



Ngongotaha Valley



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## 27.0 MOUNT NGONGOTAHA

### Landscape Character Area 27.1: Ngongotaha Valley

#### Area Defined by:

- Ngongotaha Stream corridor and SH 5 to the north
- SH 5 to the east
- North-western suburbs and Pukehangi hills to the south
- Ngongotaha valley scarps to the west

#### Area Characterised by:

- Valley floor characterised by mostly undulating gentle slopes to rolling hill country rising to moderately steep terrain to the west of Ngongotaha Stream south of the Waitetahi Stream branch.
- Underlying geology is characterised by softer unconsolidated to moderately consolidated deposits in areas of rhyolitic or andesitic ash base rock aligned with areas of more moderately undulating slopes (NZLRI category B slopes: 4°-7°) for example near Edean Road (see Map 4 Appendix 1).
- Ngongotaha Stream drainage patterns represent a complex system of tertiary, secondary and primary channels that include not only the immediate valley catchment (and mount slopes) but also plateau hill country to the west, for example the Otamaroa and Waitetahi Stream systems. The Ngongotaha Stream represents one of the most significant (complex) systems in the catchment study area (see Map 6 Appendix 1).
- Landcover is pasture dominant with limited areas of indigenous vegetation in association with stream corridors and occasional patches of production forestry.
- Land use includes farming, forestry and rural residential development with most settlement aligned with the Paradise Valley Road including Ralph Road and Paradise Valley Springs settlements.
- Features numerous archaeological sites to the west (see Map 9 Appendix 1).
- Limited stream-side Reserve A and Reserve B lands (see Map 11 Appendix 1).

#### Local Character Areas:

- Paradise Valley south
- Paradise Valley Road corridor north

#### Landscape Management Issues:

- Riparian management in alignment with Rotorua Lakes Protection and Restoration Action Programme including pine forest management issues.
- Enhancement / protection and maintenance of areas of existing indigenous vegetation particularly in relation to Ngongotaha Stream system.
- Opportunities for cluster development in relation to site specific topography and vegetation context.
- Siting, access, and design of buildings in relation to existing topographic features / natural patterns including existing indigenous vegetation patterns.
- Low impact design principles in relation to water quality, earthworks and on site stormwater / wastewater management.
- Reserves and open space linkages particularly towards the lower Ngongotaha Stream corridor to the east and Reserves A and Reserve B lands.
- Management of rural / natural character in relation to Paradise Valley Road corridor.





### Ngongotaha Domes



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## 27.0 MOUNT NGONGOTAHA

### Landscape Character Area 27.2: Ngongotaha Domes

#### Area Defined by:

- Very steep scarp to the north
- More moderate toe slopes to the east and south west
- North western suburbs (Landscape Character Area 20.2) to the south

#### Area Characterised by:

- Volcanic complex of steep Rhyolitic domes and moderately steep to strongly rolling terraces in the north turning to very steep areas on the southern slopes.
- Drainage patterns include streams that feed into both the Ngongotaha Valley to the west and Mangakakahi system to the east.
- Landcover is dominated by indigenous bush that relates to Mount Ngongotaha Scenic Reserve on the steeper domes to the south with pasture dominant on the more moderate slopes to the north.
- Settlement patterns include farm buildings on the Mount itself and a small area of residential development on the southern slopes west of Mountain Road bordering Pleasant Heights.
- One archaeological site and one geopreservation site identified named as Mount Ngongotaha lava dome.

#### Local Character Areas:

- Steep southern bush slopes
- Moderate northern pasture slopes

#### Landscape Management Issues:

- Enhancement, management of existing protected areas of indigenous vegetation and existing vegetation patterns.
- Riparian management in alignment with Rotorua Lakes Protection and Restoration Action Programme including slope stabilisation of Class 7 and 8 steep stream gullies.
- Reserves and open space linkages and connections.
- Preservation of rural character of pastoral slopes.
- Avoidance of built development that may compromise sensitive pasture slope ridgeline areas.





### Ngongotaha Scarp and Lower Slopes



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## 27.0 MOUNT NGONGOTAHA

### Landscape Character Area 27.3: Ngongotaha Scarp and Lower Slopes

#### Area Defined by:

- Ngongotaha Stream corridor to the north
- SH 5 and Selwyn Heights to the east
- Ngongotaha domes to the south
- Ngongotaha Valley to the west

#### Area Characterised by:

- Very Steep Class 7 north facing scarps in a variety of landcover including forestry, pasture and manuka / kanuka shrubland easing to rolling pastoral slopes to the north and east.
- Northern rolling slopes also feature a variety of vegetation including forestry and indigenous bush while the eastern slopes feature the Fairy Springs and Rainbow Springs commercial complexes.
- The scarp does not feature any significant drainage patterns as the elevated slopes of Mount Ngongotaha drain to the south but does include the Fairy and Rainbow Springs systems to the east (an identified geopreservation site).
- Three archaeological sites identified.

#### Local Character Areas:

- Very steep scarps
- Northern and eastern rural slopes

#### Landscape Management Issues:

- Slope stabilisation and minimisation of earthworks.
- Forestry management and management of existing shrubland vegetation.
- Management of commercial and industrial (mining) activities in relation to access, traffic, vegetation clearance and enhancement.
- Avoidance of built development that may compromise sensitive ridgeline areas.
- Siting, access, and design of buildings in relation to site specific existing topographic features / natural patterns including existing indigenous vegetation patterns.
- Riparian management in alignment with Rotorua Lakes Protection and Restoration Action Programme.





Pukehangi



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## 28.0 UTUHINA HILLS

### Landscape Character Area 28.1: Pukehangi

#### Area Defined by:

- Paradise Valley Road to the north
- Pukehangi Road and south-western suburbs (Area 2/C) to the east
- Tureporepo Stream scarps to the south and east
- Mamaku Plateau South (Area 5/A) to the west

#### Area Characterised by:

- Rolling to strongly rolling north east facing class 4 and 6 hill country with erosion subclass limitations overlying harder volcanic parent material dissected by the very steeply incised Mangakakahi Stream corridor with areas of more moderate and undulating slope to the east in proximity to Pukehangi Road.
- Pasture dominant landcover with limited production and patches of indigenous bush associated with principal drainage patterns including the very steep Mangakakahi and northern Utuhina Stream system scarps.
- Land use dominated by pastoral farming and limited production forestry with suburban settlement patterns emerging on elevated slopes at e.g. Matipo Heights contrasting with an emerging pattern of clustered residential development on newly revegetated slopes.
- Four archaeological sites including Pukehangi Pa (see Map 9 Appendix 1).

#### Local Character Areas:

- Upland rolling hills and terraces
- East Lowland undulating slopes
- Utuhina Valley rural (Great West Road) and scarps

#### Landscape Management Issues:

- Accommodation of rural residential growth for Rural A elevated north facing land
- Landscape change and loss of rural character
- Avoidance of built development that may compromise sensitive ridgeline areas.



- The limited effectiveness of minimum lot size zoning regimes as a means of providing for improved rural residential living environments.
- Opportunities for cluster development in relation to site specific physical attributes (topography and vegetation patterns).
- Siting, access, and design of buildings in relation to existing topographic features / natural patterns including existing indigenous vegetation patterns.
- Strengthening of existing indigenous vegetation patterns.
- Slope stabilisation (Utuhina Valley Scarps).
- Low impact design principles in relation to water quality, earthworks and on site stormwater / wastewater management.
- Riparian management in alignment with Rotorua Lakes Protection and Restoration Action Programme including slope stabilisation of Class 7 and 8 steep stream gullies.
- Securing reserve and open space linkages.







Tihi-o-tonga



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## 28.0 UTUHINA HILLS

### Landscape Character Area 28.2: Tihi-o-tonga

#### Area Defined by:

- Utuhina Valley and Stream corridor to the north
- South-western suburbs and Hemo Gorge to the east
- Tureporepo Valley to the south
- Mamaku Plateau (Area 23.1) to the west

#### Area Characterised by:

- Rolling to strongly rolling north east facing Class 4 dominant hill country with erosion subclass limitations overlying harder volcanic parent material.
- Drainage patterns include numerous second order Utuhina Stream corridors draining to the north.
- Landcover is pasture dominant limited patches of indigenous vegetation associated with second order stream systems (see Map 7 and 6 Appendix 1).
- Settlement patterns include suburban residential patterns of Tihi-o-tonga and Springfield south of Pukehangi Road (Utuhina Road).
- Eight archaeological sites to the east near Tihi-o-tonga (see Map 9 Appendix 1).

#### Local Character Areas:

- Elevated north facing rolling hills and terraces
- Tureporepo Valley scarp ridgeline

#### Landscape Management Issues:

- Accommodation of rural residential growth for Rural A elevated north facing land.
- Containment of suburban subdivision development patterns within existing developed areas.
- Landscape change and loss of rural character.
- Avoidance of built development that may compromise sensitive ridgeline areas.
- The limited effectiveness of minimum lot size zoning regimes as a means of providing for improved rural residential living environments.
- Siting, access, and design of buildings in relation to existing topographic features / natural patterns including existing indigenous vegetation patterns and the strengthening of existing indigenous vegetation patterns.
- Slope stabilisation (Tureporepo Valley scarps).
- Low impact design principles in relation to water quality, earthworks and on site stormwater / wastewater management.
- Riparian management in alignment with Rotorua Lakes Protection and Restoration Action Programme including slope stabilisation of Class 7 and 8 steep stream gullies.
- Securing reserve and open space linkages.





### Waipa Hills



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## 29.0 PUARENGA VALLEY

### Landscape Character Area 29.1: Waipa Hills

#### Area Defined by:

- Whakarewarewa, south eastern city suburbs and Tarawera Road to the north
- Catchment ridgeline and study area boundary to the east
- Kauaka Stream corridor to the south
- SH 5 (following Kauaka Stream corridor) to the west

#### Area Characterised by:

- Steep to very steep class 6 dominant hill country overlying predominantly volcanic parent material includes named hills (Kakapiko and Moerangi).
- Drainage patterns include second order upper catchment stream of the Waipa system (see Map 6 Appendix 1).
- Land cover in production forestry (roads, loading and clear felled areas). Also includes significant area of indigenous vegetation to the east of Lake Tikitapu (Whakarewarewa Forest - DoC) and a DoC Reserve Kakapiko Bush with archaeological site to the north of Kakapiko Hill.
- Several smaller covenanted indigenous forest areas also feature, aligned with southern branches of the Waipa Stream system named as 5 Mile Gate Swamp.
- Whakarewarewa Forest on Lake Tikitapu ridgeline.

#### Local Character Areas:

- Production forest hill country and summits
- Indigenous forest reserve lands

#### Landscape Management Issues:

- Forestry management in relation to slope stabilisation, landscape effects of clear felling and water quality / soil quality.
- Integrated management of production, indigenous and wetland vegetation patterns including riparian management in alignment with Rotorua Lakes Protection and Restoration Action Programme.
- Protection, maintenance and enhancement of significant areas of existing indigenous vegetation.
- Securing reserve and open space linkages.





### Western Kauaka Valley Hills



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## 29.0 PUARENGA VALLEY

### Landscape Character Area 29.2: Western Kauaka Valley Hills

#### Area Defined by:

- Hemo Gorge and Puarenga Stream valley floor to the north
- Kauaka Stream valley to the east
- Study area boundary to the south
- Upper Puarenga catchment stream systems to the west

#### Area Characterised by:

- Undulating to rolling Class 3, 4 and 6 land in the north to moderately steep to steep Class 6 hill country in the south / southeast overlaying unconsolidated to moderately consolidated breccia parent material (see Map 5 Appendix 1).
- Drainage patterns characterised by the second order streams from the upper Puarenga catchment complex in the north and west as well as the Te Kuha Stream valley to the southeast.
- Land cover includes production forestry (roads, loading and clear felled areas) principally to the west of Te Kuha Stream with pastoral hill country to the east.

#### Local Character Areas:

- Production forest hill country
- Pastoral hill country



#### Landscape Management Issues:

- Forestry Management in relation to slope stabilisation, landscape effects of clear felling and water / soil quality.
- Integrated management of production, indigenous and wetland vegetation patterns including riparian management in alignment with Rotorua Lakes Protection and Restoration Action Programme.
- Avoidance of built development that may compromise sensitive ridgeline areas in particular upper catchment boundary ridgeline.
- Siting, access, and design of buildings in relation to site specific existing topographic features / natural patterns including existing indigenous vegetation patterns.
- Enhancement of rural character.





Rural Valleys



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## 29.0 PUARENGA VALLEY

### Landscape Character Area 29.3: Rural Valleys

#### Area Defined by:

- Waipa, Kauaka/Ohineuia, and Upper Puarenga catchment drainage systems to Hemo Gorge to the north
- Waipa Hills to the east
- Study Area boundary and catchment ridgeline to the south
- Te Kahikatea Stream scarps to the west

#### Area Characterised by:

- Flat to undulating to strongly rolling hill country associated with principal drainage patterns on unconsolidated to moderately consolidated material.
- Drainage patterns characterised by three subcatchments including the Waipa, Kauaka/Ohineuia, and Upper Puarenga catchment systems (see Map 6 Appendix 1).
- Landcover dominated by pastoral land use in the west (Upper Puarenga catchment) and forestry in the east (Waipa Stream valley floor) with wetland areas throughout the Kauaka/Ohineuia system.
- Land use is dominated by farming in the west and production forestry including the Waipa sawmill in the east
- Traditional rural settlement dominates.
- One identified archaeological pa site north of SH 30 and Bryce Road.
- Waikaruru Stream Wetlands to the south.

#### Local Character Areas:

- Waipa production forest valley
- Industrial valley floor
- Kauaka/Ohineuia wetland valley
- Upper Puarenga catchment rural valleys

#### Landscape Management Issues:

- Environmental and landscape effects in relation to management of Rural F spray irrigation zone.
- Integrated management of production, indigenous and wetland vegetation patterns including riparian management in alignment with Rotorua Lakes Protection and Restoration Action Programme including Waikaruru Stream Wetlands.
- Management of landscape and environmental effects of Industrial C Zone including point source and non-point source pollution, siting, scale, access/traffic and opportunities for enhancement for further industrial development.
- Management of SH 5 “southern gateway” road corridor.
- Protection of rural character and the siting, access, and design of buildings in relation to site specific existing topographic features / natural patterns including existing indigenous vegetation patterns.





WEB VERSION



OUTSTANDING NATURAL FEATURES AND LANDSCAPES

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# Outstanding Natural Features and Landscapes

## Introduction

The project brief for the Lake Rotorua Catchment Landscape Assessment requires the identification of the outstanding natural features and landscapes. This work is being undertaken to meet the Council's obligations under Part II of the Resource Management Act (The Act), being:

*Section 6(b)*

*"The protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development."*

The Act does not define "outstanding" or provide guidance as to how outstanding natural features and landscapes are to be identified. Outstanding natural features and landscapes in this study have been identified as both features and landscapes with exceptional physical qualities and characteristics and/or features that are highly valued for one or more attributes.

Outstanding natural features and landscapes (ONFLs) within the Lake Rotorua catchment have been identified and mapped as part of this study. Landscape management issues in relation to identified ONFLs should be considered within the wider integrated framework of the Landscape Types and Landscape Character Areas described in this report.

While the focus of this study is Section 6(b) of the Act, it is also recognised that the study will assist Council to meet its obligations under other sections of Part II of the Act – particularly Section 7(c) and 7(f). These sections of the Act, which are set out as other matters to which regard is to be given, include amenity values and the quality of the environment.

Amenity Values are defined in the Act as follows:

*"Amenity Values", means those natural or physical qualities and characteristics of an area that contribute to people's appreciation of its pleasantness, aesthetic coherence, and cultural and recreational attributes.*

The Environment Court, primarily through decisions in relation to the Queenstown Lakes District Plan, has indicated the following distinctions:

- Section 6(b) - outstanding natural features and landscapes;
- Section 7 - amenity landscapes being those landscapes with important visual amenity values;
- Landscapes with no significant resource management issues.

Section 6(b) relates to other matters of national importance such as Section 6(a) in regard to the preservation of the natural character of wetlands and lakes and rivers and their margins and the protection of them from inappropriate subdivision, use and development.

The adoption of an assessment methodology that identifies and describes Landscape Types and Landscape Character Areas of the landscape prior to the specific identification of ONFLs provides a framework to assist Council, landowners and communities to manage, in an integrated way, landscape change depending on the particular landscape qualities and issues within each Landscape Character Area.

## Assessment Criteria

The assessment criteria used in the identification of the outstanding natural features and landscapes of the Lake Rotorua catchment study area have been adopted from Environment Bay of Plenty variation to the RPS. These criteria are in turn drawn from recent decisions of the Environment Court in firstly the Pigeon Bay and then WESI decisions. The criteria adopted for assessment of the ONFLs are as follows:

### **Natural Science Factors comprising the following three criteria:**

#### **Representativeness**

Natural features and landscapes are clearly and recognisably characteristic of the district. The key components of the landscape will be present in a way that more generally defines the character of the place, but which distils this character and essence.

Natural features in a good state of preservation are representative and characteristic of the natural geological processes and diversity of the district.

#### **Research and Education**

Natural features and landscapes that are valued for the contribution they make to research and education.

#### **Rarity**

Natural features that are unique or rare in the district, region or nationally, and few comparable examples exist.

### **Aesthetic Values comprising the following four criteria:**

#### **Coherence**

The patterns of land cover and land use are largely in harmony with the underlying natural pattern of the landform of the area and there are no significant discordant elements of land cover or land use.

#### **Vividness**

Natural features and landscapes are widely recognised across the community and beyond the local area and remain clearly in the memory; striking landscapes that are symbolic of an area due to their recognisable and memorable qualities.

#### **Naturalness**

Natural features and landscapes that appear largely uncompromised by modification and appear to comprise natural systems that are functional and healthy.

#### **Intactness**

Natural systems that are intact and aesthetically coherent and do not display significant visual signs of human modification, intervention or manipulation; visually intact and highly aesthetic natural landscapes.

In addition the following five criteria:

**Expressiveness (Legibility)**

Natural features and landscapes that clearly demonstrate the natural processes that formed them. Examples of natural process in landscape exemplify the particular processes that formed that landscape.

**Transient Values**

The consistent occurrence of transient features (for example the seasonal flowering of pohutukawa) or active geothermal features that contribute to the character, qualities and values of the landscape; landscapes that are widely recognised for their transient features and the contribution these make to the landscape.

**Shared and Recognised Values**

Natural features and landscapes that are widely known and valued by the immediate and wider community for their contribution to a sense of place leading to a strong community association with or high public esteem for the place.

**Maori Values**

Natural features and landscapes that are clearly special or widely known to tangata whenua and influenced by their connection to the Maori values inherent in the place.

**Historical Associations**

Natural features and landscapes that are clearly and widely known to the community and influenced by their connection to the historical values inherent in the place.

## Selection Process Methodology

The identification of potential outstanding natural features and landscapes (ONFLs) has been derived from the landscape types and character areas documented above.

The decision as to whether a particular natural feature or landscape qualified as outstanding was based on an initial assessment against the ONFL criteria. The professional judgement and expertise of three experienced Landscape Architects was used to evaluate the areas identified through preliminary assessment to determine whether a natural feature or landscape met the criteria for identification as “outstanding”.

Community landscape values were also assessed as far as possible through the consultation processes including general public and Tangata Whenua consultation. The record of the assessment against criteria is set out the worksheets in the following section. The decision on “ranking” is recorded in the assessment sheets attached to provide transparency for consultation, and baseline for any future reviews.

The ranking system adopts a 3 level scoring system: L = low, M = moderate, H = high in relation to the extent to which the values of the subject ONFL meet the particular criterion.

It is important to recognise that the assessment against the criteria leading to the determination as to whether a particular landscape or feature is outstanding is not additive. A landscape or feature may achieve the status of outstanding due to the way in which it meets a single criterion such as, for example, “expressiveness”. Alternatively an area can be determined to be outstanding due to the way in which it meets a combination of criteria. This method of evaluation is as intended in the RPS. Whilst each criterion is ranked therefore, a landscape or feature that “rates” moderate or even low in relation to some criteria may still achieve recommended “outstanding” status due to the way in which it exceptionally meets the attributes of a single criterion.

Whilst this landscape study identifies the Outstanding Natural Features and Landscapes within the Lake Rotorua Catchment study area a significant portion of the study area remains outside of such a delineation. These ‘amenity’ and ‘other’ landscapes are never the less important to the overall character and quality of the landscape as a whole. It is important that these landscapes are also managed to work with, enhance and protect their inherent landscape values.

The study therefore enables the Council to meet its obligations under Section 6(b) matters of national importance as well as other sections of Part II of the Act – particularly Section 7(c). This is particularly important in an area such as the Lake Rotorua catchment where the majority of the land area is not identified as outstanding but where the working rural landscape is important to the overall character of the district and the community’s identity. These natural and rural landscape values and the amenity of the working rural landscape are also of value to visitors and tourists. The tourism industry is also important to Rotorua’s economy and the wider impression of New Zealand as a rural, quality destination. It is important to recognise that working landscapes change seasonally and over time as different techniques of rural land management and production regimes change and diversify. Such change is inherent within the working rural landscape and should be accommodated without hindrance where significant landscape values are not undermined. In addition, opportunities for enhancement can result from rural landscape change.

## Identification Of Outstanding Natural Features And Landscapes

Eight outstanding natural features and landscapes (ONFL) have been identified in the Lake Rotorua catchment study area. These are:

- Lake Rotorua and margins
- Whakarewarewa Geothermal Area
- Tikitere Geothermal Area
- Mamaku Tors
- Hamurana Spring
- Hamurana Caldera Rim
- Mount Ngongotaha
- Mokoia Island

The location and extent of the above ONFLs are shown within the Study Areas Resource Map Book: Map13.

All of the features and landscapes identified in this study as outstanding have been previously identified through a regional assessment of outstanding natural features and landscapes. This regional study was originally undertaken in 1997 and updated and revised in 2007 using the RPS criteria. Both these studies were undertaken by Boffa Miskell for Environment Bay of Plenty.

**Acknowledgement:** *“Natural Heritage of the Rotorua District” (1998) Shaw. W.B, and Beadel. S. M., (Wildlands Consultants) has been used as a general reference in the preparation of the following assessments in regard to natural heritage values.*

# Description of Outstanding Natural Features and Landscapes

## Lake Rotorua

Lake Rotorua is a clear and recognisable landscape feature of the district that defines and characterises a number of further landscape areas. It is a key component of the study area's wider landscape that also distils the essence of Rotorua. In this way Rotorua is synonymous with Lake Rotorua. The lake water body in relation to the surrounding elevated topography is also representative of underlying geological processes at a broad spatial scale and is of research and educational value particularly in terms of the long-term management of water quality. While the lake itself is not "rare" within the district or region, the scale of the water body is unique within the district. The aesthetic values associated with the Lake also represent a high degree of harmony with the underlying landform; is widely recognised across the community and beyond; is memorable; and has areas of Lake margin and open water that are largely uncompromised, and intact. The geothermal nature of the lake and associated transient values also add to the landscape values of this landscape feature.

## Whakarewarewa Geothermal Area

Whakarewarewa is a clearly recognisable geothermal area that characterises the wider geothermal activity of the district with a variety of active geothermal elements including geysers, mud pools and vents. It is a key component of the lake catchment landscape that is representative of the dynamic geological processes and the diversity of the region.

High natural and aesthetic values are associated with the area's coherence as a geothermal area; it is readily recognisable as a landscape of memorable natural features and dynamic natural processes and is relatively intact given the associated visitor / tourism activities. The area clearly demonstrates natural processes of an active geothermal area and has a number of transient attributes – mist, smell and atmospheric qualities.

Whakarewarewa is of past and present day significance to Te Arawa and has a long history of natural and cultural tourism.

## Tikitere Geothermal Area

Tikitere is a recognisable geothermal area that characterises the wider geothermal activity of the district with a variety of geothermal elements including geysers, mud pools and vents.

Similar to Whakarewarewa, this area is again a key component of the lake catchment landscape that expresses the geological processes of the region. High aesthetic values are also associated with this area's coherence as a defined geothermal area; it is readily recognisable as an area of memorable natural features and natural processes and is relatively intact given the associated visitor / tourism activities.

Tikitere has significant historical Maori associations and is an area of traditional use. It also has significant historical associations as a place to visit including by known dignitaries.

## Mamaku Tors

Individually and collectively these scattered ignimbrite tor features are clearly recognisable as being characteristic of the Mamaku Plateau and Lake Rotorua Catchment. A variety of features remain in a good state of preservation. These features are of geopreservation research and educational value with few comparable examples particularly of the wider landscape pattern of tor distribution.

Aesthetic values vary according to the relative intactness of each feature with some examples representing high naturalness even when associated with existing rural dwellings. In these instances patterns of land use are largely in harmony with the underlying natural pattern of the landform feature.

The tor features are recognisable and memorable and area key landscape element in relation to the Mamaku Plateau as a gateway to Rotorua.

The Mamaku Tors are locally distinct and rate highly against a number of the assessment criteria. However, these ratings will vary according to the qualities of particular tor features, some of which are significantly modified.

A key issue in the ongoing management of this wider productive rural landscape is the identification of individual tor features or types of features that warrant specific management at a range of possible spatial scales. Further work is required, beyond the scope of this assessment report, to determine the individual tors that may be worthy of recognition / protection as landscape features.

A potential methodology for this more detailed landscape identification of tor features could include:

- A further more detailed desktop survey of the Tor features through Geo-referenced LiDAR (Light Detection and Ranging) data, using Rotorua District Council's newly acquired database (acquired since the earlier desktop analysis for this study).
- The allocation of a range of Tor typologies based on the results of this survey (for example: Tors over 8 meters in height with indigenous vegetation; Tors Under 8 meters in height in pasture; Tors with associated buildings; Tors visible from main Roads).
- Ground based survey of particular Tor features in consultation with private landowners.
- The development of appropriate non-statutory guidelines to suggest possible methods for preserving and enhancing those landscape characteristics that define the Mamaku Tor Landscape.

This more detailed assessment work would be the focus of a specific, more detailed landscape study and should be developed in close consultation with landowners.

In lieu of the above recommended more detailed assessment, the mapped delineation of the Mamaku Tors ONL follows that of the previous 1997 regional (EBoP) landscape assessment.

## Hamurana Springs

Hamurana Spring is an outstanding representative example of the natural springs that are a key component of the landscape within the study area. It is clearly recognisable as a natural feature, remains and is in a good state of preservation and is characteristic of the natural processes of the Lake.

The spring outflow requires ongoing aquatic weed management, and is of research and educational value. In combination with the surrounding open space and amenity landscape, the spring represents high aesthetic values particularly in regard to aesthetic coherence and the values associated with the mature (exotic) Redwoods that are present as part of the recreational / amenity landscape. While modification is evident, that modification relates to amenity landscape modifications that reinforce the natural qualities of the spring itself.

## Hamurana Caldera Rim

The caldera rim at Hamurana is a distinctive representative example of the wider topographic feature that defines the visual containment of the Lake Rotorua catchment. The topography and drainage patterns of the steep vegetated scarps are clearly recognisable and characteristic of the area and representative of the wider geological / volcanic process that formed the lake and caldera basin as well as being representative of wider landscape values in relation to more fragmented and modified land use areas of the caldera.

This landscape is relatively coherent in terms of aesthetic values being widely recognisable, relatively intact and demonstrating particular natural landscape characteristics.

## Mount Ngongotaha

Mount Ngongotaha consists of a series of rhyolite domes and is a distinctive example of underlying volcanic geological processes that characterise the study area and region. It is a key component of the study area landscape particularly given its scale and proximity to urban and suburban areas of Rotorua and Lake Rotorua. It also has significance in relation to the “arrival” to Rotorua from the north and the cluster of tourist facilities on its lower slopes.

While areas to the north and east exhibit less aesthetic coherence, upper elevations and the western slopes exhibit a high degree of coherence with indigenous vegetation cover that is in harmony with the underlying natural pattern of the landform. Mount Ngongotaha is widely recognisable and is a memorable and symbolic landscape of Rotorua, expressive of the area’s volcanic origins.

## Mokoia Island

Mokoia Island is a rhyolite dome that is symbolic and highly expressive of the wider volcanic geological process of the entire lake catchment area. The island is a feature and aesthetic focus of the Lake and wider catchment. In this regard Mokoia is relatively rare as well as clearly demonstrating high aesthetic values in terms of coherence of landcover and unmodified naturalness without significant recent signs of human modification.

## Assessment Summary

Detailed assessment sheets for each of the eight identified outstanding natural features and landscapes are set out in the following section.

OUTSTANDING NATURAL LANDSCAPES	Natural Science Factors	Aesthetic Values	Expressive-ness	Transient Values	Shared / Recognised Values	Maori Values	Historic Associations
Lake Rotorua	✓	✓	✓	✓	✓	✓	
Whakarewarewa Geothermal Area	✓	✓	✓	✓	✓	✓	✓
Tikitere Geothermal Area	✓	✓	✓	✓	✓	✓	
Mamaku Tors	✓	✓	✓		✓	✓	
Hamurana Springs	✓	✓	✓		✓	✓	
Hamurana Caldera Rim	✓	✓	✓			✓	
Mount Ngongotaha	✓	✓	✓		✓	✓	
Mokoia Island	✓	✓	✓		✓	✓	✓





WEB VERSION



ASSESSMENT CRITERIA WORKSHEETS

WEB

WEB VERSION

**ONFL name: Lake Rotorua and margins**

**Description:** Expansive lake formed by the Rotorua eruption and defined by the caldera basin. Principal receiving environment for the catchment discharging to the Ohau channel.

CRITERIA		RANKING	COMMENT
<b>Natural Science Factors</b>			
<b>Representativeness</b> Natural features and landscapes that are clearly and recognisably characteristic of the district. The key components of the landscape will be present in a way that more generally defines the character of the place, but which distils this character and essence.		H	Lake water bodies and margins are key landscape components that define the wider landscape character of Rotorua.
Natural features in a good state of preservation are representative and characteristic of the natural geological processes and diversity of the region.		M	Highly representative of wider geological processes. Ongoing water quality issues effecting natural science values.
<b>Research and Education</b> Natural features and landscapes are valued for the contribution they make to research and education.		H	Whole of Landscape and water quality management programmes.
<b>Rarity</b> Natural features that are unique or rare in the district, region or nationally, and few comparable examples exist.		M	Regionally distinctive Lake particularly in relation to its size.
<b>Aesthetic Values</b>			
<b>Coherence</b> The patterns of land cover and land use are largely in harmony with the underlying natural pattern of the landform of the area and there are no significant discordant elements of land cover or land use.		H	Aesthetic coherence varies across a range of Lake margin environments with greater levels of integration between margin and Lake to the north.
<b>Vividness</b> Natural features and landscapes that are widely recognised across the community and beyond the local area and remain clearly in the memory; striking landscapes that are symbolic of an area due to their recognisable and memorable qualities.		H	Symbolic Lake. Highly memorable particularly in relation to Mokoia Island and Caldera landscapes
<b>Naturalness</b> Natural features and landscapes that appear largely uncompromised by modification and appear to comprise natural systems that are functional and healthy.		M	Some modification related to recreational use.
<b>Intactness</b> Natural systems that are intact and aesthetically coherent and do not display significant visual signs of human modification, intervention or manipulation; visually intact and highly aesthetic natural landscapes.		H	Highly intact and aesthetically coherent feature. Some modification associated with more urban edges.
<b>Expressiveness (Legibility)</b>			
Natural features and landscapes that clearly demonstrate the natural processes that formed them. Examples of natural process in landscape exemplify the particular processes that formed that landscape.		H	Highly expressive of wider volcanic, geological and hydrological processes.
<b>Transient Values</b>			
The consistent occurrence of transient features (for example the seasonal flowering of pohutukawa or associated with geothermal activity) contributes to the character, qualities and values of the landscape; landscapes are widely recognised for their transient features and the contribution these make to the landscape.		M	Avifauna related to significant habitat values of identified wildlife refuges. Ephemeral features associated with geothermal activity including steam, vents and chemical reactions.
<b>SUMMARY OF LANDSCAPE ASSESSMENT</b>			
<b>Shared and Recognised Values</b>			
Natural features and landscapes that are widely known and valued by the immediate and wider community for their contribution to a sense of place leading to a strong community association with or high public esteem for the place.		H	Outstanding lake volcanic landscape.
<b>Maori Values</b>			
Natural features and landscapes that are clearly special or widely known and influenced by their connection to the Maori values inherent in the place.		H	Lake Rotorua is a dominant natural feature. The district and city share the lake name. The lake features strongly in historic images, with contemporary images focusing on Mokoia Island, and the lake shoreline. There is strong community feeling towards the degradation of lake water quality. 79% of residents were concerned with lake water quality. Lake Rotorua and Rotoiti were perceived as the most polluted of all the Rotorua lakes.
<b>Historical Associations</b>			
Natural features and landscapes are clearly and widely known and influenced by their connection to the historical values inherent in the place.		M	Lake Rotorua is named after and associated with the Te Arawa ancestors Kahumatamomoe and Ihenga. The full name of the lake being Te Rotorua-nui-a-Kahumatamomoe. The lake is revered by iwi and hapu of Te Arawa residing around the lake as their moana (ancestral lake) due to its association with tribal history and mana.
<b>OVERALL ASSESSMENT</b>			
		H	Lake Rotorua has been a focus of habitation and recreational use since times of early settlement, forming a centrepiece of a district widely known for its historical geothermal activity and cultural associations.
		H	Lake Rotorua is a defining landscape and feature of the district and is of regional and national importance.

ONFL name: Whakarewarewa Geothermal Area			
Description: Geopreservation area containing a variety of geothermal features including springs, geysers, ponds, mudpools and vents as well as associated tourism facilities and activities.			
CRITERIA		RANKING	COMMENT
<b>Natural Science Factors</b>			
<b>Representativeness</b> Natural features and landscapes are clearly and recognisably characteristic of the area, district or region. The key components of the landscape will be present in a way that more generally defines the character of the place, but which distils this character and essence.		H	Series of clearly recognisable geothermal features characteristic of the wider district. Highly representative of a key landscape component reinforced by associated tourism/cultural activities.
Natural features in a good state of preservation are representative and characteristic of the natural geological processes and diversity of the region.		M	Features in a good state of preservation although subject to modification for recreational / commercial / tourism activities
<b>Research and Education</b> Natural features and landscapes are valued for the contribution they make to research and education.		H	Opportunities for natural science research and education in relation to natural geothermal processes.
<b>Rarity</b> Natural features are unique or rare in the region or nationally, and few comparable examples exist.		H	Nationally rare in relation to extent and scale of geothermal features with few comparable examples.
<b>Aesthetic Values</b>			
<b>Coherence</b> The patterns of land cover and land use are largely in harmony with the underlying natural pattern of the landform of the area and there are no significant discordant elements of land cover or land use.		M	Geothermal features intact with high levels of coherence.
<b>Vividness</b> Natural features and landscapes are widely recognised across the community and beyond the local area and remain clearly in the memory; striking landscapes are symbolic of an area due to their recognisable and memorable qualities.		H	Highly recognisable, memorable and striking features that are symbolic of the area.
<b>Naturalness</b> Natural features and landscapes appear largely uncompromised by modification and appear to comprise natural systems that are functional and healthy.		M	Geothermal features themselves largely unmodified and highly dynamic / natural.
<b>Intactness</b> Natural systems are intact and aesthetically coherent and do not display significant visual signs of human modification, intervention or manipulation; visually intact and highly aesthetic natural landscapes.		M	Human modification evident in relation to accessing this landscape for tourism related activities; however, the natural system itself is "untamed" and volatile. An intact natural system.
<b>Expressiveness (Legibility)</b>			
Natural features and landscapes clearly demonstrate the natural processes that formed them. Examples of natural process in landscape exemplify the particular processes that formed that landscape.		H	Geothermal features that are highly expressive of natural geothermal processes within this locality as well as within the wider district
<b>Transient Values</b>			
The consistent occurrence of transient features (for example the seasonal flowering of pohutukawa) contributes to the character, qualities and values of the landscape; landscapes are widely recognised for their transient features and the contribution these make to the landscape.		H	Constant variations in landscape qualities of the geothermal landscape in relation to the type, rate and form of geothermal activity. A range of transient qualities is present including steam, geysers and vents but also olfactory and sensory (heat) transient qualities that complement the geothermal landscape resource.
<b>SUMMARY OF LANDSCAPE ASSESSMENT</b>			
<b>Shared and Recognised Values</b>			
Natural features and landscapes are widely known and valued by the immediate and wider community for their contribution to a sense of place leading to a strong community association with or high public esteem for the place.		H	Whakarewarewa is a well-known and popular visitor destination for local, domestic and international visitors. Whakarewarewa has a full time workforce comprising residents and Rotorua community. It is well recognised in contemporary publications and marketing images.
<b>Maori Values</b>			
Natural features and landscapes are clearly special or widely known and influenced by their connection to the Maori values inherent in the place.		H	Te Whakarewarewatanga-o-te-ope-taua-a-Wahiao is the full name of the former pa and present cemetery. The area is associated with a number of important ancestors namely Wahiao, Tapopoki, Huarere and others. Whakarewarewa is associated with the eruption of Tarawera or more correctly the migration of survivors whose descendants reside here. The Maori values are associated with use of geothermal activity in domestic heating, bathing and cooking. Most pools, springs and geysers have been given specific names. The geothermal resources of Whakarewarewa have contributed to economic prosperity of the resident community. The location of the NZ Arts and Crafts Institute is recognised as the home of wood carving excellence.
<b>Historical Associations</b>			
Natural features and landscapes are clearly and widely known and influenced by their connection to the historical values inherent in the place.		H	The area has a number of recognised archaeological features including (U16/6) Pa, (U16/7) Pohaturoa Pa. Historically, Whakarewarewa is an important cultural and natural tourism destination with a rich history of visitation by dignitaries as well as local and overseas tourists. It has long been recognised for its natural and cultural heritage values.
<b>OVERALL ASSESSMENT</b>			
		M	Whakarewarewa is a modified active volcanic landscape that includes a variety of individual volcanic features that are characteristic of the geothermal qualities that define the lake catchment, wider District and Region. The complex of features is recognisably "Rotorua" and has important cultural associations for Maori (both past and present) as well as a long history of recognition and visitation.

<b>ONFL name: Tikitere Geothermal Area</b>		<b>RANKING</b>	<b>COMMENT</b>
<b>CRITERIA</b>			
<b>Description:</b> Geopreservation area containing a variety of geothermal features including springs, geysers, ponds, mudpools and vents as well as associated tourism facilities and activities.			
<b>Natural Science Factors</b>			
<b>Representativeness</b> Natural features and landscapes are clearly and recognisably characteristic of the area, district or region. The key components of the landscape will be present in a way that more generally defines the character of the place, but which distils this character and essence.	H	Pattern of clearly recognisable geothermal features characteristic of the wider district. Highly representative of a key landscape component reinforced by associated tourism/cultural activities.	
Natural features in a good state of preservation are representative and characteristic of the natural geological processes and diversity of the region.	H	Good state of preservation although subject to modification for recreational / commercial / tourism activities.	
<b>Research and Education</b> Natural features and landscapes are valued for the contribution they make to research and education.	M	Opportunities for natural science research and education in relation to natural processes.	
<b>Rarity</b> Natural features are unique or rare in the region or nationally, and few comparable examples exist.	H	Nationally outstanding with few comparable examples.	
<b>Aesthetic Values</b>			
<b>Coherence</b> The patterns of land cover and land use are largely in harmony with the underlying natural pattern of the landform of the area and there are no significant discordant elements of land cover or land use.	H	Geothermal features intact with high levels of coherence.	
<b>Vividness</b> Natural features and landscapes are widely recognised across the community and beyond the local area and remain clearly in the memory; striking landscapes are symbolic of an area due to their recognisable and memorable qualities.	H	Highly recognisable, memorable and striking features that are symbolic of the area.	
<b>Naturalness</b> Natural features and landscapes appear largely uncompromised by modification and appear to comprise natural systems that are functional and healthy.	H	Geothermal features themselves largely unmodified.	
<b>Intactness</b> Natural systems are intact and aesthetically coherent and do not display significant visual signs of human modification, intervention or manipulation; visually intact and highly aesthetic natural landscapes.	M	Human modification evident in relation to accessing this landscape resource.	
<b>Expressiveness (Legibility)</b>			
Natural features and landscapes clearly demonstrate the natural processes that formed them. Examples of natural process in landscape exemplify the particular processes that formed that landscape.	H	Geothermal features highly expressive of natural processes within this area as well as within the wider district.	
<b>Transient Values</b>			
The consistent occurrence of transient features (for example the seasonal flowering of pohutukawa) contributes to the character, qualities and values of the landscape; landscapes are widely recognised for their transient features and the contribution these make to the landscape.	H	Variations in landscape values and qualities in relation to the type, rate and form of geothermal activity.	
<b>SUMMARY OF LANDSCAPE ASSESSMENT</b>			
<b>Shared and Recognised Values</b>			
Natural features and landscapes are widely known and valued by the immediate and wider community for their contribution to a sense of place leading to a strong community association with or high public esteem for the place.	H	Outstanding volcanic landscape.	
<b>Maori Values</b>			
Natural features and landscapes are clearly special or widely known and influenced by their connection to the Maori values inherent in the place.	M	The Tikitere Geothermal area is a well-known and much frequented tourism area. It is well sign posted and advertised. This area does not feature as strongly in historic art works as other geothermal areas in Rotorua.	
<b>Historical Associations</b>			
Natural features and landscapes are clearly special or widely known and influenced by their connection to the historical values inherent in the place.	H	Tikitere is associated with the tradition of the arrival of fire from Hawaiki where Ngatoroirangi called to Tanewhakaraka, Kuiuai and Haungaroa. Tanewhakaraka built two of the pa here. Tikitere is a renowned traditional bathing and healing area, and is also a resource for domestic heating, food preparation, and cooking. There are a number of hot pools, mud baths and geysers with specific names and associated ancestors.	
Natural features and landscapes are clearly and widely known and influenced by their connection to the historical values inherent in the place.	M	Associated with the arrival of early missionaries including the Bishop in 1842 and important dignitaries such as Sir George Grey in 1849. Tikitere supported a successful although short lived sulphur industry.	
<b>OVERALL ASSESSMENT</b>			
	H	Tikitere is a modified active volcanic /geothermal landscape that includes a variety of individual features characteristic of the geothermal qualities that also define the lake catchment, wider District and Region.	

ONFL name: Mamaku Tors			
<b>Description:</b> Scattered ignimbrite outcrops of varying forms of standing rock features and hillock mounds, landcover and exposure of underlying material relative to erosion (see note on page 88 of this assessment report).			
<b>CRITERIA</b>	<b>RANKING</b>	<b>COMMENT</b>	
<b>Natural Science Factors</b>			
<b>Representativeness</b> Natural features and landscapes are clearly and recognisably characteristic of the area, district or region. The key components of the landscape will be present in a way that more generally defines the character of the place, but which distils this character and essence.	<b>H</b>	Clearly and recognisable pattern of features that are distinctive of the Mamaku Plateau landscape.	
Natural features in a good state of preservation are representative and characteristic of the natural geological processes and diversity of the region.	<b>H</b>	Individual examples are in a good state of preservation, others have been modified, quarried and/or graffitied. The tor features are expressive of the volcanic landscape and volcanic formation of the area.	
<b>Research and Education</b> Natural features and landscapes are valued for the contribution they make to research and education.	<b>M</b>	Variety of individual features representing good geological research and educational opportunities.	
<b>Rarity</b> Natural features are unique or rare in the region or nationally, and few comparable examples exist.	<b>H</b>	Distinctive features with few comparable examples associated with similar landscape patterns.	
<b>Aesthetic Values</b>			
<b>Coherence</b> The patterns of land cover and land use are largely in harmony with the underlying natural pattern of the landform of the area and there are no significant discordant elements of land cover or land use.	<b>M</b>	Some good examples of outcrop / tor features and landscapes areas where landcover and land use are in harmony with natural pattern of landform particularly where tors and outcrops are associated with indigenous vegetation and fenced from surrounding pasture. Some features within the pastoral landscape create a distinctive rural amenity.	
<b>Vividness</b> Natural features and landscapes are widely recognised across the community and beyond the local area and remain clearly in the memory; striking landscapes are symbolic of an area due to their recognisable and memorable qualities.	<b>H</b>	Individual and collective patterns of features symbolic of Mamaku Plateau particularly in relation to SH5 "gateway" experience.	
<b>Naturalness</b> Natural features and landscapes appear largely uncompromised by modification and appear to comprise natural systems that are functional and healthy.	<b>M</b>	Naturalness variable with some good examples of features that exhibit a dominant natural character particularly in relation to the interplay between geology and indigenous landcover.	
<b>Intactness</b> Natural systems are intact and aesthetically coherent and do not display significant visual signs of human modification, intervention or manipulation; visually intact and highly aesthetic natural landscapes.	<b>M</b>	Some features highly to severely modified, including quarrying. Others remain fully intact.	
<b>Expressiveness (Legibility)</b>			
Natural features and landscapes clearly demonstrate the natural processes that formed them. Examples of natural process in landscape exemplify the particular processes that formed that landscape.	<b>H</b>	Highly expressive of the natural volcanic processes that have formed the Rotorua landscape and that remain an active geological environment.	
<b>Transient Values</b>			
The consistent occurrence of transient features (for example the seasonal flowering of pohutukawa) contributes to the character, qualities and values of the landscape; landscapes are widely recognised for their transient features and the contribution these make to the landscape.	<b>L</b>	Transient Values not significant.	
<b>SUMMARY OF LANDSCAPE ASSESSMENT</b>			
<b>Shared and Recognised Values</b>			
Natural features and landscapes are widely known and valued by the immediate and wider community for their contribution to a sense of place leading to a strong community association with or high public esteem for the place.	<b>M</b>	The volcanic tors create a distinctive rural landscape that are experienced as a part of the scenic arrival / departure to Rotorua along SH5. This is an important tourist as well as local access route. These features are not however widely represented in historic publications and art work.	
<b>Maori Values</b>			
2.12 Natural features and landscapes are clearly special or widely known and influenced by their connection to the Maori values inherent in the place.	<b>M</b>	The Mamaku tors were identified by specific local hapu groups as having cultural values significant through the consultation with tangata whenua. These values are associated with the features above the ground.	
<b>Historical Associations</b>			
2.13 Natural features and landscapes are clearly and widely known and influenced by their connection to the historical values inherent in the place.	<b>L</b>	No known historical associations.	
<b>OVERALL ASSESSMENT</b>			
	<b>H</b>	The Mamaku Tors represent a variety of individual landscape features of varying quality that collectively represent a highly distinctive volcanic rural landscape at a District level. (see note on page 88 of this assessment report).	

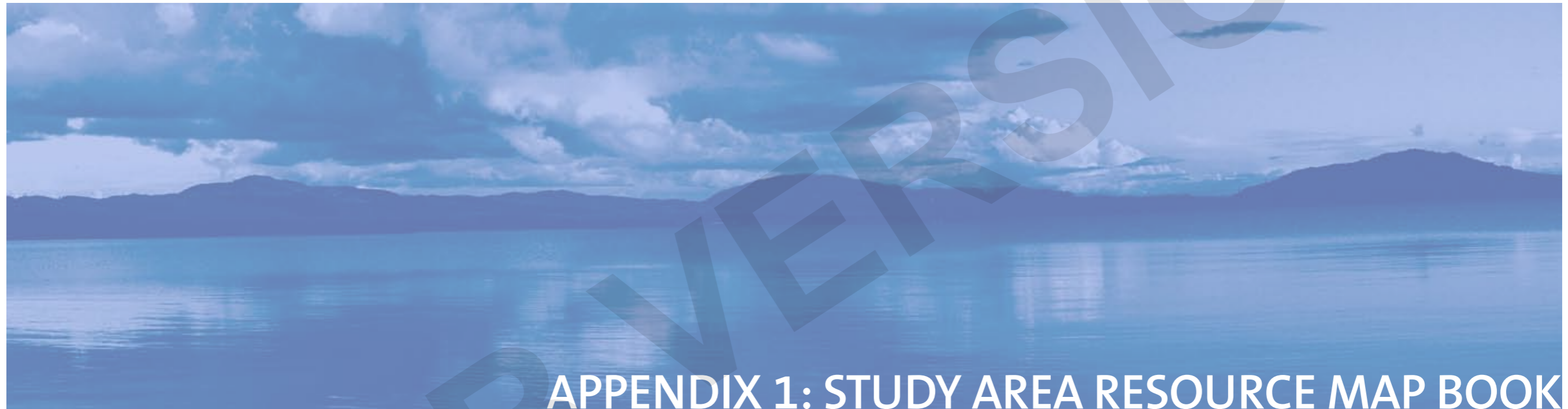
ONFL name: Hamurana Spring		
Description: Fresh water spring, pools, stream and associated amenity landscape		
CRITERIA	RANKING	COMMENT
<b>Natural Science Factors</b>		
<b>Representativeness</b> Natural features and landscapes are clearly and recognisably characteristic of the area, district or region. The key components of the landscape will be present in a way that more generally defines the character of the place, but which distils this character and essence.	H	Recognisable spring feature representative of wider hydrological processes that characterise the Lake and wider catchment.
Natural features in a good state of preservation are representative and characteristic of the natural geological processes and diversity of the region.	H	Unmodified feature, stream subject to weed infestation. Highly representative of natural geological and hydrological processes.
<b>Research and Education</b> Natural features and landscapes are valued for the contribution they make to research and education.	H	Conservation management values, water quality management and monitoring values.
<b>Rarity</b> Natural features are unique or rare in the region or nationally, and few comparable examples exist.	M	Not unique. A good representative example (other examples include, but are not limited to, Waiowhero Springs, Rainbow Springs, Fairy Springs).
<b>Aesthetic Values</b>		
<b>Coherence</b> The patterns of land cover and land use are largely in harmony with the underlying natural pattern of the landform of the area and there are no significant discordant elements of land cover or land use.	H	Surrounding amenity landscape, land cover and land uses including recreational activities reinforce spring and stream feature.
<b>Vividness</b> Natural features and landscapes are widely recognised across the community and beyond the local area and remain clearly in the memory; striking landscapes are symbolic of an area due to their recognisable and memorable qualities.	H	Memorable landscape feature at a local feature level.
<b>Naturalness</b> Natural features and landscapes appear largely uncompromised by modification and appear to comprise natural systems that are functional and healthy.	M	Appearance of natural functioning and healthy hydrological system at springhead with weed management required along the discharge stream channel (exotic oxygen weed infestation).
<b>Intactness</b> Natural systems are intact and aesthetically coherent and do not display significant visual signs of human modification, intervention or manipulation; visually intact and highly aesthetic natural landscapes.	M	Largely unmodified and intact with the exception of viewing platforms and tracks to provide public access. Associated landscape is modified as a recreational amenity landscape.
<b>Expressiveness (Legibility)</b>		
Natural features and landscapes clearly demonstrate the natural processes that formed them. Examples of natural process in landscape exemplify the particular processes that formed that landscape.	H	Highly expressive of natural hydrological processes and underground water sources / resources.
<b>Transient Values</b>		
The consistent occurrence of transient features (for example the seasonal flowering of pohutukawa) contributes to the character, qualities and values of the landscape; landscapes are widely recognised for their transient features and the contribution these make to the landscape.	H	Dynamic water movements and flows that contribute to the qualities and values of this feature.
<b>SUMMARY OF LANDSCAPE ASSESSMENT</b>		
<b>Shared and Recognised Values</b> Natural features and landscapes are widely known and valued by the immediate and wider community for their contribution to a sense of place leading to a strong community association with or high public esteem for the place.	H	Outstanding natural feature.
<b>Maori Values</b>		
Natural features and landscapes are clearly special or widely known and influenced by their connection to the Maori values inherent in the place.	M/H	Hamurana Springs and reserve is signposted from both directions on Hamurana Road by the Department of Conservation (DoC) signs. The stream itself is not obvious. The area is not well recognised or popular in historical published works, art or used in iconic images in marketing.
<b>Historical Associations</b>		
Natural features and landscapes are clearly and widely known and influenced by their connection to the historical values inherent in the place.	M	2 recorded pa and one midden. No known historical associations.
<b>OVERALL ASSESSMENT</b>		
	M	Fresh water spring and associated amenity landscape representative of wider hydrological processes that influence Lake Rotorua.



<b>ONFL name : Hamurana Caldera Rim</b>	
<b>Description:</b> Steep sided partially vegetated caldera scarp dissected by incised overland flow paths draining toward the Lake	
<b>CRITERIA</b>	<b>RANKING COMMENT</b>
<b>Natural Science Factors</b>	
<b>Representativeness</b> Natural features and landscapes are clearly and recognisably characteristic of the area, district or region. The key components of the landscape will be present in a way that more generally defines the character of the place, but which distils this character and essence.	<b>H</b> Representative sample landscape of the Rotorua caldera rim feature that is clearly recognisable as being characteristic of the wider caldera slopes defining the Lake Rotorua volcanic basin. A key component that contributes to the visual containment of the Lake and inland lowland surrounds.
Natural features in a good state of preservation are representative and characteristic of the natural geological processes and diversity of the region.	<b>H</b> Relatively unmodified section of the landform feature with areas of intact indigenous vegetation. Highly representative of geological processes. Limited built form evident in association with land use modification.
<b>Research and Education</b> Natural features and landscapes are valued for the contribution they make to research and education.	<b>M</b> Moderate value in relation to understanding wider natural processes of the Lake catchment and the formation (volcanic explosion crater) of the caldera and Lake Rotorua.
<b>Rarity</b> Natural features are unique or rare in the region or nationally, and few comparable examples exist.	<b>M</b> Not unique but a good representative example.
<b>Aesthetic Values</b>	
<b>Coherence</b> The patterns of land cover and land use are largely in harmony with the underlying natural pattern of the landform of the area and there are no significant discordant elements of land cover or land use.	<b>M</b> Coherence of landform strongest representative feature with some variations in land cover from indigenous to exotic (forestry) introducing limited discordant elements.
<b>Vividness</b> Natural features and landscapes are widely recognised across the community and beyond the local area and remain clearly in the memory; striking landscapes are symbolic of an area due to their recognisable and memorable qualities.	<b>H</b> Widely recognisable and symbolic of the wider caldera landform – especially when viewed from a distance.
<b>Naturalness</b> Natural features and landscapes appear largely uncompromised by modification and appear to comprise natural systems that are functional and healthy.	<b>M</b> Steep scarp slopes relatively unmodified by built form. Modified by production forestry in parts.
<b>Intactness</b> Natural systems are intact and aesthetically coherent and do not display significant visual signs of human modification, intervention or manipulation; visually intact and highly aesthetic natural landscapes.	<b>M</b> Highly coherent in terms of landform with contrasting variations of land cover.
<b>Expressiveness (Legibility)</b>	
Natural features and landscapes clearly demonstrate the natural processes that formed them. Examples of natural process in landscape exemplify the particular processes that formed that landscape.	<b>H</b> Highly expressive of underlying volcanic and geological processes that characterise Rotorua caldera and Lake.
<b>Transient Values</b>	
The consistent occurrence of transient features (for example the seasonal flowering of pohutukawa) contributes to the character, qualities and values of the landscape; landscapes are widely recognised for their transient features and the contribution these make to the landscape.	<b>L</b> Transient values not significant.
<b>SUMMARY OF LANDSCAPE ASSESSMENT</b>	
<b>Shared and Recognised Values</b>	
Natural features and landscapes are widely known and valued by the immediate and wider community for their contribution to a sense of place leading to a strong community association with or high public esteem for the place.	<b>L/M</b> This landscape is sufficiently well defined to be a recognisable feature within the local community. It is not however signposted or interpreted. It is not apparent in published historical works and art or represented in popularly and widely accessible marketing images.
<b>Maori Values</b>	
Natural features and landscapes are clearly special or widely known and influenced by their connection to the Maori values inherent in the place.	<b>M</b> The 'Te Kurapa' range of hills include the pa, Te Rangiwahakairo and urupa Orangikahui.
<b>Historical Associations</b>	
Natural features and landscapes are clearly and widely known and influenced by their connection to the historical values inherent in the place.	<b>L</b> No known historical associations.
<b>OVERALL ASSESSMENT</b>	
	<b>H</b> Representative area of steep caldera rim scarp that defines the wider topographic feature of the Lake Rotorua caldera that surrounds the Lake.

ONFL name: Mount Ngongotaha		
Description: Steep volcanic intrusion (cone) feature of rhyolite dome complex formed after the Rotorua eruption rising from the caldera floor		
CRITERIA	RANKING	COMMENT
<b>Natural Science Factors</b>		
<b>Representativeness</b> Natural features and landscapes are clearly and recognisably characteristic of the area, district or region. The key components of the landscape will be present in a way that more generally defines the character of the place, but which distils this character and essence.	H	Key component of the Rotorua landscape that is recognisably characteristic of the district and local area.
Natural features in a good state of preservation are representative and characteristic of the natural geological processes and diversity of the region.	H	Highly representative of volcanic geological processes. Associated intact indigenous vegetation expressive of original landcover.
<b>Research and Education</b> Natural features and landscapes are valued for the contribution they make to research and education.	L/M	
<b>Rarity</b> Natural features are unique or rare in the region or nationally, and few comparable examples exist.	L/M	Distinctive in terms of location to urban development and relationship with Lake, caldera floor and surrounding production landscapes.
<b>Aesthetic Values</b>		
<b>Coherence</b> The patterns of land cover and land use are largely in harmony with the underlying natural pattern of the landform of the area and there are no significant discordant elements of land cover or land use.	M	Variations in landform and landcover are evident over the extent of Ngongotaha with the greatest coherence of landcover, land use and underlying landform being evident in the south west in relation to existing DoC reserve land.
<b>Vividness</b> Natural features and landscapes are widely recognised across the community and beyond the local area and remain clearly in the memory; striking landscapes are symbolic of an area due to their recognisable and memorable qualities.	H	Highly recognisable across the community and beyond, and contributes to volcanic landscape character. Forms an important landform backdrop to the urban area.
<b>Naturalness</b> Natural features and landscapes appear largely uncompromised by modification and appear to comprise natural systems that are functional and healthy.	M	Reserve land areas exhibit high naturalness with current management relating to conservation and public access. Some modification has occurred to parts of the landform and landcover.
<b>Intactness</b> Natural systems are intact and aesthetically coherent and do not display significant visual signs of human modification, intervention or manipulation; visually intact and highly aesthetic natural landscapes.	M	Conservation management areas exhibit a high degree of intactness. Other areas are more modified particularly in terms of landcover.
<b>Expressiveness (Legibility)</b>		
Natural features and landscapes clearly demonstrate the natural processes that formed them. Examples of natural process in landscape exemplify the particular processes that formed that landscape.	H	Highly expressive of underlying natural processes a very good example of a particular geomorphologic process.
<b>Transient Values</b>		
The consistent occurrence of transient features (for example the seasonal flowering of pohutukawa) contributes to the character, qualities and values of the landscape; landscapes are widely recognised for their transient features and the contribution these make to the landscape.	L	Transient values not significant.
<b>SUMMARY OF LANDSCAPE ASSESSMENT</b>		
<b>Shared and Recognised Values</b>		
Natural features and landscapes are widely known and valued by the immediate and wider community for their contribution to a sense of place leading to a strong community association with or high public esteem for the place.	M	Ngongotaha is a dominant landscape feature in the Rotorua catchment that can be seen from most vantage points near and around Lake Rotorua. The lower slopes are a popular tourist / recreation destination.
<b>Maori Values</b>		
Natural features and landscapes are clearly special or widely known and influenced by their connection to the Maori values inherent in the place.	H	Ngongotaha features in early traditions of Rotorua through association with occupying Patupaiaruhe and later Ihenga of Te Arawa. Its lower slopes have pa, settlements, urupa and important resources such as springs. Ngongotaha is revered as an ancestral maunga (mountain) by many of the resident hapu of Te Arawa.
<b>Historical Associations</b>		
Natural features and landscapes are clearly and widely known and influenced by their connection to the historical values inherent in the place.	L	Historical associations are not significant, although tourism activities have been present for some time.
<b>OVERALL ASSESSMENT</b>		
	H	Characteristic volcanic dome feature and steep vegetated landscape that defines the wider underlying geological processes within the Lake catchment.

<b>ONFL name : Mokoia Island</b>	
<b>Description: Lake bound rhyolite dome island predominantly in indigenous vegetation cover</b>	
<b>CRITERIA</b>	<b>RANKING COMMENT</b>
<b>Natural Science Factors</b>	
<b>Representativeness</b> Natural features and landscapes are clearly and recognisably characteristic of the area, district or region. The key components of the landscape will be present in a way that more generally defines the character of the place, but which distils this character and essence.	H Clearly recognisable landscape feature in association with the open water body of the Lake. The island is a key landscape element that provides a focal point for views of Lake Rotorua.
Natural features in a good state of preservation are representative and characteristic of the natural geological processes and diversity of the region.	H Highly representative of wider geological processes in relation to the formation of Lake Rotorua and the caldera basin.
<b>Research and Education</b> Natural features and landscapes are valued for the contribution they make to research and education.	H/M Opportunities in relation to conservation management as well as predator and pest control.
<b>Rarity</b> Natural features are unique or rare in the region or nationally, and few comparable examples exist.	H Highly distinctive and rare within the district and region.
<b>Aesthetic Values</b>	
<b>Coherence</b> The patterns of land cover and land use are largely in harmony with the underlying natural pattern of the landform of the area and there are no significant discordant elements of land cover or land use.	H Highly coherent in relation to landcover and underlying landform.
<b>Vividness</b> Natural features and landscapes are widely recognised across the community and beyond the local area and remain clearly in the memory; striking landscapes are symbolic of an area due to their recognisable and memorable qualities.	H Symbolic, recognisable and memorable landscape element. The island is a feature of views across the lake and contributes to the vividness and memorability of the Lake and island as a joint composition.
<b>Naturalness</b> Natural features and landscapes appear largely uncompromised by modification and appear to comprise natural systems that are functional and healthy.	H While past modification has occurred current indigenous land cover is largely uncompromised.
<b>Intactness</b> Natural systems are intact and aesthetically coherent and do not display significant visual signs of human modification, intervention or manipulation; visually intact and highly aesthetic natural landscapes.	H Very limited modification associated with the eastern shore.
<b>Expressiveness (Legibility)</b>	
Natural features and landscapes clearly demonstrate the natural processes that formed them. Examples of natural process in landscape exemplify the particular processes that formed that landscape.	H Highly expressive volcanic feature that contributes to the volcanic character of the region.
<b>Transient Values</b>	
The consistent occurrence of transient features (for example the seasonal flowering of pohutukawa) contributes to the character, qualities and values of the landscape; landscapes are widely recognised for their transient features and the contribution these make to the landscape.	H Transient values associated with avifauna and wildlife refuge.
<b>SUMMARY OF LANDSCAPE ASSESSMENT</b>	
<b>Shared and Recognised Values</b>	
Natural features and landscapes are widely known and valued by the immediate and wider community for their contribution to a sense of place leading to a strong community association with or high public esteem for the place.	H Outstanding natural landscape.
<b>Maori Values</b>	
Natural features and landscapes are clearly special or widely known and influenced by their connection to the Maori values inherent in the place.	H Mokoia has a long tradition and association with Te Arawa hapu. Originally known as Te Motutapu-a-Tinirau named by Ihenga. The island is associated with Uenukukopako and Tutanekai.
<b>Historical Associations</b>	
Natural features and landscapes are clearly and widely known and influenced by their connection to the historical values inherent in the place.	H Mokoia is associated with the arrival of and confrontation with Ngapuhi war chief Hongi Hika. The well known story of Hinemoa and Tutanekai has inspired many love songs in New Zealand and supports the tourism industry of Rotorua. There are 13 recorded pa, rock carvings, a bathing pool and a walking track on the island.
<b>OVERALL ASSESSMENT</b>	
	H Mokoia Island is a defining landscape feature and vegetated island landscape. It forms a key component of the Lake Rotorua landscape and is of high cultural and historical significance.



APPENDIX 1: STUDY AREA RESOURCE MAP BOOK

WEB VERSION

### **Landscape Type and Character Area Definitions**

**Map 1:** Landscape Types and landscape Character Areas

### **Natural and Physical Resources**

**Map 2:** NZMS 260 Topographic Series

**Map 3:** Aerial Photography

**Map 4:** Elevation

**Map 5:** Underlying Geology (New Zealand Land Resource Inventory)

**Map 6:** River Environments Classifications of New Zealand (NIWA)

**Map 7:** Land Cover Data Base (Landcare research)

### **Landscape Assets**

**Map 8:** Land Use Capability Units (Landcare research) (see Appendix 2 for an explanation of Land Use Capability)

**Map 9:** Archaeological Sites and Geopreservation sites and QEII Covenants

**Map 10:** Department of Conservation Reserves

**Map 11:** Rotorua District Council Zoning including Reserve A and Reserve B zones

**Map 12:** Cultural Landscapes (Boffa Miskell 2007)

**Map 13:** Outstanding Natural Features and Landscapes

## Landscape Types (11) and Landscape Character Areas (38)

### 19.0 Lake Rotorua and Margins

- 19.1 Hamurana East
- 19.2 Mourea / Okawa Bay
- 19.3 Pohue Bay
- 19.4 Te Hgae
- 19.5 Hannahs Bay
- 19.6 Ngapuna
- 19.7 Ohinemutu / Kawaha Point
- 19.8 Waikuta
- 19.9 Ngongotaha Lakeside
- 19.10 Awahou
- 19.11 Hamurana West
- 19.12 Mokoia Island
- 19.13 Lake Rotorua Waters

### 20.0 Urban Rotorua and Settlements

- 20.1 Rotorua City & Suburbs
- 20.2 North-western Suburbs
- 20.3 South-western Suburbs
- 20.4 Whakarewarewa
- 20.5 South-eastern Suburbs

### 21.0 Northern Caldera

- 21.1 Te Waerenga
- 21.2 Northern Caldera Scarp
- 21.3 Mourea Hill

### 22.0 Mamaku Plateau North

- 22.1 Mamaku Township
- 22.2 Mamaku Rural

### 23.0 Mamaku Plateau South

- 23.1 Mamaku Forestlands
- 24.0 Western Rural
- 24.1 Hamurana North
- 24.2 Lower Plateau Slopes
- 24.3 Tarukenga East

### 25.0 Eastern Rural Terrace

- 25.1 Easter Rural Terrace

### 26.0 Eastern Rural Hills

- 26.1 Eastern Rural Hills

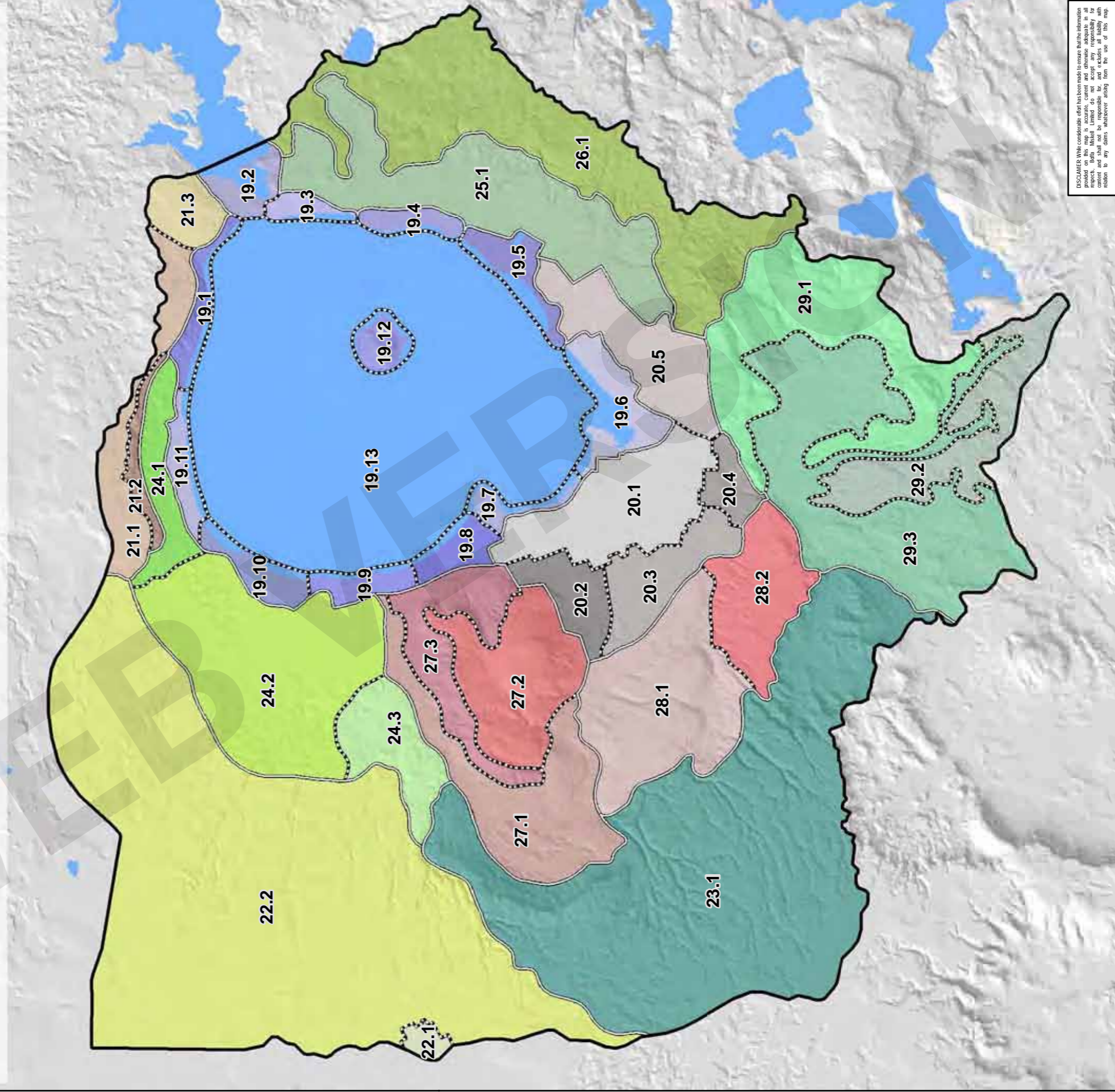
### 27.0 Mount Ngongotaha

- 27.1 Ngongotaha Valley
- 27.2 Ngongotaha Domes
- 27.3 Ngongotaha Scarp & Lower Slopes

### 28.0 Utuhina Hills

- 28.1 Pukehangi
- 28.2 Tihi-o-tonga
- 29.0 Puarenga Valley
- 29.1 Waipa Hills
- 29.2 Western Kauaka Valley Hills
- 29.3 Rural Valleys

Note: The numbering of these landscape types and landscape characteristics follows on from the southern rural areas landscape assessment.

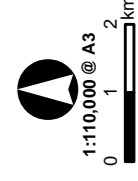


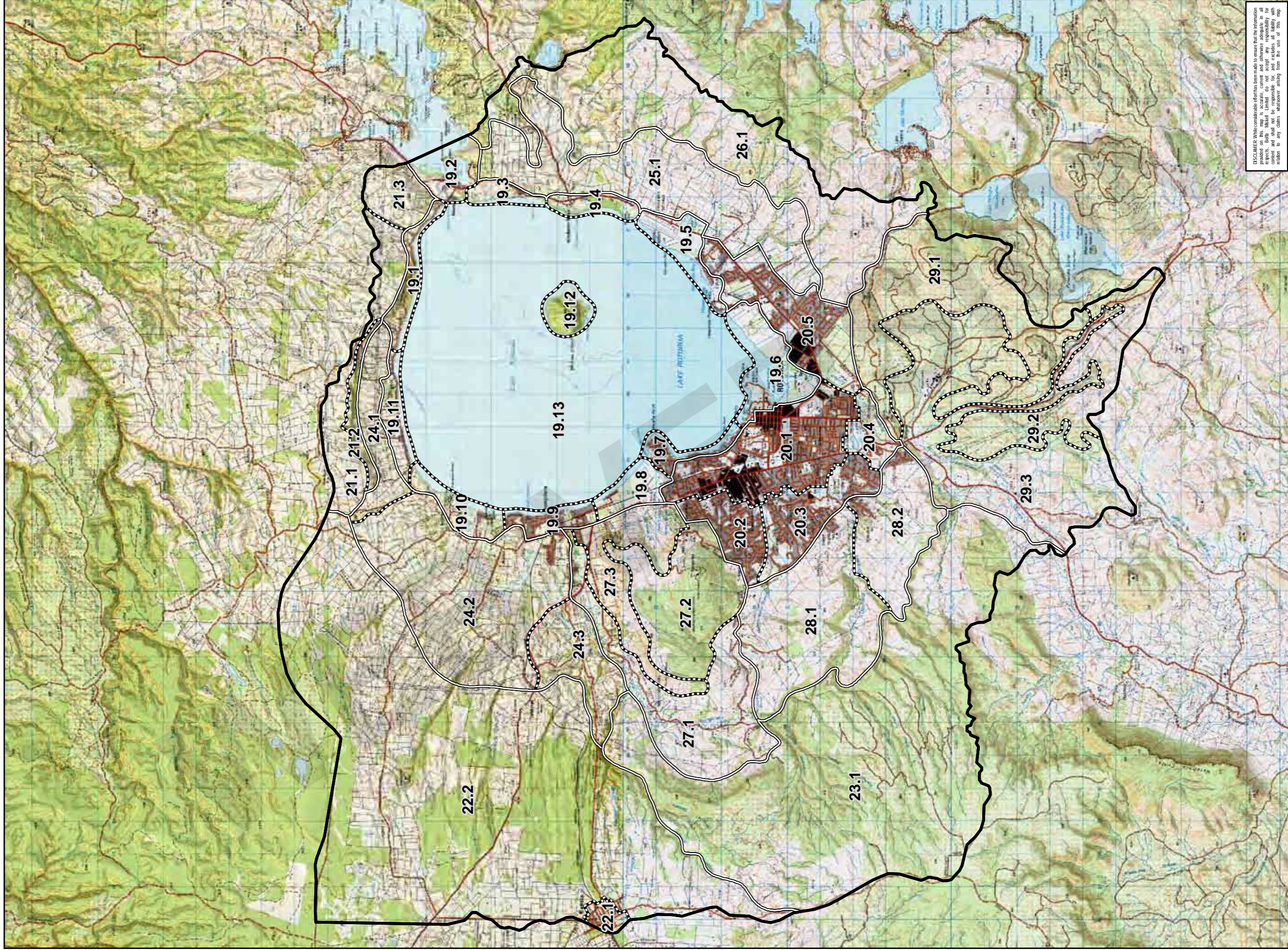
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Map 1. Landscape Types and Landscape Character Areas

- Study Area Boundary
- Landscape Character Area
- Lakes

Date: February, 2009 Data Sources: Boffa Miskell Ltd, Land Information New Zealand (LINZ) lakes  
 File: U:\Auckland\2005\T05132\_JM\_Rotorua Catchment\landscape Assessment\GIS\Maps\Map\_Book\T05132\_Map\_1\_20090223.mxd



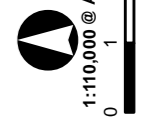


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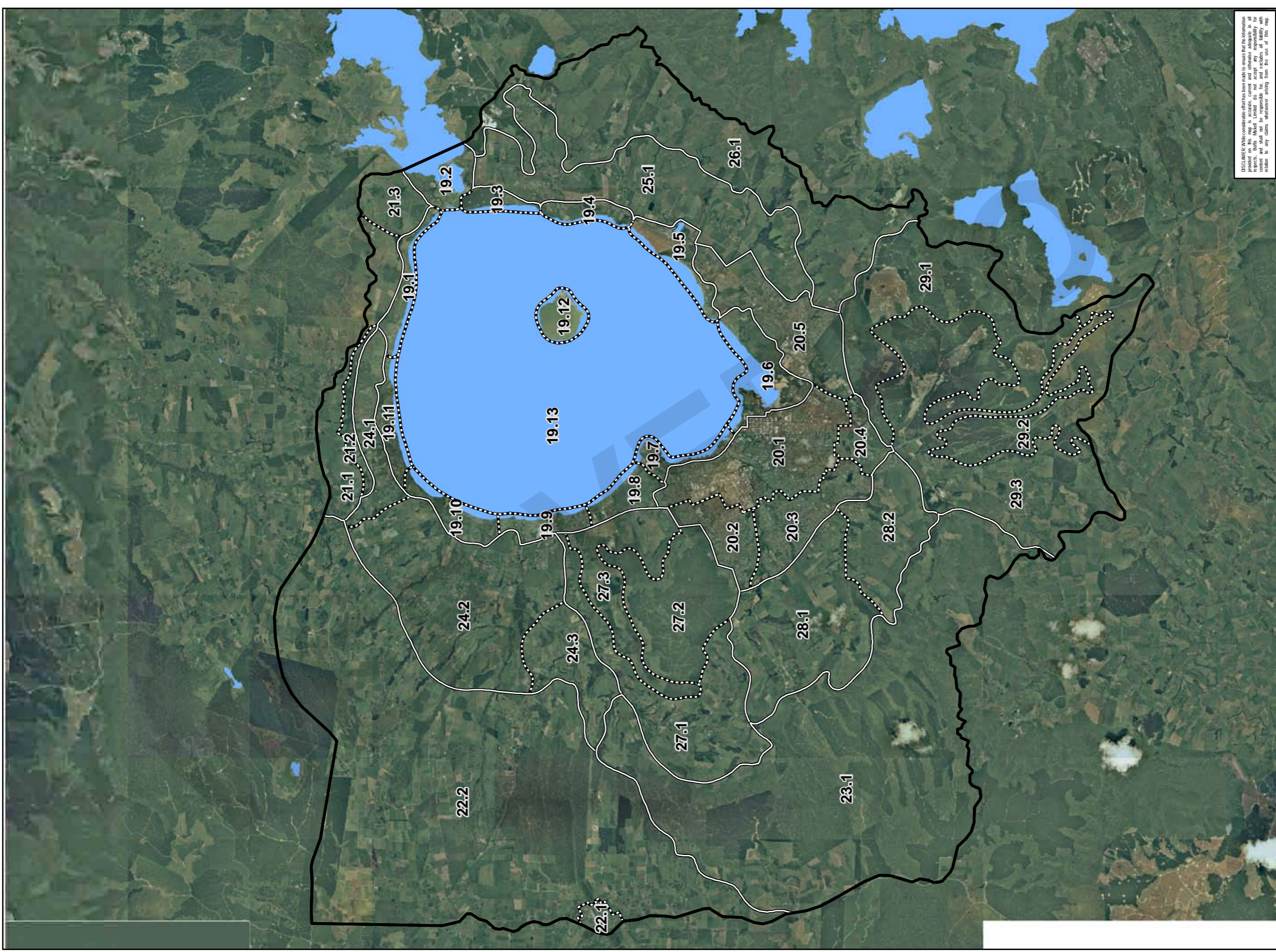
**Map 2. NZMS260 Topographic Series**

-  Study Area Boundary
-  Landscape Character Area
-  Landscape Type

Date: February 2009 Data Sources: Boffa Miskell Ltd, Land Information New Zealand (LINZ) New Zealand Map Series 260 (NZMS260)  
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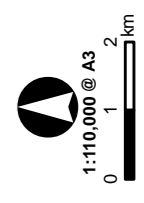


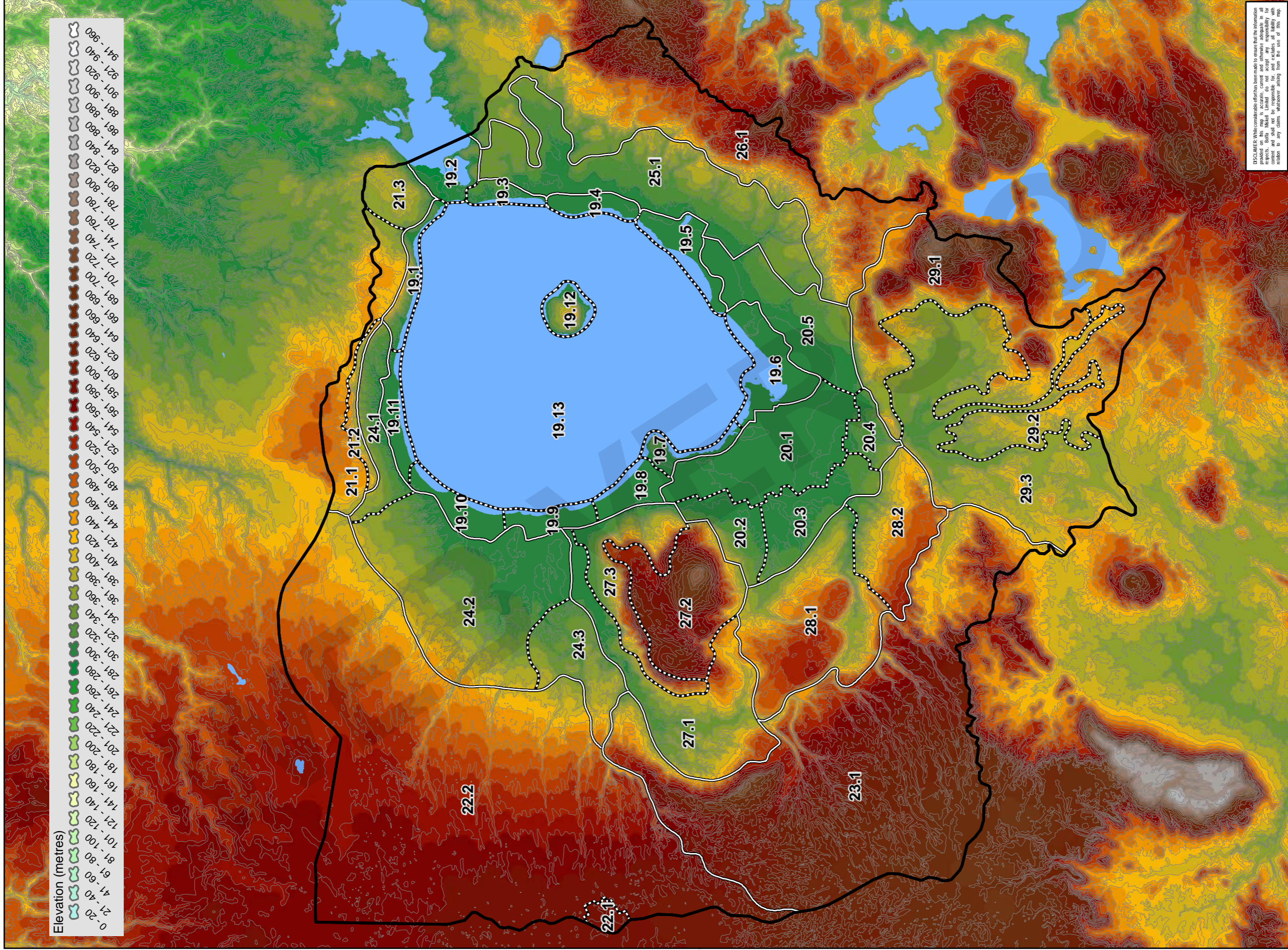
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### Map 3. Aerial Photography

-  Study Area Boundary
-  Landscape Character Area
-  Lakes

Date: February 2009 Data Sources: Boffa Miskell Ltd, Rotorua District Council 2006 ortho-rectified aerial photography  
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Elevation (metres)

0 - 20  
21 - 40  
41 - 60  
61 - 80  
81 - 100  
101 - 120  
121 - 140  
141 - 160  
161 - 180  
181 - 200  
201 - 220  
221 - 240  
241 - 260  
261 - 280  
281 - 300  
301 - 320  
321 - 340  
341 - 360  
361 - 380  
381 - 400  
401 - 420  
421 - 440  
441 - 460  
461 - 480  
481 - 500  
501 - 520  
521 - 540  
541 - 560  
561 - 580  
581 - 600  
601 - 620  
621 - 640  
641 - 660  
661 - 680  
681 - 700  
701 - 720  
721 - 740  
741 - 760  
761 - 780  
781 - 800  
801 - 820  
821 - 840  
841 - 860  
861 - 880  
881 - 900  
901 - 920  
921 - 940  
941 - 960  
961 - 980








**Map 4. Elevation**

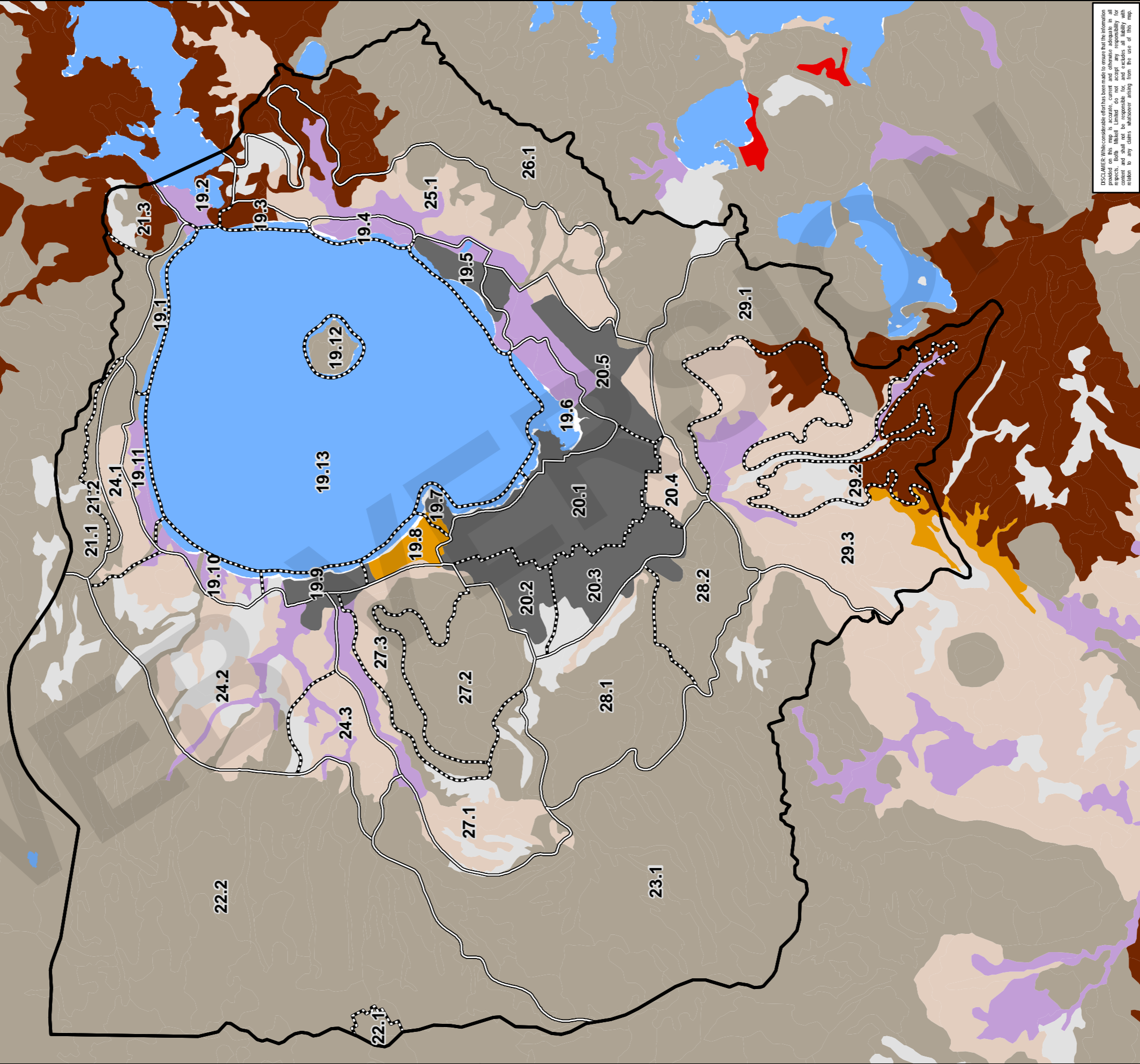
 Study Area Boundary 
  Landscape Character Area 
  20m contours 
  Lakes

Date: February 2009 Data Sources: Boffa Miskell Ltd, Land Information New Zealand (LINZ) lakes & 20m contours (elevation derived from 20m contours)  
 File: U:\Auckland\2005\T05132\_M\_Rotorua Catchment landscape Assessment\GIS\Maps\Map\_Book\T05132\_Map\_4\_20090211.mxd

 1:110,000 @ A3  
 0 1 2 km

**Baserock**

-  Lavas, Ignimbrites and Other 'Hard' Volcanic Rocks
-  Breccias Older Than Taupo Breccia
-  Unconsolidated to Moderately Consolidated Clays, Silts, Sands, Tephra and Breccias
-  Ashes Older Than Taupo Pumice
-  Peat
-  Rotomahana Mud
-  Taupo and Kaharoa Breccia and Volcanic Alluvium
-  Urban Area



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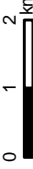
**Map 5. Underlying Geology**

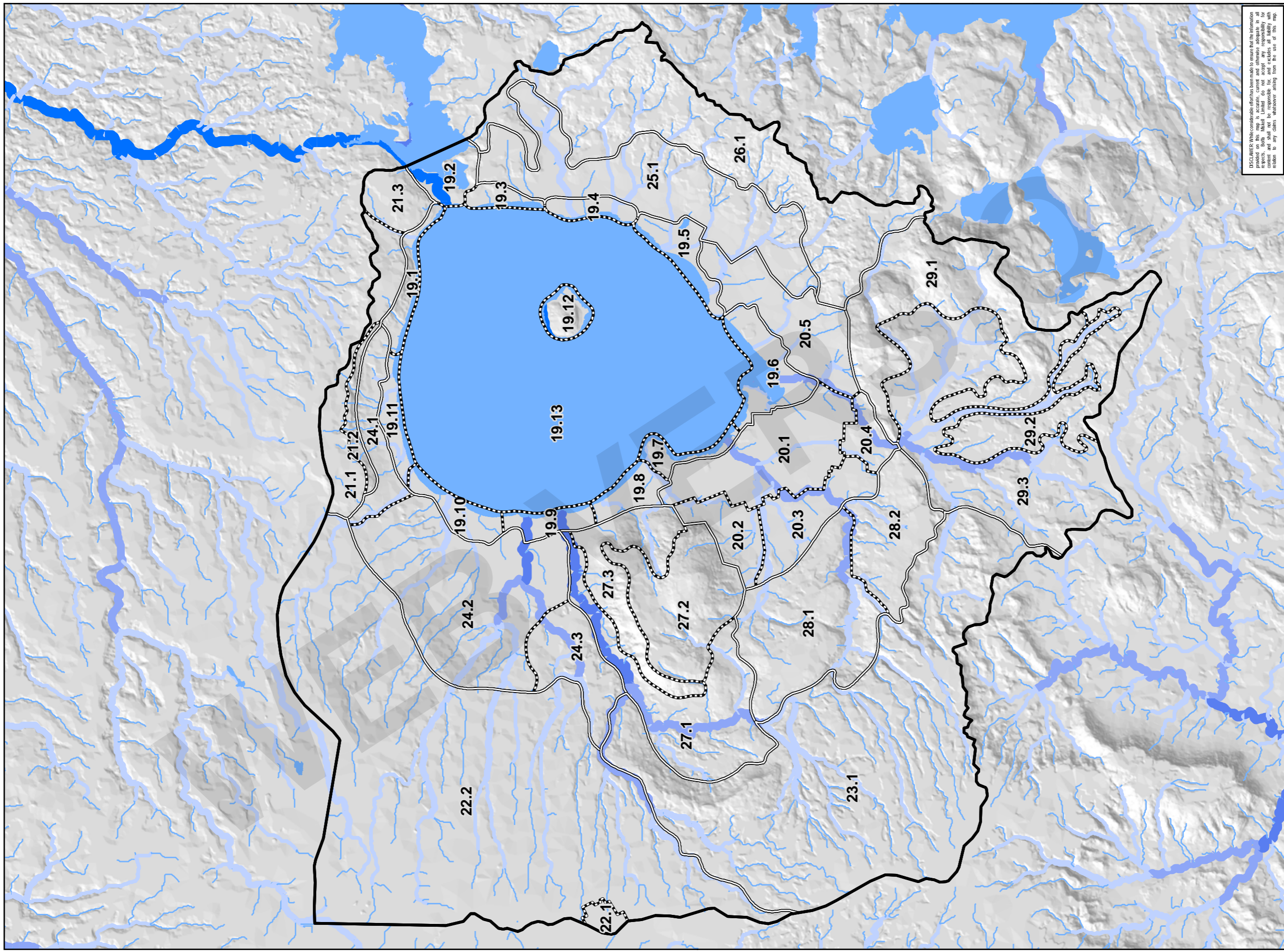
-  Study Area Boundary
-  Landscape Character Area
-  Lakes

Date: February 2009 Data Sources: Boffa Miskell Ltd, Landcare Research Ltd, New Zealand Land Resource Inventory (NZLRI) base rock data  
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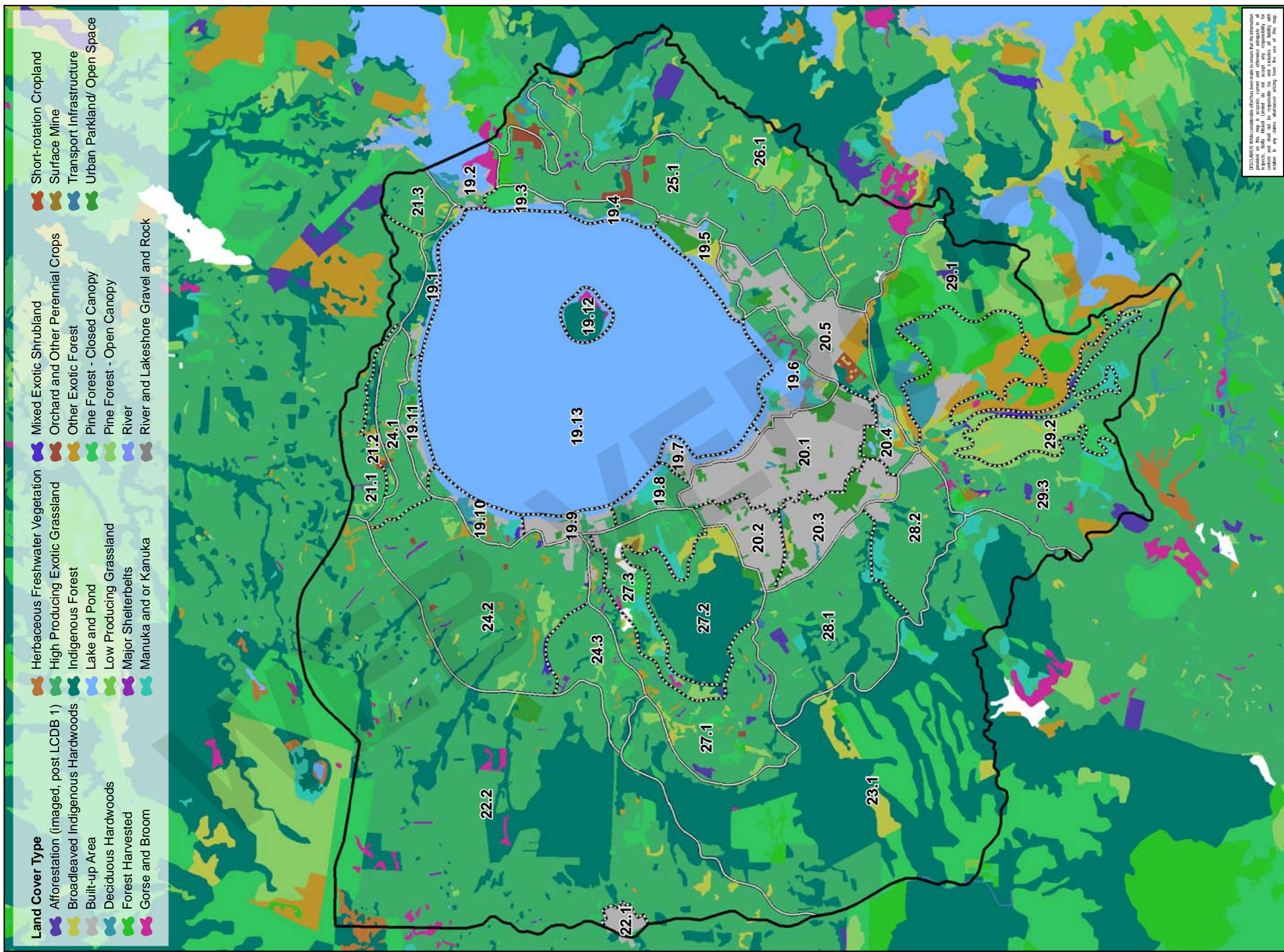
**Map 6. River Environment Classification of New Zealand**

- Study Area Boundary
- Landscape Character Area
- Stream Order
- Lakes

Date: February 2009 Data Sources: Boffa Miskell Ltd, Land Information New Zealand (LINZ) lakes; National Institute of Water and Atmospheric Research (NIWA) River Environment Classification dataset, 2004  
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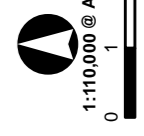


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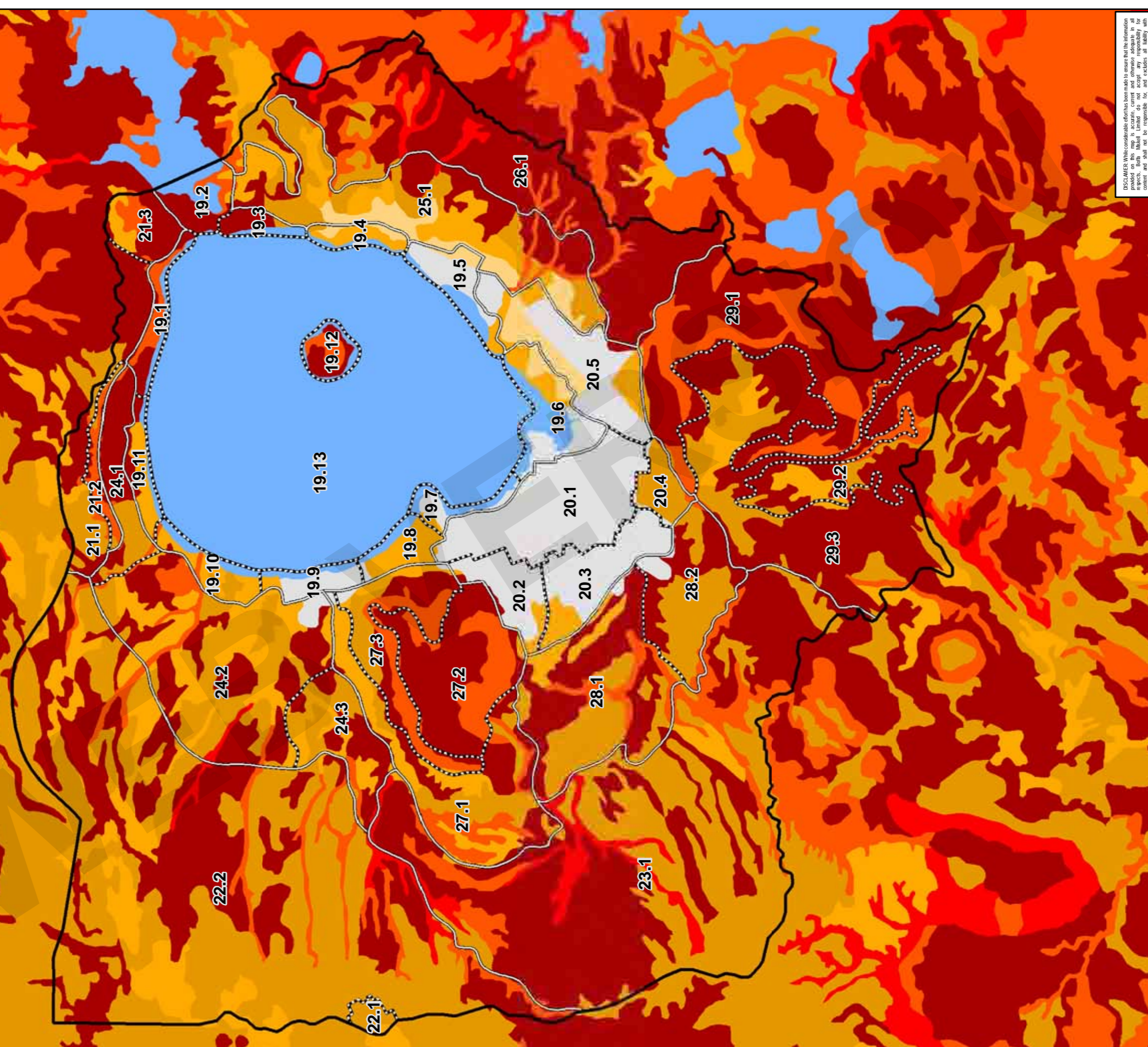
**Map 7. Land Cover**

Study Area Boundary  
Landscape Character Area  
Landscape Type

Date: February 2009 Data Sources: Boffa Miskell Ltd, Land Information New Zealand (LINZ) lakes, Landcare Research Ltd, Land Cover Database 2 (LCDB2)  
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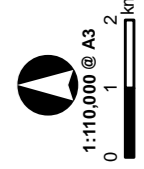
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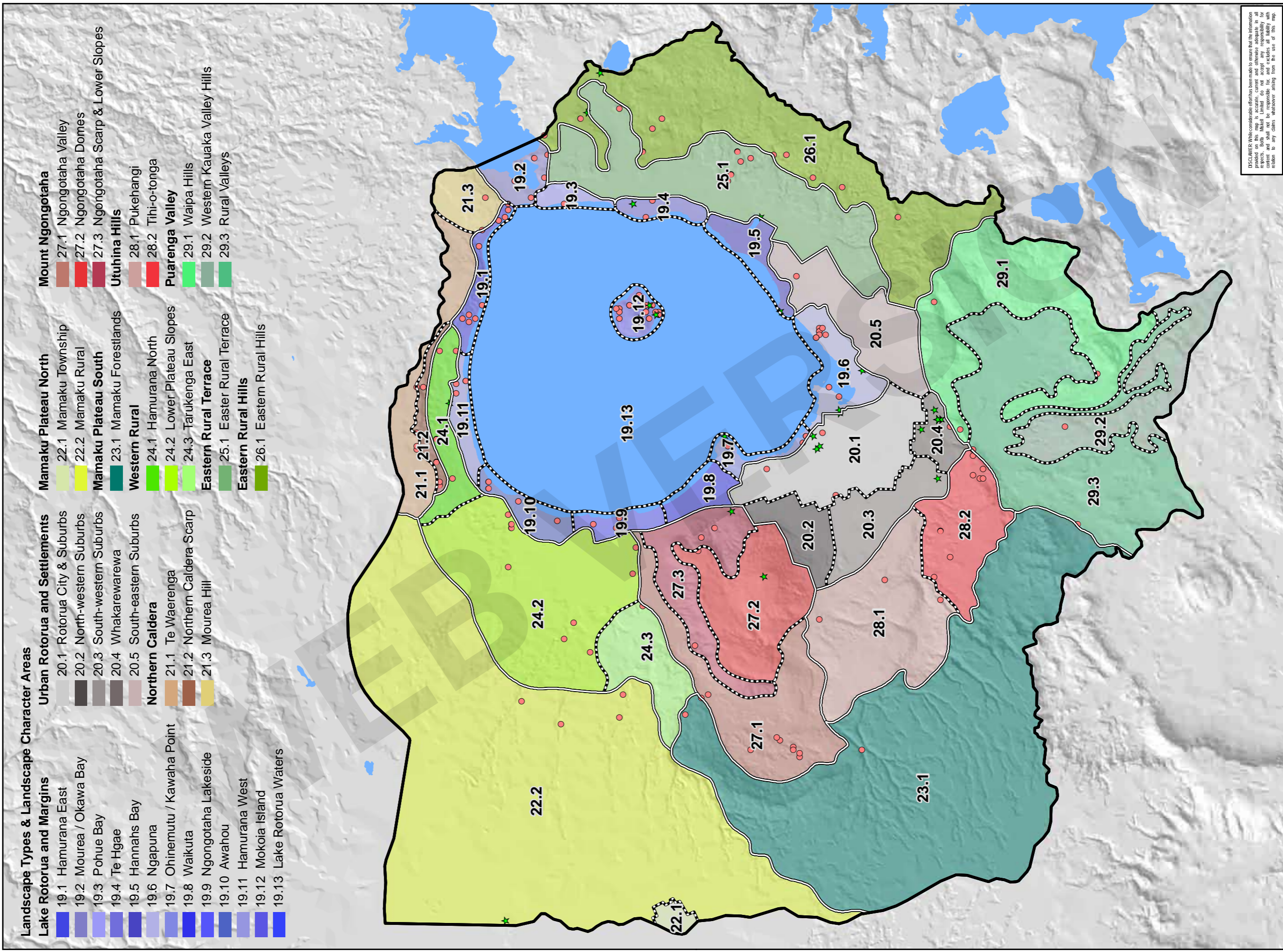


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**Map 8. Land Use Capability**

Study Area Boundary Landscape Character Area   
 Landscape Type   
 Date: February 2009 Data Sources: Boffa Miskell Ltd, Land Information New Zealand (LINZ) lakes, Landcare Research Ltd, Land Use Capability (LUC) as part of the New Zealand Land Resource Inventory (NZLRI) dataset  
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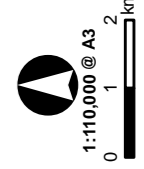


- Landscape Types & Landscape Character Areas**
- Lake Rotorua and Margins**
    - 19.1 Hamurana East
    - 19.2 Mourea / Okawa Bay
    - 19.3 Pohue Bay
    - 19.4 Te Hgae
    - 19.5 Hannahs Bay
    - 19.6 Ngapuna
    - 19.7 Ohinemutu / Kawaha Point
    - 19.8 Waikuta
    - 19.9 Ngongotaha Lakeside
    - 19.10 Awahou
    - 19.11 Hamurana West
    - 19.12 Mokoia Island
    - 19.13 Lake Rotorua Waters
  - Urban Rotorua and Settlements**
    - 20.1 Rotorua City & Suburbs
    - 20.2 North-western Suburbs
    - 20.3 South-western Suburbs
    - 20.4 Whakarewarewa
    - 20.5 South-eastern Suburbs
  - Northern Caldera**
    - 21.1 Te Waerenga
    - 21.2 Northern Caldera Scarp
    - 21.3 Mourea Hill
  - Mamaku Plateau North**
    - 22.1 Mamaku Township
    - 22.2 Mamaku Rural
  - Mamaku Plateau South**
    - 23.1 Mamaku Forestlands
  - Western Rural**
    - 24.1 Hamurana North
    - 24.2 Lower Plateau Slopes
    - 24.3 Tarukenga East
  - Eastern Rural Terrace**
    - 25.1 Easter Rural Terrace
  - Eastern Rural Hills**
    - 26.1 Eastern Rural Hills
  - Mount Ngongotaha**
    - 27.1 Ngongotaha Valley
    - 27.2 Ngongotaha Domes
    - 27.3 Ngongotaha Scarp & Lower Slopes
  - Utuhina Hills**
    - 28.1 Pukehangi
    - 28.2 Thi-o-tonga
  - Puarenga Valley**
    - 29.1 Waipa Hills
    - 29.2 Western Kauaka Valley Hills
    - 29.3 Rural Valleys

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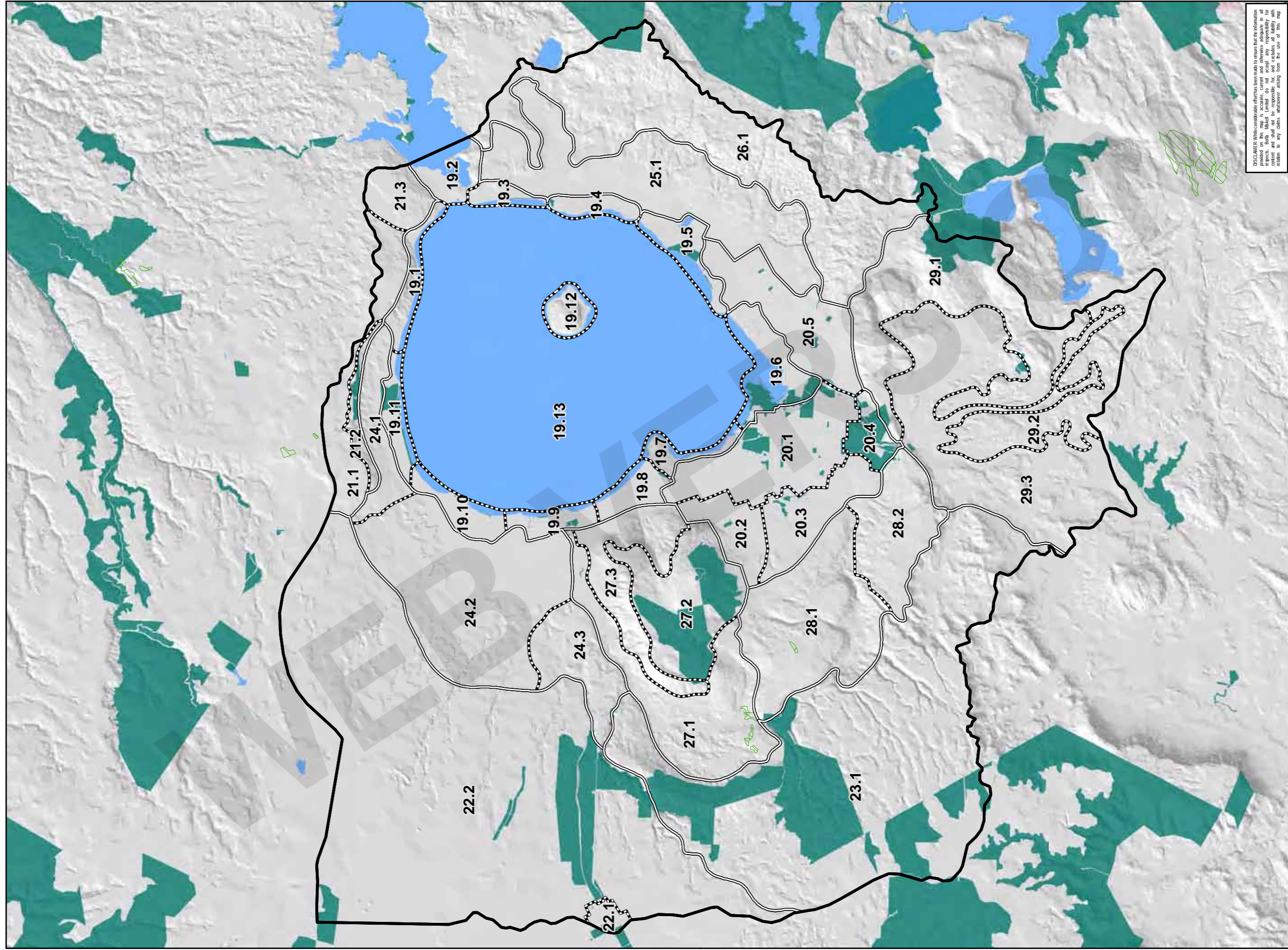
**Map 9. Archaeological and Geopreservation Sites**

- Study Area Boundary
- Landscape Character Area
- Geopreservation Sites
- Archaeological Sites
- Lakes



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Date: February 2009 Data Sources: Boffa Miskell Ltd, Land Information New Zealand (LINZ) lakes, Rotorua District Council Geopreservation Sites, New Zealand Archaeological Association (NZAA) Central Index of New Zealand Archaeological Sites (CINZAS)  
 File: U:\Auckland\2005\T05132\_JM\_Rotorua Catchment landscape Assessment\GIS\Maps\Map Book\T05132\_Map\_9\_20090211.mxd

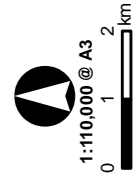


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**Map 10. Department of Conservation Units and QEII Covenants**

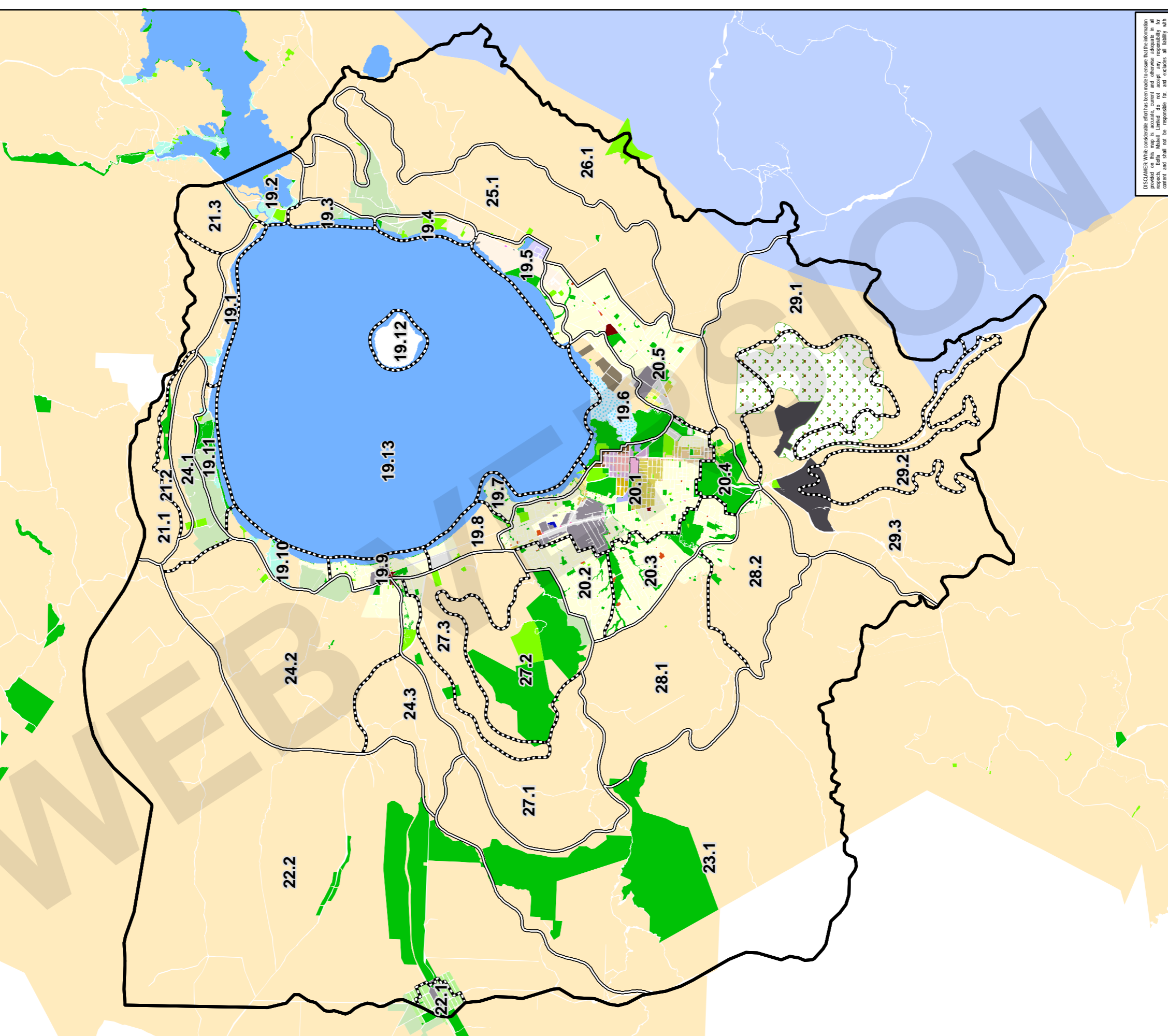
-  Study Area Boundary
-  Landscape Character Area
-  Landscape Type
-  Department of Conservation Units
-  QEII Covenants

Date: February 2009 Data Sources: Boffa Miskell Ltd, Land Information New Zealand (LINZ) lakes, Department of Conservation (DOC) Units, Queen Elizabeth II (QEII) Trust Covenants  
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- Rotorua District Plan Zones**
- Rural B1 (Rural Residential B1)
  - Commercial B1 (CBD Rotorua Central)
  - Airport Protection
  - Commercial A (CBD Core)
  - Commercial B (CBD Fringe)
  - COMMERCIAL B1 (CBD Rotorua Central)
  - Commercial C (Major Urban Centres)
  - Commercial D (Suburban Centres)
  - Commercial E (Service Station)
  - Commercial F (Rural Commercial)
  - Commercial G (Mixed Enterprises Zone)
  - Commercial H (Commerce Park)
  - Industrial A (Light Industrial)
  - Industrial B (General Industrial)
  - Industrial C (Heavy Industrial)
  - Lakes A
  - Reserve A (Public)
  - Reserve B (Private and Community)
  - Residential A (Kainga Maori)
  - Residential B (Low Density)
  - Residential C (High Density)
  - Residential D (Residential/Office)
  - Resort A (CBD)
  - Resort B (Fenton Street)
  - Resort C (Whakarewarewa)
  - Resort D
  - Rural A (General)
  - Rural B (Rural Residential)
  - Rural C (Kaingaroa Papakainga)
  - Rural D (Rural Settlement)
  - Rural E (Lakeside Settlement)
  - Rural F (Spray Irrigation)
  - Transitional Development
  - Water A (Activity)
  - Water B (Conservation)



DISCLAIMER: While reasonable efforts have been made to ensure the accuracy of the information provided on this map, Boffa Miskell does not accept any responsibility for errors or omissions, and shall not be responsible for any claims, damages or losses arising from the use of this map.

**Map 11. Rotorua District Council Zoning**

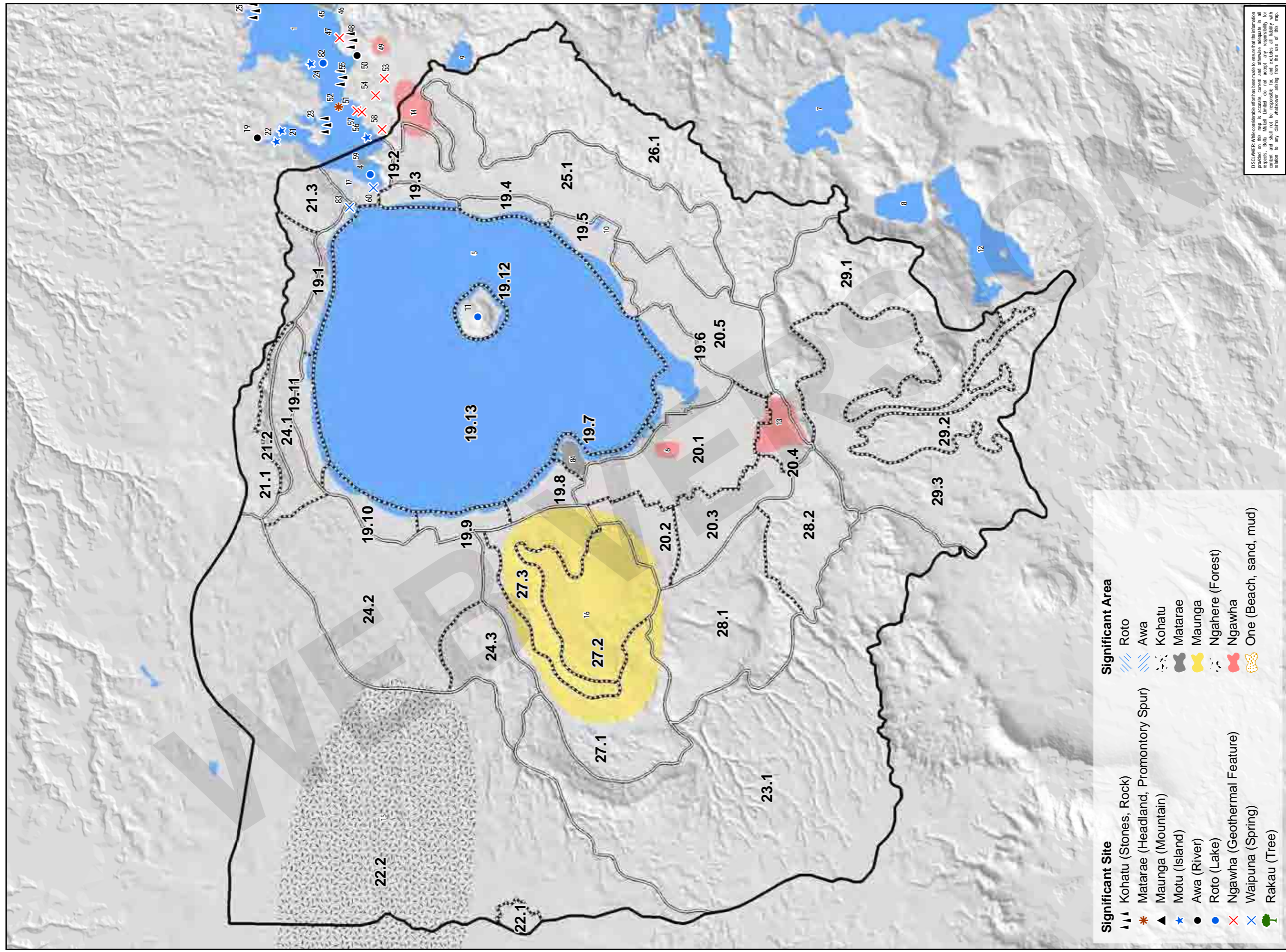
Study Area Boundary Landscape Character Area

Landscape Type

Date: February 2009 Data Sources: Boffa Miskell Ltd, Rotorua District Council Zoning  
 File: U:\Auckland\2005\T05132\_IM\_Rotorua Catchment Landscape Assessment\GIS\Maps\Map Book\T05132\_Map\_11\_20060211.mxd



1:110,000 @ A3  
 0 1 2 Km

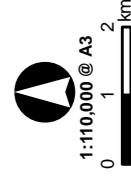


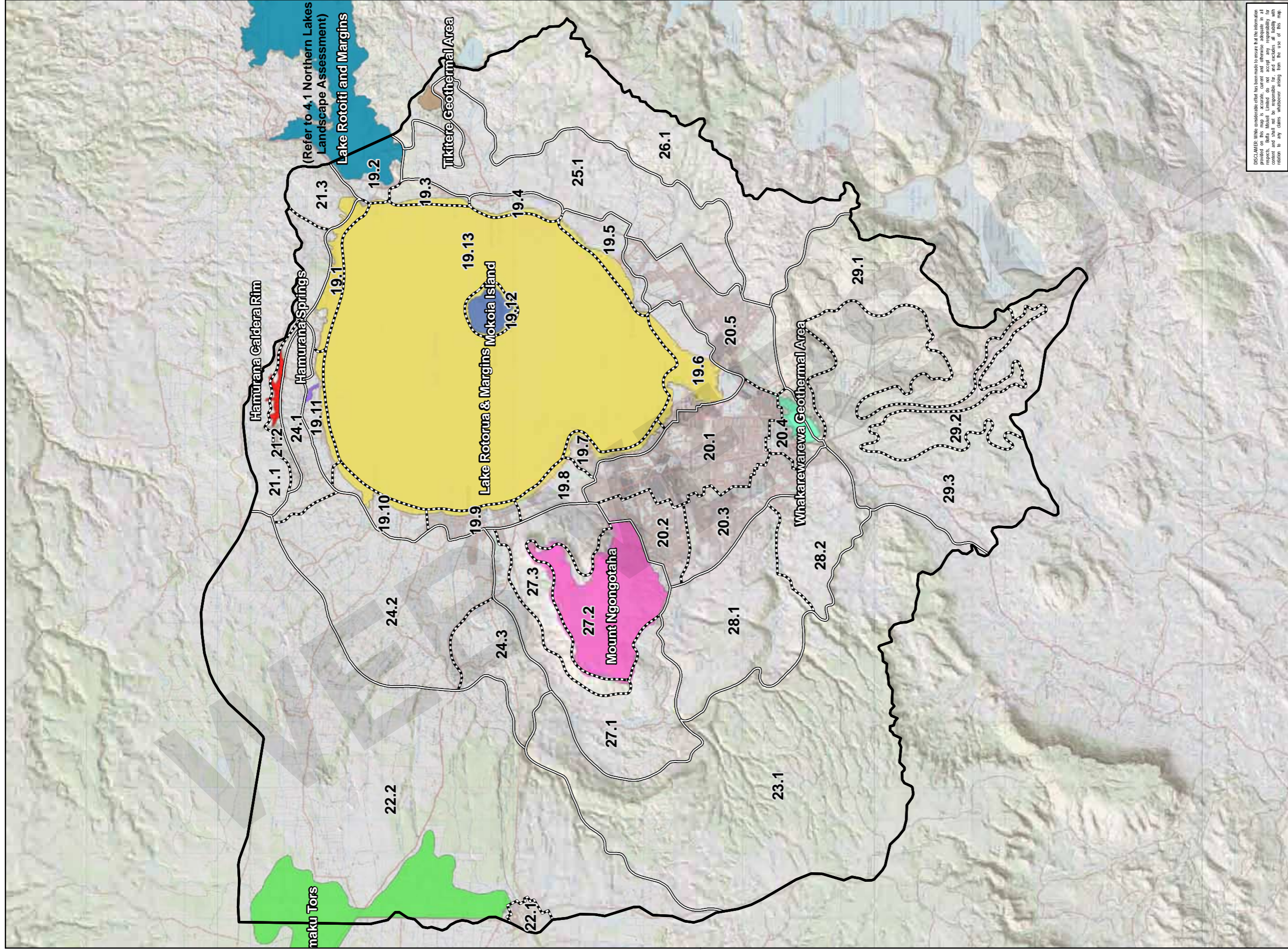
<b>Significant Site</b>	<b>Significant Area</b>
▲▲ Kohatu (Stones, Rock)	▨ Roto
* Matarae (Headland, Promontory Spur)	▨ Awa
▲ Maunga (Mountain)	▨ Kohatu
★ Motu (Island)	▨ Matarae
● Awa (River)	▨ Maunga
● Roto (Lake)	▨ Ngahere (Forest)
× Ngawha (Geothermal Feature)	▨ Ngawha
× Waipuna (Spring)	▨ One (Beach, sand, mud)
● Rakau (Tree)	

**Map 12. Rotorua Cultural Landscapes**

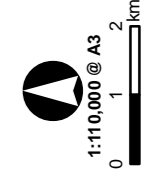
- Study Area Boundary
- Landscape Character Area
- Landscape Type
- Lakes

Date: February 2009 Data Sources: Boffa Miskell Ltd Cultural Landscapes, Land Information New Zealand (LINZ) lakes  
 File: U:\Auckland\2005\T05132\_1M\_Rotorua Catchment Landscape Assessment\GIS\Maps\Map\_Book\T05132\_Map\_12\_20090223.mxd





DISCLAIMER: While every effort has been made to ensure the information provided on this map is accurate, current and otherwise adequate in all respects, Boffa Miskell Limited does not accept any responsibility for any errors or omissions, and shall not be liable for any loss or damage, whether direct or indirect, arising from the use of this map.



Map 13. Outstanding Natural Features and Landscapes

Study Area Boundary Landscape Character Area

Landscape Type

Date: April 2010 Data Sources: Boffa Miskell Ltd Landscape Types & Character Areas, Outstanding Natural Features and Landscapes (ONFL), Land Information New Zealand (LINZ) NZMS260  
File: U:\Auckland\2008\T05132\_JM\_Rotorua Catchment landscape Assessment\GIS\Maps\Map Book\T05132\_Map\_13\_20100416.mxd



APPENDIX 2:

**NEW ZEALAND LAND RESOURCE INVENTORY TERMS AND EXPLANATIONS**

WEB VERSION

## New Zealand Land Resource Inventory (NZLRI)

The NZLRI is a spatial database containing similar information to that in the NZLRI worksheets. There are about 100,000 polygons (map units) within the NZLRI, each of which describes a parcel of land in terms of five characteristics or attributes (rock, soil, slope, erosion, vegetation). These are contained on about 400 worksheets or maps covering the whole of New Zealand. Scientists at Landcare Research are upgrading the vegetation component of the NZLRI using satellite images to identify where changes have occurred during the past 20 years or so. The NZLRI also contains very useful Land Use Capability (LUC) assessments for each of the polygons described.

### Computerised Resource

New Zealand is fortunate in having access to the computerised New Zealand Land Resource Inventory (NZLRI). It is a powerful tool for managing land, planning resource use, or environmental research. The foundation layers of Landcare Research's GIS consist of physical resource information derived from the NZLRI.

### The main features are:

1. An inventory of five physical factors controlling land use—rock, soil, slope, erosion and vegetation
2. Land Use Capability (LUC) assessments. These are shown as map units or land 'parcels' that are essentially uniform with respect to physical characteristics (i.e., the factors described in 1.).
3. Fundamental Data Layers (FDLs) which contain data for 16 key soil attributes for all New Zealand soils.
4. Pastoral and forestry production parameters, plus administrative and natural boundaries.

These allow comparative land use studies within a wide range of national or regional areas.

## Land Use Capability Assessments

In addition to the inventory code described above, each map unit also contains a coded Land Use Capability (LUC) assessment of the land's capacity for sustained productive use taking into account physical limitations, soil conservation needs and management requirements. Land Use Capability assessment, while being extremely versatile in its applications, is only one of many interpretations that could be based on the land inventory information. This assessment should not be confused with recommended land use or present land use. The Land Use Capability assessment has three basic components—class, subclass and unit. Class is the most general, classifying land from I (the most versatile and productive class) to VIII (the class with most limitations to use). Subclass groups units with the same kind of limitation or hazard. Only the dominant limitation is recorded in symbol form on the worksheets, but other limitations are recorded in the land use capability extended legend. The four kinds of limitations recognised are:

1. e erodibility
2. c climate
3. w wetness
4. s soil limitation within the rooting zone

The Unit, which is represented by a number, indicates the particular LUC and denotes similar management and conservation requirements.

## Slope

Slope is expressed in degrees in the following way:

0-3°	Flat to gently undulating
4-7°	Undulating
8-15°	Rolling
16-20°	Strongly rolling
21-25°	Moderately Steep
26-35°	Steep
>35°	Very Steep

Source: <http://www.landcareresearch.co.nz/databases/nzlr.asp>

WEB VERSION



APPENDIX 3: ROTORUA CULTURAL LANDSCAPES



WEB VERSION

The following list of natural features and landscapes of cultural significance to Maori has been sourced from a number of publications, statutory documents, legislation and mapping references. In particular Don Stafford's *Te Arawa* (1967) and *Landmarks of Te Arawa* (1994/1996), *Bateman Historical Atlas* (1997), the *Te Arawa Lakes Settlement Act 2006* and the *Waitangi Tribunal: He Maunga Rongo - Report on Central North Island Claims Wai1200 (2007)* have been used. These areas are mapped and can be found within the Study Area Resource Map Book: Map 12

Consultation with the Te Arawa Lakes Trust, Te Pūmāutanga o Te Arawa, local marae and the Te Arawa Standing Committee of Rotorua District Council, have provided verification, additions and valuable amendments.

The significance of cultural features and landscapes has been determined using a tiered scale of significant, highly significant and outstanding. Significant items have been identified by traditional name and are of local significance. Highly significant items have been identified by name, have an association with local hapu, specific ancestors and important events. Outstanding items are often associated with eponymous ancestors of the iwi and hapu, important to the cultural identity and well-being of the iwi, well known and recognised.

**Key**

- Awa river, stream
- Kohatu rock, outcrop
- Maunga ancestral mountain, peak, range
- Ngawha hot spring or pool
- Roto Lake
- Waipuna freshwater spring

Ref	Traditional Name	Other Name	Category	Rating	Source
1	Te Rotokite a Ihenga i ariki ai Kahu	Te Roto iti kite a Ihenga	Roto	Outstanding	Stafford:1996:139,142, Te Arawa Lakes Settlement Act 2006:Schedule 1 & 4
2	Rotoehu		Roto	Highly Significant	Stafford:1967:56,93,96, Te Arawa Lakes Settlement Act 2006:Schedule 1
3	Rotoma		Roto	Highly Significant	Te Arawa Lakes Settlement Act 2006:Schedule 1, Waitangi Tribunal: He Maunga Rongo - Report on Central North Island Claims (Wai1200):2007:71
4	Okawa	Te wai mimi o Kawatapuurangi	Roto	Highly Significant	Stafford:1996:70,169
5	Te Rotorua nui a Kahumatamomoe	Lake Rotorua	Roto	Outstanding	Stafford:1994:109
6	Kuirau	Taokahu	Ngawha	Highly Significant	Stafford:1994:41
7	Okareka		Roto	Highly Significant	Te Arawa Lakes Settlement Act 2006:Scheldue 3

Ref	Traditional Name	Other Name	Category	Rating	Source
8	Tikitapu	Blue Lake	Roto	Highly Significant	Te Arawa Lakes Settlement Act 2006:Scheldue 1 & 4
9	Rotokawau		Roto	Significant	Stafford:1994:179
10	Rotokawa		Roto	Significant	Stafford:1994:109
11	Te Motutapu a Tinirau	Mokoia	Roto	Outstanding	Stafford:1994:51
12	Rotokakahi	Green Lake	Roto	Highly Significant	
13	Te Whakarewarewatanga o te ope taua a Wahiao	Whakarewarewa	Ngawha	Outstanding	Stafford:1994:148-149
14	Tikitere		Ngawha	Outstanding	Stafford:1994:124-125
15	Mamaku Volcanic Outcrops		Kohatu	Highly Significant	Hui at Parua Marae:2006
16	Ngongotaha		Maunga	Outstanding	Stafford:1967:34-35
17	Ohau		Awa	Highly Significant	Stafford:1996:65
18	Te Tikitiki a Tamiuru		Kohatu	Highly Significant	Stafford: 1996:120,173
19	Okere	Kaituna	Awa	Outstanding	Stafford:1996:70,144
20	Motu a Tara		Motu	Highly Significant	Stafford:1996:52,175
21	Motu o hiwa		Motu	Significant	Stafford:1996:53,144
22	Motutapu		Motu	Significant	Stafford:1996:54, 144
23	Te Upoko o Te Kahu		Kohatu	Significant	Stafford:1996, 124
24	Motumauri		Motu	Significant	Stafford:1996:52,146
25	Te Upoko o Te Rangiwahia		Kohatu	Significant	Stafford:1996:124,148
26	Te Kokopu o te oranga		Rakau	Significant	Stafford:1996:35,149
27	Pararaki		Awa	Significant	Stafford:1996:87,154
28	Te Mokoroa		Matarae	Significant	Stafford:1996:52,154
29	Matawhaura (point)		Maunga	Outstanding	Stafford:1996:49-50,155
30	Matawhaura		Maunga	Outstanding	Stafford:1996:49-50,155
31	Tapuaehearuru		One	Outstanding	Stafford:1996:112-114,156
32	Te Rere a Kupe		Waipuna	Highly Significant	Stafford:1996:99,157
33	Te Pohui o Tawake		Kohatu	Highly Significant	Stafford:1996:89,159
34	Raepahu		Kohatu	Significant	Stafford:1996:97,159
35	Te Korokoro o Ngaki		Waipuna	Significant	Stafford:1996:39,161
36	Oturawaru		Maunga	Significant	Stafford:1996:79,161
37	Ngahainga		Maunga	Significant	Stafford:1996:58,160
38	Pakautara		Awa	Significant	Stafford:1996:83,162
39	Tokopa		Awa	Significant	Stafford:1996:122,162,163
40	Mangakopikopiko		Awa	Significant	Stafford:1996:43,163
41	Pukenui		Maunga	Significant	Stafford:1996:163
42	Te Hiwi o te patiti		Maunga	Significant	Stafford:1996:24-25,163
43	Te Hiwi o marama	Paekura	Maunga	Significant	Stafford:1996:24,172
44	Omarukaka		Ngahere	Significant	Stafford:1996:73,163
45	Paehinahina		Matarae	Highly Significant	Stafford:1996:81:164-165
46	Ngawhero		Roto	Significant	Stafford:1996:63,165
47	Manupirua		Ngawha	Highly Significant	Stafford:1996:43-44,166
48	Turanga a Rakeiao		Kohatu	Highly Significant	Stafford:1996:123,166
49	Ruahine		Ngawha	Highly Significant	Stafford:1996:101,120,166
50	Waiharuru		Awa	Significant	Stafford:1996:125,166
51	Waihunuhunu		Ngawha	Significant	Stafford:1996:125, 167
52	Tumoana		Matarae	Highly Significant	Stafford:1996:122,167

Ref	Traditional Name	Other Name	Category	Rating	Source
53	Waitupapaku		Ngawha	Significant	Stafford:1996:167
54	Maraeroa		Ngawha	Significant	Stafford:1996:167
55	Te Rewarewa		Kohatu	Significant	Stafford:1996:100,167
56	Motuhara		Motu	Significant	Stafford:1996:168
57	Te Rei		Ngawha	Significant	Stafford:1996:99,168
58	Otutatarā		Ngawha	Significant	Stafford:1996:168
59	Motutawa		Matarae	Highly Significant	Stafford:1996:54-56,169
60	Te Waitohinga a Rangiteorere		Waipuna	Highly Significant	Stafford:1996:70:169
61	Haupapa		Roto	Highly Significant	Stafford:1996:21,170
62	Wainikau		Roto	Significant	Stafford:1996:126,170
63	Omarupoto		Roto	Significant	Stafford:1996:73,170
64	Whangaroa		Roto	Significant	Stafford:1996:136,170
65	Otautu	Ngatautu	Roto	Highly Significant	Stafford:1996:78,171
66	Te Pohue	Te Pohuewhakawerewere a Hinehopu	Roto	Highly Significant	Stafford:1996:89,172
67	Whakaihupuku		Kohatu	Highly Significant	Stafford:1996:133,173
68	Waitangi		Ngawha	Highly Significant	Stafford:1996:129,173
69	Rakaumakere	Te Waharoa	Awa	Significant	Stafford:1996:97,173
70	Te Maero	Te Wairoa/Te Whare o Turaki	Awa	Significant	Stafford:1996:40,173
71	Te Rotoiti		Roto	Significant	Stafford:1996:174
72	Whangaroa		Roto	Highly Significant	Stafford:1996:136,174
73	Tuara o Matata		Ngawha	Significant	Stafford:1996:122:174
74	Te Oneroa		Roto	Significant	Stafford:1996:74,175
75	Te Muriwai		Awa	Significant	Stafford:1996:58,175
76	Te Waiheru o Te Rarau		Roto	Significant	Stafford:1996:175
77	Onewhero		Roto	Significant	Stafford:1996:175
78	Whakarewa		Roto	Significant	Stafford:1996:175
79	Te rakau tipua a Hinehopu		Rakau	Highly Significant	Stafford:1996:23-24
80	Te Whakamaru ra o Hinehopu	Te Tahuna/Omatatahuna	Ngahere	Highly Significant	Stafford:1996:98,
81	Te Hapua		Roto	Highly Significant	Stafford:1996:20,151
82	Te Awa i takapuhaia		Roto	Highly Significant	Stafford:1996:18,179
83	Te Whakahiakai		Waipuna	Significant	Stafford:1994:146-147,177
84	Kawaha		Matarae	Highly Significant	Stafford:1994:32-34,163
132	Rerewhakaaitu	Lake Rerewhakaaitu	Roto	Highly Significant	Te Arawa Lakes Settlement Act 2006:Scheldue 3, Stafford:1967:171,174
134	Makatiti	Makatiti Dome	Maunga	Highly Significant	Waitangi Tribunal: He Maunga Rongo - Report on Central North Island Claims (Wai1200):2007:15, Stakeholders Workshop:12.10.2007



APPENDIX 4: RURAL LAND USE MANAGEMENT RESOURCES

WEB VERSION

## AGRESEARCH

[www.agresearch.co.nz](http://www.agresearch.co.nz)

Soil Characteristics Important to Management.

Information for farmers on soil characteristics to assist them manage their soil effectively: texture, structure, organic matter content, porosity and water-holding capacity and some aspects of chemical fertility and fertiliser management.

Vision - To be the pre-eminent organisation in New Zealand for promoting and enabling the sustainable management and development of the water environment

## AGRIQUALITY

[www.agriquality.co.nz](http://www.agriquality.co.nz)

AgriBase

This is a national database or central index of farm ownership, location and management throughout New Zealand. It lists both agricultural and horticultural properties (around 100,000 in total), each with a unique identification code and links farm business units to land-based information. Through the creation of maps based on geographic information systems it has the capability for a wide range of uses.

## BIODIVERSITY

Biodiversity New Zealand

<http://www.biodiversity.govt.nz/index.html>

This site provides information about Aotearoa New Zealand's native biodiversity, what is being done to help conserve and manage it, and who is involved. The information and work programmes covered in this site are part of New Zealand's long-term commitment to conserve its natural heritage under the New Zealand Biodiversity Strategy

The Department of Conservation and the Ministry for the Environment are working with Local Government New Zealand and other agencies to deliver a package of measures for protecting indigenous biodiversity on private land (i.e. areas outside public conservation lands), under the New Zealand Biodiversity Strategy (NZBS).

The package includes contestable funds to help land managers improve the condition of biodiversity on private land, with both advice and financial support. It also includes ensuring that the regulatory framework assigns responsibilities and supports the protection of biodiversity on private land.

To guide local bodies and land managers in their decision-making on land use and protection, there is a programme of guidance about biodiversity protection on private land.

Further guidance for resource management planners about indigenous biodiversity is available on the quality planning website.

## CROP AND FOOD

[www.crop.cri.nz/](http://www.crop.cri.nz/)

### **Sustainable land and water use**

We develop crop production systems to enhance productivity in balance with environmental needs. Clients need practical solutions that meet consumer expectations for health, safety and quality while minimising the impact of intensive use on our land, water and air.

We work with New Zealand's land-based industries to develop the knowledge and systems they need to make optimum use of their land and water resources.

### **The Sustainable Crop Production program**

The aim was to produce Recommended Best Management Practices (RBMPs) for the production of process tomatoes, maize and sweet corn in the North Island of New Zealand.

## **Soil Quality Management System (SQMS)**

SQMS is a decision-support system designed to help farmers monitor and manage changes in soil quality to enhance the productivity and environmental sustainability of mixed-cropping farms on the Canterbury Plains, New Zealand

[www.crop.cri.nz/home/products-services/crop-production/sqms/index.htm](http://www.crop.cri.nz/home/products-services/crop-production/sqms/index.htm)

## DAIRY FARMING

### **Fonterra**

<http://www.fonterra.com>

### **Dairy Industry Strategy for Sustainable Environmental Management,**

### **Pastoral Greenhouse Gas Research Consortium**

### **Dairying and Clean Streams Accord**

Fencepost.com

<http://www.fencepost.com>

Website for farmers includes weather forecasts and full access to farming information and services. Login and share your views and questions with other farmers from all around NZ - Discussion Groups Search more than 350 Fencepost Expert Farming articles in - Knowledge Base

### **Dexcel**

<http://www.dexcel.co.nz>

### **Dairy Industry Strategy for Sustainable Environmental Management (2006)**

A strategy put together by dairy farming leaders has created a way for New Zealand dairying to change its environmental impact while maintaining productivity.

### **Effluent Management**

#### **A Guide to Managing Farm Dairy Effluent - WAIKATO (2007)**

This booklet for farmers provides the best management practices and regional rules for the main effluent systems currently operating in the Waikato.

### **Waterway Management**

Bay of Plenty:

- Clean Streams
- A Guide to Managing Waterways on Bay of Plenty Farms.
- This booklet provides guidelines for managing waterways on farms in the Bay of Plenty Region.

### **Dairying and the Environment (DEC Manuals 2006)**

These manuals contain fundamental information for the management of environmental issues on dairy farms in New Zealand. They have been designed to assist dairy farmers and those advising dairy farmers with practical, effective and safe solutions to manage potential environmental impacts. These manuals are intended to promote voluntary uptake of best management practices.

### **Riparian Management**

Information on the set-up and management of riparian margins.

### **Planning an Effluent Treatment System.**

Things to think about if you are planning a new effluent treatment system.

### **enviroDirect.**

This is part of the Dexcel's Farm4Tomorrow programme. enviroDIRECT provides practical information resources on environmental issues faced on New Zealand dairy farms, and, can put you in touch with service providers operating in your region. Its aim is to provide simple and fast answers to any environmental. EnviroDIRECT is a FREE service is brought to you by Dexcel, with the support of the Ministry for the Environment, Dairy InSight, Environment Waikato, New Zealand Landcare Trust and Fonterra.

### **Land Application**

Information regarding the set-up and management of the land application of effluent.

### **Limiting Pugging and Compaction Damage.**

Management tips for the prevention of pugging and compaction damage.

### **DEERESEARCH**

<http://www.deerresearch.org.nz/index.asp>

The New Zealand deer industry's major research website.

This website provides information on DEEResearch and, for registered users, allows unlimited access to hundreds of research papers and a large amount of other deer research information.

### **ENVIRONMENT BAY OF PLENTY**

<http://www.ebop.govt.nz>

### **Dairy Effluent Deficit Irrigation Report**

This guideline summary provides some help to farmers about what types of treatment and disposal systems would be appropriate dependant on the sensitivity of the receiving environment.

Included in the guidelines are other dairy farm activities that have potential to impact on the environment i.e. silage pits, calf-rearing facilities, and dairy feed pads/loafing pads.

### **Farm Dairy Fact Sheets**

Environment Bay of Plenty produces fact sheets that relate to various areas of our responsibilities. These fact sheets provide information on specific topics and are very useful resources for Bay of Plenty residents.

- FD02 - Land based systems
- FD03 - Discharges to surface water
- FD04 - Feed pads, loafing pads and farm races
- FD05 - Silage stacks and bales
- FD06 - Disposal of waste milk

### **Land**

- Land Monitoring
- Pest Animals
- Pest Plants
- Land Management
- Dairy Effluent
- Detention Dams and Drop Structures

### **Farm Dairy Fact Sheets**

- Farm Tracks
- How to Plant
- Run off Pasture Management
- Shelter Belts
- Stream Crossings
- Willow Species Uses And Management
- Weed Control
- Woodlot Production
- Woodlot Species
- Stock Water Supply
- Revegetation Projects

### **Establishment techniques for revegetation projects.**

Describes plant selection, site preparation, planting methods, fertiliser and post planting care for revegetation projects.

### **ENVIRONMENT WAIKATO**

<http://www.ew.govt.nz/>

### **Waikato Farm Environment Awards Trust, 2003:**

### **A Practical Guide to Low Impact Tracks and Races.**

### **Waikato Farm Environment Awards Trust.**

### **Trees on Farms**

Planting trees gives many returns – financial, providing habitat for native species and creating a landscape we can all enjoy. The secret of successful results is to match the tree to the use and locality, and manage it in the right way.

'Trees on Farms: a guide with local experience of growing trees in the Waikato Region' covers a range of aspects of selection, establishment and care of trees on farms. It also includes comments and case studies from landowners who attended one of four 'Trees on Farms' workshops, sharing a range of different local experiences. You can view or print the report from this page in PDF file format.

<http://www.ew.govt.nz/enviroinfo/land/treesonfarms.htm>

### **Environment Waikato - River Management Guidelines**

Good river management protects our property and land from damage

### **What to Plant in Maungatautari Ecological District**

Environment Waikato local area planting guide series 1, Janice Amoore, Karen Denyer

### **Guide to Managing Farm Dairy Effluent**

View the document on website

### **Areas of Significant Indigenous Vegetation and Habitats of Indigenous Fauna in the Waikato Region : Guidelines to Apply Regional Criteria and Determine Level of Significance**

TR 2002/15, Karen Denyer, Wildland Consultants Limited

### **Clean Streams: A Water Body Enhancement Strategy for Environment Waikato**

This document sets out proposals for the operation of a project to support the protection of water body margins in the Waikato Region. It sets out the background to the project, its objectives and priorities, and focuses in particular on its implementation. It is intended as a guide to Environment Waikato staff and Councillors to ensure that the project is consistently managed and as effective as possible in achieving improvements in the management of water body margins.

### **Environment Waikato Best Practice Guidelines for Waterways Crossings**

(TR 2006/25, David Speirs, Greg Ryan)

31 page document

[View the document on website](#)

### **Managing Waterways on Farms**

4 page booklet

### **Environmental indicators**

Environment Waikato has environmental indicators that help tell us about the quality of, and any changes in, the Waikato region's environment.

#### **LAND AND SOIL**

- Biodiversity
- Land
- Soil

#### **INLAND WATER**

- Groundwater
- Lakes
- Rivers and Streams
- Wetlands

### **Map of River Management Catchments and Zones**

Environment Waikato has divided the Waikato Region into nine river management catchments and zones. The scheme assets include conservation fencing, land retired from grazing use, plantings of trees and structures including bridges, erosion control flumes and crossings.

### **FERTRESEARCH**

[www.fertresearch.org.nz](http://www.fertresearch.org.nz)

### **Fertiliser Code of Practice.**

The Code of Practice for Fertiliser Use is funded by the New Zealand Fertiliser Manufacturers' Research Association (NZFMRA) and promoted under the Association's brand name, Fert Research. It is an industry-wide document founded on the principles of sustainable land management. Its non-prescriptive approach provides for the safe, effective and responsible use of fertiliser on a site-specific basis.

The Code is intended to be a living document and it has undergone practical evaluation and review since its initial launch in 1998. In 2002 addenda were added to address issues and trends that had emerged in the four years since launch, and minor changes were made to incorporate new information into the Code document. The Code will continue to undergo practical evaluation and review by appropriate groups to ensure it remains relevant.

A training programme has been developed to ensure advisors and end users are provided with sufficient guidance in the use of the Code to achieve its objectives.

### **Applying Farm Dairy Effluent to Land**

This information sheet highlights the benefits of applying effluent to land, the nutrients it contains and examples of how to calculate nitrogen loading rates and effluent application rates.

### **Nitrogen Fertiliser in Sustainable Farming.**

Discusses the relationship between clover and nitrogen fertiliser, good practice for N applications and recommended rates of application.

### **NIWA**

[www.niwa.cri.nz](http://www.niwa.cri.nz)

Guidelines for Constructed Wetland Treatment of Farm Dairy Wastewaters in New Zealand.

This document provides practical guidance on the use of constructed wetlands to improve the quality of discharges from farm dairy waste ponds.

### **SHMAK**

The New Zealand Stream Health Monitoring and Assessment Kit

<http://www.landcare.org.nz/SHMAK/index.html>

This kit enables non-scientists to:

- collect consistent, scientifically valid information from small rural streams
- to use that information to make assessments of stream health

### **FORESTRY**

NZ Forest Owners Assn (NZFOA)

[www.nzfoa.org.nz](http://www.nzfoa.org.nz)

New Zealand Forest Owners Association - Environmental Research Database.

"The largest database of New Zealand forestry environmental literature ever compiled." The Forests Environmental Research Group has compiled a database of over 830 pieces of environmental literature and developed an invaluable resource for the New Zealand forest and related sectors. While primarily developed for forest industry managers involved in the resource management field, the New Zealand -specific information also has much wider application for consultants, local and central government, and other land based industries such as agriculture and mining.

### **The New Zealand Forest Accord**

A commitment by forest companies and conservationists to value, protect and conserve New Zealand's indigenous forests. The Accord was signed in 1991 by representatives of four industry organisations and 10 conservation groups. It recognises the importance of commercial plantation forestry both as an economic activity and an alternative to the depletion of natural forests.

*Forestry Stewardship Council*

<http://www.fsc.org/en/>

FSC is an international not-for-profit membership-based organization that brings people together to find solutions to the problems created by bad forestry practices and to reward good forest management.

### **HORTICULTURE AND FOOD RESEARCH INSTITUTE OF NEW ZEALAND LTD (HORTRESEARCH)**

<http://www.hortresearch.co.nz/>

HortResearch is a Government-owned world-class fruit science company. We use our unique resources in fruit, plants and environmentally sustainable production systems to produce innovative fruit and food products. We assist industry by developing innovative solutions and future plans.



### **Sustainable Land Use Research Initiative (SLURI)**

<http://www.sluri.org.nz/>

Sustainable Land Use Research Initiative (SLURI)

A national centre for maintaining and managing our soils SLURI will:

- carry out research on the sustainable management of land
- develop new tools for regulators and land managers
- fully involve key stakeholders and other research organisations.

### **LAND CARE GROUPS (LAND CARE TRUST - ICM PROJECT)**

[http://www.landcare.org.nz/integrated\\_catchment\\_management](http://www.landcare.org.nz/integrated_catchment_management)

ICM aims to integrate the management of land, water and related biological resources in order to achieve their sustainable and balanced use. ICM brings together those involved in primary production, environmental conservation, land and water planning, research, environmental rehabilitation and other aspects of natural resource management at a catchment scale. ICM is based on a systematic effort to understand, through interpretation and analysis, the linkages between ecosystems, resources and people. It is a strategic approach to the management of environmental problems and involves the bringing together of a diversity of perspectives, disciplines and practices.

This is a Ministry for the Environment's Sustainable Management Fund project aimed at sharing community level best practice in Integrated Catchment Management (ICM) nationally.

This Ministry for the Environment Sustainable Management Fund project is aimed at sharing community level best practice in Integrated Catchment Management (ICM) nationally. The purpose of the project is to establish a network of Integrated Catchment Management practitioners and participants involved at the community level, and to provide opportunities for these people to share experiences, tools and approaches throughout New Zealand.

### **Landcare CRI**

[www.landcareresearch.co.nz](http://www.landcareresearch.co.nz)

Protecting and Restoring our Natural Heritage - a Practical Guide

This guidebook provides information on protection, management and restoration of native ecosystems – why it is needed, how it can be done and where you can obtain further information. The material is presented in the order in which you need to proceed for any management or restoration project. Mark Davis – freelance ecologist and Dr. Colin Meurk – Landcare Research plant ecologist.

### **Land Information New Zealand**

<http://www.linz.govt.nz/home/index.html>

LINZ holds authoritative information about land surveys and ownership, topographic maps and nautical charts. We make sure that the rating valuation system is fair and consistent and oversee the buying and disposal of Crown land.

### **SUSTAINABLE ADVANCING SUSTAINABLE MANAGEMENT SYSTEMS IN AGRICULTURE AND HORTICULTURE**

<http://www.samsn.org.nz/>

### **Deer Farming**

Deer Industry New Zealand

<http://www.nzgib.org.nz>

### **New Zealand Deer Farmers Landcare Manual**

This document provides best management practices for New Zealand Deer Farmers. It includes information on management strategies to minimise negative environmental impacts e.g. erosion, water quality.

### **MEAT & WOOL NEW ZEALAND**

<http://www.meatnz.co.nz>

### **MINISTRY OF AGRICULTURE AND FORESTRY**

<http://www.maf.govt.nz/mafnet/rural-nz/>

### **The best means to achieve excellence in rural New Zealand...**

- Sustainability
- Best practices
- Biodiversity
- Climate
- Irrigation
- Land
- Native forests
- Organics
- Resources
- Water

### **MAF - Sustainable Farming Fund.**

The purpose of the Sustainable Farming Fund (the Fund) is to support projects that will contribute to improving the financial and environmental performance of the land-based productive sectors.

The Fund aims to help the land based sectors solve problems and take up opportunities to overcome barriers to economic, social and environmental viability. Funded projects are listed at this site.

### **Best Practice Dairying Catchments for Sustainable Growth.**

This project is an initiative by the dairy industry to integrate environmentally safe practices into dairy farming. The project will encourage the adoption of best management practices that meet industry and regulatory authority requirements and address local issues.

### **Total Energy Indicators of Agriculture Sustainability**

The aim of this study was to determine baseline data on total energy inputs, as indicators of the sustainability of the dairy production sector. Indicators were based on energy consumption, together with other indicators for land, water use, social effects and financial performance.

### **MINISTRY FOR THE ENVIRONMENT (MfE)**

<http://www.mfe.govt.nz/>

### **State of the environment publications**

<http://www.mfe.govt.nz/publications/ser/index.html>

### **Best practice guides and guidelines**

Ministry for the Environment, 2001: Managing Waterways on Farms:

A guide to sustainable water and riparian management in rural New Zealand.

### **Best Practice Land Management Systems for Deer Farming.**

The project is an initiative of the NZ Deer Farmers Association to produce a Landcare Manual to meet environmental responsibilities in deer farming. The aim is to be both simple and practical and describe best practice methods enabling deer farmers to meet any statutory, market and ethical requirements for the long-term environmental sustainability of their deer farming operations.

### **Landcare Resource Kit**

Development and Distribution. MFE SMF funded project - To develop and distribute a landcare group resource kit. This will address the issues facing any person, group or agency trying to work collectively to address sustainable management of resources issues.

### **Ecological Footprint.**

The Ecological Footprint is the total amount of land it takes to support a lifestyle. This is calculated on the basis of the products that a person consumes. This page provides background information on the concept and a model to calculate an individual's footprint.

### **Soil Conservation – Technical Handbook**

This handbook provides best current practice in the field of soil conservation. June 2001,

### **Environmental Farm Plans**

Environmental farm plans are used by a number of Regional Councils to encourage best environmental management practices on rural land.

- Waikato RC Environmental Farm Plans; Riparian Management Plans.
- Bay of Plenty RC Environmental Programmes.
- Hawkes Bay RC Soil Conservation Plans; Erosion Control Plans.
- Manawatu-Wanganui RC Environmental Plans.
- Taranaki RC Riparian Management Plans; Conservation Farm Plans; Agroforestry Farm Plans; Comprehensive Farm Plans.

### **Dairying and Clean Streams Accord.**

In 2003 MAF, MFE, Fonterra and Local Govt NZ signed an Accord which aims to minimise the impact of dairying on New Zealand's streams, rivers, lakes and wetlands so that they are suitable, where appropriate, for fish, drinking by stock and swimming. The Accord specifies targets to keep dairy cattle out of streams, lakes and wetlands, to treat farm effluent, and to manage the use of fertilisers and other nutrients. Many of the implementation details will be fleshed out in regional action plans to be prepared by Fonterra and regional councils by June 2004.

### **Managing Waterways on Farms: A guide to sustainable water and riparian management in rural New Zealand.**

This publication provides background information about the sources, causes and processes involved with the deterioration of streams in farmed catchments and the consequences of that deterioration. It is aimed at those who provide advice to farmers about how they manage their land, and to those farmers who wish to enhance their properties and reduce the impacts of their farming operations. July 2001, Ref. ME385

### **PARLIAMENTARY COMMISSIONER FOR THE ENVIRONMENT**

<http://www.pce.govt.nz/>

The Parliamentary Commissioner for the Environment (PCE) aims to maintain and improve the quality of New Zealand's environment. The central focus is on environmental sustainability - how we can live within the ecological limits of the planet today and into the future.