocky shore, Te Awaiti station.

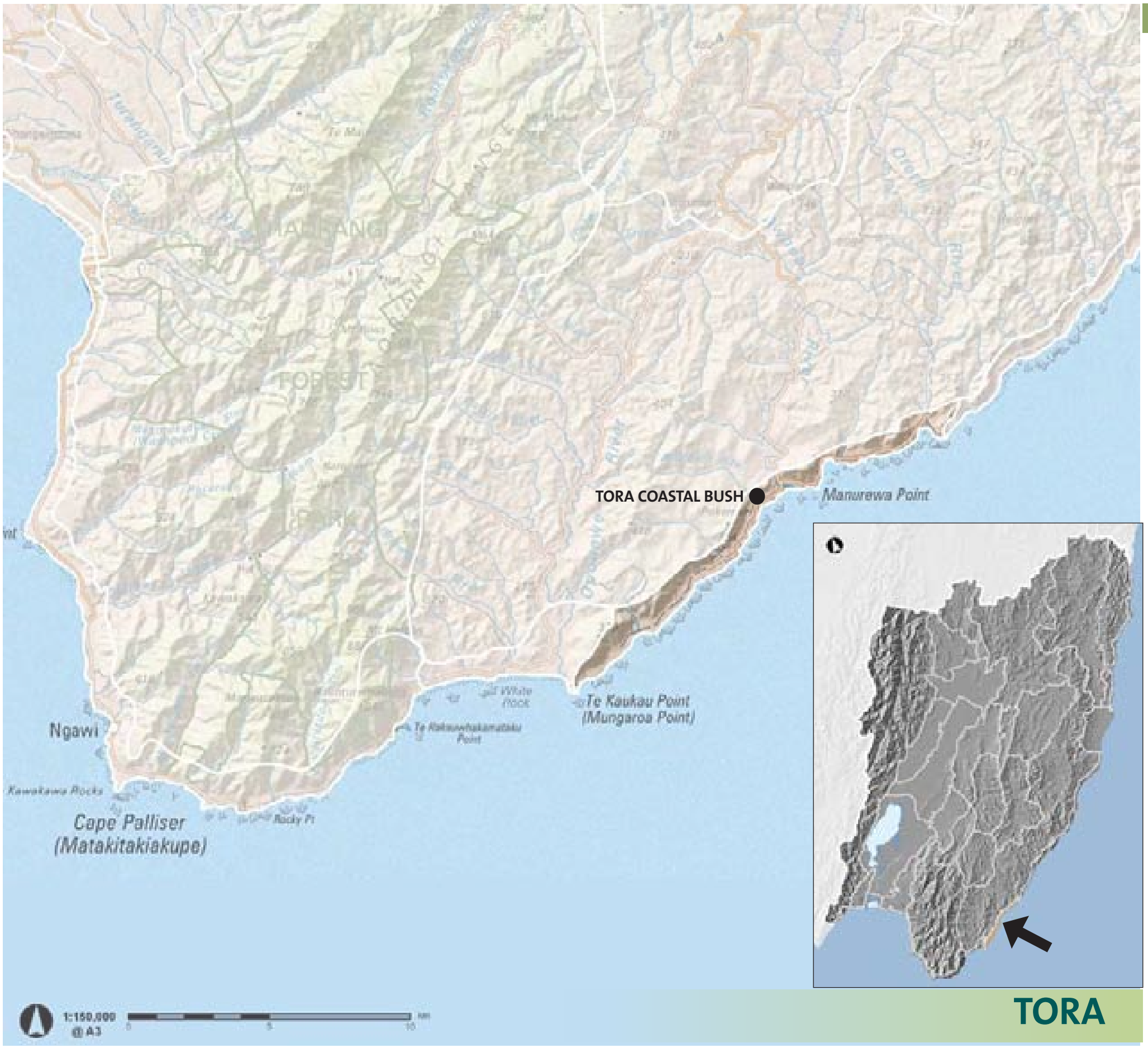
A rare, and now protected, remnant of coastal native forest remains on the slopes behind the Tora Station settlement.

KEY LANDSCAPE CHARACTERISTICS

- Changing landscape character from a former 'wild' and sparsely settled coast to one where residential occupation is evident and relatively prominent in locations
- Narrow coastal platform enclosed by steep escarpments
- Coastal habitat remnant (SNs14 in WCDP)

1 This name is probably meant to be 'Te Oroi'.

View south from Tora Station to Te Kaukau Point. The coastal hill, Pukemuri, rises directly from the coastal platform to 364m asl.



TORA

Left: Te Awaiti Station was one of the first stations settled along the Wairarapa Coast; located in a relatively sheltered embayment at the mouth of the Oterei River. Right: Residential subdivision and development along the coast north of the Awhea River is changing the wild and often uninhabited character of the coastal edge.

WHITE ROCK

The White Rock character area includes the shoreline, coastal platform and lower coastal hills of the White Rock embayment south of Te Kaukau (Te Kakau) Point, together with the coastal terraces and mouth of the Opouawe River. The southern extent is marked by the Aorangi Ranges character area.

The character area includes two notable white limestone coastal features; Te Kaukau Point and White Rock Reef. The rocky shore platform and formations at Te Kaukau Point are uplifted layered limestone, sandstone and mudstone sediments. The White Rock Reef is the exposed end of a tilted limestone sheet that extends about 700m offshore.

The Opouawe River carries rough gravels from its Aorangi Range catchment and has built up broad gravel terraces and flood plains inland of its mouth. A second, smaller, river (Whawhanui River) discharges to the sea near the White Rock Reef.

Rough grazed pasture covers the narrow coastal platform, river terraces and low hills. Mature exotic trees are established around the White Rock station farmstead and shelter belts are on the river terrace. Small pockets of regenerating native scrub occur in some gullies, otherwise there is no substantial native vegetation.

The prominent forested Aorangi Ranges enclose the White Rock bay to the south and are a stark contrast to the small scale and relatively bare hills and platform of the coastal edge. To the north, the Te Kaukau Point landform is a prominent feature of this part of the coast and encloses the bay. The relative enclosure of the White Rock bay seems more sheltered than most other parts of the exposed Wairarapa Coast.

The character area is an isolated and well defined coastal road end with the White Rock station farmstead buildings and stockyards the only residential occupation. White Rock station was one of the early sheep stations established in the Wairarapa. White Rock Road accesses the coast from Tuturumuri via the Opouawe River valley, and changes name to Ngapotiki Road at the Whawhanui River bridge. The Ngapotiki Road end provides walking access to the Ngapotiki Fan 2.5km to the south.

Several heritage sites relating to Maori occupation are located along the coast, including pa, horticulture structures, rock walls, ovens and middens. The area was renown for storage of kumara and the number and characteristics of the rua kumara (pits) in this area are significant.

The White Rock reef extends 700m offshore.

KEY LANDSCAPE CHARACTERISTICS

- Te Kaukau (Kakau) Point
- White Rock reef
- Aorangi Range backdrop
- Isolated sheltered coastal embayment

The Aorangi Range is an imposing backdrop at the southern end of the bay.

WHITE ROCK

Left: The limestone rock formation midway along the beach is the landward end of the White Rock reef and can provide a relatively sheltered boat launching site in some conditions. Right: A sand/gravel beach extends the whole length of the character area. With the strong physical enclosure at either end (Te Kaukau Point in the north and the Aorangi Ranges in the south) the bay feels quite sheltered compared to the generally exposed Wairarapa coast.

CAPE PALLISER

The Cape Palliser character area comprises a ribbon of coast between Ngapotiki and Te Kopi. It includes the sea, shore, coastal platform and immediate area of coastal influence.

Cape Palliser forms the southernmost point of the North Island and is characterised by a narrow, rocky shoreline and coastal platform, steep gravel beaches, and a very steep coastal escarpment and scree slopes. The area features a number of prominent and often dramatic landforms, including: The Sails of Kupe (Nga Ra a Kupe), Te Humenga Point, Ngapotiki Fan and Whatarangi Bluff.

The predominant land type is hard rock coastal fringe (Land Type 12) is predominant and expressed in the hard greywacke and pillow lava which in places extends into the sea. Around Whatarangi, the Land Type is a combination of types 3 and 8, which are expressed as steep to very steep coastal terraces, marine bench and beach ridge complexes.

Cape Palliser, The Sails of Kupe and Ngapotiki Fan are identified as outstanding natural features in the Wairarapa Combined District Plan. Sites of geological interest, as identified in the Wairarapa Coastal Strategy include: Ngawi Point (Te Kawakawa or Black Rocks), Cod Rocks, and Rocky Point (Matakitaki a Kupe).

Due to the tough coastal conditions, including strong salt laden winds, vegetation is relatively sparse and limited to hardy native coastal shrubland.

The fur seal colony at Cape Palliser is the only one in the North Island where breeding is well-established. The Cape Palliser area also contains breeding sites of variable oystercatcher, banded dotterel and red-billed gull.

Several place names are attributed to Kupe, the Polynesian explorer who first discovered Aotearoa New Zealand. Kupe spent some time in the area apparently having been attracted by an abundant fish.

This area is arguably one of the most significant historical areas along the Wairarapa coastline. The area contains some of the earliest Maori occupation sites recorded in New Zealand as evidenced by stone walls associated with growing kumara and prolific heritage sites scattered around the coast and inland. As well as kumara, Maori cultivated other plants including the karaka tree and several stands of these trees still remain.

Road access along the coast is precarious, though it is sealed to just north of Ngawi, the road is constantly being eroded by the sea. The coastal settlement of Whatarangi is relatively recent, consisting of residential housing built during the 1960s and 70s. There is also a small settlement at Mangatoetoe, adjacent to The Sails of Kupe.

As well as early Maori stone walls, there is a stone wall at Waitutuma Stream of European origin having been built by Barton of White Rock Station .

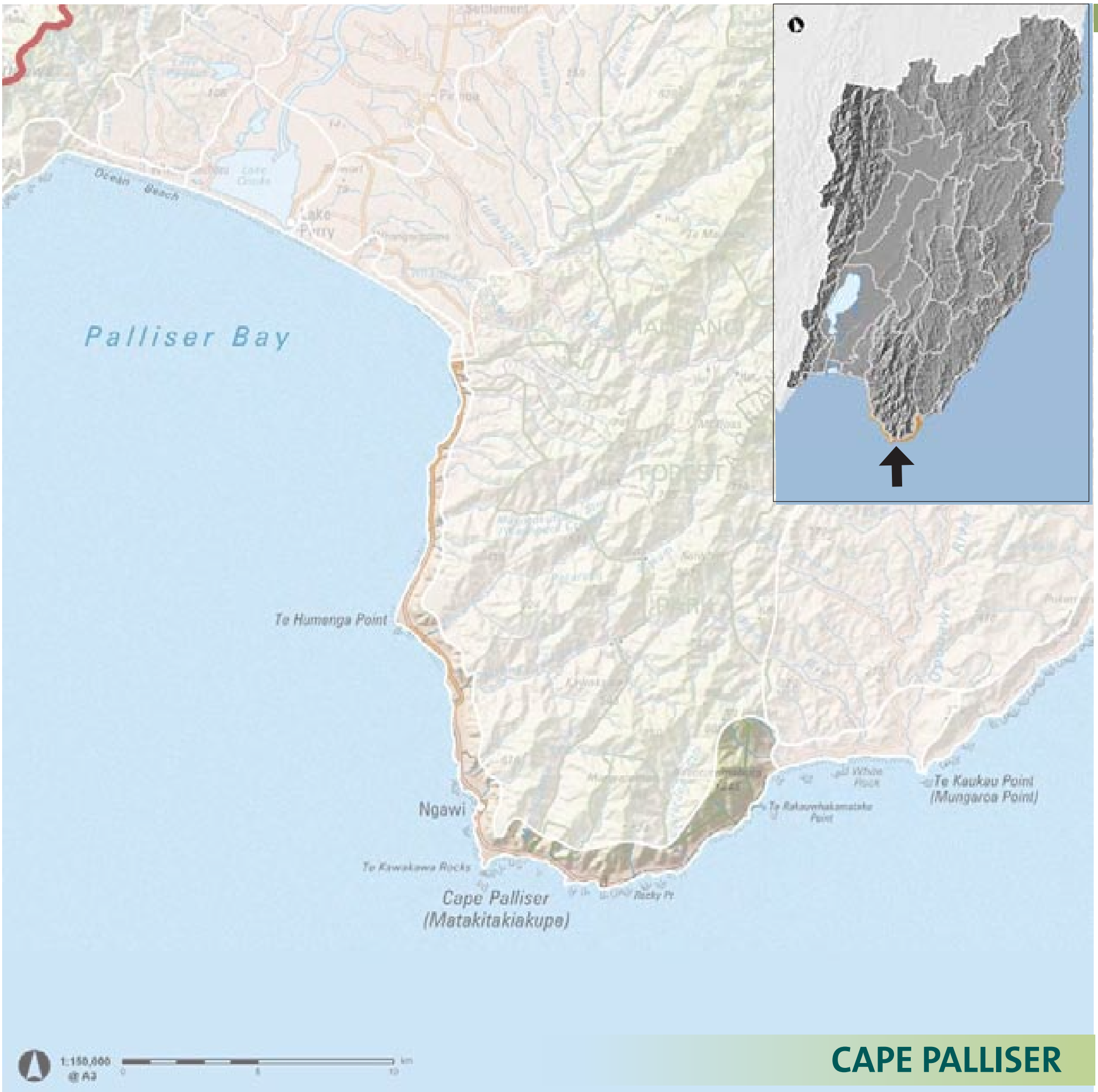
Kupe's Sail is an unusual geological feature, comprised of a huge slab of sandstone full of fossilised barnacles, shells, and other marine organisms.

The Cape Palliser lighthouse, which was installed in 1897, is a popular destination, as is Ngawi, which has no harbour, so fishing boats are launched by bulldozers from the beach. The bulldozers and boats line the road edge and are a popular and often photographed feature. Settlement is mostly long-established baches, however, there have been small coastal subdivisions recently approved near Te Humenga Point, together with protection of important ecological habitat around the Point itself.

KEY LANDSCAPE CHARACTERISTICS

- Important breeding sites – fur seal, variable oystercatcher, banded dotterel and red-billed gull.
- Rugged, strong coastal influence, steep escarpment, narrow coastal platform.
- Isolated, with sparsely populated fishing villages, eg. Ngawi, Whatarangi
- Series of striking landforms such as The Sails of Kupe, Whatarangi Bluff, Cape Palliser, Te Humenga Point, Ngapotiki Fan
- Heritage values – concentrated along coast and inland beside rivers, early Maori settlement, Cape Palliser Lighthouse, Matakitaki a Kupe Historic Area

The fishing settlement of Ngawi is nestled at the foot of the steep coastal escarpment. Te Humenga Point in the middle ground



CAPE PALLISER

Left: Erected in 1897, the Cape Palliser lighthouse provides a panoramic view from the top, up 252 steps. Right: Although somewhat modified by road construction, the Whatarangi Bluff demonstrates the erosive power of rainwater on soft sandstone.

WHANGAIMOANA

The Whangaimoana character area includes the elevated coastal terraces from Lake Onoke around to just west of the Putangirua Pinnacles. The raised coastal terrace has a near vertical face, with deeply incised gullies. The shore is sandy and at high tide, reaches the base of the escarpment. Land Type 12 is predominant and expressed in the hard greywacke rock, the steep coastal escarpment, scree slopes and uplifted shore cut platforms.

A number of streams converge and descend from the terrace to the sea at Whangaimoana. The stream mouth is typically impeded by drifting sand, forming a rush-filled backwater.

The climate is characterised by exposure to strong, cold, salt-laden south-westerly winds. The exposed scree slopes of the escarpment are bare, but the majority of the escarpment is covered in well adapted low-growing native vegetation. Patches of regenerating native vegetation are present in the incised gullies which provide a more sheltered microclimate. The terrace above the escarpment is grazed to the seaward edge.

The area includes the small bach settlement of Whangaimoana. 'Whangaimoana' was one of the earliest sheep stations established in the Wairarapa, established in 1843 by Purvis Russell. The original homestead, built in 1876, still stands and is a local landmark.

A heritage site relating to Maori occupation is recorded near the Lake Ferry settlement. It is thought to pre date 1770, although the nature of the site is unclassified. Pre and post climatic changes, believed to have occurred in the 16th century saw Maori live in this area so that they could be near the richness of Lake Onoke, the coast and valleys near to the coast.

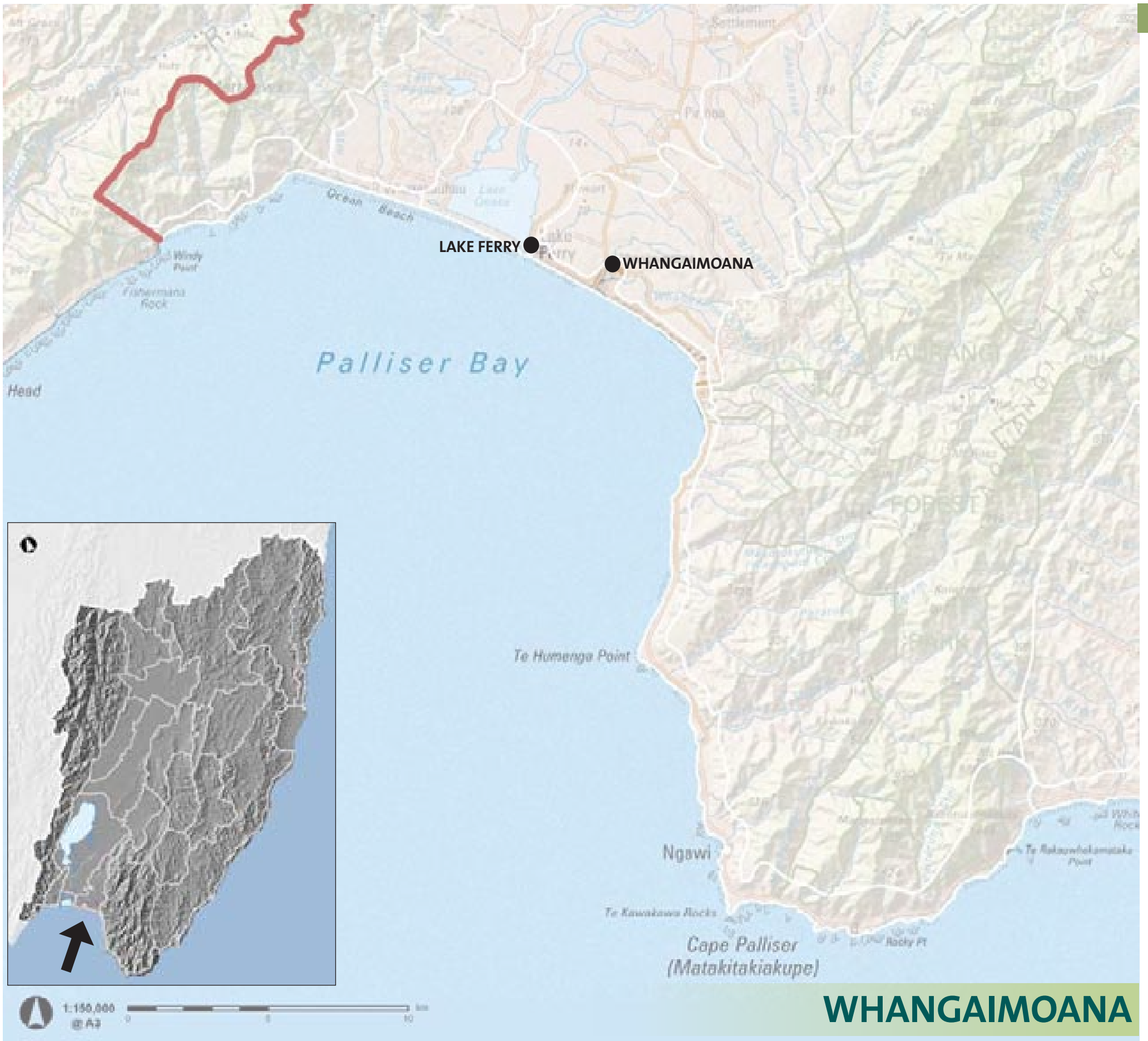
KEY LANDSCAPE CHARACTERISTICS

- Dramatic coastal escarpment and deeply incised gullies
- Flat terrace with abrupt transition between grazing and coastal vegetation
- Sparsely settled, heritage values associated with original

The coastal escarpment has resulted in an abrupt transition between the Lake Ferry township near the edge of the terrace and coastal vegetation on the escarpment.

The raised coastal terrace has a near vertical face, with deeply incised gullies which provide a more sheltered microclimate for regeneration to occur.

The hard greywacke rocky outcrops and scree slopes associated with Land type 12 are evident along the length of the escarpment.



WHANGAIMOANA

Left: The small settlement at Whangaimoana comprises around 50 properties, most of which are holiday houses. Right: The dominant land cover is pasture, with a few mature pine shelterbelts scattered across the terrace. Lake Onoke in the middle ground and the Rimutaka Ranges define the western boundary of the Wairarapa.

ONOKE

The Lake Onoke 'spit' is a mixed sand and gravel barrier beach that has formed by concurrent processes of marine sedimentation and tectonic uplift. In the process it has impounded an embayment to form a shallow coastal lake. The Onoke character area encompasses Lake Onoke, its immediate margins and the raised shingle bar which forms the coastal edge. The area is strongly influenced by coastal processes, such as strong, southerly, salt laden winds, wave action, storm surges and tidal influences. The shingle bar is often inundated at high tide, and is a popular spot for fishing.

Onoke forms part of the southern coastal fringe Land Type 3, which is characterised by an undulating and highly mobile marine bench, ridge complexes and the gravel barrier bar. There are limitations on land use imposed by flooding, and the historical difficulties surrounding access to the land.

Lake Onoke is a brackish lake and forms part of the wider ecological corridor between Lake Wairarapa and the coast, collectively these two lakes are referred to by Maori as Wairarapa Moana. The wider area is considered to be of national and international importance for indigenous plant and animal communities and has also been identified as being of national importance to fisheries. The diverse habitats within the wetlands attract a wide range of wetland birds, including some international migratory birds.

The lake edge, which is regularly inundated by water, supports a submerged "turf" community of small native plants. Much of the open lake water is devoid of aquatic vegetation, thought to be caused by its high turbidity. The land surrounding the lake is in pasture, with various shelterbelts, and amenity planting, especially in the environs of Lake Ferry.

Lake Ferry is a small settlement between the shores of Lake Onoke and Palliser Bay, supporting fishing and tourism activities. It comprises mostly baches and holiday homes on small residential size allotments, but land holdings are much larger beyond the settlement. The primary landuses of the wider area are extensive sheep and beef farming.

There is a rich history of Maori occupation in the area and heritage sites are present although some have been adversely affected by intensive farming and the altered water levels such as at Okorewa and Kiriwai. (see notes). In particular, Maori have traditionally been attracted to the lake due to two annual migrations. The first from a Maori calendar perspective was the inward migration of juvenile fish during Gregorian spring and the second was the outward migration of mature tuna during late summer and autumn.

Lake Onoke was historically significant as part of the former coastal route which enabled trade with Wellington (Te Whanganui o Tara). Goods would be transported up Lake Onoke and then up the Ruamahanga River. Lake Onoke was susceptible to flooding, and the bar could be crossed by foot when it was closed, but while open, the lake itself had to be crossed and drownings were common. Local Maori set up a ferry service, which was later formalised by the appointment of a ferryman and a regular service. Lake Ferry hotel was established in 1879.

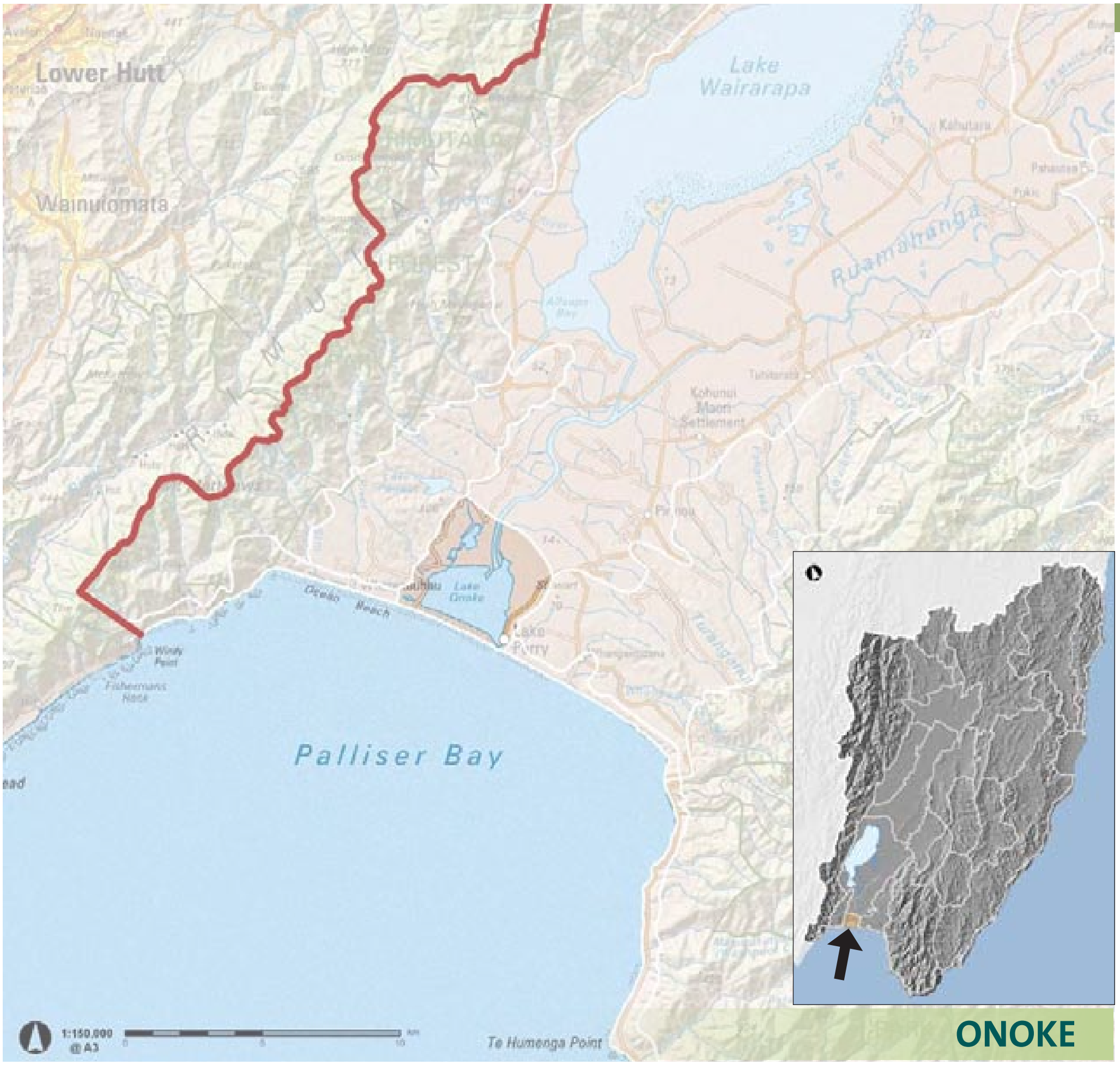
Settlement around Lake Ferry dates back hundreds of years. Archaeological research suggests that there were people living here from the 12th century until about 1600. Lake Ferry settlement is nestled at the base of the uplifted marine terraces.

The idea of artificially opening Onoke Spit to control the water level and prevent the flooding of thousands of acres of land in the southern plains was has been a highly contentious issue since settlement by European pastoralists. Maori generally did not want the lake level controlled, especially during the tuna migratory period, given the potential disruption to mahinga kai (food gathering) sites. However, by the early 1900s, large teams of horses were used to scoop out a channel in the spit, and extensive stop-banking had been constructed. This was later superseded by the 'Lower Wairarapa Valley Development Scheme' which involved construction of the Ruamahanga bypass around Lake Wairarapa.

KEY LANDSCAPE CHARACTERISTICS

- Flooding constraints
- Rugged landscape with a strong coastal influence
- The spit is an important geological feature
- Ecological significance of the lake as a corridor between Lake Wairarapa and the axial ranges
- Historic use of the Ferry
- Lake Ferry settlement, fishing, tourism and farming
- Tuna heke, annual migration of tuna

Left: The Lake Onoke channel to the sea, near Lake Ferry settlement is a popular fishing destination. Right: Periodically, the outlet from Lake Onoke is closed off and needs to be reopened.



Left: Due to the vulnerability of the lake margins to flooding, the dominant land use continues to be sheep and beef grazing.
Right: Ruamahanga channel diversion cuts a swathe through the low lying and very open landscape.

OCEAN BEACH

The Ocean Beach character area includes the coastal strip from Onoke, west towards the South Wairarapa district boundary and includes the row of long-established baches at Ocean Beach. The shoreline is a mixed sand and gravel beach, which is uncommon in New Zealand. The shore platform is relatively narrow, with the steep slopes of Mount Mathews (941m), the highest peak in the Rimutaka Ranges, forming a dramatic backdrop to the coastal platform. At Wharekauhau, these steep toe slopes become near vertical escarpments, which have been raised by tectonic activity to form an elevated coastal terrace.

Land Type 12 is predominant and expressed in the hard greywacke rock, rocky bluffs, shingle toeslopes, and steep scree slopes of the Rimutaka. Various tributaries, such as the Wharekauhau and Wharepapa Streams, transport gravels and other sediments from the Rimutaka out to sea. At Thrust Creek and Mukamuka Stream, the West Wairarapa Fault has lifted and exposed ancient gravel deposits, crushed greywacke and basaltic volcanic rock.

The area is rugged, and subjected to strong coastal wind and high rainfall. Regenerating native forest on the slopes of the Rimutaka descends onto the coastal platform and in some places extends right to the sandy shore. The Ocean Beach cliffs include a mosaic of unusual vegetation sequences with flaxland and scrubland, with shrub and sedges in seepages. Vegetation around the baches is rough grass, and scrub.

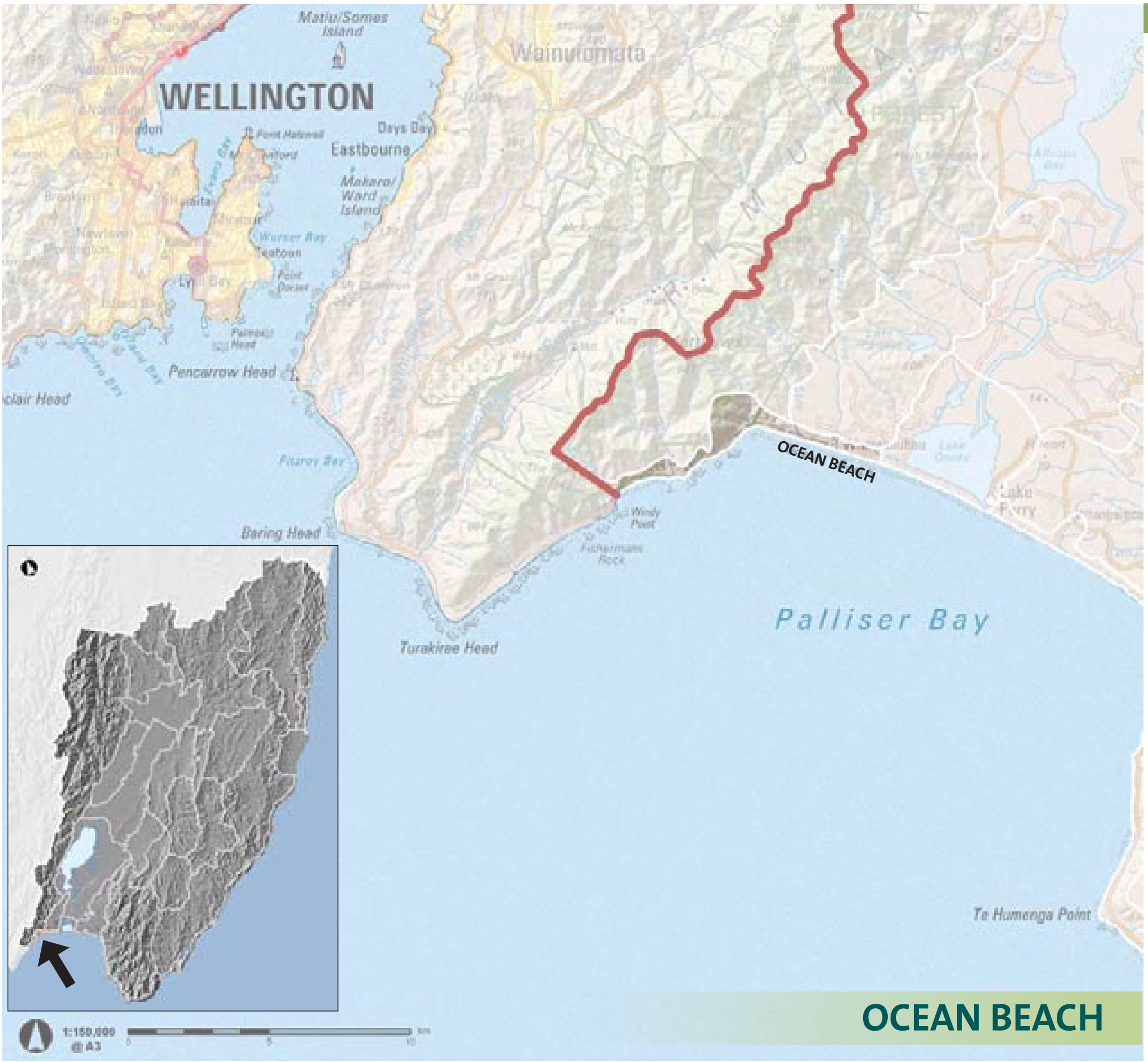
The Wairarapa coastal highway began at Turakirae point and is so named because of the absence of forest after uplift activity, that allowed for relatively comfortable walking along the coastal margins. This was an important transportation route between Whanganui A Tara and Ahuriri. Papakainga were found at Mukamuka and Wharepapa.

KEY LANDSCAPE CHARACTERISTICS

- Steep scree and forested slopes of the Rimutaka Range abruptly descend to meet coastal platform
- Terrace escarpment below Wharekauhau
- Historical baches at Ocean Beach
- Rivers dissecting/ fragmenting terrace
- Sites of geological interest include Thrust Creek, and the Mukamuka Stream

The hard, greywacke bluffs and scree slopes (Land Type 12) are characteristic of the area and are accentuated by the contrast with the surrounding native coastal vegetation. The baches are a distinctive feature at Ocean Beach.

Left: Gravels brought down by the Wharekauhau Stream form a fan on the beach between the terrace and foothills of the Rimutaka Ranges. Native forest regeneration is gradually creeping down the ranges and provides a backdrop to the Ocean Beach baches. Right: Buildings associated with Wharekauhau Lodge can be seen on the terrace above Ocean Beach.



The rocky scree slopes of the terrace escarpment, together with the harsh coastal conditions makes it difficult for all but the hardiest coastal vegetation to survive. The terrace is grazed right up to the seaward edge.

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Lake Pounui towards Onoke Lagoon, Lake Onoke and the coast.

APPENDICES

APPENDIX 1: CULTURAL HISTORY

While the Wairarapa, administratively, is part of the Greater Wellington Region, it is in landscape terms, a separate 'region' with its own identity. The combined area of the three Wairarapa territorial authorities - Masterton, Carterton and South Wairarapa - make it the third largest district in New Zealand (approximately 6 million hectares).

The landscape is recognisably different from the neighbouring districts and this study seeks to explain what gives the Wairarapa its particular identity and to describe its varied landscape character. The evaluation that will be subsequently completed will identify what parts of the Wairarapa deserve to be given special recognition and careful management.

WAIRARAPA MAORI AND LANDSCAPE[1]

INTRODUCTION

The word 'landscape' encapsulates so much that is important to Wairarapa Maori. From a Maori viewpoint, whether it is a mountain range, river valley, a hill slope, or a particular tree, each has its own kawa or process to follow and each part has a connection to everything around it. While features such as the Tararua Ranges, Lake Wairarapa and Castlepoint (Rangiwhakaoma) are well known, amongst the hills and plains there are many landscapes and places that are important to different whanau, hapu and iwi.

For Maori, landscapes are often the basis for stories passed down from ancestors. Monumental events, tragedies and the happenings of everyday life occur within a landscape. To attain the knowledge that would help to sustain families, successive generations had to understand how the land and sky were structured and therefore the life cycles of flora and fauna that dwelt within different zones.

So that families and hapu knew where they could make decisions over land, sea and waterways, boundaries were applied. One means by which a family could confirm that an area was theirs was through knowledge of natural features such as hills and streams. Senior members could not only recite the boundary markers but also historical events and ancestors that tied a family to one place or another.

The concept is no different in coastal areas, except the landscapes are submerged beneath water, and extend way out into the ocean. The concept of mana whenua, mana moana, mana tangata defines the area over which whanau and hapu have decision making rights. Just like the land and sea are not severed by the tides nor are mana whenua, mana moana, mana tangata.

1 This section is an edited version of material prepared by Joseph Potangaroa.

Kaumatua maintain that if you start with the gods and come down to today everything is in the correct order. With the exception of Papatuanuku and Ranginui and first people, whakapapa is used to illustrate when a tupuna lived or when an iwi became established in the Wairarapa. The number of generations between a child of 2009 and Kupe are used to established how many generations ago are referred to. The generation given refers to the lifetime of a central tupuna whose leadership led to permanent occupation, not necessarily the person after whom the iwi takes a name.

CULTURAL ASSOCIATIONS AND SETTLEMENT HISTORY

Maori interpret their surroundings in the same way as all other cultures in the world. They personify features, and attribute great mythological feats to their atua (gods). Where Maori differ from many other cultures is that they tied themselves directly to the land and to the deities through whakapapa (genealogical connection). This gives them an inherent connection to the land and also an inherent responsibility to care for the land as you would a precious elder or ancestor.

Landscapes and landmarks were key identifiers for iwi, hapu and whanau. They were also connection points between iwi, hapu and whanau. Wairarapa has some clear examples of these 'connectors'.

Sites associated with Maui and Kupe connected Wairarapa Maori to all iwi. Te Ika a Maui relates to landscapes across Aotearoa and connect Maori to those places as well. In turn, sites associated with Maui resonate strongly with all iwi as they make up the key components of the land. The Wairarapa constitutes arguably the most significant part of the fish of Maui being (part of) the head and associated features. Thus other iwi around the country recognise the cultural significance of the landscapes located in the Wairarapa.

Similarly, Kupe is a significant ancestor and character in the story of Aotearoa. He is credited with discovering and naming Aotearoa. As such, his name is associated with many sites around Aotearoa and with iwi, hapu around the country as well. These sites tie Wairarapa iwi to other iwi around the country.

Landscapes were used to identify demarcation of tribal interests between iwi and/or hapu. One example of this was the identification of the Remutaka (sic) Ranges as the site that binds the iwi of Wellington (Te Whanganui o Tara) to Wairarapa following a peace agreement in 1840, which led to the return of Wairarapa hapu from Mahia.

Papatuanuku and Ranginui

The land and seabed are the body of Papatuanuku (the earth mother) and therefore all landscapes are a part of her. All life on Papatuanuku dwell

View from Black Rock Road subdivision, north- east of Masterton.

on a part of her body. The annual cycles of the sun, moon and stars that dwell upon Ranginui, (the sky father), determine when activities should occur on Papatuanuku. Atua are believed to dwell in the skies because the stars and elements are immortal whereas aspects of land erode and humans die.

Maui (approx 58 generations ago)
Maui, an ancient ancestor of many Wairarapa Maori, discovered these islands. The story is commemorated in the legend of Te Ika A Maui – The Fish of Maui. The Wairarapa view is that we live on Te Upoko o te Ika - The head of the fish, and Wairarapa Moana is Te karu o te ika or 'the freshwater eye of the fish'. The other eye is Wellington Harbour. Kawakawa - Palliser Bay is Te Waha o Te Ika a Maui or 'the mouth of the fish'. Turakirae Head and Matakitaki a Kupe (Cape Palliser) are known as the 'jaws of the fish'. The combined Rimutaka, Tararua and Ruahine ranges are referred to as the 'spine of the fish'. Hapuakorari, the lake of the flax sticks in the Tararua Ranges is known as 'the pulse of the fish'.

Kupe(28 generations ago)
The explorer Kupe called in to Castlepoint and as was his peoples' custom, established ownership rights by declaring that the most prominent landmark was his head, which is why a man's head can still be seen on Matira - Castle rock with the remainder of his body extending along the reef to the north. He used personification of a natural occurrence to name the place. In this way Rangiwhakaoma –'where the sky runs' - was named.

As he had done at other places throughout the Pacific Ocean where dangerous whirlpools, rips, rocks and currents were present, at Rangiwhakaoma, Kupe left a tale of a giant octopus whose tentacles would kill people if they were not careful. Waves and strong currents at Castlepoint have claimed many lives over the centuries. From this initial point of contact, Kupe named numerous landmarks along the Wairarapa coast and several inland locations.

First people (more than 28 generations ago)
The first people to occupy the Wairarapa lived in coastal areas. Early people lived beside, and based their economies on, river valleys around the coast.

Descendents of Toi te Huatahi(26 generations ago)
The first descendents of Toi te Huatahi in the Wairarapa were known as Te Tini o Awa. Thereafter the descendents of Whatonga, Toi te Huatahi's grandson, became known as the people of Ngai Tara and Rangitane. Tara Ika (Ngai Tara) and Rangitane were the son and grandson of Whatonga. While Ngai Tara and Rangitane people became established during the lifetimes of the eponymous ancestors, prominent Whatonga descendents were still arriving 11 generations ago.

Descendents of Te Aomatarahi (12 generations ago)
The Ngati Ira and Ngai Tahu people are descendents of Te Aomatarahi. Several major Ngati Ira hapu are still recognised as the main groups that tie descendents to land in the Wairarapa. Ngai Tahu of the Wairarapa is descended from different tupuna than the prominent iwi of the South Island with the same name. There was also more than one Ngati Ira although the descendents of Te Aomatarahi are the main ones. Ngati Ira and Ngai Tahu whakapapa is particularly prominent in the southern Wairarapa.

Descendents of Kahungunu (approximately 11 to 15 generations ago)
The Takitimu waka is the ancestral canoe of the Ngati Kahungunu people. Tupai, a tohunga aboard the Takitimu, stayed in the Wairarapa for some time, as did Rongokako the son of Tamatea Arikinui (25 generations ago), captain of the Takitimu. Tradition also shows that Taraia, the great grandson of the tupuna Kahungunu passed through the region while successfully engaging in a series of skirmishes.

Whakapapa shows that the people who came to be known as Ngati Kahungunu ki Wairarapa arrived in a series of migrations over several generations.

Early 1800s (8 generations ago)
The introduction of muskets during the first decades of the 19th century was a key factor that saw many iwi displaced from their traditional homelands. Iwi that originated from further up the North Island soon made their way into the Wairarapa. Ngati Toa, Ngati Raukawa, Te Ati Awa, Ngati Mutunga and Ngati Tama are iwi that stayed for a number of years at various locations around southern and central parts of the region. Korero about where they lived and how they utilised the land during their stay has been handed down. With the exception of three hapu, most tangata whenua left the region but came back after peace agreements had been reached.

Maori (6 generations ago)
In terms of landscape and Wairarapa Maori, or the combination of mana whenua and Maori who originated from different places, the late nineteenth and twentieth centuries are transitional times for the land and Maori. By the late 19th century Maori from all over New Zealand were coming to the Wairarapa in search of work.

Mana whenua only retained small mostly uneconomic blocks of land by this point. So to survive they became the labour force for the government and new owners of private land. This was not the desire of the people but a reality if they wanted to feed and clothe families.

NAMES

Landscapes and landmarks provide the background to names such as Wairarapa. The term Wairarapa only came into being after provincial councils were created during the 19th century. Traditionally, Wairarapa referred to the Ruamahanga River valley from immediately around Wairarapa Moana as far north as the area between the Tauherenikau and Waiohine rivers. The land north of the Waiohine to Pukaha Mount Bruce was known as Te Kauru or the upper valley. Within both there were numerous features.

NAVIGATION

The journey of Haunuiananaia(25 generations ago) chasing and finally catching up with his errant wife Wairaka has been told many times. He started at Heretaunga - Hawkes Bay, walked to Rangitikei on the west coast, down to Porirua and then through the Ruamahanga River valley. All the way he named landmarks after situations that he found himself in. The names in various forms are still in use today.

In the Wairarapa segment of his walk he left a map for all people that came after him. Starting at Remutaka (sic) maunga (Rimutaka mountains) -to sit down, he saw Lake Wairarapa (Wairarapa Moana) -waters that made his eyes glisten below him. After descending down into a valley he came to and named the Tauwharenikau awa (Tauherenikau river) -house made of nikau, then the Waiohine o Wairaka awa (Waiohine river) -water for his woman, then to Waiawangawanga awa (Waingawa river) -confused waters, next to Waipoua awa(water where he tested the depth with his walking stick) and finally to the Ruamahanga awa (twin forks after a bird snaring trough in a forked tree branch). All the while he looked

for Te Rangitumau maunga (holding up the sky) that he had seen from Remutaka (sic). Anyone who was told this story during the times when the Ruamahanga River valley was a patchwork of forest, swamp and grassy plains could navigate their way through the valley.

MARKERS

Prominent hills, rocks and trees were used to indicate where sea landscapes were. Lining up two points could tell a canoe crew where a rock was that they would want to avoid, where a good fishing hole was, or that they were coming onto a reef. Often the method was to head straight out from a marker and as soon as this point was lost to sight it was time to start fishing.

A straight imaginary line between a prominent rock in the sea and a hill on land could indicate a fishing boundary between families.

A landscape feature could be dangerous. So a story would be created to act as a warning. In these situations the words tapu – sacred, rahui – prohibited area or taniwha –unusual creature, might be applied to ensure that the place was treated with caution. The means of conveying the message could be through a story, a directive or a manmade object such as a post. Examples are dangerous stretches of water, bluffs and quicksand.

ECONOMY

When living in a situation where trade was limited to exchange through hospitality, infrequent warfare, and swapping of excess goods or materials for those that were non-existent or scarce, each individual in a whanau or hapu group had to know their land in detail.

If a whanau held mana whenua over a landscape that took in all the land that they could see, they would need to know each ecosystem within the landscape. They would need to understand how each being within that ecosystem coexisted or was influenced by other elements.

When they needed to make a new item that required say cutting down a tree, planning took into account how the job would affect other life forms, including land around the tree. This meant not only ensuring that people were safe by excluding all but specialist work crews from a defined area but also how other trees both big and small might be injured. Would insects, birds or rats be put out? Would the disappearance of a large tree create too much light in the understory or be of benefit? If a log needed to be floated down a river, would land between where the tree stood and the river be scarred? If fire was used to cut the tree, what was the potential for the fire to get out of control? These factors and others needed to be thought through before a tree was chosen because any one could change the land. If a problem occurred the people could suffer as a consequence of not caring for Papatuanuku and her mokopuna.

HOMES

An annual migratory cycle was established after the first people moved further inland. Groups began walking, or where practicable used waka on rivers, to move between inland areas and the coast. During autumn and winter the treasures of river flats, forest and swamp were utilised while the resources of the coastal areas were exploited during summer. Spring was a time of preparation for the coming year.

The landscape had to be observed to decide where the best place for papakainga – unfortified villages, and pa – fortified villages should be built. Although style of village complex and even building design changed over centuries in response to changing social and climatic situations, basic planning tools were consistent.

People wanted to be near food, water and resource sources but they did not want to be unhygienic, damp, cold, or in areas prone to flooding. Pa were built on defensible parts of hills and normally only used in times of need. Most of life was spent in papakainga on flat land nearer to rivers or coastal streams. But no matter where people were situated they calculated things such as where prevailing winds came from, how the sun would nurture or ruin crops, whether annoying insects might be close and how sanitation would be maintained without detrimentally affecting the surrounding land. Knowledge of landscape had a significant bearing on these decisions.

TE URUROA

It was Te Ururoa or the foothills and valleys, essentially the favoured home of nga manu – the birds, where human's chose to live. If birds were present there would be trees that they ate from and most of the trees had parts that humans could use for various purposes.

Kiore - the rat was a staple food that ate from the same trees. By moving to the coast at a certain time the people not only got optimum nutritional value from fish species, they also gave the inland food sources a chance to breed and grow. By the time that the people arrived back into the valleys, autumn was approaching and it was time to prepare for catching migrating eels. Eels were available all year round but autumn was the time for the annual harvest which put greater emphasis on the importance of the waterways.

CURRENT ISSUES

Broadly, there are several issues that concern Maori at whanau, hapu and iwi levels in relation to landscapes in the Wairarapa; these include:

- Subdivision, especially where there is alteration or destruction of waahi tapu, effects on access to mahinga kai and kai populations, visual effects on landscapes and landmarks important to iwi;
- Water quality, pollution, and effects of land use and development on waterways;
- Waitangi Tribunal Claims (Wairarapa iwi are seeking return of places such as Wairarapa Moana, Pukaha Mount Bruce and Ngaumu Forest);
- Official recognition of associations and or changes, to management regimes of specific features highly significant to whanau, hapu and iwi;
- Restoration of areas such as along waterways and native forest.

GLOSSARY

- atua = god
- awa = river
- hapu = clan
- iwi = confederation of clans
- kai = food
- kaumatua = elder
- mahinga kai = food gathering area
- marae = meeting place
- matira = lookout
- maunga = hill, mountain, mountain range
- mokopuna = descendent
- tikanga = customs, values and practices
- tupuna = ancestor
- waahi tapu = sacred or significant places
- waiata = songs
- waka = canoe
- whanau = family or extended family

EUROPEAN SETTLEMENT IN THE WAIRARAPA*

EXPLORATION

The first European explorer to sight Wairarapa was James Cook in 1770 (Tasman only sailed on the western side of Aotearoa followed by Russian navigators Bellingshausen and Lazarev in 1820, and the Frenchman Dumont D'Urville in 1827 (Bagnall, 1979).

The establishment of the New Zealand Company's Wellington settlement in 1840 led to the inland exploration of the Wairarapa area, the pressure for grazing land leading to a number of expeditions taking place in the early 1840s. The first significant trip was by surveyor Robert Stokes and companion JW Child and two Maori guides in November 1841 followed by a second larger expedition in May 1842 led by assistant surveyor Charles H. Kettle and Cadet Arthur Willis. Other parties followed, and reports to the Company urged the opening of the Wairarapa to settlement.

LAND LEASES

Maori were keen for pakeha settlers and, rather than wait for the New Zealand Company to acquire land in the Wairarapa, four entrepreneurs – Charles Clifford, William Vavasour, Henry Petre, and Frederick Weld negotiated in March 1844 for the lease of the open country to be known as Wharekaka Station for £12 per annum. Other leases soon followed and in April 1845 twelve stations were listed in a Wellington Independent table with between forty and fifty Europeans living in the district (Bagnall, 1976).

Once farming became established, wool was quickly the main export item.

According to Ben Schrader (2009) in the article 'Wairarapa region - European settlement':

The runholders' relations with their landlords were cordial. Maori sought Pakeha neighbours because it gave them mana (status), trading opportunities and protection from enemies. Pakeha depended on Maori for food, labour and transport.

Although the leasing system seemed to suit both leaseholders and their landlords, it was illegal under the Native Land Purchase Ordinance of 1846, designed to facilitate the sale of land to the Government for new settlers.

LAND PURCHASE

From mounting pressure and on recommendations of surveyors S. C. Brees and H. S. Tiffen, the New Zealand Company obtained authority for purchase of 250,000 acres for a Church of England settlement in the Wairarapa. The first attempt at negotiating a purchase in 1847 failed. The leases in place provided Maori with steady income, and they were strongly opposed to sale. A second attempt by Native Secretary Henry T. Kemp followed in 1848 and local Maori agreed to sell but at a price the buyers would not pay and the Church of England settlement was established in Canterbury.

To deal with the cause of the failure of purchase, no new leases were meant to be taken up but in fact the area leased expanded and rental income rose.

The majority of the leaseholders in the Wairarapa appealed to Government for some legal authority to be established as there was method of resolving land disputes between Maori and their tenants, and between the tenants. They said the longer purchase was postponed the more averse to sale the Maori were.

The first Government purchase of a quarter million acres in the Wairarapa was negotiated by Donald McLean on the back of Hawkes Bay purchases and was signed on 22 June 1853 by Wiremu Te Potangoroa. The price was £2,500 and the block included the coast between the Waimata Stream and Whareama River, reaching inland to the Wangaehu (sic) and Ihuraua River. Sir George Grey personally travelled to Wairarapa to negotiate further sales and his personal mana meant further sales followed, including 350,000 acres around Lake Wairarapa, (Wairarapa Moana) 40,000 acres of the Tuhitarata Block, 40,000 acres on the western side of the valley, and a number of homestead purchases (Bagnall, 1976).

Around the same time the Small Farms Association was formed (Schrader, 2009),

"Out of concern that large runholders were stopping working people from accessing Wairarapa farmland, Joseph Masters lobbied to set up a 100-acre town on the Wairarapa plain where citizens would own a one-acre town section and a 40-acre dairy farm. By the end of the year the government had approved two settlements. The association would buy and sell the town sections; farms would be bought directly from the Crown".

Of the first towns, Greytown, was sited on the recently purchased Tauherenikau Block. After negotiations with Ngāti Hamua leader Te Retimana Te Korou, land beside the Waipoua River was bought for Masterton. The first small farmers arrived in 1854. The Association was dissolved in the early 1870s, and surplus town sections were put into land trusts to benefit each community.

These settlements were the first planned inland towns in New Zealand. Featherston and Carterton followed in 1857 and Martinborough was set out by the Hon. John Martin in 1881. Bagnall (1976) states that,

"By 1865 settlers in Featherston, Greytown, Carterton and Masterton were managing to survive with less hardship from their established cultivation and a little reciprocal trade. There was at least one main street in each, with the promise of homes, even shops, to fill out the vacant sections."

ACCESS

The Rimutaka Road opened on 10th June 1856 after 10 years of construction and cost £35,000 (Bagnall, 1976). In 1871, Scandinavian and other immigrant settlers were recruited by the government to build roads and railways in the heavily forested Te Tapere Nui a Whatonga, Seventy Mile Bush. In exchange for work the immigrants would be given 40 acres of farmland (Schrader, 2009).

The Scandinavian settlers built the road from Kopuaranga to the north. Work on the improvement of the Featherston - Masterton road started in 1862 and district roads branching east and west from this road followed, the road to Castlepoint being completed in 1879 (Bagnall, 1976).

**This section was prepared by Edita Babos, Carterton District Council, reviewed by Gareth Winter, Wairarapa Archive*

Long after the completion of the Castlepoint Road, coastal shipping was most often used to reach the coast, most goods being transported this way well into the 20th century. Ferries operated at Lake Onoke (Lake Ferry), and the Whareama, Owahanga and the Akitio River mouths, usually with associated hotels. Safety of sea travel was improved with the lighthouse at Cape Palliser in 1897 and at Castlepoint in 1912 (Bagnall, 1976).

Proposals for a rail line from Wellington to the Wairarapa were first considered in 1863. The government took up the programme in the early 1870s and the Wellington-Hutt line was completed by autumn 1874. However, it took a further four years for the line to reach Featherston over the Rimutaka Incline, and another two years until the Masterton opening in November 1880. The Incline route had its limitations and alternatives were explored as early as 1899. However, it took until 1955 for the current single tunnel line to be completed (Bagnall, 1976).

Masterton developed more rapidly due to its geographical advantages and "*slight edge in personal leadership*". Greytown and Carterton followed closely, then Featherston, and last Martinborough (Bagnall, 1976). Smaller villages, such as Mauriceville and Tinui, were established as rural service centres.

Today the Wairarapa has a population of 44,817, of which 88.2% are of European descent. Masterton is the region's centre with a population of 19,500 (2006 Census).

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The settlement of Carterton looking east, was established in 1857 as a base for workers building the road from Greytown to Masterton.

LAND USE[2]

Land use varies across the Wairarapa and is direcly influenced by topography, geology, soils and climate. The western areas comprise young soils derived from Rimutaka and Tararua greywacke and argillite. The central plains are also young – formed in the last million years by alluvial gravels from the ranges, and comprise large fans, terraces and flood plains. The eastern uplands consist of uplifted sandstone, mudstone and limestone and feature broad valleys and steep, erosion-prone hill sides.

The climate is generally warm and dry, with over 2,000 hours average sunshine per annum. Rainfall diminishes west to east, ranging from 1200 to 800 millimetres per year. Winters are cool with frosts common from April to October, and possible most months.

Before the arrival of man much of the district was covered in forest, either conifer-broadleaf or beech. Maori, who settled the district nearly 1,000 years ago, were the first horticulturists. The remains of their extensive gardens can be seen at scattered locations on the south and east coasts. Their primary crop was kumara although they also cultivated hue, or gourd.

By the time European settlers arrived in the Wairarapa, fires, started by Maori and natural outbreaks, had substantially altered the vegetation. There were large areas of grassland and fern on the plains, while much of the eastern hill country was scrub and fern covered. The wetter western areas and the northern portion of the district were unaffected, and were still substantially forested.

Some of New Zealand's first extensive pastoral enterprises were undertaken on the Wairarapa plains. Driving their sheep around the coast from Wellington, the pioneer pastoralists, cousins Frederick Weld, Charles Clifford, and William Vavasour, established the first sheep run in the district at Wharekaka, south of Martinborough in 1844. They were followed by others in quick succession and much of the plain and the eastern hills were being leased from their Maori owners for sheep and cattle runs by the early 1850s.

In 1854 the twin small farm settlements of Greytown and Masterton were founded. The two villages, established by members of the Small Farms Association, and the Government-sponsored towns of Carterton and Featherston which followed shortly, were created to allow men of limited capital to purchase enough land to form small farms.

The pattern of agricultural development in the Wairarapa was strongly influenced by soil type and climatic considerations. The eastern hill country was slowly cleared of most remaining native forest and converted to grassland. It generally sustained extensive sheep and beef producing stations, many of which had to shift their produce by sea, the double handling involved adding to the cost of transport. Many of these large holdings were broken up in the early 20th century, by a combination of Government acquisition and family subdivision.

The land in the valley and in the wetter western foothills was traditionally farmed in much smaller blocks, with lamb fattening, dairying and cropping, often in conjunction with each other, being more important.

New Zealand's fourth co-operative dairy company opened in Greytown in January 1883, followed by more than fifty other factories. As roads improved and large scale milk tankers became operational, the companies amalgamated. There were only four by the mid 1970s and dairying seemed to be in decline. Since that time all the Wairarapa factories have closed but dairying has assumed a more important role.

Cropping was strong on the floor of the plains at times but has never had the importance of more traditional areas such as Canterbury. In the past, wheat and oats were major crops but now mixed cropping (mainly barley and peas) predominates and arable farming accounts for less than 2% of the Wairarapa land use.

Horticulture was an important industry in the region, especially on the rich alluvial soils. As well as extensive market gardens, a large number of berry and pip fruit orchards were established. One grower, James Hutton Kidd, laid the foundation for New Zealand apple breeding in the 1920s by introducing a number of important new varieties, including 'Gala'. The Greytown fruit industry flourished, but rising costs and poor returns have seen this industry shrink in importance.

The Wairarapa region is New Zealand's sixth-largest winemaking region, concentrating on producing premium wines. In 2007 there were 829 hectares in grapes, about 6% of New Zealand's total. The wine industry is concentrated on the gravel soils and dry climate of Martinborough, although there are also plantings in East Taratahi and at Opaki, north of Masterton. There are also about 200 hectares of olive trees producing about 15% of New Zealand's olive oil.

Wairarapa's hill country was extensively developed in the period following World War Two. Government rehabilitation schemes settled farmers on comparatively small blocks and generous subsidies encouraged the development of pasture on scrub covered lands. The development of aerial topdressing with lime and superphosphate enabled increased production.

The removal of subsidies in the mid-1980s changed the direction of hill country farming. Farmers were unable to maintain costly marginally economic pastures and stocking rates declined. Some recently converted land reverted to scrub, while other land was converted to plantation forestry.

Large scale forestry was first introduced to the Wairarapa in the 1940s when the Government started planting the Ngaumu block to help stabilise erosion prone land and to provide housing timber. Planting doubled in the 1990s but in recent years forestry planting has been curtailed and now planting and harvesting rates are in equilibrium.

THE PRESENT

The 2007 Agricultural Census recorded 1438 farms in the Wairarapa. Approximately 73% of the farmed land is reported as being in grass (Figure1), reflecting the dominance of pastoral agriculture in the region. Although having a high profile and contributing significantly to the economy, horticulture and fruit growing (including wine growing) comprise less than 1% of the total land area. Plantation forestry accounts for 12% while mature and regenerating native forests contribute a similar amount. The percentage of land used for arable farming is very small.

[2] This section is an edited version of material by Gareth Winter, Archivist, Masterton District Council.

The significant number of smaller properties on the urban fringes accounts for the relatively high percentage of farms of less than 20 hectares (Figure 2). There were 20% between 20 and 100 hectares, and 45% over 100 hectares.

These statistics reflect the dominance of the larger pastoral farms as a percentage of land, suggesting extensive pastoralism is the dominant landscape effect in the eastern hill country, while the more intensively farmed smaller holdings are to be found in the central lowlands, especially close to the towns.

The dominance of livestock farming is also reflected in the farm type by farm number figures, with 71% of farms engaged in livestock farming (Figure 3).

THE FUTURE

The fluctuating state of farm economics makes it difficult to predict how agriculture will affect the landscape in the future, even in the medium term. In recent years forestry and dairy have both undergone major swings in fortune, while some aspects of sheep and beef farming have come under severe financial pressure.

The impact of the proposed central valley irrigation project could change the degree of arable farming on the plains, allowing more horticultural crops to be raised, and offering the opportunity for high value intensive seed production. The proposed irrigation project has the potential to increase the amount of land suitable for dairying.

The role of wool, once the mainstay of the Wairarapa economy, has diminished to the extent that it is now little more than a by-product of the lamb meat industry. This has encouraged farmers to change their farming practices to produce more high quality meat and many have replaced dual-purpose sheep with breeds better suited to meat production.

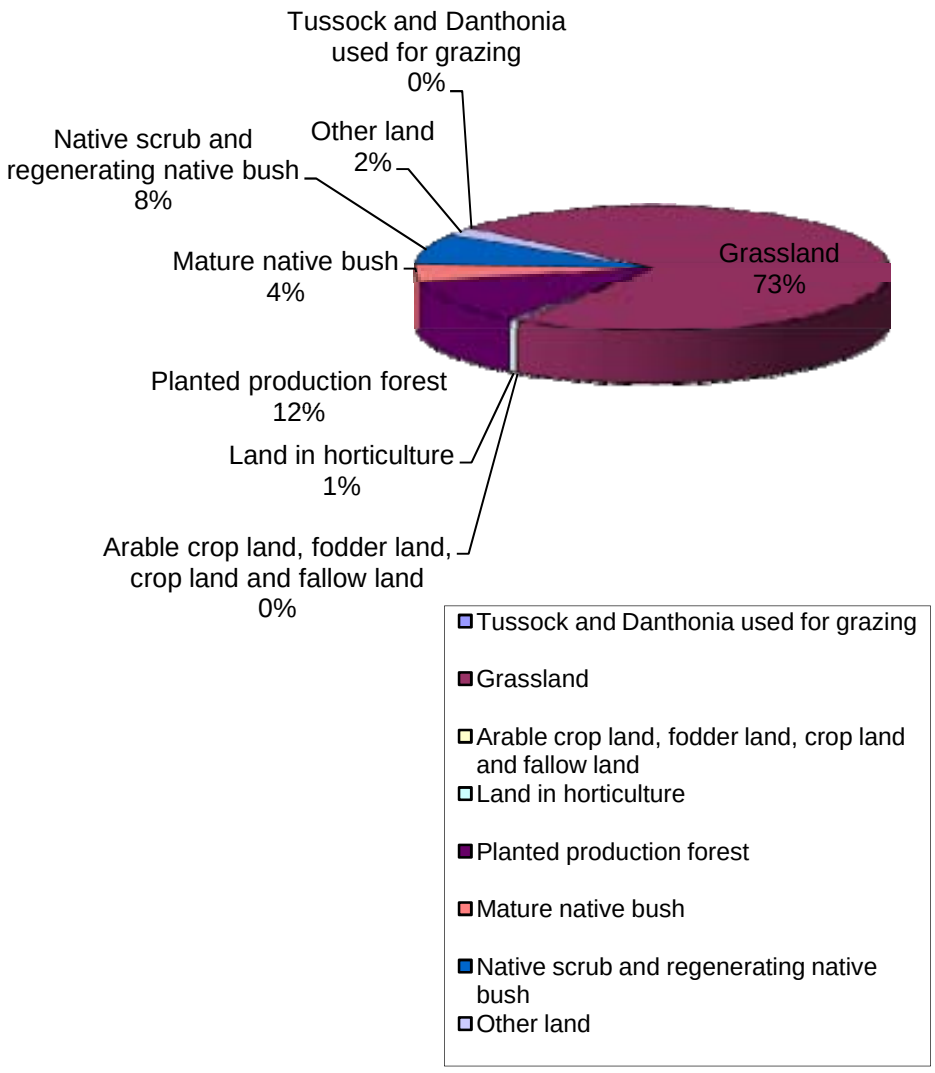


Figure 1: Wairarapa agricultural areas in hectares, by useage at 30 June 2007. Source, 2007 Agricultural Census, Statistics New Zealand

Since 1990 the Wairarapa's sheep numbers have fallen by nearly 30%, reflecting a fundamental change in livestock production, with an emphasis on highly productive stock. This has occurred by the infusion of improved genetics, both from new sheep breeds and by extensive use of high-performing sires to improve productivity and profitability. The Wairarapa Romney Improvement Group has been locally important.

These better performing animals require better nutrition, and farming systems have evolved to make full use of their potential. Farmers are resowing pastures with higher performing grasses and intensifying their animal management systems by better internal subdivision. There has been a marked increase in the use of nitrogenous fertilisers and many properties now finish their own lambs.

These processes are less economically sustainable on steeper country and it seems likely more marginal land will be withdrawn from pasture, perhaps being converted to plantation forestry, or being allowed to revert to native forest.

The potential for climate change to affect the eastern hill country should not be underestimated, however. The consensus is that rainfall will increase in western areas and will diminish in the east, with the possibility of worsening and more regular droughts. This would militate against more intensive livestock farming.

Deer farming has proven prone to cycles of boom and bust. There is currently little likelihood of expansion as financial returns have been poor and the Wairarapa herd has fallen by 50% in the past five years.

Arable farming is a minor activity in the Wairarapa, accounting for less than 2% of land use. It requires large scale operations to be economically feasible and it is unlikely there will be substantial expansion without increased irrigation.

Dairy farming has made a resurgence in those parts of the district where climatic conditions are suitable. There has been an increase of 50% in dairy cattle numbers since 1990, although there has been a slight fall in numbers since 2002. The average farm size and herd size has increased, larger operations being more economically sustainable. Some South Wairarapa herds have become certified as organic.

Extensive horticulture has been in decline in the Wairarapa for some years, with large-scale apple and pear growing almost disappearing. Vegetable growing, once extensive in the valley, has ceased due to small units being economically unsustainable.

Viticulture has expanded in the past thirty years but requires very particular soil types and climates, and further extensive expansion seems unlikely.

The forestry industry may have a larger role to play in the near future as public attitudes change. Forests will be regarded as more than a supply of wood. Their role in carbon sequestration and storage, and their use for erosion control and the maintenance of biodiversity and water quality

will add to their value.

The New Zealand agricultural sector currently produces a large amount of greenhouse gases which could be offset by planting exotic forests. Such plantings would seem likely in the more erosion-prone eastern hill country especially on land that is economically marginal for livestock farming. Climate change could threaten this expansion, as an increasingly dry climate and rising wind flows would make growing conditions less favourable.

The long-term future of farming in the Wairarapa will be based on livestock farming and forestry. The state of economic returns for meat and wool in the foreseeable future make it unlikely there will be any large development of marginal hill country for livestock production, nor a reversal of the trend for marginal country to be planted in exotic forests.

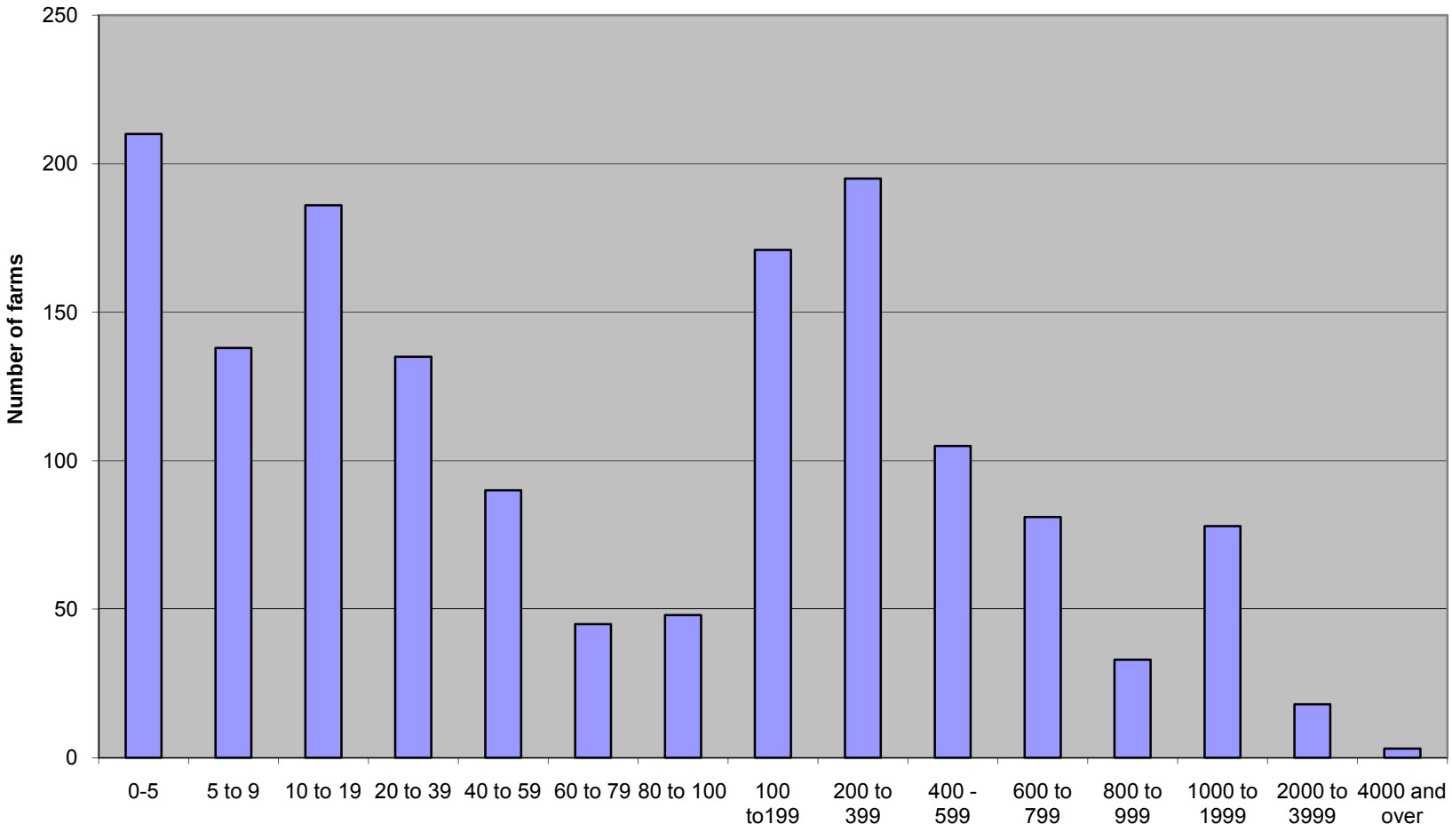


Figure 2: Wairarapa farms by farm size at 30 June 2007. Source: 2007 Agricultural Census, Statistics New Zealand

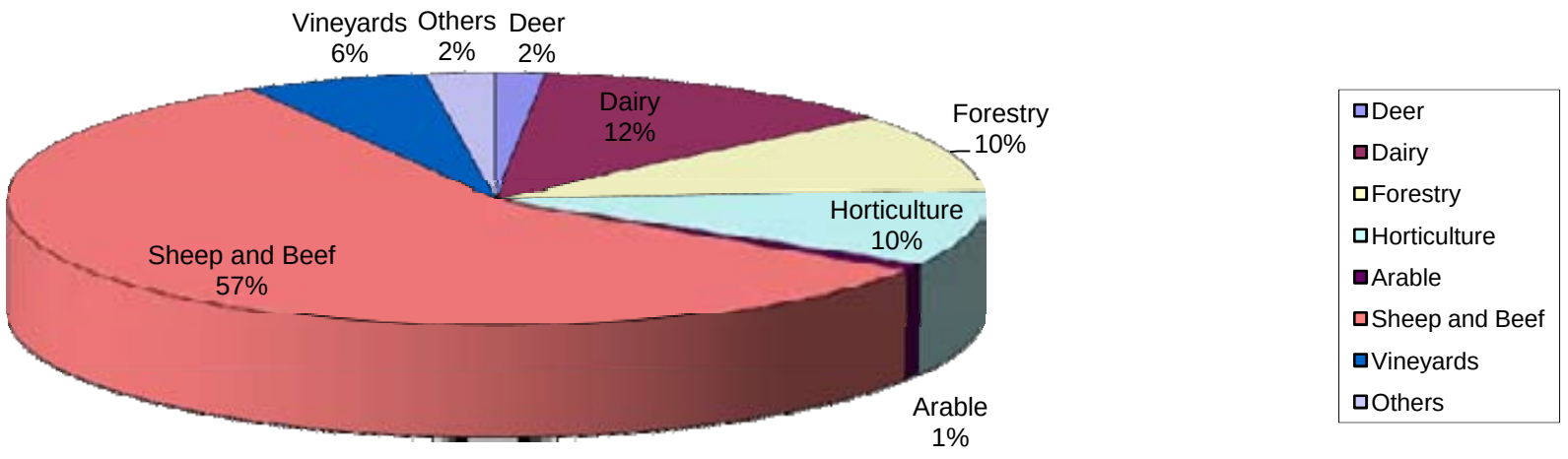


Figure 3: Wairarapa farms by Farm Type (ANZSIC06). Source, 2007 Agricultural Census, Statistics New Zealand

APPENDIX 2: GEOLOGY

The Wairarapa contains a record of upheavals which have reshaped the Earth's crust and many of these are evident in today's landscape. The landscape consists of a diverse range of landforms from the high western Tararua and Rimutaka Ranges, the broad central river plains, and the dissected eastern hill country to the narrow coastal platforms and escarpments.

The Wairarapa is characterised by intensive faulting, tilting and uplifting of a similar range of basement rocks extending from Marlborough to East Cape. The West Wairarapa Fault that forms the eastern margin of the Rimutaka and Tararua Ranges is a continuation of the Clarence Fault that extends through Marlborough to the south. Similarly, the East Wairarapa fault appears to be a continuation of the Hope-Kaikoura fault.

The origins of the Wairarapa landscape date back to 120 million years ago with the accumulation of thousands of metres of sand and silt on the sea floor and occasional submarine eruptions. Over time, the deeply buried sand and silt were transformed into the hard greywacke that comprises the Tararua, Rimutaka and Aorangi ranges; about 20 million years ago the hard greywacke that forms these ranges was uplifted.

The plains have been built up from the aggregation of gravels through erosion of the ranges. Most of the coastal hill country consists of a complex of softer rocks and bands of limestone with mudstones and conglomerates scattered throughout.

The pronounced north-east/south-west trend of axial ranges, inland valleys and coastal hills results from the 'concertina like' convergence, in the collision of the Pacific and Indian-Australian Plates. As a result, the landscape of the Wairarapa has a distinctive north-east/south-west alignment.

TAIPO

The Taipo landforms are a distinctive characteristic of the Wairarapa Hill country, but do also occur in other parts of New Zealand, such as the east coast hill country.

Taipo is the name given to the distinctive steep jagged hills that occur in the eastern Wairarapa hill country. Examples of these are Tinui Taipo and the nearby Mangapakeha Taipo, Te Maipa Taipo, (near Stronvar) and the Taipo in the Rocky Hill Road area. These particular Taipos are relatively well known due to their accessible locations in easy view from public roads. Their dramatic visual character is largely due to the steep serrated rocky ridges, made all the more distinct by the lack of substantial vegetative cover such as forest. The Rocky Hills Sanctuary (DoC Reserve) and Taipo Minor are notable exceptions, both supporting mature podocarp/hardwood forest.

Taipos are a prominent feature along the length of the Wairarapa eastern hills and are associated with Land Type 7 (Cretaceous Hard Rock and Steeplands) which make up 11.6 % of total area of Wairarapa. Land type 7 occupies a relatively narrow band of the eastern hill country running parallel and close to the coast.

The Taipo landforms result from the differential erosion of raised and tilted blocks of sandstones and mudstones. The variation in erosion resistance of soft and hard rocks is reflected in the steep and craggy rocky formations.

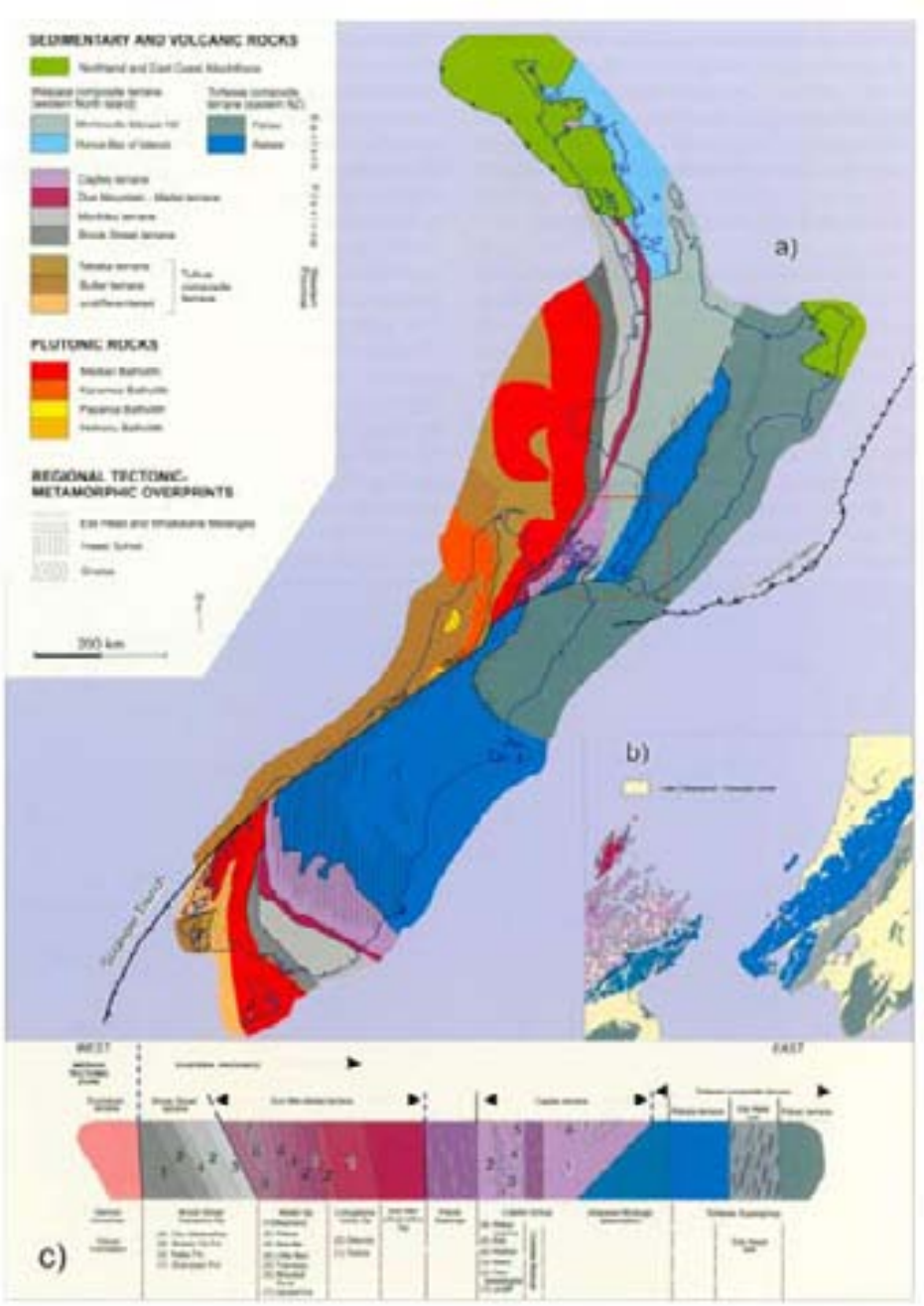


Figure 8a) Basement (pre-Late Cretaceous) geological map of New Zealand. Units are grouped according to major, rather than sole, rock type. Nomenclature and boundaries of North Island Torlesse and Waipapa terranes are controversial; parts of Morrinsville-Manaia Hill and Pahau units may be correlative. Northland and East Coast Allochthons were emplaced in the Early Miocene; all other units were in mutual juxtaposition by the Late Cretaceous. Adapted from Black (1994), Mortimer (1995), Mortimer *et al.* (1997, 1999) and references therein.
b) Basement rocks subdivided into tectonostratigraphic terranes for the Wellington area.
c) Cartoon cross section through basement rocks of Marlborough/Wellington area illustrating structural style and relationships.

Source: Institute of Geological and Nuclear Sciences Ltd. (2000) Geology of the Wellington Area. Begg. J & Johnston. M (compilers).

Local maori called the landforms Taipo; meaning demon or devil. Traditional stories of local maori associates particular powers to the taipos.

http://www.rangitane.iwi.nz/education/index.php/stories/traditional/the-taipo-of-tinui

GIS Data set used: Geopreservation Sites _ Geological Society of New Zealand Science

Castle Point

Riversdale Beach

Flat Point

Honeycomb Rock

Glendhu Rocks

Palliser Bay

White Rock

Cape Palliser

1:325,000 @ A3

0 5 10 15 20 km

Active Faults

Sand
Gravels
Mudstone
Sandstone
Conglomerate & Breccia
Greywacke
Limestone
Claystone
Melange
Coquina
Basalt
Silt

GEOLOGY

APPENDIX 3: GEOPRESERVATION SITES

The New Zealand Geopreservation Inventory[1] highlights the 'best examples of the wide diversity of natural physical features and processes that together characterise each part of New Zealand and document its long complex geological history, the formation of its landforms and evolution of its unique biota'.

New Zealand has unique and diverse range of natural landforms, geology and soil heritage, due to its location and formative processes. The New Zealand Geopreservation Inventory 'aims to identify and list information about all the internationally, nationally and many of the regionally important earth science sites throughout New Zealand, irrespective of their current protected status'.

Within the Wairarapa there are 38 recognised sites of geological importance, ranging from historic areas of mining to marine terraces, fault scarps, taipo , fossil forests and sand dunes.

Each site is listed for its importance and significance.

For importance, the inventory categorises the sites into three levels (A-C):

A: international: site of international scientific importance.

B: national: site of national scientific, educational or aesthetic importance.

C: regional: site of regional scientific, educational or aesthetic importance.

For vulnerability, each site has been classified (1-5) depending on its perceived vulnerability to human activities:

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 humans activity

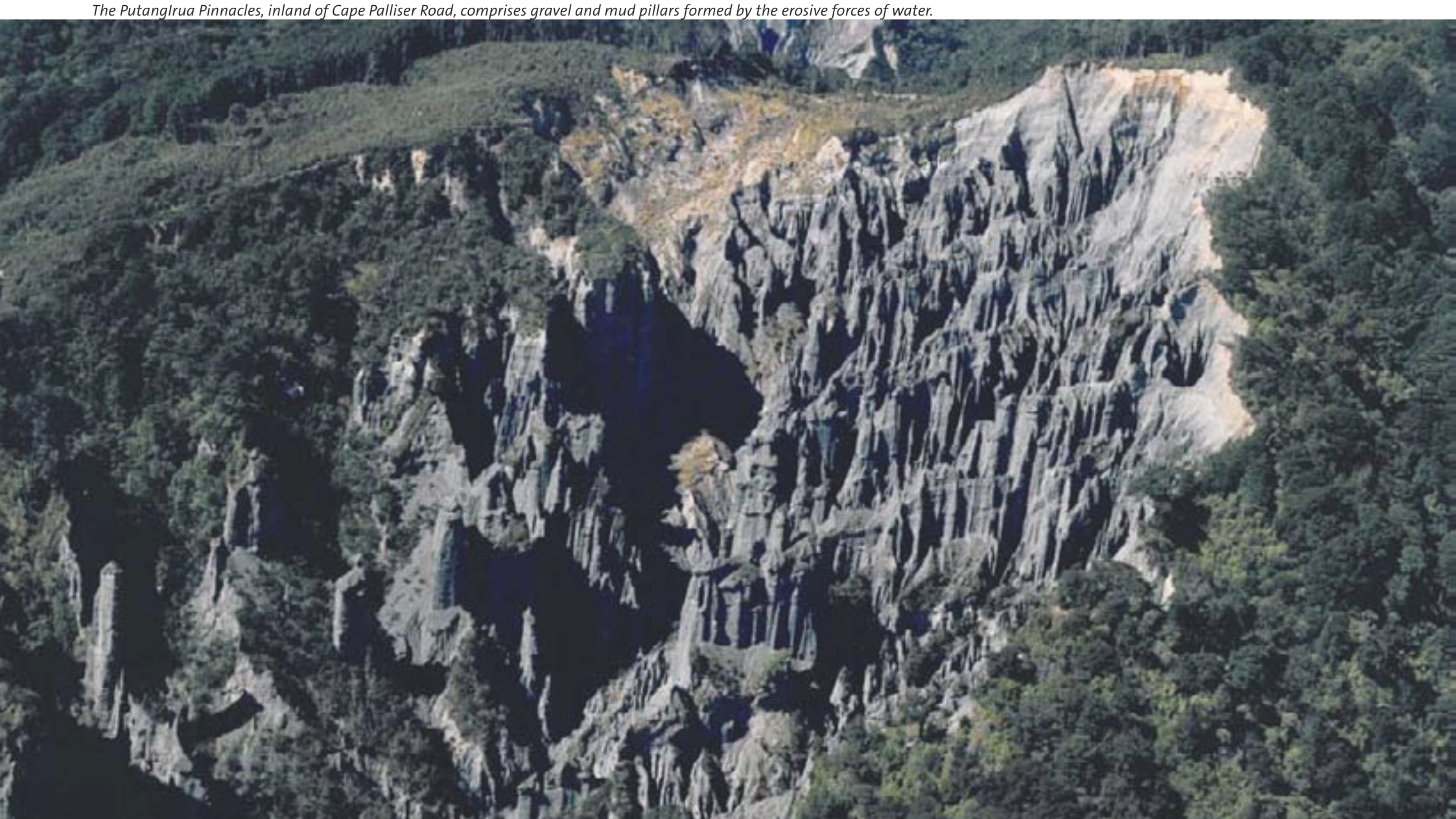
5 Site already destroyed (not necessarily by human activity)

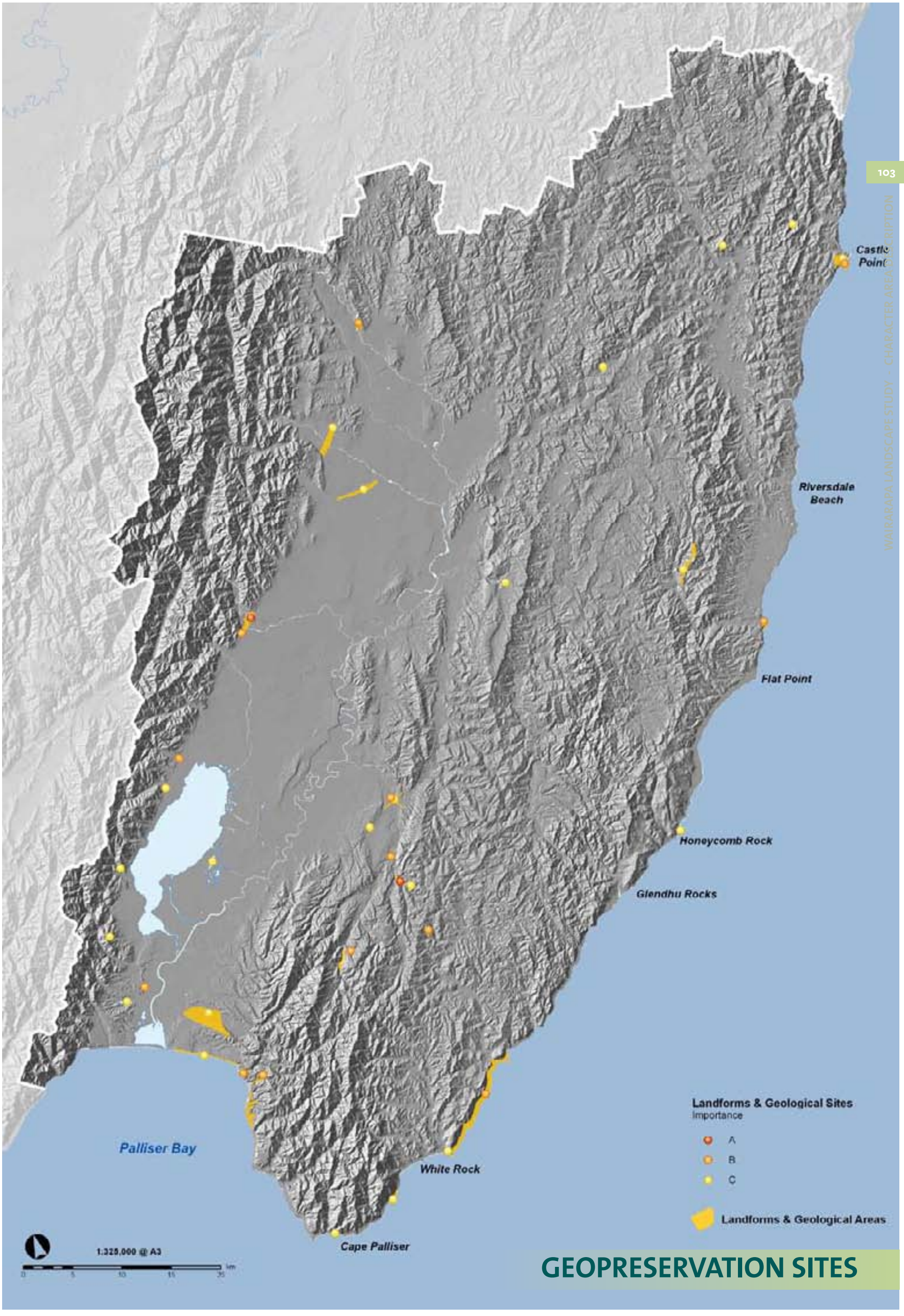
The full list of sites, their location and details are contained overleaf.

GIS Data set used: Geopreservation Sites - Geological Society of New Zealand

1 *Geological Society of New Zealand. 1996.*

The PutangIrua Pinnacles, inland of Cape Palliser Road, comprises gravel and mud pillars formed by the erosive forces of water.





GEOPRESERVATION SITES

GEOPRESERVATION SITE DETAIL

Geopreservation Site detail			
Name	**Location**	**Importance**	**Vulnerability**
Kupe's Sail sandstone slab	At the mouth of Little Mangatoetoe Stream, 1 km west of Cape Palliser.	C	3
Ngapotiki alluvial fan	2.5 km south of the end of Ngapotiki Road at the mouth of Mataopera Stream.	C	3
Te Kaukau Point Paleocene Amuri Group sediments	On the Wairarapa Coast, about 2 km east of White Rock.	C	3
Pukemuri Stream uplifted marine benches	East Wairarapa coast, from Te Kaukau Point to Manurewa Point.	B	2
Putangirua Pinnacles	One major area and several subsidary areas about 2 km up the Putangirua Stream, east coast of Palliser Bay (Te Kopi).	B	2
Palliser Bay Miocene transgressive sequence and diverse macrofauna	Stream and coastal cliffs around eastern side of Palliser Bay.	B	2
Palliser Bay Plio/Pleistocene section	Northern cliffs of Palliser Bay from Lake Ferry eastwards for about 4 km.	C	3
Eparaimu uplifted marine benches, Palliser Bay	East flank of S. Ruamahanga Valley.	C	3
Big Hill earth pillars, rills and gullies	Between Paruwai Road and White Rock Road, 1 km south of Big Hill trig.	B	3
Haurangi Hairpin Plio-Pleistocene limestone	Haurangi Hairpin, upper Ruakokopatuna Valley, south Wairarapa.	B	3
Glenburn dike	1 km north of Honeycomb Rock.	C	3
Lake Pounui gravel-dammed lake	500 m west of Western Lake Road between Lake Wairarapa and Lake Onoke and 1.5 km west of Battery Hill.	C	3
Battery Hill abandoned gravel bar	Under Western Lake Road, 300 m NE of Battery Hill, between Lake Onoke and Lake Wairarapa.	B	2
Sunnyside Miocene conglomerate	Tributary of Mangaopari Stream, opposite Sunnyside homestead, locally known as McLeods Creek.	C	3
Mangaopari Miocene-Pleistocene paleomagnetic section	Bell's Creek, Mangaopari Stream and Makara River. 4 km of sequence.	A	3
Huangarua River cyclothems	Banks of Huangarua River, 400 m downstream from junction of Ruakokopatuna and Makara Streams.	B	3
Galatea Mine gold	In Rimutaka Ranges, approached from Wairarapa side.	C	3
Dry River Fault, White Rock Road scarp	Martinborough-Awhea Road (White Rock Road), 6.8 km from Martinborough Square.	C	3
Huangarua Fault	Te Muna Road-Huangarua River.	C	3
Huangarua Syncline flexural slip faults	Just W of Martinborough-Masterton Road, c.4 km SE of Martinborough.	B	3
Lake Wairarapa sand dunes	Between Allsops Bay and Mangatete Stream in a 15 x 3 km belt.	C	2
West Wairarapa Fault, Burlings Stream	Slopes on N side of Burlings Stream, c.1 km west of Lake Wairarapa.	C	3
Kaiwhata River mouth fossil forest and Miocene flysch sequence	For 100 m on either side of Kaiwhata River mouth, north of Flat Point, Wairarapa coast.	B	3
West Wairarapa Fault - Cross Creek horst dam	Where Cross Creek Rd cuts across fault trace; 2-3 km west of north end of Lake Wairarapa.	C	1
West Wairarapa Fault, 1855 scarp	Pigeon Bush, southern Wairarapa Valley.	B	2
Kaiwhata Stream sills	Kaiwhata Stream, east of Ngahape.	C	2
Kourarau freshwater fossils	Road cutting on south side Tupurupuru-Te Wharau Rd, 200 m west of Puketiro Rd junction.	C	1
South Waiohine fault bulge	On uplifted north-west side of West Wairarapa Fault, 500 m west of Waiohine Valley Rd, about 1 km north of Woodside Station.	B	2
West Wairarapa Fault, Waiohine River faulted terraces	North side of mouth of the Waiohine Gorge, c.4 km NW of Greytown.	A	2
Masterton Fault (Waingawa Fault)	North side of Waingawa Freezing Works, Masterton.	C	2
Carterton Fault, Blairlogie Road trace	Blairlogie Road, c.2 km W of Awatoitoi.	C	3
Castlepoint Pleistocene sediments	Wairarapa coast east of Tinui.	B	3
Castlepoint marine terraces	Castlepoint, coastal Wairarapa.	C	3
West Wairarapa Fault, Waingawa River faulted terraces	Waingawa River - Upper Plain Road at foot of Tararua Range.	C	3
Kerosene Bluff black shale	In road cutting on south side of Castlepoint Rd, about 5 km from coast.	C	2
Tinui taipo	2 sq km hill and ridge centred around Maunsell Trig (359 m high), 2 km north of Tinui township.	C	3
McClouds Trig rock slump	Near McClouds trig, 30 kms north of Masterton on the Ruamahanga River.	B	3

APPENDIX 4: SOILS

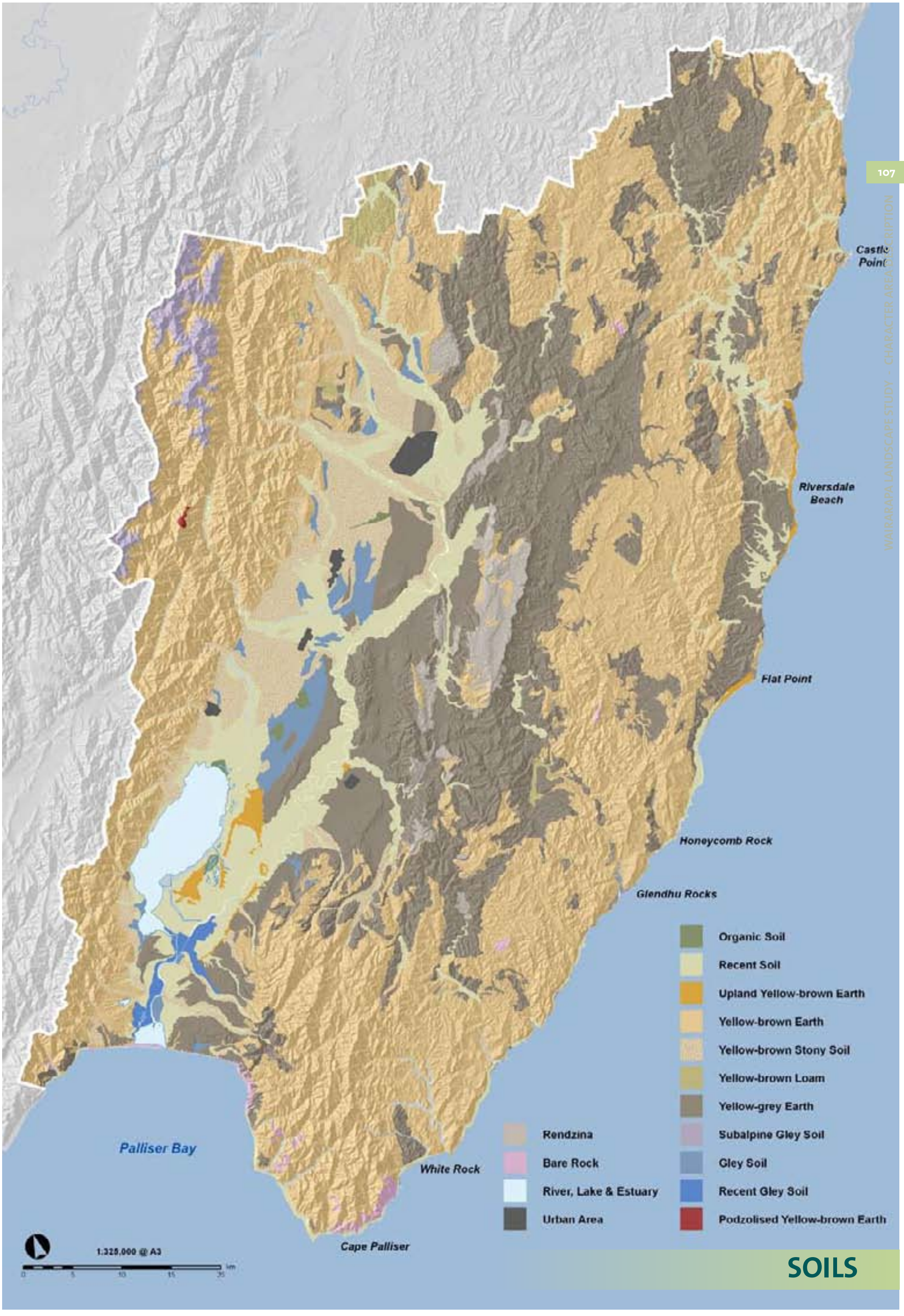
The soils of the Wairarapa reflect the geological processes that have created them. The varied land uses throughout the area are largely dependent on the soil types, topography and climate.

In broad terms, the Wairarapa soils can be considered as two general groups; the more fertile soils associated with the plains, river systems and lowlands, and the relatively less fertile soils associated with the hills and steeplands of the ranges and eastern hill country.

The plains and lowlands soils are dominated by recent and recent gley soils, yellow-grey earths, and yellow-brown stony soils. Recent and recent gley soils have developed on silty and sandy gravels or alluviums of the plains and are derived from the greywake material transported from the western ranges by the Ruamahanga River and its western tributaries. The lowlands in the eastern plains are predominantly yellow-grey earths developed on loess, in areas of relatively low rainfall (1000-1140 mm p.a.) with a summer dry period. Yellow-brown stony soils, also derived from greywake alluviums and gravels, have developed on the western side of the plains, where there is relatively high rainfall on old floodplain areas. The climate and flat to rolling topography together make various parts of the plains and lowlands suitable for arable and pastoral farming and forestry.

The eastern hill country is predominantly yellow-brown earths interspersed with small pockets of intergrade between yellow-grey and yellow-brown earths. Yellow-brown earths and related steepland soils are developed on greywake loess as well as mudstone and siltstone in areas of moderate rainfall and are weakly or strongly leached. The soils of the eastern hill country together with the climate, and also the hilly to very steep topography, make the land suitable for pastoral farming and forestry.

GIS Data set used: Soils - Landcare Research


Castle Point
Riversdale Beach
Flat Point
Honeycomb Rock
Glendhu Rocks
Palliser Bay
White Rock
Cape Palliser
1:325,000 @ A3
km
0
5
10
15
35
Organic Soil
Recent Soil
Upland Yellow-brown Earth
Yellow-brown Earth
Yellow-brown Stony Soil
Yellow-brown Loam
Yellow-grey Earth
Subalpine Gley Soil
Gley Soil
Recent Gley Soil
Podzolised Yellow-brown Earth
Rendzina
Bare Rock
River, Lake & Estuary
Urban Area

SOILS

APPENDIX 5: ELEVATION & SLOPE

Elevation and slope are highly variable given the topography which varies from high axial ranges, wide river flood plains, and dissected steep coastal hills to narrow uplifted coastal platforms and associated escarpments.

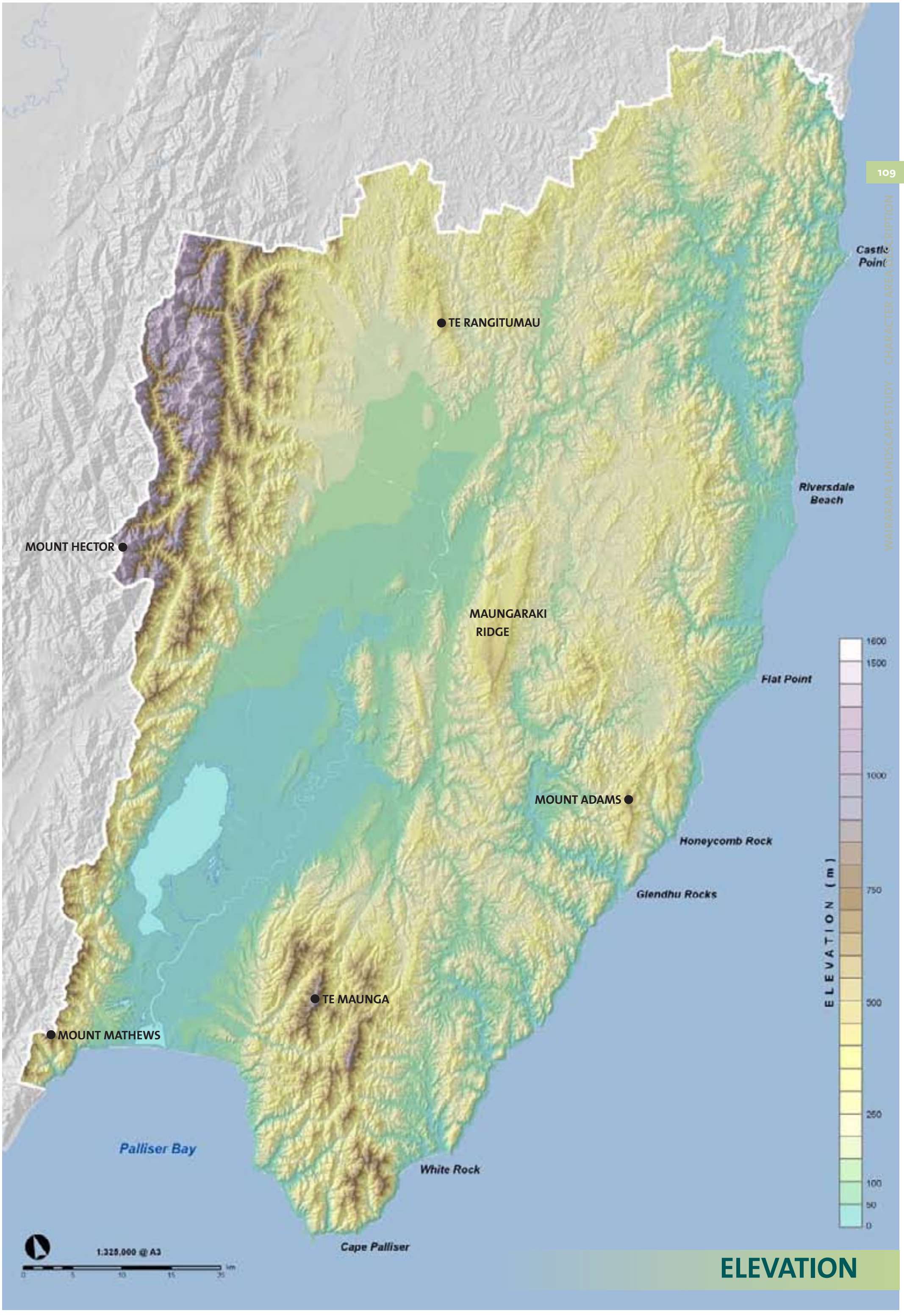
The Tararua Ranges has several ridges and peaks rising to over 1000m with Mt Hector the highest point at 1529m. The Rimutakas are generally lower with Mt Mathews the high point at 940m. The Aorangi Ranges reach similar elevations to parts of the Rimutaka Ranges with three ridges over 800m in height and the high point, Te Maunga at 979m. The ranges have predominantly steep to very steep topography with a network of sharp ridges, pointed hill and mountain tops and steep-sided stream and river gullies. The foothills to the ranges are lower, more rounded and vary from hilly to steep topography.

The plains include flat, undulating and sometimes rolling land and descend from 140m asl at Opaki, north of Masterton, to near sea level at Lake Onoke (over a distance of 75 km). The plains also have a definite downward tilt from the west to the east. This tilt is clearly expressed in the pattern of rivers that cross the plains from the Tararua Ranges to the Ruamahanga River that follows the toe of the eastern hills to the sea.

The hill country to the north and east of the plains is a complex of hills, mountains and river valleys that range from very steep slopes to quite broad flat valley floors. There are several ridges and mountains above 500m including Mt Adams (the highest at 664m), Maungaraki Ridge (560m). Te Rangitumau (604m) is the high point of the hill country north of the Aorangi Ranges, but generally the hill tops and ridges range between 300m and 400m.

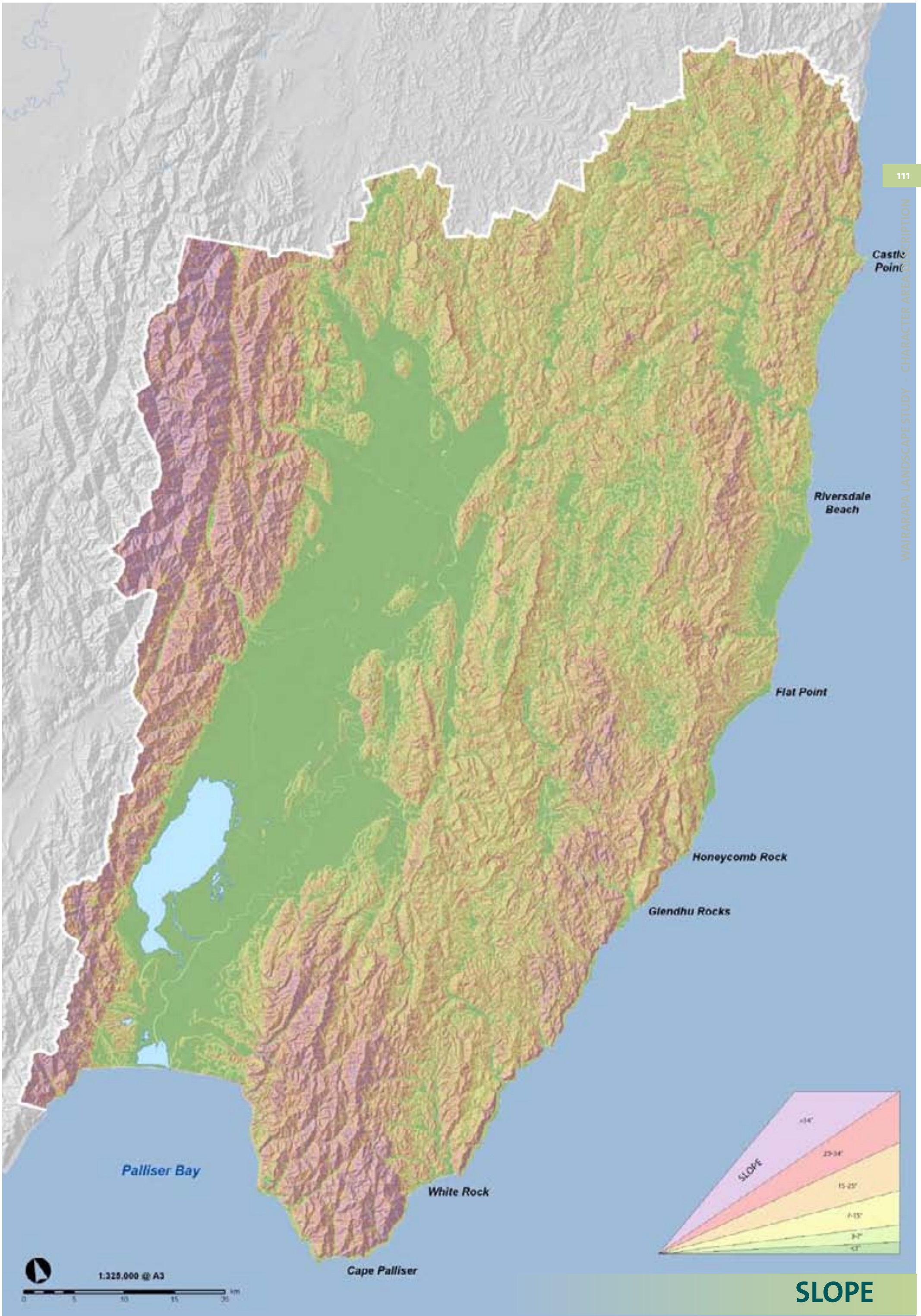
There is approximately 200km of coastline in the Wairarapa. The majority of the coast comprises a narrow coastal platform defined by steep and usually high coastal escarpments or hills. Exceptions to the narrow coastal platform occur at river mouths such as the Opouawe, Pahaoa, Kaiwhata and Whareama rivers where the enclosing slopes give way to more open river valleys and alluvial flood plains. The Homewood coastal plains are the only sizable area of flat to rolling land adjacent to the coast.

GIS Data set used: derived from digital elevation model, Land Information New Zealand


TE RANGITUMAU
MOUNT HECTOR
MAUNGARAKI RIDGE
MOUNT ADAMS
TE MAUNGA
MOUNT MATHEWS
Castle Point
Riversdale Beach
Flat Point
Honeycomb Rock
Glendhu Rocks
White Rock
Palliser Bay
Cape Palliser
ELEVATION (m)
1600
1500
1000
750
500
250
100
50
0
1:325,000 @ A3
km
0
5
10
15
35

ELEVATION

The Rocky Hills area, near Te Wharau, have a distinctive conical shape due to the hard underlying parent material (Land Type 7). Maungaraki Ridge is visible in the left of the background.


Castle Point
Riversdale Beach
Flat Point
Honeycomb Rock
Glendhu Rocks
Palliser Bay
White Rock
Cape Palliser
1:325,000 @ A3
km
0
5
10
15
35
SLOPE
<14°
14-23°
23-34°
>34°

SLOPE

APPENDIX 6: LAND COVER

Many factors influence the land use patterns including geology, soils, topography, climate, existing land cover, and economic factors.

Today agricultural uses are by far the most prevalent land cover types in the Wairarapa. Improved pasture and grassland covers nearly all of the plains, lowlands and much of the hill country. Vineyards, horticultural crops and arable crop land are very minor land uses in terms of total area, and are concentrated in the eastern and north plains area.

Indigenous forest covers the second largest area of land. The native forest is mainly confined to the Tararua, Rimutaka and Aorangi Ranges; there are also several moderately- sized isolated remnant native forest areas amongst the exotic forests on the eastern hills. There are no sizable areas of indigenous vegetation remaining on the lowlands or plains, but many small fragments are scattered throughout the farmland.

Extensive areas of exotic production forest have been established in the eastern part of the hill country north of about Hinakura. Smaller plantations are also established on the western foothills west of Carterton and Masterton. Small exotic woodlots and shelterbelts are common throughout the hill country and lowlands adjacent to the plains.

Large tracts of the eastern hill country support native kanuka- dominated scrub, exotic scrub (gorse and broom) and regenerating native forest. These often steep and inaccessible areas, originally cleared of native forest for grazing, are now reverting to native vegetation. The changing economics of sheep and beef farming are not currently profitable on this country, consequently large areas have been retired from grazing or have been planted in exotic forest.

GIS Data set used: LCDB 2 Terralink International

Some of New Zealand's first extensive pastoral enterprises were undertaken on the Wairarapa plains, and grasslands continue to be the dominant land cover today.


Castle Point
Riversdale Beach
Flat Point
Honeycomb Rock
Glendhu Rocks
White Rock
Palliser Bay
Cape Palliser
Alpine Vegetation, Gravel & Rock
Indigenous Forest
Exotic Forest
Native Shrubland & Fernland
Exotic Shrubs & Shelterbelts
Tussock Grassland
Low Producing Grassland
High Producing Exotic Grassland
Vineyards, Orchards & Crops
River, Lakes & Wetlands
Coastal & Estuarine
Man-made Environment
1:325,000 @ A3
km
0
5
10
15
35

LAND COVER

APPENDIX 7: RECORDED NATURAL AREAS

A sizable area (140,251 hectares) of the Wairarapa is identified in the GIS data sets as being indigenous vegetation or habitat, some of which are formally protected.

Most of the protected indigenous habitat/vegetation lies within the rugged ranges and eastern hill country. The Rimutaka, Tararua, and Aorangi Forest Parks, which are administered by Department of Conservation comprise a significant part of the bush-clad ranges. Other smaller areas of protected native forest in the eastern hills are also protected and managed by DoC, including the Rewa Bush Conservation area (1265 ha west of Riversdale), Rocky Hills Sanctuary (418 ha), Oumukura Scenic Reserves (148 ha), and Tora Bush Scenic Reserve (549 ha).

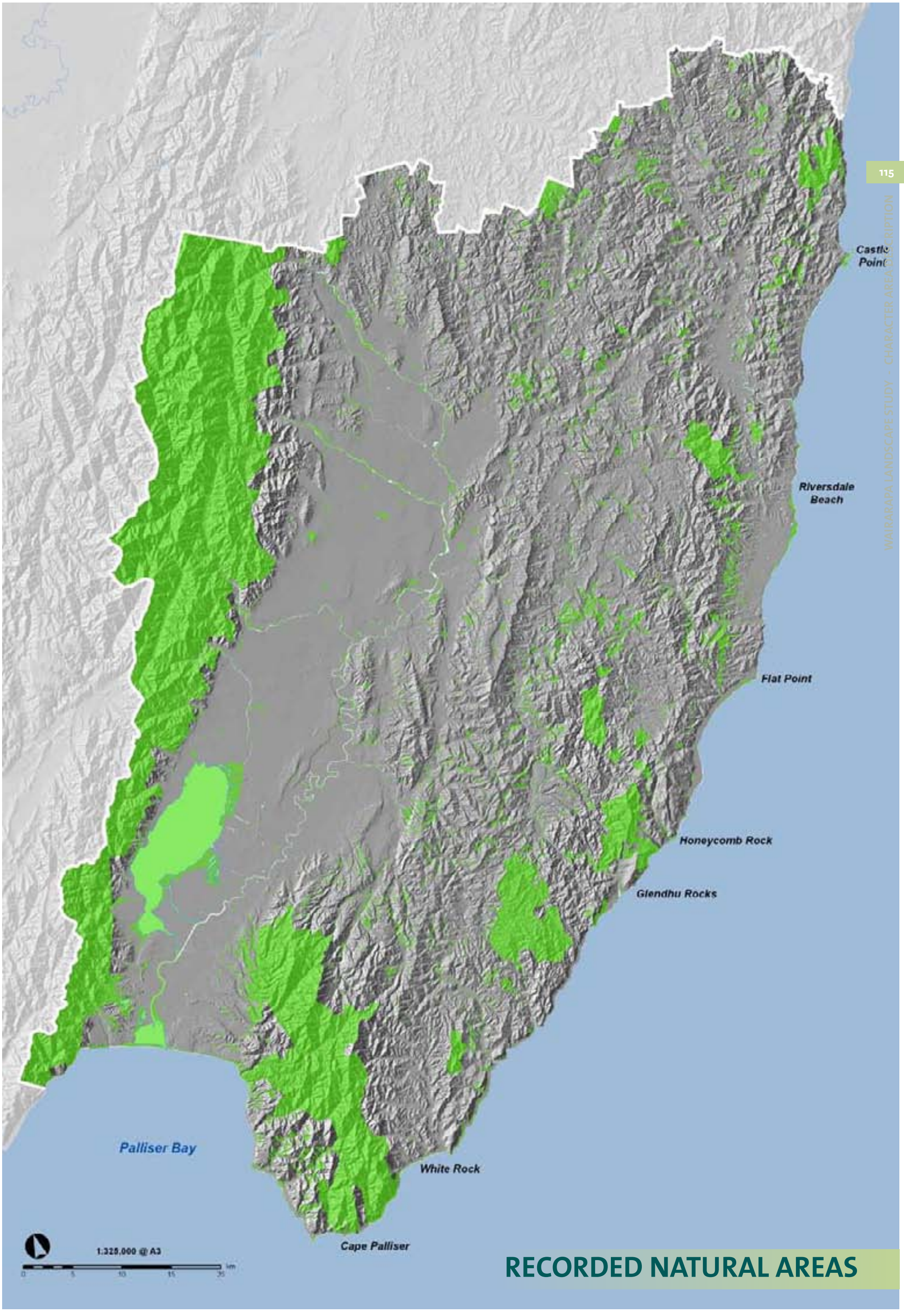
Apart from these areas, only small fragments of indigenous vegetation or habitat remain in the Wairarapa. While some of these fragments are protected as reserves, QE II open space covenants, or conservation covenants under the Reserves Act, many have no protection. While there are many sites identified as Recommended Areas for Protection (RAPs) and indigenous threatened habitat sites, these areas have no protective status.

Lakes Wairarapa and Onoke have been identified as potential RAMSAR sites.

GIS Data sets used:

- *RAP sites (DoC)*
- *Protected Private Land (DoC) Estate- DoC*
- *DoC Reserves*
- *QEII National Trust open space covenants*
- *Indigenous threatened environments (DoC)*
- *RAMSAR Candidate sites- (DoC).*

The forest remnant at Tora is a rare example of protected indigenous coastal vegetation in the Wairarapa.



RECORDED NATURAL AREAS

APPENDIX 8: INDIGENOUS VEGETATION IN THE WAIRARAPA*

The Wellington Regional Native Plant Guide[1] divides the Wairarapa into 8 ecological zones and provides some basic information about past indigenous vegetation cover – "an historical picture of what these zones might have looked like before forest clearance and landscape modification".

Most of the Wairarapa coast is zoned as *Rocky Coastal* zone and past landscapes included wind and salt resistant shrubland dominated bluffs and steep escarpments. In gullies and more sheltered coastal areas originally there was a mixed forest of trees adapted to the stresses of excessive drainage and salt.

The Riversdale coastline is zoned as *Duneland,* with the past landscape being a highly diverse area of wetland/dry dune habitat where grass and shrubland dominated the younger dunes and forest covered the old dunes.

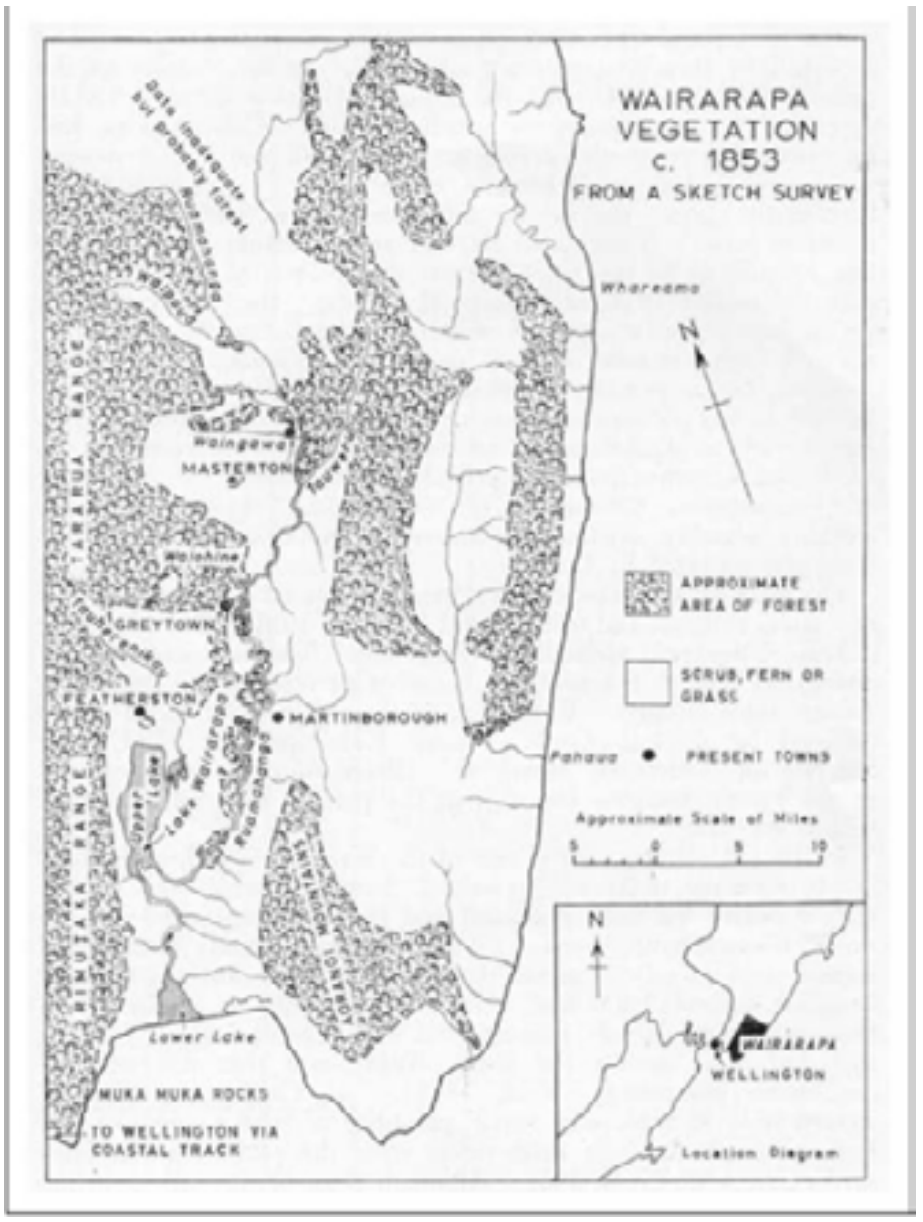
Tauweru River, Gladstone and Ponatahi areas are zoned as *Eastern Wairarapa Foothills*. Past landscapes were dominated by kanuka associations and totara. Titoki and ngaio dominated the relatively frost-free areas.

The *Northern Wairarapa* ecological zone covers Mauriceville, Bideford, Mt Bruce (Pukaha), Mataikona River and Kopuaranga areas. Historical habitats through the hill country were diverse with heavy podocarp forest in higher rainfall areas, while to the east the vegetation was dominated by mixed forests of rimu, rata and matai.

Tinui, Whareama, Homewood, Te Wharau, Pahaoa and Tuturumuri areas are in the *Eastern Wairarapa Dry Hill Country* zone. Past landscapes were diverse habitats: hill country, steep escarpments along incised rivers, and old raised river terraces. This area was forested throughout with species tolerant of drought. Divaricating, small-leaved shrubs dominated the undergrowth. Kowhai and ngaio were dominant on the frost-free river escarpments. The *Southern Wairarapa Plains* zone includes Whangaimoana-Pirinoa, Lake Wairarapa, Pounui, Kahutara and Tuhitarata area. In the past, these landscapes of terraces and rolling hills were dominated by beech forest, swamp forest and wetland plants in the wetter lakeside soils.

Featherston, Greytown, Carterton, Masterton, Te Ore Ore, Opaki and Martinborough are in the *Central Wairarapa Plains* zone. Historical vegetation consisted of drought and frost-tolerant podocarps in the well-drained stony soils.

The *Inland Wairarapa Hill Country* zone covers Hinakura, Tablelands, Ngaumu, Wainuioru and Ruakokoputuna (Ruakokopatuna). Past landscape were hillslopes with rata-rimu-tawa-broadleaf forest with beech species dominating the drier spurs.



Vegetation of the Wairarapa in Mid-Nineteenth Century. Tuatara: Volume 11, Issue 2, June 1963

1 The Wellington Regional Council, *Wellington Region Native Plant Guide*. Wellington, New Zealand, 1999

**This section was prepared by Edita Babos, Carterton District Council*

THE VEGETATION OF THE WAIRARAPA IN MID-NINETEENTH CENTURY*

Hill (1963) describes the vegetation pattern of the Wairarapa in early European times (c. 1843). He notes that grassland covered 200,000 acres, forest 80,000 acres, fern and scrub covered 25,000 acres and swamp 20,000 acres. Hill describes the forest as:

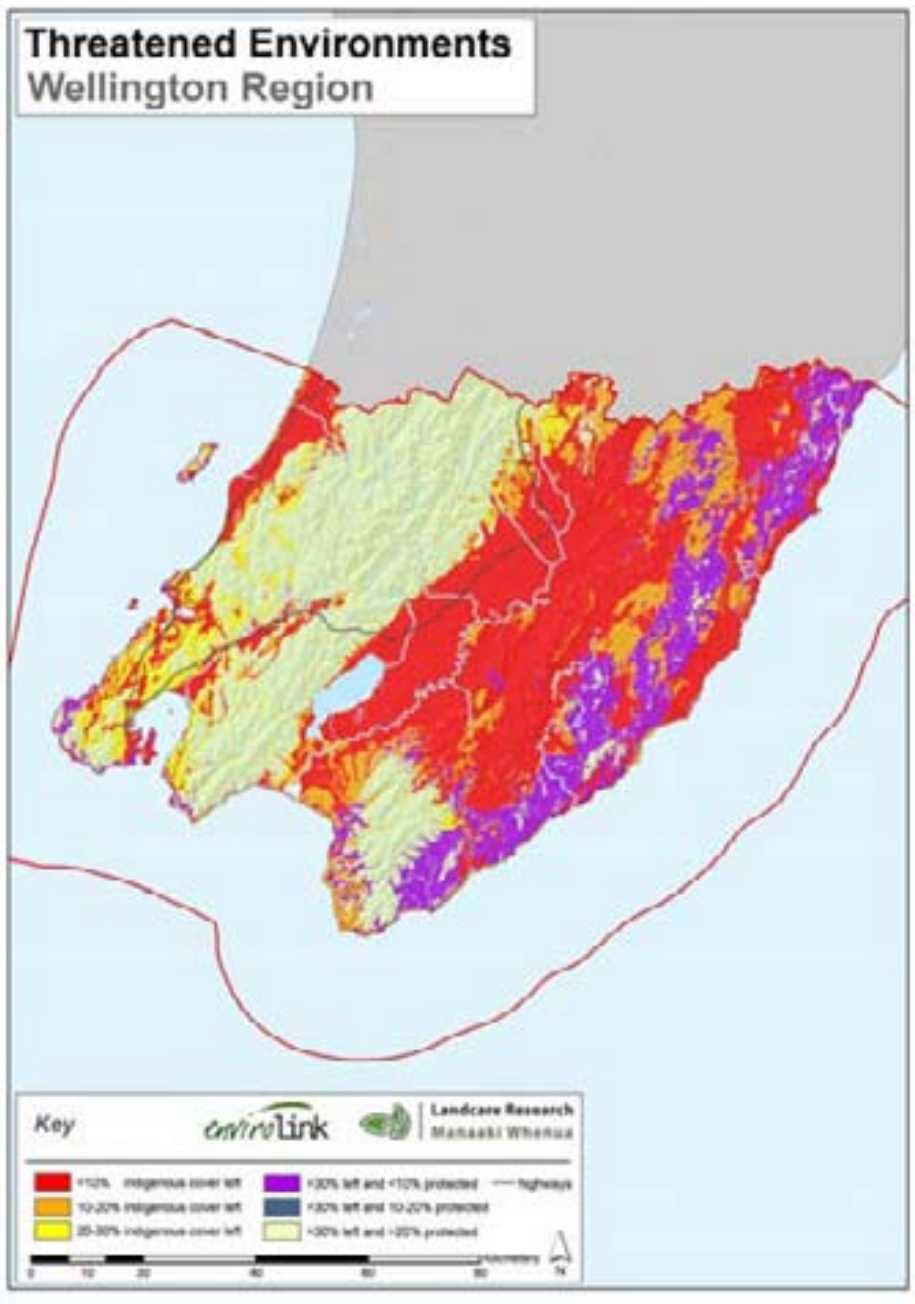
> *"To the west of Lake Wairarapa, the mixed podocarp/broadleaf forest extended down from the Rimutaka Range to reach the lake margin and similar salients of bush extended into the valley at several points, notably in a 20,000 acre block between the Waingawa and Waiohine Rivers. At its northern end the valley was closed off by an area of bush-clad hills and down-land that extended with little break to a clearing in the vicinity of the Manawatu Gorge. Bush then continued as far as the margins of the tussock lands of the Ruataniwha/Takapau basin."*[2]

And the extensive eastern hill country as:

> *"In the hill country to the east of the Wairarapa Valley, the four major elements of forest, grassland, fern and scrub and swamp were repeated but with grassland and swamp being found only in small discontinuous patches. The Haurangi and Maungaraki Ranges were largely in mixed podocarp/broadleaf forest with some beech at around 2,500 feet. However, the hills, as distinct from the ranges, were largely fern-clad but with a good deal of Angelica spp. and grass among the fern. Weld noted that this was the case near Whareama (Weld, 1844). At Castlepoint the hills were mainly in grass with small quantities of toe-toe, manuka and fern, although the hills furthermost from the coast were in bush (D'Urville, 1826-27, p. 104), Although most of the valleys in the area are steep and narrow, some of the larger valleys were sufficiently broad to contain a good deal of swamp. The lower Whareama Valley, for instance, was 'swampy and ankle-deep in water, full of pig ruts and covered in toe-toe' (Weld, 1844). At Porangahau the valley was less swampy and contained about 3,000 or 4,000 acres of grass (Thomas and Harrison, 1845). Grass extended inland from Porangahau in a broad strip that reached the Ruataniwha basin (Colenso in Bagnall and Peterson, 1948, pp. 217, 268). Such was the lack of firewood here that Colenso's exploring party had to make do with tufts of grass for fuel."*[3]

He concludes by describing the damage caused to the native vegetation by the European settlers:

> *"The broadleaf forest shrubs and juvenile trees were reported as being 'eagerly devoured' by cattle (Allom, 1849, p. 201), karaka (Corynocarpus laevigatus) being particularly favoured. Cattle thus had significant effects upon the species composition of all forest areas to which they had access, and in the absence of fences, these areas must have been quite extensive. The fern and scrub was also opened up by trampling and thus made available for sheep. 'Cattle speedily destroy the fern and grass takes its place ... the fern has, in many parts, disappeared, and thousands of acres of the native rye-grass, and other grass are now to be found' (Allom, 1849, p. 21). The grazing of sheep rapidly destroyed a number of species. Both Angelica and Aciphylla were eaten avidly by sheep, the latter in its flaccid, juvenile form. Other plants to suffer were the coastal fern (Anogramma leptophylla), the native carrot (Daucus brachiatus), Lepidium oleraceum and Senecio greyii (Thomson, 1922, pp. 517-518, 521-522)."*[4]



The Threatened Environment Classification has been developed by Landcare Research – Manaaki Whenua to help identify areas in which much reduced and poorly protected terrestrial indigenous ecosystems are most likely to occur.

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Ministry for the Environment – National Priority Regional and District/ City Council Maps, updated 19 December 2007. URL:http://www.mfe.govt.nz/issues/biodiversity/rare/index.html

2 R. D. Hill (1963) The Vegetation of the Wairarapa in Mid-Nineteenth Century. *Tuatara: Volume 11, Issue 2, June 1963*

3 R. D. Hill (1963)The Vegetation of the Wairarapa in Mid-Nineteenth Century. Tuatara: Volume 11, Issue 2, June 1963

4 Ibid.

*This section was prepared by Edita Babos, Carterton District Council

APPENDIX 9: IDENTIFIED HERITAGE SITES

Historic heritage includes sites where physical traces of a past activity remain such as buildings, sites of human occupation, burial and archaeological sites. It also includes sites that are significant for their spiritual or historical associations. Heritage sites are important linkages to the past and provide insight into the way Wairarapa's communities and settlements have developed. They also contribute to the character and amenity value of a location or area. Useful background detail of Maori association with, and European settlement of the Wairarapa landscape is provided in Section B of this report.

Wairarapa contains many sites of historic, cultural and spiritual heritage significance to both Maori and Europeans. The heritage sites that have been identified include:

- Historic buildings , features and trees;
- Archaeological sites and;
- Sites of significance to Maori including wahi tapu;
- Precincts- areas of buildings or other features that collectively have significant historic heritage values.

ARCHAEOLOGICAL SITES

Archaeological sites are places where human activity, pre 1900, has left behind some physical trace. In Wairarapa, 337 archaeological sites have been identified with the majority being of Maori origin located mainly on or near the coast and the eastern edge of the plains. The Maori sites include a wide range of themes such as sites of: defensive pa's, urupa, horticulture, middens/ovens, and dendroglyphs. European archaeological sites are few and include, monuments and defensive stockades and infrastructure sites such as railway tunnels and brick kilns.

The Department of Conservation report, *Archaeology of the Wellington Conservancy: Wairarapa A study in tectonic archaeology* provides valuable background to the archaeology of the Wairarapa, and describes the pre European Maori archaeology of the Wairarapa. Excerpts from the abstract and introduction of the report are reproduced, (in part) below.

The Wairarapa region is a tectonic landscape at the south eastern corner of the North Island of New Zealand. Seismic events are an important key to its natural and cultural character. Archaeological sites and environmental events are dated by their stratigraphic relationship to earthquake-uplifted shorelines, and with dune-building phases and alluvial deposition episodes thought to be triggered by earthquakes.

Two cultural periods are recognised: early and late. Early period sites are older than or contemporary with a period of seismic activity dated to about the late 15th Century AD. The inferred early settlement pattern was coastal. At the time of Maori settlement the coast was largely forested with extensive lagoons between uplifted beach ridges, and it had been stable for at least 800 years. Economic pursuits, in particular gardening, were related to the geological nature of the coast. Gardening was common where a hard rock platform and coastal sediments of greywacke or limestone resistant to wave erosion occurred in front of the coastal hills. It was virtually absent from parts of the coast where the coastal hills were easily eroded mudstones fronted by soft rocks and coastal sediments poorly resistant to wave erosion. Parts of the coast were abandoned following uplift of the coast that drained lagoons, silted up streams, and reactivated building of stream fans on the coastal platform.

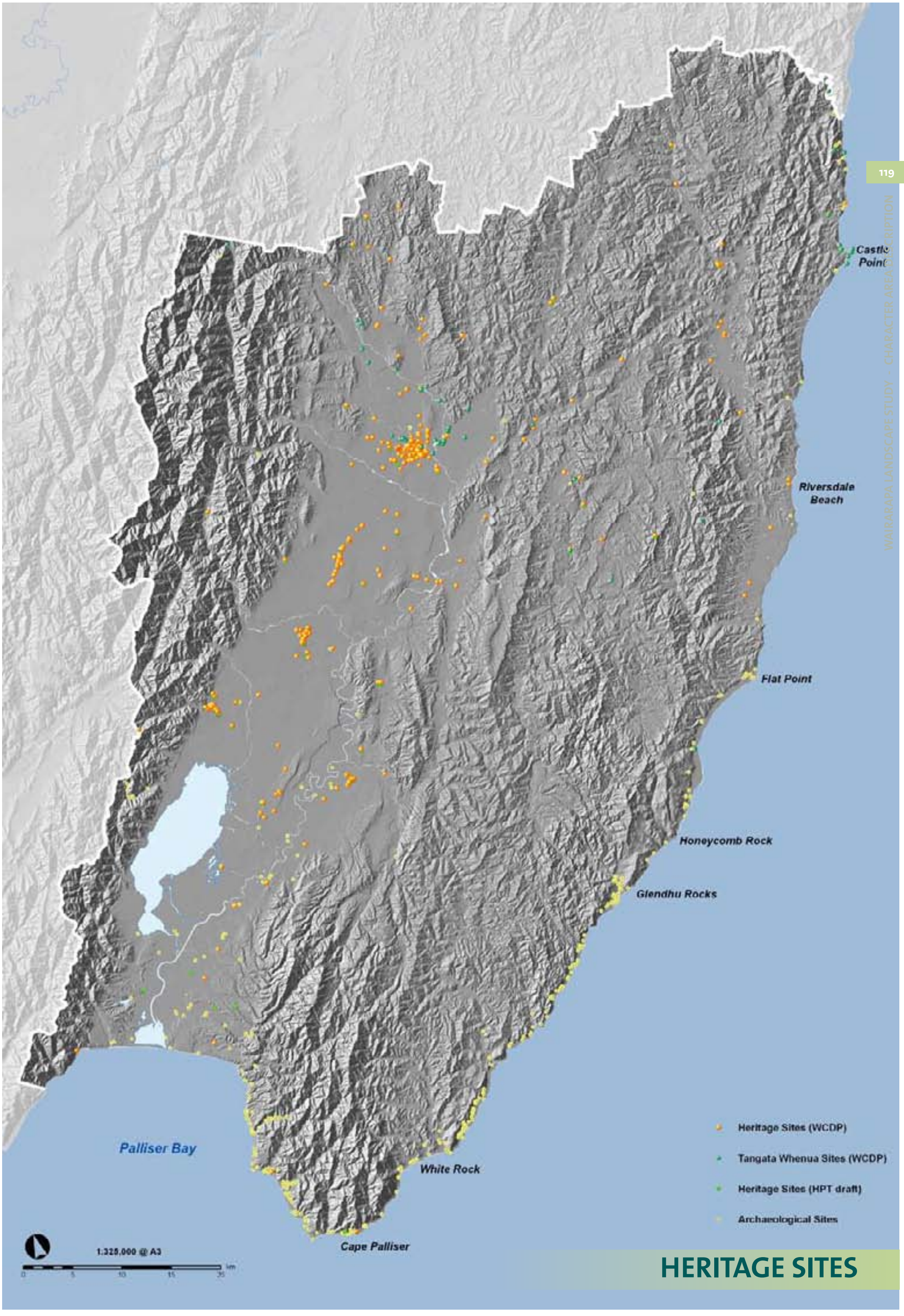
During the late period the focus of occupation moved to the main Wairarapa valley. Gardening was practised in the southern part of the valley and settlement sites tended to be concentrated on the eastern side of the valley. Forest clearance, however, focused on the extensive gravelly soils of the Waiohine fans that were deposited from the mountain ranges on the western side of the valley at the end of the last glaciation.

HERITAGE SITES

The Wairarapa Combined District GIS dataset identifies 404 heritage sites. However, many of these are located within the urban areas of the towns and are therefore not included in the study area. The list includes, houses, woolsheds, monuments, churches, cemeteries, and pa sites. The Historic Places Trust's register lists 67 heritage sites in the Wairarapa including pa, homesteads, churches and woolsheds.

GIS Data sets used:
Draft Historic Places Trust Listed Sites- New Zealand Historic Places Trust
New Zealand Archaeological Sites- New Zealand Archaeological Association
Local Heritage sites- GWRC and Wairarapa Combined District Plan

Kupe's Sail, or Nga-ra-o-Kupe, is the name that was originally applied to two triangular planes of light-coloured cliff on the eastern shore of Palliser Bay. One local story links the site with Kupe and his companion Ngake who were camped here on one occasion, and held a competition to find out who could construct a canoe sail first. According to this legend Kupe won and the sails were then hung up against the cliffs .



HERITAGE SITES

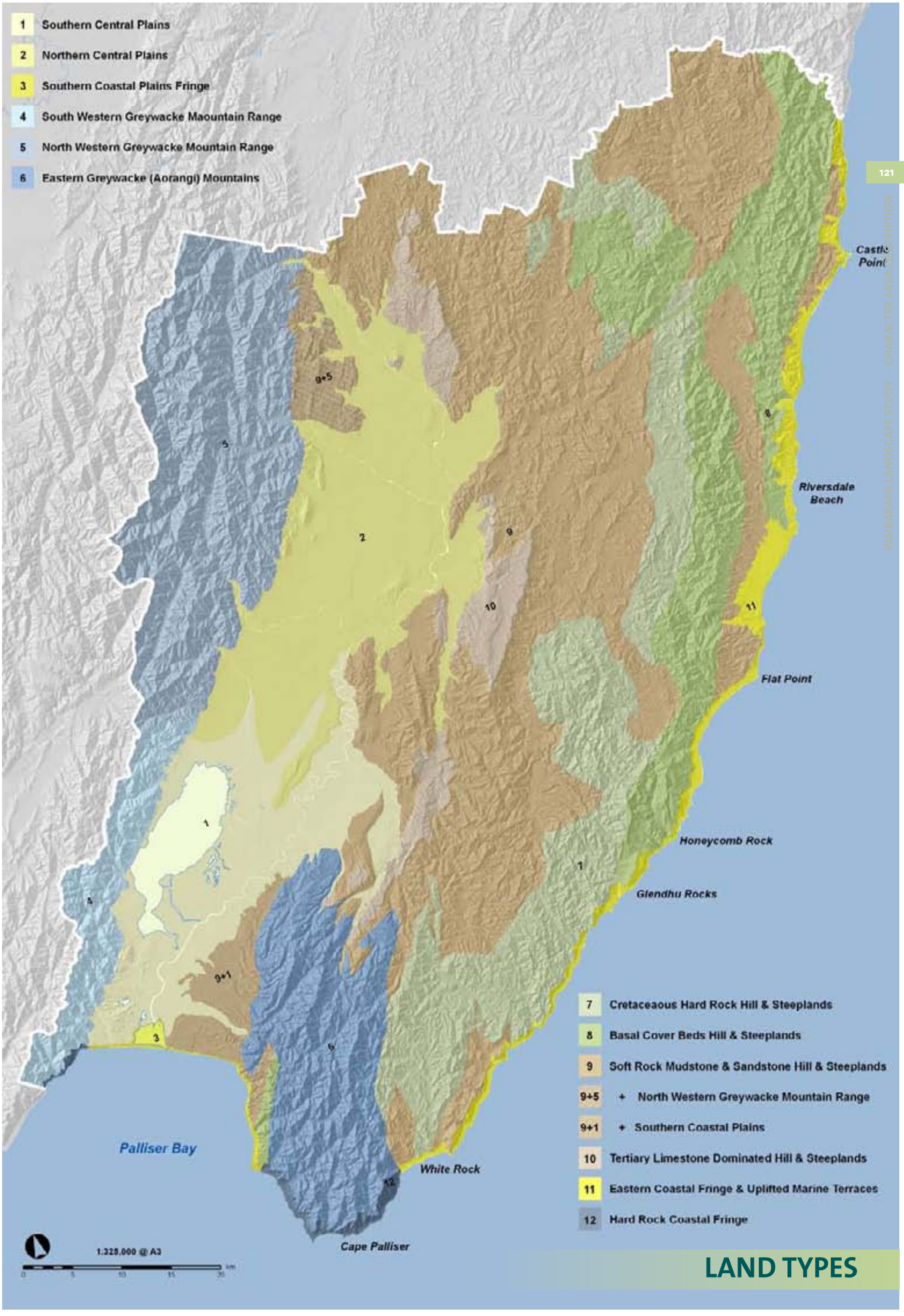
APPENDIX 10: LAND TYPES

The Wairarapa landscapes can be subdivided into a series of 'natural segments' or land types based on a range of biophysical factors. As a starting point to the Wairarapa Landscape Study, Landcare Research was engaged to delineate land types of the Wairarapa (the full report follows).

Twelve land types were identified. The division into land types is based on a detailed analysis of a range of data sources including scientific papers, geological and topographical maps, Protected Natural Area surveys, joint Earth Science Society inventories, and expert scientific knowledge. Landcare Research has undertaken similar land typing exercises for other regions and districts in various parts of New Zealand.

Each land type is described in terms of landform components, geological formation, elevation, remnant native vegetation and present land use. The 12 land types are listed below and shown on the adjacent Map. The land types are referred to by their number throughout the character area descriptions of this report.

1. **SOUTHERN CENTRAL PLAINS**
2. **NORTHERN CENTRAL PLAINS**
3. **SOUTHERN COASTAL PLAINS FRINGE**
4. **SOUTH WESTERN GREYWACKE MOUNTAIN RANGE**
5. **NORTH WESTERN GREYWACKE MOUNTAIN RANGE**
6. **EASTERN GREYWACKE [AORANGI] MOUNTAINS**
7. **CRETACEOUS HARD ROCK HILL AND STEEPLANDS**
8. **BASAL COVER BEDS HILL AND STEEPLANDS**
9. **SOFT ROCK MUDSTONE AND SANDSTONE HILL AND STEEPLANDS**
10. **TERTIARY LIMESTONE DOMINATED HILL AND STEEPLANDS**
11. **EASTERN COASTAL FRINGE AND UPLIFTED MARINE TERRACE**
12. **HARD ROCK COASTAL FRINGE**


1 Southern Central Plains
2 Northern Central Plains
3 Southern Coastal Plains Fringe
4 South Western Greywacke Maountain Range
5 North Western Greywacke Mountain Range
6 Eastern Greywacke (Aorangi) Mountains
Castle Point
Riversdale Beach
Flat Point
Honeycomb Rock
Glendhu Rocks
White Rock
Cape Palliser
Palliser Bay
1:325,000 @ A3
0 5 10 15 35 km
7 Cretaceaous Hard Rock Hill & Steeplands
8 Basal Cover Beds Hill & Steeplands
9 Soft Rock Mudstone & Sandstone Hill & Steeplands
9+5 + North Western Greywacke Mountain Range
9+1 + Southern Coastal Plains
10 Tertiary Limestone Dominated Hill & Steeplands
11 Eastern Coastal Fringe & Uplifted Marine Terraces
12 Hard Rock Coastal Fringe

LAND TYPES

LAND TYPES OF THE MASTERTON, CARTERTON AND SOUTHERN WAIRARAPA DISTRICTS

PREPARED BY IAN H. LYNN, LANDCARE RESEARCH

Land Types of the Masterton, Carterton and Southern Wairarapa Districts

Ian H. Lynn






Landcare Research
Manaaki Whenua

Land Types of the Masterton, Carterton and Southern Wairarapa Districts

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Landcare Research Contract Report: LC0910/036

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Grant G. Hunter Scientist Landcare Research	Alison Collins Science Team Leader Soil and Landscapes

Contents

Summary

Project and Client

Landcare Research, Lincoln, delineated and documented 'land types' of the Masterton, Carterton and Southern Wairarapa districts for Boffa Miskell in August–September 2009 as part of the Wairarapa Landscape Study for the Greater Wellington Regional Council.

Objectives

- Describe and map land types at 1:250 000 for the Masterton, Carterton and Southern Wairarapa districts according to the protocol of previous work.
- Delineate the spatial distribution of the land types at 1:250 000 on NZMS 262 and 1:50 000 on NZMS 260 base maps.

Methods

- The following data sources were used to select key defining criteria for the land types: scientific papers, geological maps (at various scales), topographic maps, Protected Natural Area surveys and the Register of Protected Natural Areas, and Earth Science Society inventories.
- The process involved the following steps:
    - Subdivision of the landscape into 'natural segments' or land types on the basis of topography and geology
    - Description of the landform components within land types
    - Search of the literature to determine the specific geology, vegetation, rainfall, altitude etc. of landform components
    - Description of the land-use potential and impacts of use within landform components from the authors' experience and local knowledge

Results

- Twelve land types have been established for the Masterton, Carterton and Southern Wairarapa districts. The land types distinguish major physiographic landform units and are broadly equivalent to a 'land region' as defined for hierarchical land resource mapping in New Zealand. The land types depict largely lithologically based macro relief units.

- The key features of the landform components within land types are summarised in table format under the following headings:
    - Geological formation
    - Elevation (m)
    - Remnant native vegetation
    - Present land use
    - Agronomic potential
    - Potential land use
    - Potential impacts (of land use on the landscape and environment)

Conclusions

- The 12 land types established at a scale of 1:250 000 for the Masterton, Carterton and Southern Wairarapa districts provide a geomorphologically based assessment and grouping of the district's landscape.
- Although the land types have been designed primarily to assist in landscape assessment they also provide an objective, physically based subdivision of the Masterton, Carterton and Southern Wairarapa districts' landscape suitable for resource monitoring, strategy planning, and land resource assessment and evaluation.

1. Introduction

Landcare Research, Lincoln, delineated and documented ‘land types’ of the Masterton, Carterton and Southern Wairarapa districts for Boffa Miskell in August–September 2009 as part of the Wairarapa Landscape Study for the Greater Wellington Regional Council.

2. Background

A hierarchical land systems approach was used for the Masterton, Carterton and Southern Wairarapa districts study following a similar methodology to that used in the studies of the Canterbury regional landscape (Boffa Miskell and Lucas Associates 1993), Queenstown Lakes District (Lucas et al. 1995), Marlborough Sounds (Lucas et al. 1997; McRae et al. 2004), Bay of Plenty Region (Lucas et al. 1998), and the Marlborough District (Lynn 2009).

‘Land type’ is the preferred term for geomorphologically based land units distinguished at a scale of 1:250 000, to overcome variation in the use of terminology between the landscape architects, planners and land-resource-based science professions.

The land types used in this study distinguish major physiographic landform units and are broadly equivalent to a ‘land region’ as defined for hierarchical land resource mapping in New Zealand by Lynn and Basher (1994). The land types depict largely lithologically based macro relief units and are frequently bounded by structural dislocations or contrasting rock terranes.

2.1 Regional setting of the current study area

The Wairarapa forms part of an eastern central New Zealand terrane and landscape characterised by intensive faulting, tilting and uplift of a similar suite of basement rocks extending from Marlborough to East Cape (Fig. 1). The pronounced north-east/south-west trend of axial ranges, inland valleys and coastal hills results from the ‘concertina like’ convergence, collision and subduction of the Pacific and Indian-Australian plates.

In this region the parent rocks are heterogeneous. The higher axial ranges consist of older indurated greywacke and argillite rocks. The plains have been built up from aggregation gravels deposited as fans, river terraces and floodplains through erosion of these ranges during the late Quaternary. Most of the coastal hill country, however, consists of a complex mixture of softer rocks of Tertiary and late Cretaceous age – marine sandstones and siltstones, and bands of harder, upstanding limestone. Scattered throughout are more erodible Tertiary rocks – mudstones, greensand and conglomerates. These geological factors in combination with the prevailing climate of pronounced summer dryness, desiccating NW winds and occasional heavy rainstorms have predisposed the hill country to widespread erosion. Consequently it is a landscape of shattered hills associated with deep-seated weaknesses in the material underlying the soils, the rapid rate of uplift, and the impact of severe storms.

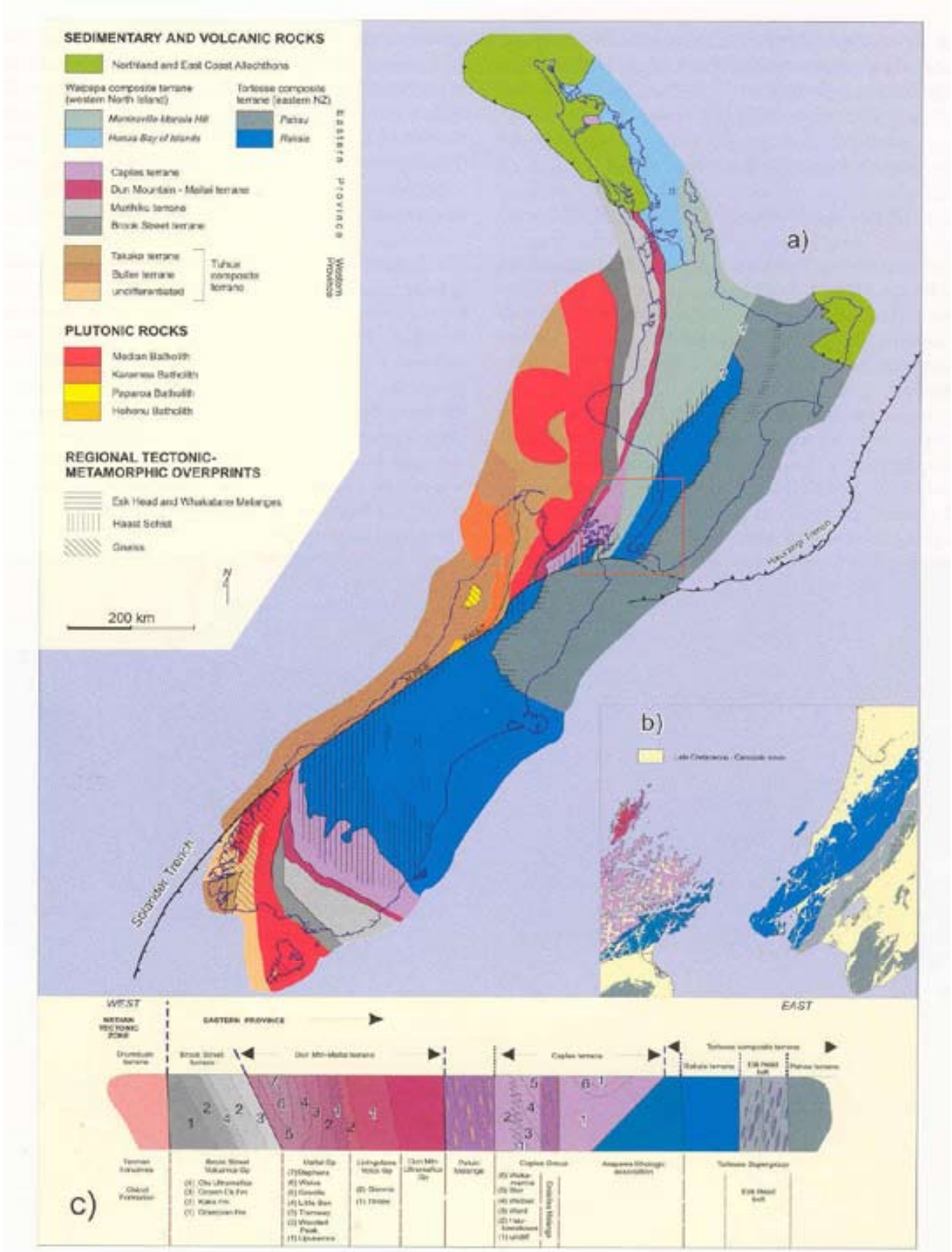

Figure 8a) Basement (pre-Late Cretaceous) geological map of New Zealand. Units are grouped according to major, rather than sole, rock type. Nomenclature and boundaries of North Island Torlesse and Waipapa terranes are controversial; parts of Morrinsville-Manaia Hill and Pahau units may be correlative. Northland and East Coast Allochthons were emplaced in the Early Miocene; all other units were in mutual juxtaposition by the Late Cretaceous. Adapted from Black (1994), Mortimer (1995), Mortimer *et al.* (1997, 1999) and references therein.
b) Basement rocks subdivided into tectonostratigraphic terranes for the Wellington area.
c) Cartoon cross section through basement rocks of Marlborough/Wellington area illustrating structural style and relationships.

Fig. 1 Illustration of the extent of similar basement rocks, deformation style and resulting gross landscape extending from Marlborough to East Cape (from Begg & Johnston 2000).

In the context of this report 'hard' and 'soft' rock are defined as:

'hard rock': includes indurated and moderately indurated rock – rocks that have acquired an element of hardness and strength through induration relating to depth of burial or through grain overgrowths and/or cementation to the extent that grain disintegration (grain fracturing) dominates over disaggregation (separation along existing grain boundaries). They have been deformed by brittle fracture and shearing, ring when struck with a hammer and require a strong blow to fracture.

'soft rock': includes weakly indurated rocks which are consolidated, with minor or insignificant cementation, and are of low strength. They disintegrate with a mild to strong hammer blow, or are crushable by hand. They deform by plastic flow and produce regoliths dominated by fine-grained materials with high clay contents that lack cohesion and strength. They are frequently dispersive and have poor drainage characteristics. They are susceptible to mass movement forms of erosion.

3. Objectives

- Describe and map land types at 1:250 000 for the Masterton, Carterton and Southern Wairarapa districts according to the protocol of previous work.
- Delineate the spatial distribution of the land types at 1:250 000 on NZMS 262 and 1:50 000 on NZMS 260 base maps.
- Summarise the key features of the landform components within land types in a table format under the following headings:
    - Geological formation
    - Elevation (m)
    - Remnant native vegetation
    - Present land use
    - Agronomic potential
    - Potential land use
    - Potential impacts (of land use on the landscape and environment).

4. Methods

The following data sources were used to select key defining criteria for the land types: scientific papers (see Bibliography), geological maps (at various scales, e.g. Johnston 1980; Lee & Begg 2002; Begg & Johnston 2000), and topographic maps. The process involved the following steps:

- Subdivision of the landscape into 'natural segments' or land types on the basis of topography and geology

- Description of the landform components within each land type
- Search of the literature to determine the specific geology, vegetation, rainfall, altitude etc. of each landform component
- Description of the land-use potential and impacts from the authors' experience and local knowledge

The Protected Natural Area (PNA) programme (McEwen 1987; Beadel et al. 2004), the Register of Protected Natural Areas, and the inventory and maps of important geological sites and landforms (Kenny & Hayward 1996) were used as additional data sources.

In the summary tables 'agronomic potential', 'potential land use' and 'potential impacts' are based on an assessment of the factual information recorded in columns 1 to 5, and an evaluation of current trends. Agronomic potential is qualitatively ranked as high, medium, low or nil. Potential land use identifies current land uses that are considered to become dominant or that will become more widespread on that landform component in the foreseeable future. Potential impacts identify the major consequences on the landscape and environmental qualities of those projected land uses.

Due to the time constraints imposed on the study, information on the remnant native vegetation is indicative, and is intended to flag areas or communities that are potentially at risk. The remnant vegetation entries should be checked and modified by an ecologist. Detailed descriptions and locations of sites of rare and endangered communities or species are available from Landcare Research and PNA Programme reports (e.g. Beadel et al. 2004).

5. Results

Twelve land types have been established for the Masterton, Carterton and Southern Wairarapa districts and delineated at 1:250 000 on NZMS 262 and 1:50 000 on NZMS 260 topographic base maps. The constraints of map scale and time mean that the land type boundaries are indicative. For land types that occur in narrow valleys, individual land types are frequently nested within each other. Accurate delineation, more appropriate for individual site or 'local-level' assessment and planning, would require detailed precision mapping at scales greater than 1:50 000.

The following land types were established:
1. Southern Central Plains
2. Northern Central Plains
3. Southern Coastal Plains Fringe
4. South Western Greywacke Mountain Range
5. North Western Greywacke Mountain Range
6. Eastern Greywacke [Aorangi] Mountains
7. Cretaceous Hard Rock Hill and Steeplands
8. Basal Cover Beds Hill and Steeplands
9. Soft Rock Mudstone and Sandstone Hill and Steeplands
10. Tertiary Limestone Dominated Hill and Steeplands
11. Eastern Coastal Fringe and Uplifted Marine Terrace
12. Hard Rock Coastal Fringe

To convey the general characteristics and appearance, and to compare and contrast respective land types, some illustrations have been included. They have been sourced from either Begg & Johnston (2000), Lee & Begg (2002) or supplied by Boffa Miskell. Some of the illustrations are located adjacent to the current study region from areas into which the respective land types extend.

Detailed land type descriptions and tables of the respective land types follow.

1 Southern Central Plains Land Type

The Southern Central Plains Land Type incorporates the broad, flat to gently undulating (0–3°) and undulating (4–7°), predominantly fine-grained depositional floodplain landforms; floodplain terraces and associated backswamp basins, levees, channels, channel bars and cut-offs / oxbow lakes of the lower Ruamahanga River; extensive shallow lakebed deposits, lakeshore beaches and beach ridges; lakeshore and marginal swamp deposits; inland sand dune belts and associated swamps, ponds and sand flats; the marginal, rolling (8–15°) to strongly rolling (16–20°) coalescing alluvial gravel fans (frequently cut by faults, e.g. Wairarapa Fault); the eastern marginal, undulating (4–7°) to rolling (8–15°) coalescing gravel alluvial fans, marginal loess-mantled foothills and isolated soft- and hard-rock-cored downlands of the southern Wairarapa Valley. Elevation ranges from 2 to 200 m [GR:955760], and rainfall from 800 to 1200 mm per annum. The land type includes the lowland sections of the Ruamahanga, Tauherenikau, Waiohine and Waingawa rivers.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Low terraces	Holocene and Recent alluvium	0–20	Short-tussock grassland, matagouri, kōwhai, kānuka scrub/woodland	Intensive grazing, cash and feed cropping, viticulture, orchards	High	Cash and feed cropping, horticulture, viticulture, orchards, intensive grazing	Intensified land use, subdivision, windbreaks, irrigation, ‘lifestyle’ blocks
Floodbasins and backswamps	Holocene and Recent alluvium and organic deposits	0–20	Flax, raupō, sedge and rushland swamp vegetation, scrubland	Intensive grazing, cash and feed cropping	High	Cash and feed cropping, horticulture, intensive grazing	Intensified land use, windbreaks, drainage, irrigation, subdivision
Recently abandoned floodplains	Holocene and Recent fluvial deposits	0–20	Flax, raupō, sedge and rushland swamp vegetation, scrubland	Intensive grazing, feed cropping	High	Cash and feed cropping, horticulture, intensive grazing	Intensified land use, windbreaks, irrigation, drainage, subdivision
Channels and cut-off features, lakes and oxbows	Holocene and Recent fluvial deposits	0–20	Kahikatea forest, mānuka, flax, raupō, sedge and rushland	Intensive grazing, cash and feed cropping	High	Cash and feed cropping, horticulture, intensive grazing	Intensified land use, drainage, windbreaks, subdivision
Lakeshore margin flats	Holocene and Recent mud, silt and sands	0–10	Flax, raupō, sedge and rushland swamp vegetation, scrubland	Intensive grazing, cash and feed cropping	High	Cash and feed cropping, horticulture, intensive grazing	Intensified land use, windbreaks, drainage, subdivision
Lakeshore beaches and beach ridges	Holocene and Recent beach gravels and sands	0–10	Pīngao, scrub, bracken	Extensive grazing, wasteland	Low	Semi-intensive grazing, recreation, stabilisation	Loss of native vegetation, increase in exotics, recreational impacts
Inland sand dune complexes, (swamps and	Holocene and Recent dune sand and organic	0–40	Pīngao, spinifex, dune slack, danthonia grassland	Extensive grazing, exotic forestry, conservation,	Low	Exotic forestry, extensive grazing, dune stabilisation, recreation	Exotic trees, recreational impacts, loss of native vegetation

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
sand flats)	deposits			recreation, stabilised wasteland			
Coalescing gravel alluvial fans	Holocene and Recent alluvium, poorly sorted fan gravel deposits	0–40	Short-tussock grassland, matagouri, kōwhai, kānuka scrub/woodland	Intensive grazing, cash and feed cropping, viticulture, orchards, exotic forestry	High	Cash and feed cropping, horticulture, viticulture, orchards, intensive grazing	Intensified land use, windbreaks, irrigation, forestry, subdivision, ‘lifestyle’ blocks
Older dissected alluvial terrace remnants	Loess-mantled Quaternary gravel deposits	10–100	Short-tussock grassland, matagouri, kōwhai, kānuka scrub/woodland	Intensive grazing, cash and feed cropping	High	Cash and feed cropping, horticulture, intensive grazing	Intensified land use, windbreaks, irrigation, forestry, subdivision, ‘lifestyle’ blocks
Loess-mantled marginal foothills and isolated soft-rock-cored downlands	Undifferentiated loess-mantled Early Quaternary deposits	10–200	Silver-tussock grassland matagouri and kōwhai scrub, broadleaved scrub	Intensive grazing, feed and cash cropping, exotic forestry	medium to high	Intensive grazing, cash and feed cropping, exotic forestry	Intensive land use, windbreaks, cultivation, exotic forestry, subdivision
Loess-mantled isolated hard-rock-cored hills and downlands	Torlesse Supergroup sandstones and mudstones with some loess cover	70–200	Silver-tussock grassland matagouri and kōwhai scrub, broadleaved scrub	Intensive grazing, feed and cash cropping, exotic forestry	medium to high	Intensive grazing, cash and feed cropping, exotic forestry	Intensive land use, windbreaks, cultivation, exotic forestry, subdivision

Fig. 2 View westwards from Whangaimoana across Lake Onoke to the Rimutaka Ranges, the dissected higher terraces of the Southern Central Plains (centre) and gravel beach ridges and soft rock cliffs of the Southern Coastal Plains Fringe Land Types (foreground). (Source: Boffa Miskell)

2 Northern Central Plains Land Type

The Northern Central Plains Land Type incorporates the extensive undulating (4–7°) to rolling (8–15°) stony and free-draining coalescing alluvial gravel fans, the heads of which are frequently offset by active faults in the west (e.g. Wairarapa and Mokonui faults), and associated terrace treads and risers, channels, channel bars and imperfectly drained inter-fan swales; flat to gently undulating (0–3°) predominantly depositional gravel floodplain landforms of low terraces, channels, channel bars and associated levees of the upper Ruamahanga and Waipoua rivers; the rolling (8–15°) to strongly rolling (16–20°) often loess-mantled soft- and hard-rock-cored downlands and marginal foothills of the northern Wairarapa Valley. Elevation ranges from 0 to 358 m [GR:S26/265353] and rainfall from 800 to 1400 mm per annum.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Well-drained coalescing stony fans and terraces	Late Pleistocene and Holocene alluvium, variable loess cover	40–300	Short-tussock grassland, matagouri, kānuka scrub/woodland	Intensive grazing, cash and feed cropping, orchards, exotic forestry	High	Cash and feed cropping, horticulture, orchards, intensive grazing	Intensified land use, windbreaks, irrigation, forestry, subdivision, ‘lifestyle’ blocks
Terrace treads (and risers)	Holocene and Recent alluvium	40–250	Danthonia grassland, kānuka, matagouri, scrub, cabbage trees, bracken	Intensive grazing, cash and feed cropping, orchards	High	Cash and feed cropping, horticulture, orchards, intensive grazing	Intensified land use, windbreaks, irrigation, subdivision
Inter-fan swales	Holocene and Recent alluvium	40–250	Danthonia grassland, kānuka, matagouri, kahikatea forest cabbage trees	Intensive grazing, feed cropping	High	Cash and feed cropping, intensive grazing	Intensified land use, windbreaks, irrigation, drainage, subdivision
Recent floodplains	Holocene and Recent fluvial deposits	40–200	Danthonia grassland, kānuka, matagouri, kahikatea forest cabbage trees	Intensive grazing, feed cropping	High	Cash and feed cropping, horticulture, intensive grazing	Intensified land use, windbreaks, irrigation, subdivision
Active braided floodplain	Holocene and Recent fluvial deposits	40–200	Ephemeral communities	Opportunist grazing, scrub wasteland	Low	Opportunist grazing	Largely ‘natural’ environment, exotic ‘river control’ trees, and scrub
Channels and cut-off features	Holocene and Recent fluvial deposits	40–200	Kahikatea forest, mānuka, flax, raupō, sedge and rushland	Intensive grazing, cash and feed cropping	High	Cash and feed cropping, horticulture, intensive grazing	Intensified land use, drainage, windbreaks, subdivision
Marginal hard rock foothills and isolated soft rock	Torlesse Supergroup rocks and undiff. loess-mantled Early	150–358	Silver-tussock grassland matagouri and kānuka scrub,	Intensive grazing, feed and cash cropping, exotic	Medium to high	Intensive grazing, cash and feed cropping, exotic forestry	Intensive land use, windbreaks, subdivision, cultivation,

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
cored downlands	Quaternary deposits		broadleaved scrub	forestry			exotic forestry

Figure 7a The township of Masterton (middle distance) is sited largely upon Holocene and last glacial alluvial gravels. The braided Waingawa River (left) carries a bedload of cobbles of indurated sandstone and mudstone from the Tararua Range in the distance. The Masterton basin is traversed by a number of active faults, including the Wairarapa Fault at the base of the mountains in the distance, and the Masterton Fault, a splay that strikes northeastwards through Masterton township itself. The Masterton Fault crosses the Waingawa River close to the railway bridge, the further bridge visible in the middle distance. The lowlands of the Masterton basin are used principally for agriculture and horticulture.

Photo CN43682/4: D.L. Homer

Fig. 3 The well-drained coalescing stony fan component of the Northern Central Plains Land Type built by the Waingawa River, Masterton (from Lee & Begg 2002).

3 Southern Coastal Plains Fringe Land Type

The Southern Coastal Fringe Land Type incorporates the undulating (4–7°) to rolling (8–15°) marginal marine bench and beach ridge complexes, rolling (8–15°) coalescing foot-lope fans and debris aprons below the coastal escarpments, the active undulating (4–7°) to rolling (8–15°) gravel barrier bar that entraps Lake Onoke and the surrounding brackish lake and lagoon–estuary fringe wetlands, the basal gravel storm beach ridges and the steep (26–35°) to very steep (>35°) eroding sea cliffs formed in unconsolidated gravels and weakly consolidated mudstones, and minor indurated hard rock terrain bordering Palliser Bay. Elevation ranges from sea level to 100 m, the rainfall is in the vicinity of 1200 mm per annum and the land type is extremely exposed the southerly winds.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Gravel barrier bar	Holocene and Recent beach gravel	0–20	Pīngao, scrub, bracken	Opportunistic grazing, wasteland	Low	Opportunistic grazing, recreation, stabilisation	Loss of native vegetation, increase in exotics, recreational impacts
Brackish lake and estuary fringe	Holocene and Recent fluviatile and lagoonal deposits	0–3	Swamp, carr, lacustrine, slacks, saltmarsh (estuarine, lacustrine)	Extensive grazing, feed cropping	Medium	Intensive grazing, cash and feed cropping	Intensified land use, drainage, windbreaks, subdivision
Basal cliff gravel beach ridges	Holocene and Recent beach gravel	0–20	Pīngao, dune slack, danthonia grassland	Opportunistic grazing, conservation, recreation, wasteland	Low	Conservation, extensive grazing, stabilisation, recreation	Exotic weeds and trees, recreational impacts, tracking, loss of native vegetation
Steep to very steep coastal escarpment	Holocene and Pleistocene gravel and weakly consolidated Tertiary mudstone	0–100	Mānuka scrub, danthonia grassland	Opportunistic grazing, conservation, recreation, stabilised wasteland	Low	Conservation	Exotic weed and tree invasion, tracking, recreational impacts, loss of native vegetation
Coalescing footslope fans and debris aprons	Alluvium & colluvium from Pleistocene gravel and weakly consolidated Tertiary mudstone	5–40	Scrub (mānuka?), danthonia grassland	Extensive and semi-intensive grazing	Medium	Intensive grazing, feed cropping	Subdivision, shelter belts, fencing, settlement development, recreational impacts
Marginal marine bench and beach ridge complexes	Holocene and Recent beach gravel and sands	0–40	Scrub, bracken fern, danthonia grassland	Extensive and semi-intensive grazing	Medium	Intensive grazing, feed cropping	Subdivision, shelter belts, fencing, settlement development, recreational impacts
Soft-rock sea cliffs	Holocene and	0–100	Specialist cliff	Conservation	Nil	Conservation	Exotic weed and tree

	Pleistocene gravel and weakly consolidated Tertiary mudstone		species				invasion, loss of native vegetation
Hard-rock sea cliffs & associated gravel beaches and reefs (minor component)	Torlesse Supergroup sandstones and mudstones	0–100	Specialist cliff species	Conservation	Nil	Conservation	Exotic weed invasion, loss of native vegetation

Fig. 4 Southern Coastal Plains Fringe Land Type, a view eastwards from above Whatarangi to Te Humenga Point (Source: Boffa Miskell).

4 South Western Greywacke Mountain Range Land Type (Rimutaka Ranges)

The South Western Greywacke Range Land Type encompasses the south-eastern slopes of the Rimutaka Ranges and includes those catchments draining into Lake Wairarapa south of Rimutaka Saddle. The faulted and heavily dissected uplifted landscape is predominantly underlain by deformed Esk Head Belt rocks, sandstone and/or mudstone dominated sequences with blocks of chert, basalt, and limestone of the Torlesse Supergroup, and associated minor valley-fill alluvium and colluvium. Landform components include steep (26–35°) to very steep (>35°), hill and mountain slopes to 941 m [Mt Matthews]; and minor narrow and sinuous, undulating terraces and floodplains [e.g. Owhanga Stream and Cross Creek]. Severe erosion, large-scale slumps and gravel-choked riverbeds are a feature. The climate is relatively moist, rainfall varies between 1200 and 2000+ mm per annum, increasing with elevation. Summer drought is uncommon or negligible above 150 m. Extensive stands of silver beech occur, with some hard beech, black beech and red beech being present; the lowland hardwood forests of the Rimutaka Range are a complex mosaic of hardwood species with isolated podocarps (Hall's totara and rimu); rātā–kāmahi and scrub at lower elevations.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Steep to very steep upper mountain slopes	Torlesse Supergroup sandstones and mudstones	300–941	Silver, hard and red beech, rātā–kāmahi forest	Conservation land, protected native forest, recreation	Low–nil	Conservation land, recreation	Recreation, tracking, buildings, pylons etc.
Moderately steep to steep lower hill and mountain slopes	Torlesse Supergroup sandstones and mudstones	0–300	Silver hard and black beech, rātā–kāmahi forest	Conservation land, exotic forestry, reverted scrubland, extensive grazing, recreation	Low	Exotic forestry, conservation land, extensive grazing, recreation	Exotic forest, tracking, increase in exotic weeds, recreation
Narrow undulating terraces and footslope fans	Pleistocene and Recent alluvium from predominantly Torlesse Supergroup sandstones and mudstones rocks	5–120	Podocarp–broadleaved forest, rimu, matai, kahikatea	Intensive grazing, conservation land	Medium	Intensive grazing, feed cropping, exotic forestry, conservation land	Intensified land use, shelter belts, subdivision
Narrow sinuous floodplains	Recent alluvium from predominantly Torlesse Supergroup sandstones and mudstones rocks	5–20	Podocarp–broadleaved forest, kahikatea, rimu, matai	Semi-intensive grazing, conservation land	Medium	Intensive grazing, feed cropping	Intensified land use, shelter belts, subdivision

5 North Western Greywacke Mountain Range Land Type (Tararua Ranges)

The North Western Greywacke Range Land Type encompasses the south-eastern slopes of the Tararua Ranges and includes the major western tributaries of the Ruamahanga River system (the Waiohine, Waingawa, and Waipoua rivers). The intensively faulted and strongly dissected uplifted mountain landscape is predominantly underlain by deformed Torlesse Supergroup terrane rocks of well-indurated grey sandstone–mudstone dominated sequences with minor conglomerate, basalt, chert, and rare limestone, and associated minor valley-fill alluvium and colluvium. Landform components include steep (26–35°) to very steep (>35°), mountain and hill slopes to 1529 m [Mt Hector]; and minor narrow and sinuous, undulating terraces and floodplains [e.g. Kiriwhakapapa and Atiwhakatu streams]. Severe erosion, large-scale slumps and gravel-choked riverbeds are a feature. The climate is relatively moist, rainfall varies between 1600 and 8000^{+} mm per annum, increasing markedly with elevation. Summer drought is uncommon or negligible. Extensive stands of silver beech occur, with some hard beech, black beech and red beech being present; the lowland hardwood forests of the Tararua Range are a complex mosaic of hardwood species with isolated podocarps (Hall's totara and rimu); rātā–kāmahi and scrub at lower elevations.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Steep to very steep upper mountain slopes and summits	Torlesse Supergroup sandstones and mudstones	500–1530	Silver beech forest, snow tussock & alpine herbfield >1250 m	Conservation land, protected native forest, recreation	Nil	Conservation land, recreation	Recreation, tracking, buildings, pylons etc.
Moderately steep to steep lower mountain and hill slopes	Torlesse Supergroup sandstones and mudstones	150–500	Red beech–kāmahi forest, rātā–kāmahi forest	Conservation land, reverted scrubland, exotic forestry, recreation	Low	Conservation land, exotic forestry, recreation	Exotic forest, tracking, increase in exotic weeds, recreational impacts
Lower marginal hill slopes	Torlesse Supergroup sandstones and mudstones	150–500	Red beech–kāmahi forest, rātā–kāmahi forest	Exotic forestry, conservation land, reverted scrubland, extensive grazing, recreation	Low	Exotic forestry, conservation land, extensive grazing, recreation	Exotic forest, tracking, increase in exotic weeds, recreation
Narrow undulating terraces and footslope fans	Pleistocene and Recent alluvium from predominantly Torlesse Supergroup sandstone and mudstone rocks	100–250	Podocarp–broadleaved forest, rimu, matai, kahikatea	Intensive grazing, reverted scrubland, conservation land	Medium	Intensive grazing, feed cropping, exotic forestry, conservation land	Intensified land use, subdivision, shelter belts
Narrow sinuous floodplains	Recent alluvium from predominantly Torlesse Supergroup sandstone and mudstone rocks	100–250	Podocarp–broadleaved forest, kahikatea, rimu, matai	Semi-intensive grazing, conservation land	Medium	Intensive grazing, feed cropping	Intensified land use, subdivision, shelter belts

6 Eastern Greywacke [Aorangi] Mountains Land Type

The Eastern Greywacke Mountains Land Type encompasses the Aorangi Range and the associated marginal hills underlain by indurated Pahau terrane rocks of the Torlesse Supergroup and associated minor valley-fill alluvium and colluvium. The Pahau terrane consists of grey sandstones and sandstone–mudstone sequences with minor conglomerate, basalt and sparse limestone, and is less well indurated than the older greywackes to the west although they are commonly intensely fractured and deformed. Landform components include dissected steep (26–35°) to very steep (>35°) hill and mountain slopes up to 981 m [Mt Ross]; minor narrow and sinuous and frequently fault and crush zone controlled undulating terraces and floodplains [e.g. Otakaha, Pararaki and Mangatoetoe streams], and minor sea cliffs and associated coastal landforms in the south. Large-scale slumping is also a feature along the southern coast. The climate is characterised by exposure to strong desiccating north-westerly and cold salt-laden south-westerly winds. Rainfall varies between 1200 and 2400^{+} mm per annum increasing with elevation. In the southern area low altitude forest is dominated by māhoe, hīnau and rewarewa with scattered rimu, matai and miro emergents, with areas of silver beech at higher elevations, and flax–mānuka–*Cassinia* scrub and grassland occurring on seaward faces. In the more northern region black, silver and red beech with occasional podocarps on the slopes and silver beech on the higher ridge tops is characteristic.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Steep to very steep upper mountain slopes	Torlesse Supergroup sandstones and mudstones	500–981	Silver beech, subalpine scrub	Conservation land, protected native forest, extensive grazing, recreation	Low	Extensive grazing conservation land, recreation	Recreation, tracking, buildings, pylons etc.
Moderately steep to steep lower hill and mountain slopes	Torlesse Supergroup sandstones and mudstones	10–500	Silver, hard and black beech, scattered podocarps	Conservation land, exotic forestry, reverted scrubland, extensive grazing, recreation	Low	Exotic forestry, extensive grazing, conservation land, recreation	Exotic forest, tracking, increase in exotic weeds, recreation
Lower marginal hill slopes	Torlesse Supergroup sandstones and mudstones	150–500	Māhoe, hīnau and rewarewa with scattered rimu, matai and miro	Extensive grazing, reverted scrubland, exotic forestry, conservation land, recreation	Medium	Exotic forestry, extensive grazing, conservation land, recreation	Exotic forest, fencing, tracking, increase in exotic weeds, recreation
Narrow undulating terraces and footslope fans	Pleistocene alluvium from predominantly Torlesse Supergroup sandstone and mudstone rocks	5–120	Podocarp–broadleaved forest, rimu, matai, kahikatea	Semi-intensive grazing, conservation land, exotic forestry	Medium	Intensive grazing, feed cropping, exotic forestry, conservation land	Intensified land use, subdivision, shelter belts
Narrow sinuous floodplains	Recent alluvium from predominantly Torlesse Supergroup sandstone and mudstone rocks	5–120	Podocarp–broadleaved forest, kahikatea, rimu, matai	Semi-intensive grazing, conservation land, flood/depositional hazard	Medium	Semi-intensive grazing, feed cropping	Intensified land use, subdivision, shelter belts

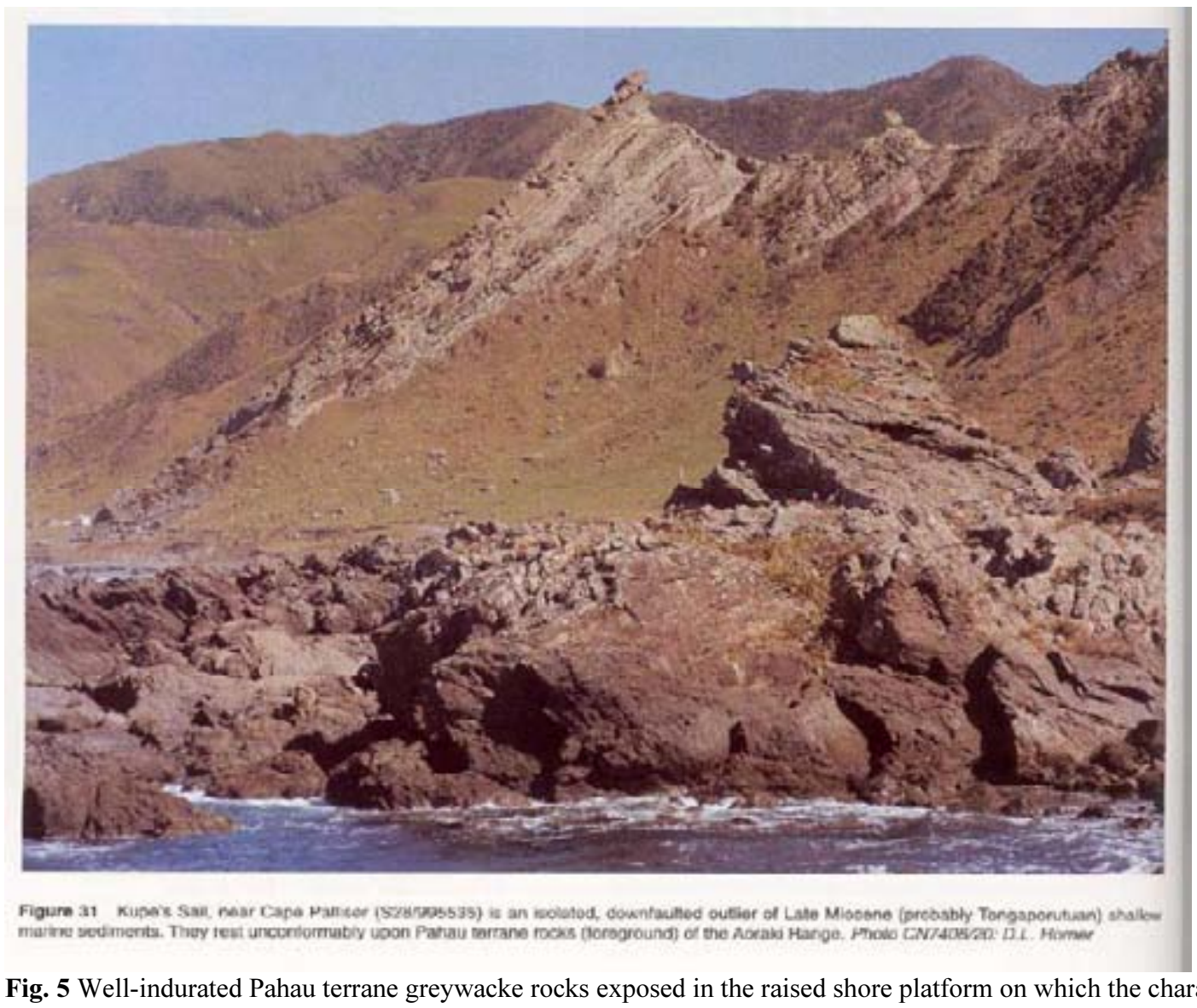

Figure 31 Kupe's Sail, near Cape Palliser (S28/995535) is an isolated, downfaulted outlier of Late Miocene (probably Tongaporutuan) shallow marine sediments. They rest unconformably upon Pahau terrane rocks (foreground) of the Aorakl Range. Photo CN7405/20: D.J. Homer

Fig. 5 Well-indurated Pahau terrane greywacke rocks exposed in the raised shore platform on which the characteristic Eastern Greywacke Mountain Land Type hill-slope landscape develops, middle and background (from Begg &Johnston 2000).

7 Cretaceous Hard Rock Hill and Steeplands Land Type

The Cretaceous Hard Rock Hill and Steeplands Land Type is underlain by indurated, predominantly well-bedded alternating, sandstone and mudstone, with minor conglomerate and spilitic volcanics. This uppermost Torlesse terrane is less well indurated than the older greywackes to the west, and the Aorangi Range greywackes to the south, although they are similarly extensively fractured and deformed with extensive crush zones. Landform components include dissected steep (26–35°) to very steep (>35°) hill slopes, jagged sharp hill-slope summits; rolling (8–15°) to strongly rolling (16–20°) coalescing colluvial/alluvial footslope fans; and narrow and sinuous, undulating terraces and floodplains. Massive more erosion resistant sandstone blocks (taipos) occur within the various formations and form prominent strike ridges. Extensive shallow surficial soil slip erosion under pasture, intense gullying and large-scale slumps within crush zones, and gravel-choked riverbeds are a feature. Elevation varies from sea level to 628 m and rainfall from 1000 to 1600 mm per annum. Vegetation cover varies from extensive induced pasture, reverted scrubland and remnant beech–lowland podocarp–hardwood forest. Example areas include the hill country of the central Opouawe catchment, the coastal block north of Manurewe Point, and the lower Pahaoa River to Hikorangi.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Steep to very steep hard rock erosional hill slopes	Cretaceous mudstones and sandstone, with minor conglomerate and limestone	0–630	Rimu, r̄ t̄, tawa , hard and black beech forest, m̄ nuka and broadleaved scrub	Semi-intensive grazing, exotic forestry, reverted scrubland	Medium	Intensive grazing, exotic forestry, conservation land	Fencing, tracking, exotic forest, decrease in scrub
Steep jagged summits, ridges and spur crests	Cretaceous sandstones and mudstone, with minor conglomerate and limestone	200–630	Hard and black beech, m̄ nuka and broadleaved scrub	Semi-intensive grazing, exotic forestry, reverted scrubland	Medium	Intensive grazing, exotic forestry, conservation land	Fencing, tracking, exotic forest, decrease in scrub, man-made structures
Steep to very steep coastal escarpments	Cretaceous mudstones and sandstone, with minor conglomerate and limestone	0–200	Hard and black beech, m̄ nuka and broadleaved scrub flax–m̄ nuka–*Cassinia* scrub	Extensive grazing, exotic forest, conservation land	Low	Extensive grazing, exotic forest, conservation land	Tracking, fencing, increase in exotic vegetation
Terraces	Quaternary and Holocene alluvium	40–250	Podocarp forest	Intensive grazing, feed cropping	High	Intensive grazing, feed cropping	Intensified land used, cultivation, shelter trees, subdivision
Meander floodplains	Recent alluvium and swamp deposits	40–250	Wetlands, sedges and grasses	Intensive grazing and feed cropping	High	Intensive grazing, feed cropping	Subdivision, cultivation, drainage, shelter trees
Fans	Quaternary and Holocene fan deposits	40–250	Podocarp forest	Intensive grazing, feed cropping	High	Intensive grazing, feed cropping	Subdivision, cultivation, shelter trees

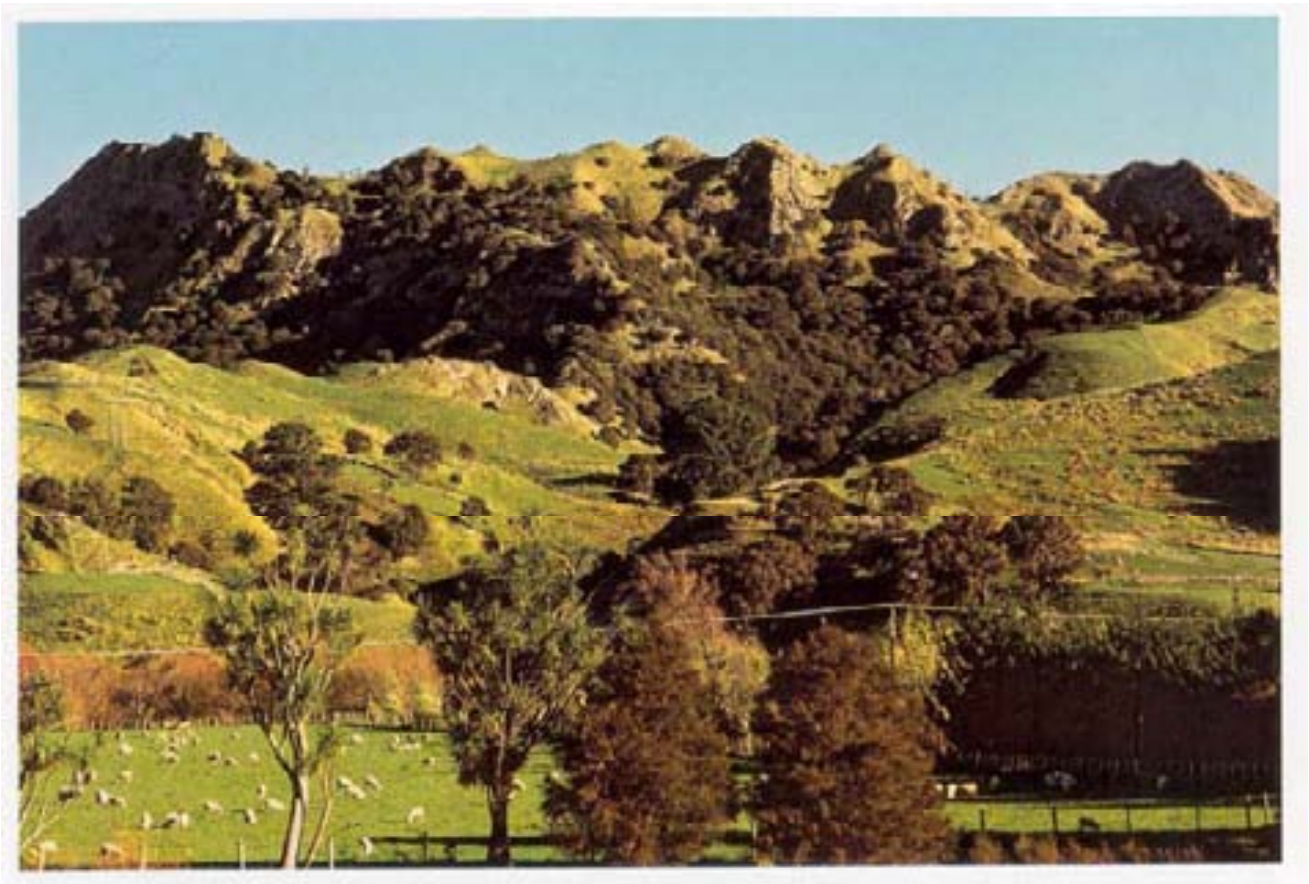

Figure 12 Massive bodies of erosion-resistant Taipo Formation sandstone are present within the more easily weathered Mangapokia Formation, resulting in steep-sided landforms known locally as "taipos". The Mangapakeha Taipos (T26/635275) cover an area 6 km by 4 km, elongate in a northerly direction, parallel to the regional strike of the enclosing rocks.

Photo CN11697/14: D.L. Horner

Fig. 6 Variation in erosion resistance of the underlying rocks is reflected in landform style and steepness within the Cretaceous Hard Rock Hill and Steepland Land Type (from Lee & Begg 2002).

8 Basal Cover Beds Hill and Steeplands Land Type

The Basal Cover Beds Hill and Steeplands Land Type is underlain by *moderately indurated* Early Cretaceous to Oligocene rocks overlying the greywacke basement. They consist of well-bedded fine- to coarse-grained sandstone, mudstone and conglomerate; and graded bedded to massive in parts carbonaceous, sandstone, siltstone, calcareous mudstone and greensand, with minor limestone. Although folded and faulted the degree of deformation is significantly less than in the older rocks. Landform components include dissected steep (26–35°) to moderately steep (21–25°) hill slopes with narrow rounded summits; rolling (8–15°) to strongly rolling (16–20°) coalescing colluvial/alluvial footslope fans; and narrow and sinuous, undulating terraces and floodplains. Shallow surficial soil slip erosion is extensive especially under pasture. Elevation varies from sea level to 663 m [Mt Adams] and rainfall from 1000 to 1600 mm per annum. Vegetation cover varies from extensive induced pasture, reverted scrubland and remnant beech – lowland podocarp– hardwood forest. Example areas include the hill country centred on Maungapurupuru.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Steep hard rock [moderately indurated] erosional hill slopes	Cretaceous to Oligocene mudstones and sandstone, with minor conglomerate and limestone	0–600	Rimu, rātā, tawa, hard and black beech forest, mānuka and broadleaved scrub	Semi-intensive grazing, exotic forestry, reverted scrubland	Medium	Intensive grazing, exotic forestry, conservation land	Fencing, tracking, exotic forest, decrease in scrub
Broad rounded summits, ridges and spur crests	Cretaceous to Oligocene mudstones and sandstone, with minor conglomerate and limestone	200–600	Hard and black beech, mānuka and broadleaved scrub	Semi-intensive grazing, exotic forestry, reverted scrubland	Medium	Intensive grazing, exotic forestry, conservation land	Fencing, tracking, exotic forest, decrease in scrub, man-made structures
Steep to very steep coastal escarpments	Cretaceous to Oligocene mudstones and sandstone, with minor conglomerate and limestone	0–200	Hard and black beech, mānuka and broadleaved scrub flax–manuka–*Cassinia* scrub	Extensive grazing, exotic forest, conservation land	Low	Extensive grazing, exotic forest, conservation land	Tracking, fencing, increase in exotic vegetation
Terraces	Quaternary and Holocene alluvium	40–250	Podocarp forest	Intensive grazing, feed cropping	High	Intensive grazing, feed cropping	Subdivision, cultivation, shelter trees
Meander floodplains	Recent alluvium and swamp deposits	40–250	Wetlands, sedges and grasses	Intensive grazing and feed cropping	High	Intensive grazing, feed cropping	Drainage, cultivation, subdivision, shelter trees
Fans	Quaternary and Holocene fan deposits	40–250	Podocarp forest	Intensive grazing, feed cropping	High	Intensive grazing, feed cropping	Cultivation, subdivision, shelter trees

9 Soft Rock Mudstone and Sandstone Hill and Steepland Land Type

The Soft Rock Mudstone and Sandstone Hill and Steepland Land Type consists of hill and valley landscapes underlain by predominantly Tertiary sedimentary strata. The landscape is developed on undifferentiated massive to well-bedded, often calcareous, blue-grey mudstone with discontinuous limestone lenses, and alternating bedded sandstone and mudstone sequences with minor conglomerate. Landform components include steep (26–35°), smooth rounded hills developed on the more weakly indurated lithologies, and minor structurally controlled hill slopes [strike ridges with distinctive dip and scarp slopes], and associated narrow and sinuous terraces and floodplains, and minor ‘hard rock’ hill slopes. Extensive mass movement erosion – large-scale slumps and both deep and shallow-seated earthflows, as well as shallow soil slips, are common. Elevation ranges from 0 to 598 m [Kupukore] and rainfall from 1200 to 1400 mm per annum. Vegetation cover varies from extensive induced pasture, reverted scrubland and remnant beech – lowland podocarp – hardwood forest. Example areas include the hill country around Alfredton, Wainuioru, and Hikawera.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Soft rock erosional hill slopes	Tertiary mudstones and sandstone, with minor conglomerate and limestone	0–600	Podocarp forest, mānuka and broadleaved scrub	Semi-intensive grazing, exotic forestry, reverted scrubland	Medium	Intensive grazing, exotic forestry, conservation land	Fencing, tracking, exotic forest, decrease in scrub
Spur crests and summits	Tertiary sandstones, mudstones and conglomerate	200–600	Podocarp forest, mānuka and broadleaved scrub	Semi-intensive grazing, exotic forestry, reverted scrubland	Medium	Intensive grazing, exotic forestry, conservation land	Fencing, tracking, exotic forest, decrease in scrub, skyline structures
Soft rock structural landforms, e.g. cuestas	Tertiary limestones and calcareous sandstones	40–600	Podocarp forest, kāwhai, broadleaved scrub	Semi-intensive grazing, exotic forestry, reverted scrubland	Medium	Semi-intensive grazing, exotic forestry, conservation land	Fencing, tracking, exotic forest, decrease in scrub
Hard rock erosional hill slopes (minor)	Torlesse Supergroup sandstones and mudstones	40–295	Podocarp forest, kāwhai, broadleaved scrub	Semi-intensive grazing, exotic forestry, reverted scrubland	Medium	Semi-intensive grazing, exotic forestry, conservation land	Fencing, tracking, exotic forest, decrease in scrub
Terraces	Quaternary and Holocene alluvium	40–250	Podocarp forest	Intensive grazing, feed cropping	High	Intensive grazing, feed and cash cropping	Subdivision, cultivation, shelter trees,
Meander floodplains	Recent alluvium and swamp deposits	40–250	Wetlands, sedges and grasses	Intensive grazing and feed cropping	High	Intensive grazing, feed cropping	Drainage, cultivation, subdivision, shelter trees

22

Fans	Quaternary and Holocene fan deposits	40–250	Podocarp forest	Intensive grazing, feed cropping	High	Intensive grazing, feed cropping	Cultivation, subdivision, shelter trees

23

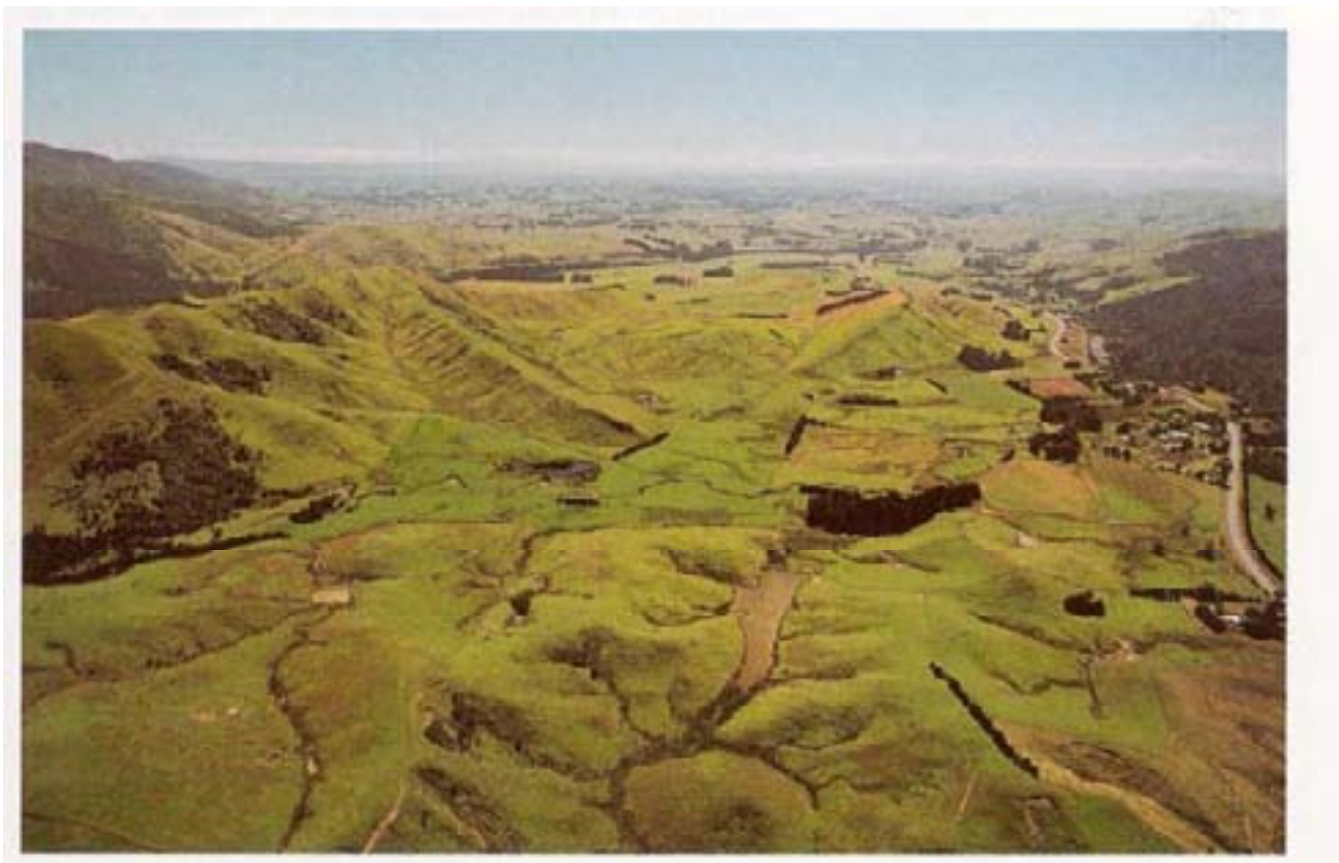

Figure 21 At Mount Bruce (T25/315500) Esk Head belt basement rocks on the west (left) and Waioeka terrane basement on the east (right) bound the Kaiparoro Syncline, comprising Late Miocene (Soren Subgroup) and Pliocene (Onoke Group) marine rocks. Rocks underlying the hills to the left of the prominent strike ridge are Late Miocene mudstones of the Soren Subgroup. The prominent strike ridge-forming horizon is the Kaiparoro Limestone of late Late Miocene (Kapitean) age, and the low hills in the core of the syncline are mudstones of Pliocene age.

Photo CN43665/11: D.L. Homer

Fig. 7 Variable soft rock lithologies and their characteristic landscapes in the Mt Bruce area (from Lee & Begg 2002).

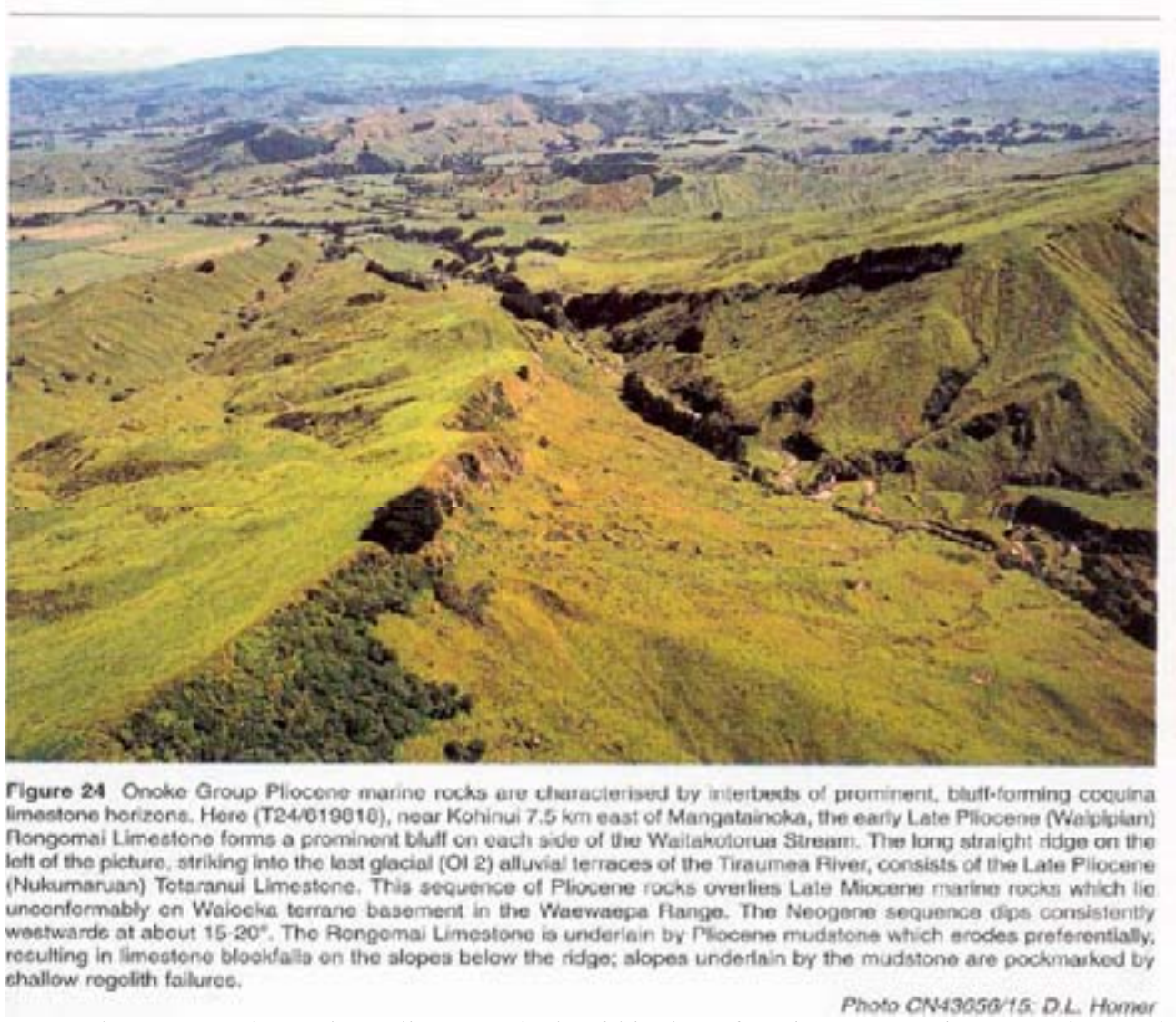

Figure 24 Onoke Group Pliocene marine rocks are characterised by interbeds of prominent, bluff-forming coquina limestone horizons. Here (T24/619616), near Kohinui 7.5 km east of Mangatainoka, the early Late Pliocene (Waipipian) Rongomai Limestone forms a prominent bluff on each side of the Waitakotorua Stream. The long straight ridge on the left of the picture, striking into the last glacial (OI 2) alluvial terraces of the Tiraumea River, consists of the Late Pliocene (Nukumaruan) Totaranui Limestone. This sequence of Pliocene rocks overlies Late Miocene marine rocks which lie unconformably on Waiocka terrane basement in the Waewaepa Range. The Neogene sequence dips consistently westwards at about 15-20°. The Rongomai Limestone is underlain by Pliocene mudstone which erodes preferentially, resulting in limestone blockfalls on the slopes below the ridge; slopes underlain by the mudstone are pockmarked by shallow regolith failures.

Photo CN43656/15: D.L. Homer

Fig. 8 The more erosion resistant limestone beds within the soft rock sequence play a prominent role in determining ridgeline orientation (from Lee & Begg 2002).

10 Tertiary Limestone Dominated Hill and Steeplands Land Type

The Tertiary Limestone Dominated Hill and Steeplands Land Type consists of moderately steep (21–25°), to steep (26–35°), dissected hill country and steeplands with strong lithological control, underlain by mid- to late Tertiary coarse-grained coquina, commonly rubbly or pebbly and cross-bedded limestone [e.g. Totaranui Limestone] and associated undifferentiated massive to poorly bedded concretionary calcareous blue-grey mudstone with alternating sandstone and mudstones. Landform components include steep, structurally controlled, hill slopes [strike ridges and distinctive dip and scarp slopes], smooth rounded hills developed on the more weakly indurated strata; and associated narrow and sinuous terraces and floodplains. Mass movement erosion slumps and earthflows as well as shallow soil slips are common on the associated mudstone components. Elevation ranges from 100 to 604 m [Rangitumau], and rainfall from 1000 to 1400 mm per annum. Vegetation cover varies from extensive induced pasture, reverted scrubland and remnant beech – lowland podocarp – hardwood forest. Example areas include the Rangitumau hill country north of Masterton, the hill country east of Gladstone, and on the true right of the Huangaru and Ruakokoputuna rivers.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Limestone-cored structurally controlled hill slopes – strike ridges and distinctive dip and scarp slopes	Tertiary limestones and calcareous sandstones	100–604	Hard and black beech, podocarp forest	Semi-extensive grazing, exotic forest, conservation	Medium	Semi-extensive grazing, exotic forestry, conservation	Increase in exotic pasture, fencing, tracking, exotic forest, recreation impacts
Soft rock erosional slopes	Tertiary sandstones, and mudstones	100–500	Hard and black beech, podocarp forest	Semi-extensive grazing, exotic forestry, reverted scrubland	Medium	Semi-extensive grazing, exotic forestry	Increase in exotic pasture, fencing, tracking, exotic forest, decrease in scrub cover
Minor valley terraces and drainage swales	Colluvium and alluvium from predominantly Tertiary sandstones, mudstones and limestones	100–250	Hard and black beech, podocarp forest	Semi-extensive grazing, feed cropping, exotic forestry	Medium	Semi-extensive grazing, feed cropping, exotic forestry	Increase in exotic pasture, fencing, tracking, exotic forest, decrease in scrub cover
Floodplains	Recent alluvium	100–200	Totara-rich podocarp forest, swampland vegetation	Semi-extensive grazing, feed cropping, exotic forestry	Medium	Semi-extensive grazing, feed and cash cropping	Increase in exotic pasture, fencing, tracking, drainage, exotic forest, decrease in scrub cover

Figure 8 The Puketoi Range is a spectacular topographic feature in the Wairarapa map area, with a high point (Summit, 803 m) that exceeds the elevation of the North Island axial ranges in this area (782 m, west of Mangamaire). The range is an elongate strike ridge of Late Pliocene coquina limestones (the lower, Rongomai Limestone of Waipipian age, the upper, Te Onepu Limestone of Mangapanian age). The green slope in the foreground is essentially a dip slope underlain by Te Onepu Limestone. Strong prevailing winds from the northwest account for the elongate form of the shrubs in the foreground.

Photo CN4366/24: D.L. Homer

Fig. 9 Prominent strike ridge with distinctive dip and scarp slopes underlain by erosion-resistant limestone formations (from Lee & Begg 2002).

11 Eastern Coastal Fringe and Uplifted Marine Terrace Land Type

The Eastern Coastal Fringe and Uplifted Marine Terrace Land Type encompasses the coastal margin from Ngapotiki to Te Kaukau Point, northwards to the Owahanga River and beyond. The land type is underlain by predominantly Tertiary or late Cretaceous centimetre to metre bedded, or massive to poorly bedded sandstone and mudstones, sometimes calcareous, with limited limestone. Landform components include flat to gently undulating (0–3°) dissected uplifted marine terraces; steep (26–35°) to very steep (>35°) coastal escarpments and cliffs formed in both soft and hard rock lithologies often with extensive earthflow and soil slip erosion; rolling (8–15°) to strongly rolling (16–20°) coalescing alluvial footslope fans; rolling (8–15°) to strongly rolling (16–20°) coastal sand dune complexes and inter-dune sand flats; narrow and sinuous undulating terraces and floodplains; lagoons and tidal creeks, and narrow sandy and gravel ocean beaches. Elevation ranges from sea level to 100 m, and rainfall varies from 1200 to 1600+ mm per annum. Remnant vegetation consists of totara-rich podocarp forest, pīngao and spinifex and specialised cliff and shore communities.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Uplifted marine terraces (frequently dissected)	Late Pleistocene marginal marine sand and gravel	5–60 (80)	Totara-rich podocarp forest	Intensive grazing, exotic forestry	High	Intensive grazing, feed and cash cropping, exotic forestry	Shelterbelts, fencing, subdivision, settlement development
Steep to very steep coastal escarpments	Tertiary and late Cretaceous aged sandstone and mudstone with minor limestone	0–60 (80)	Podocarp forest, kīwhai, broadleaved scrub	Extensive grazing, exotic forestry, conservation land	Low	Exotic forestry, extensive grazing, conservation land	Invasion of exotic species, tracking
Coalescing alluvial footslope fans	Alluvium & colluvium from sandstone, mudstone and gravels	5–50	Totara-rich podocarp forest	Intensive grazing, exotic forestry	High	Intensive grazing, feed and cash cropping, exotic forestry	Shelterbelts, fencing, subdivision, settlement development
Coastal sand dune complexes – active fore dunes – semi-stable intermediate dunes – stable dunes – interdune sandflats	Holocene and Recent dune sand	0–20	Pīngao, spinifex, dune slack, danthonia grassland	Extensive grazing, conservation, recreation, stabilised wasteland	Low	Conservation, extensive grazing, recreation, stabilised wasteland	Exotic species invasion, tracking, loss of native vegetation, dwellings and structures
Lagoons and tidal creeks	Holocene and Recent mud, silts and sand	0–5	Wetland vegetation	Opportunistic grazing,	Low	Conservation	Exotic weed invasion, drainage

				conservation			
Narrow sinuous floodplains	Holocene and Recent alluvium	0–20	Totara-rich podocarp forest	Intensive grazing, feed cropping	High	Feed and cash cropping, intensive grazing	Intensified land use, subdivision, windbreaks, drainage
Coastal cliffs and reefs	Tertiary and late Cretaceous aged sandstone and mudstone with minor limestone	0–100	Specialist plant communities	Conservation, recreation	Nil	Conservation, recreation	Exotic weed invasion
Sandy and gravel beaches	Holocene and Recent beach sand & gravel	0–20	Specialist plant communities	Conservation, recreation	Nil	Conservation, recreation	Exotic weed invasion

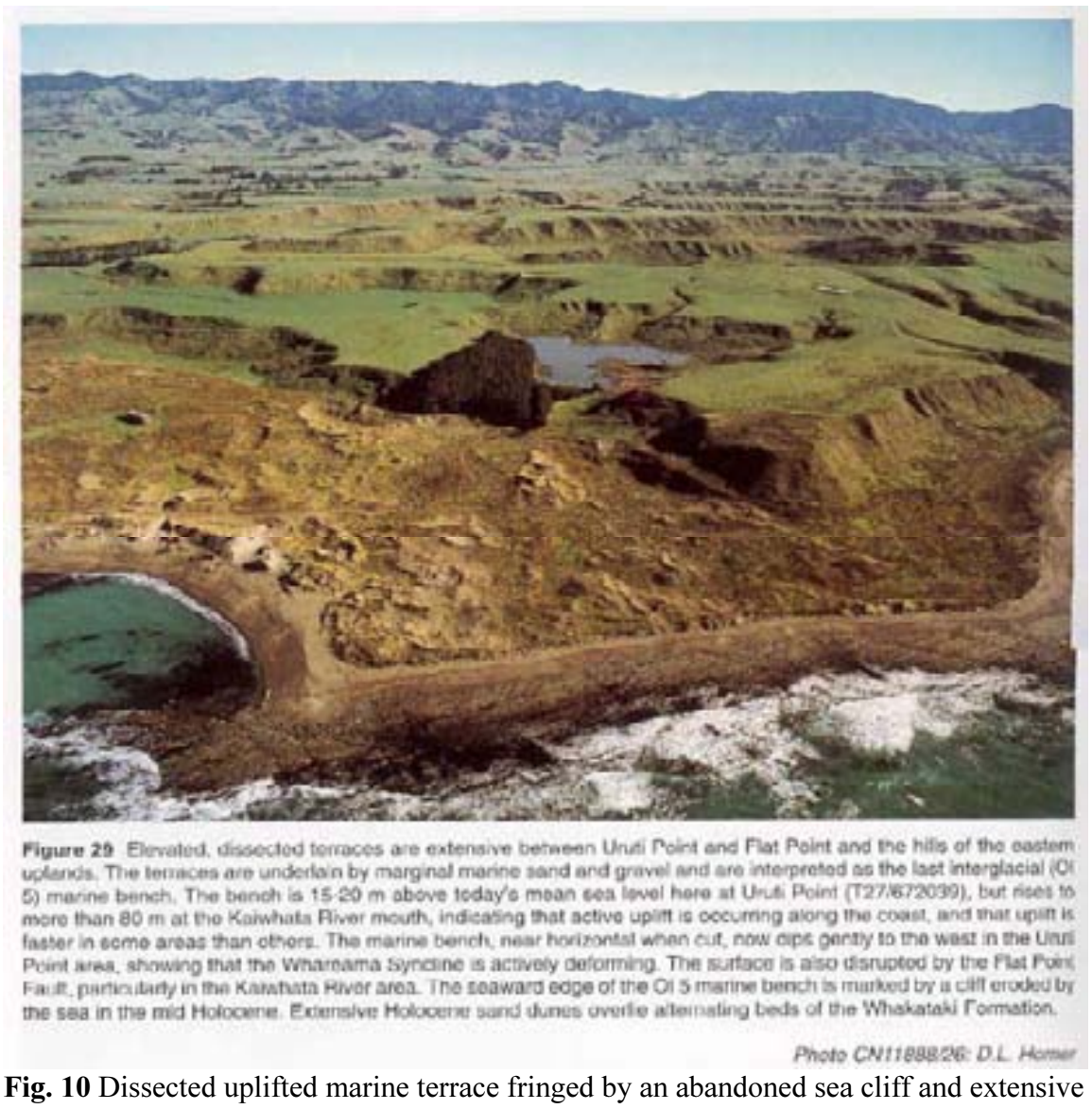

Figure 29 Elevated, dissected terraces are extensive between Uruti Point and Flat Point and the hills of the eastern uplands. The terraces are underlain by marginal marine sand and gravel and are interpreted as the last interglacial (Oi 5) marine bench. The bench is 15-20 m above today's mean sea level here at Uruti Point (T27/672039), but rises to more than 80 m at the Kaiwhata River mouth, indicating that active uplift is occurring along the coast, and that uplift is faster in some areas than others. The marine bench, near horizontal when cut, now dips gently to the west in the Uruti Point area, showing that the Whareama syncline is actively deforming. The surface is also disrupted by the Flat Point Fault, particularly in the Kaiwhata River area. The seaward edge of the Oi 5 marine bench is marked by a cliff eroded by the sea in the mid Holocene. Extensive Holocene sand dunes overlie alternating beds of the Whakataki Formation.

Photo CN11888:26: D.L. Homer

Fig. 10 Dissected uplifted marine terrace fringed by an abandoned sea cliff and extensive sand dune belt characteristic of the Eastern Coastal Fringe Land Type (from Lee & Begg 2002).

Figure 31 A wide, flat Holocene marginal marine bench in the Flat Point area is largely the result of continuing uplift. Sea level has remained static through the late Holocene (the last 6500 years). Streams carry cobbles derived from Glenburn Formation, and Tinui and Mangatu group lithologies across the bench to the sea, where they are distributed along the shoreline by longshore drift.

Photo CN43676/15. D.L. Homer

Fig. 11 Landforms characteristic of the Eastern Coastal Fringe Land Type low-angle coalescing alluvial fans building over a marine bench fringed by a stabilised sand dune belt at Flat Point (from Lee & Begg 2002).

12 Hard Rock Coastal Fringe Land Type

The Hard Rock Coastal Fringe Land Type encompasses the coastal margin from Turakirae Head to Corner Creek along the western Palliser Bay shoreline, and from Parakiti River to Ngapoiki along the south-eastern coast. It is underlain largely by well-indurated Torlesse Supergroup rocks consisting of grey sandstones and sandstone–mudstone sequences with minor conglomerate, basalt and sparse limestone, and is intensely faulted, fractured and deformed. Landform components include steep (26–35°) to very steep (>35°) coastal escarpments and cliffs, narrow active ocean gravel beaches, uplifted shore platforms with abandoned beach ridges, extensive offshore reefs, and minor rolling (8–15°) to strongly rolling (16–20°) coalescing alluvial footslope fans. Large-scale slumping and slope failure is a feature on the coastal escarpments and cliffs. Elevation ranges from sea level to 300+ m, and rainfall from 1000 to 1200+ mm per annum. The climate is characterised by exposure to strong cold salt-laden south-westerly winds. Remnant vegetation consists of coastal scrub and forest, pīngao and spinifex and specialised cliff and shore communities.

Landform component	Geological formation	Elevation (m)	Remnant native vegetation	Present land use	Agronomic potential	Potential land use	Potential impacts
Steep to very steep coastal escarpments	Torlesse Supergroup sandstones and mudstones	0–200	Coastal scrub, flax–mānuka–*Cassinia* scrub and grassland	Conservation land, opportunist grazing	Very low	Opportunistic grazing, conservation land	Tracking, recreational impacts, increase in exotic weeds, loss of native species
Steep to very steep sea cliffs and rock bluffs (some basal gravel beach ridges and associated reefs)	Torlesse Supergroup sandstones and mudstones	0–200	Specialist plant communities coastal scrub, flax–mānuka–*Cassinia* scrub and grassland	Conservation land	Nil	conservation land	Increase in exotic weeds, loss of native species
Gravel beaches	Holocene and Recent beach gravel	0–20	Pīngao, scrub, bracken, specialist plant communities	Conservation land, recreation	Nil	Conservation land, recreation	Increase in exotic weeds, loss of native species
Uplifted shore-cut platforms with beach ridges	Torlesse Supergroup sandstones and mudstones	0–60	Pīngao, scrub, bracken, specialist plant communities	Conservation land	Nil	Conservation land	Increase in exotic species
Coalescing alluvial footslope fans	Alluvium & colluvium from Torlesse Supergroup sandstones and mudstones	5–50	Coastal scrub, flax–mānuka–*Cassinia* scrub and grassland	Extensive grazing, conservation land	Low	Semi-intensive grazing, recreation	Tracking, recreational impacts settlement development

6. Conclusion

The 12 land types established at a scale of 1:250 000 for the Masterton, Carterton and Southern Wairarapa districts provide a geomorphologically based assessment and grouping of the district's landscape. Although the land types have been designed primarily to assist in landscape assessment and planning, they also provide an objective, physically based, subdivision of the Masterton, Carterton and Southern Wairarapa districts' landscape suitable for resource monitoring, strategy planning, and land resource assessment and evaluation.

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Fig. 12 Uplifted shore-cut platforms and associated beach ridges backed by an abandoned sea cliff characteristic of the Hard Rock Coastal Fringe Land Type (from Begg & Johnston 2000).

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