# BASELINE LANDSCAPE ASSESSMENT

## Rotorua/ Te Arawa Lakes

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Local People. Global Knowledge.

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# Rotorua Te Arawa Lakes
# Baseline Landscape Assessment

## Contents

This report has been prepared for the Bay of Plenty Regional Council for the purposes of providing a baseline landscape and cultural assessment for six Rotorua Te Arawa lakes. It is not to be relied upon or used out of context by any other person without reference to MTEC Consultants Ltd, Wildland Consultants Ltd and Toi Ora Associates. The reliance by other parties on the information or opinions contained within this report shall, without prior review and agreement in writing, be at such parties sole risk.

# ROTORUA TE ARAWA LAKES
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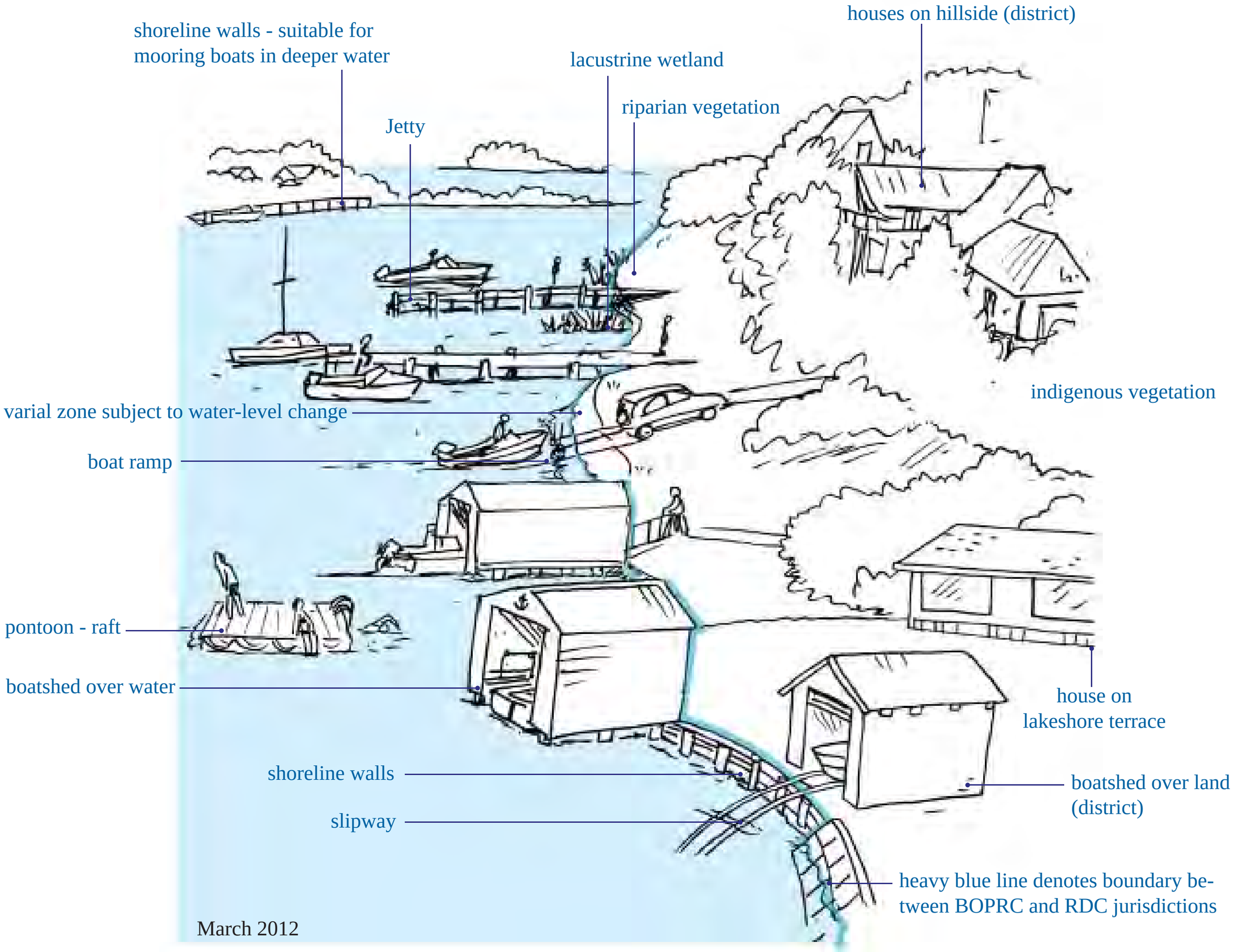


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# 1 PROJECT BRIEF

MTEC Consultants, Wildland Consultants and Toi Ora & Associates (hereafter referred to as the 'project team') have addressed, the Bay of Plenty Regional Council (BOPRC) project brief outlined below:

> *"The project will provide the client with insight into the current situation regarding lake structures, and to assist future considerations around lakes structure management. The project will assist understanding of how multiple structures can cause a cumulative effect on the landscape, cultural, aesthetic and natural character values of the lakes.*
>
> *The project relates to:*
>
> - *Lake Rotorua / Te Rotorua nui a Kahumatamomoe*
> - *Lake Rotoiti / Te Roto kite a Ihenga I Ariki ai e Kahumatamomoe*
> - *Lake Rotoehu*
> - *Lake Rotoma*
> - *Lake Tarawera*
> - *Lake Ōkāreka*
>
> *The project will:*
>
> - *Provide a concise definition of cumulative effects as it relates to lake structures.*
> - *Provide an assessment methodology for understanding how new, existing or altered structures may impact on the; landscape, cultural, amenity and natural character values.*
> - *Undertake a baseline assessment of the six lakes to identify where cumulative or increased accumulation of structures may impact on; landscape, cultural, amenity or natural character values.*
> - *Identify areas, under the current conditions, which are sensitive to cumulative effects, including if they are already impacted by existing structures (including as a result of multiple structures).*
> - *Undertake all work with an understanding the unique management of the Rotorua Te Arawa Lakes, in particular the relationship between Te Arawa Lakes Trust, Land Information New Zealand, Rotorua District Council and the Bay of Plenty Regional Council, and the dual position of Te Arawa Lakes Trust as landowner and Tangata Whenua.*
>
> *The project will produce:*
>
> - *Recommendations to reduce the impacts of existing structures, including where appropriate, location specific actions, and/or changes.*
> - *Recommendations to manage the impacts of new structures, including where appropriate, location specific actions."*

The project team undertook research, site visits and assessment during the project period of December 2011 to May 2012, combining landscape, cultural and ecological expertise in the collation of this report.

# 2 HISTORICAL CONTEXT

Since the arrival of the Te Arawa waka at Maketu (circa 1350) and the eventual migration inland from the coastal area, the Te Arawa people have occupied the region – Mai Maketu ki Tongariro – and have staunchly guarded and defended this territory from invasion by outside tribes.

Te Arawa people created and adapted their culture around the lakes and the geothermal environment over the centuries and although aspects of their culture has changed with time, some of the traditional customs of food gathering and harvesting natural resource materials are still practised.

Not all iwi/hapū of Te Arawa waka have a direct relationship but by virtue of their whakapapa with the Te Arawa waka, they have an association or linkage with the lakes that exist within the Te Arawa rohe or district. There are some lakes within the Te Arawa rohe that are not covered within the Te Arawa Lakes Settlement, however iwi/hapū only still have an association with them.

Detailed history of the tribal settlement of the lakes can be found in the writings of Don Stafford especially 'Te Arawa', and 'Landmarks of Te Arawa' Volumes 1 and 2 – see Appendices for details.

# 3 TE ARAWA LAKES SETTLEMENT 2006

The Te Arawa Lakes Settlement Act 2006 and Deed of Settlement 2004 saw the establishment of the Te Arawa Lakes Trust (previously Te Arawa Maori Board Trust Board) to receive and manage the settlement assets on behalf of and for the benefit of the present and future members of Te Arawa. The Settlement is comprised of a redress package that consists of acknowledgements and apologies to Te Arawa for breeches of the Treaty of Waitangi, the cultural redress which sees the return of 13 lake beds to Te Arawa ownership, establishment of formal protocols with government agencies, establishment of Te Arawa Fisheries Regulations to manage non-commercial fishing of their taonga species, a financial address, annuity redress, and the Te Arawa Lakes Trust co-management role with Rotorua District Council and BOPRC for 13 lakes. Lake Okaro is still to be negotiated and agreed to be returned by Rotorua District Council.

Prior to this settlement, the iwi/hapū associated with the lakes in the region had no input into the day-to-day management of the lakes, despite having many waahi tapu and sites of significance in and around them.

The Te Arawa Lakes Trust is made up of nine trustees of three tuupuna rohe groupings. Te Kawatapuarangi, Tuhourangi, and Te Ure o Uenukukopako. Each tuupuna rohe has three members that are selected by the hapū in each tuupuna rohe. The Trusts mission is "*to provide sustainable cultural, social, health, environmental and economic benefits for Te Arawa*".

(Details of the Deed of Settlement can be obtained from the Te Arawa Lakes Trust or the Office of Treaty Settlements, or www.legislation.govt.nz and copies are retained by the Regional Council including the associated maps, or a summary viewed on the TALT website www.tearawa.iwi.nz )

Figure 1 Te Takinga Marae, Mourea Channel, Lake Rotoiti

# 4 EXISTING LANDSCAPE ASSESSMENTS

## 4.1 Previous studies

Previous landscape studies have been undertaken and tested through various public forums. In particular the following documents identify outstanding natural features and landscapes for the Rotorua Te Arawa lakes:

- Bay of Plenty Regional Council (BOPRC): Outstanding Natural Features and Landscapes Review in Inland Bay of Plenty February 2009 by Boffa Miskell Ltd;
- Rotorua District Council (RDC): Lake Rotorua Landscape Assessment, Eastern Lakes; Landscape Assessment, Northern Lakes Landscape Assessment June 2010 by Boffa Miskell Ltd.

It is also noted that there are parallels with the coastal environment in terms of landscape assessment methodologies and development pressures. The New Zealand Coastal Policy Statement (NZCPS) 2010 also contains relevant terminology.

Further material from the most useful and relevant landscape studies is included in Appendix 2 and 3, with a summary below.

## 4.2 Outstanding Natural Features and Landscapes review in inland Bay of Plenty

The Outstanding Natural Features and Landscapes (ONFL) Review undertaken for Inland Bay of Plenty in February 2009 for Bay of Plenty Regional Council (BOPRC) by Boffa Miskell Ltd was prepared to identify ONFLs. A summary tabulation of relevant material from this report follows.

Table 1: Data extracted from Outstanding Natural Features and Landscapes report. Ranks: L=Low M=Moderate H=High

| ONFL Assessment Criteria Matrix for the Rotorua Te Arawa Lakes | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Natural science factors | | | | | | | | | | | Values | |
| ONFL Number | Name | Representativeness | Condition | R&E | Rarity | Coherence | Vividness | Natural | Intact | Expressiveness | Transient | Summary | Valued | Historic | **Overall** |
| Six Project Lakes: | | | | | | | | | | | | | | | |
| 53 | Rotorua | H | M | H | M | H | H | M | M | H | M | H | H | M | **H** |
| 57 | Rotoiti | M | M | M | M | H | H | H | M | M | M | M | H | H | **H** |
| 71 | Rotoehu | H | H | M | M | M | M | M | M | H | M | M | H | H | **H** |
| 72 | Rotoma | H | H | H | H | H | H | H | M | H | M | H | H | H | **H** |
| 64 | Tarawera | H | H | H | H | H | H | H | H | H | M | H | H | H | **H** |
| 61 | Ōkāreka | M | H | H | H | H | H | H | M | M | M | H | H | M | **H** |
| Other Rotorua Te Arawa Lakes: | | | | | | | | | | | | | | | |
| 59 | Rotokawau | H | H | M | M | H | H | H | H | H | M | H | M | M | **H** |
| 60 | Okataina | H | H | M | H | H | H | H | H | H | M | H | H | H | **H** |
| 62 | Rotokakahi (Green) | H | H | H | H | H | H | H | M | H | M | H | H | H | **H** |
| 63 | Tikitapu (Blue) | H | H | H | H | H | H | H | H | H | M | H | H | H | **H** |
| 67 | Rotomahana | H | H | H | H | H | H | H | H | H | H | H | H | M | **H** |
| 70 | Rerewhakaaitu | H | H | H | M | H | M | H | M | H | M | H | H | M | **H** |

This table is important because it shows that the water bodies of the six subject lakes - Rotorua, Rotoiti, Rotoehu, Rotoma, Ōkāreka and Tarawera - are all Outstanding Natural Features or Landscapes.

## 4.3 Previous assessments - Lake Rotorua Landscape, Eastern Lakes, and Northern Lakes Landscapes

Rotorua District Council (RDC) has commissioned three landscape assessments relevant to this project; Lake Rotorua, the Northern lakes, and the Eastern Lakes. A summary of relevant extracts is included in Appendix 3. These have a greater level of detail than the regional study, and identify various land-based ONFLs.

## 4.4 Existing regional mapping

ONFLs (as per the Outstanding Natural Features and Landscapes Review) have been mapped in the BOPRC GIS mapping system. Close examination undertaken for this project revealed that the ONFL boundaries supplied do not consistently follow *"contiguous naturally occurring vegetation and*

*prominent landform features on lake edges".* As a result, they were of little use for this project. Authors of the ONFL Review advised that, at the time, it was considered that verification at a more detailed scale of the boundaries was acceptable and that this could be done on a case-by-case basis.

Similarly, *"contiguous naturally occurring vegetation"* is not fully mapped within current regional ecological data layers. Therefore these data sets could not be used as an accurate mapping base for this project.

The national Land Cover Database 2 (LCDB2) provides a suitable level of detail at a scale of 1:50,000, and this was used as a proxy to help define *"contiguous naturally occurring vegetation".* LCDB2 is a thematic classification of 43 land cover and land use classes covering mainland New Zealand, near-shore islands, and the Chatham Islands. The first version of the Land Cover Database (LCDB1) was completed in 2000 using SPOT satellite imagery acquired over the summer of 1996/97. LCDB2 was released in July 2004 and used Landsat 7 ETM+ satellite imagery acquired over the summer of 2001/02. The newer release reports on land cover/land use change for the five-year period between each acquisition of satellite imagery. It was determined that this data set was the most useful to address the project brief.

## 4.5 Natural character definition

The landscape reports mentioned above address ONFLs. Where required by planning provisions, natural character also needs to be assessed. Natural character is an important component of this baseline landscape assessment. Appendix F of the Bay of Plenty Regional Council Regional Policy Statement (RPS) includes criteria for assessment of natural character, as follows:

> ***"Natural systems expressed***
>
> *1.1 The qualities and patterns of the landscape express integrated physical processes and ecological systems and promote and support the healthy functioning of the natural environment.*
>
> ***Landform***
>
> *1.2 Landform retains its natural form and qualities.*
>
> ***Land cover***
>
> *1.3 Land cover is unmodified from its natural state or is regenerating and contributes to a high degree of naturalness or, where managed, retains the qualities of naturalness.*
>
> ***Waterscape***
>
> *1.4 Seascapes, harbours, estuaries, wetlands, geothermal surface features, lake or river water bodies are natural without obvious human structures or intervention.*
>
> ***Fauna***
>
> *1.5 Habitat for fauna is natural and functions without compromise by human influence or modification.*"

These criteria are suitable for the assessment of whether lake structures will affect natural character in particular locations.

# 5 ROTORUA TE ARAWA LAKES

## 5.1 Overview

Rotorua is a major tourist destination, being world famous for its cultural and geothermal attractions as well as for trout fishing, mountain biking, and other adventure activities. It is a true 'lakes district', with seventeen lakes providing varied natural, wild, and scenic landscapes, as well as recreational and lifestyle opportunities.

The Rotorua Te Arawa lakes have unique characteristics, qualities, and uses. The six subject Rotorua Te Arawa lakes are those with the greatest residential development and the most extensive representations of lake structures on their shorelines. On Lakes Rotoma, Rotoehu, Ōkāreka, and Tarawera, settlements are limited to particular sections of shoreline. By contrast, settlements surround much of Lakes Rotorua and Rotoiti. Lakes outside the project scope have quite limited development.

The following table provides a comparison of the lakes, in terms of quantitative parameters for length, width, surface area, shoreline length, depths, elevation, islands, and settlements.

**Table 2: Summary of physical attributes of the six Rotorua Te Arawa lakes (various sources).**

| **Rotorua Te Arawa Lakes Physical Statistics** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Lake** | Max Length (km) | Max Width (km) | Surface Area ($km^2$) | Shoreline (km) | Average Depth (m) | Max Depth (m) | Elevation (m, asl) | Islands | Settlements |
| Rotorua | 12.1 | 9.7 | 79.8 | 46.2 | 10.0 | 45.0 | 280 | Mokoia | Rotorua, Ngongotaha, Hamurana, Holdens Bay, Hannahs Bay, Awahou |
| Rotoiti | 15.0 | 3.6 | 34.3 | 61.4 | 33.0 | 93.5 | 279 | Yes | Hinehopu, Gisborne Point, Okawa Bay, Okere Arm, Otaramarae |
| Rotoehu | 4.6 | 4.0 | 8.1 | 40.2 | 8.3 | 13.5 | 295 | Nil | Otautu Bay, Kennedy Bay |
| Rotoma | 5.2 | 4.7 | 11.2 | 24.8 | 38.6 | 83.0 | 316 | Sunken | Rotoma |
| Tarawera | 11.4 | 9.0 | 41.0 | 50.5 | 57.0 | 87.5 | 298 | Yes | Spencer Rd and Te Wairoa |
| Ōkāreka | 2.8 | 1.9 | 3.5 | 13.1 | 18.4 | 33.5 | 355 | Nil | Ōkāreka |

Detailed descriptions of the lakes are available from existing literature and websites, so are not provided here.

# 6 NATURAL CHARACTER OF THE ROTORUA TE ARAWA LAKES

## 6.1 Natural systems

The main natural physical processes at play are volcanism and water. The Rotorua Te Arawa lakes are part of the greater Taupo Volcanic Zone that stretches from the Tongariro volcanoes to White Island and beyond. This volcanism is expressed clearly in the mountains, domes, calderas, lakes, and rivers, as well as the ignimbrite plateaus and tephra features. Active volcanism is expressed in the steaming hot springs, mud pools, and geysers throughout the Rotorua Te Arawa Lakes environment.

Water has formed lakes in trapped craters, valleys, and lower-lying depressions and has worn river gorges, tomos, and streams. Combined with natural water flows and currents, wind causes waves to shift sediments to form shallow flats and beaches, and has also eroded exposed shorelines. Unusual geothermal features - such as fractured sink holes, springs and caves - occur where volcanism and water have combined forces.

The ecology of the Rotorua Te Arawa lakes is also unique. Pohutukawa forest occurs around the lake edges. Vegetation regenerating after the 1886 Tarawera eruption is also unusual because it's age is known precisely. Lake fringes and wetlands provide habitat for a diverse complement of water birds, including the threatened dabchick. Indigenous fauna rely on the ecological integrity of these natural systems.

Physical and ecological processes are well-expressed around the Rotorua Te Arawa lakes:

- At assorted hot springs and steaming features;
- In aquatic habitats near the shore and at the river mouths, and in lagoons and wetlands;
- On sandy beaches, rocky shores, and vegetated margins.

## 6.2 Landform

Large portions of the lake shorelines are unmodified and have retained its natural land form, especially on:

- Flat areas near water level; valleys and wetlands;
- On the islands, outcrops, peninsulas, and in many bays;
- Rock cliffs and steep scarps;
- Vegetation extending to surrounding ridges and skylines.

Figure 2: Lake Tarawera, within the Te Wairoa arm.

## 6.3 Landcover

The amount and extent of unmodified landcover around the lakes varies. Lake Rotorua has little unmodified vegetation surrounding the lake, while much of the Tarawera shoreline is indigenous vegetation with a high degree of naturalness. Where farmland and exotic plantation forest extend to the shoreline there is often also remnant or regenerating indigenous vegetation. Even where settlement has been developed, there are many areas of vegetation that contribute significantly to naturalness.

Figure 3: Secondary indigenous forest at Te Papatu Point, Lake Rotoiti.

## 6.4 Waterscape

The Rotorua Te Arawa lakes offer a varied, interesting, and often highly scenic waterscape. Open water vistas change constantly due to weather and light conditions. The lake edge backdrop is an essential part of the waterscape that cannot be separated in any rigorous landscape assessment. This lake edge backdrop is reflected in still waters, and influences water colours through the processes described above.

**Figure 4: Lake Tarawera, from shoreline near outlet.**

## 6.5 Lake shore vegetation

Lake edges are subject to natural dynamic processes of wave action and erosion, sediment sorting, and build up of shallows by currents and waves. Emergent plant communities have established on shallow, still, and sheltered lake margins.

**Figure 5: Typical 'natural' lake margin vegetation.**

Figure 6: Emergent wetland vegetation located at Lake Ōkāreka.

## 6.6 Fauna

The Rotorua Te Arawa lakes provide outstanding habitat for a diverse water bird population, including large populations of scaup, dabchick, coot, ducks, black swan, gull, and shags (three species). They are also significant aquatic habitats, for indigenous species such as koaro bullies, kōura, and kakahi (freshwater mussel).

Figure 7: Australian coot, locally common in sheltered embayments.

**Figure 8: Sample of lakes fauna. Clockwise from top left; NZ scaup or papango - flocks assemble in sheltered bays. Gulls roosting on jetty at Lake Rotoiti. Dabchick or weweia; the lakes are a national stronghold. Little black shag on pontoon Okareka. Okere Channel structure provides roost for gulls and shags. Tui - common on lake margins.**

## 6.7 Lake Descriptions

### 6.7.1 Lake Rotorua

Rotorua is a large catchment with major inflowing streams, such as Puarenga, Utuhina, Waiteti, Awahou, and Hamurana. The lakes outlet is via the Ohau Channel to Lake Rotoiti and the level is controlled, within a narrow band, by a stop-log structure/weir at the top of the Channel.

Although much of the catchment is farmland, the lake margins are not farmed, being mainly residential (Rotorua CBD, Koutu, Kawaha Point, Ngongotaha, Hinemoa Point, Holdens Bay, Hannahs Bay, Mourea), grassed reserve (Hamurana, Hannahs Bay), geothermal (Sulphur Bay), indigenous vegetation (all of Mokoia Island, Mourea to Wilsons Bay, Te Ngae), wetland (Ngapuna, Waiwhiro Stream - Parawai Road, cliffs and adjacent exotic plantation forest (Mourea to Banksia Place), willow wetlands (Mataikotare and Ngapuna), and airport infrastructure.

Indigenous forest on lake margins is largely secondary, such as the extensive area between Mourea and Wilsons Bay, Mokoia Island, and even the particularly significant stand of kahikatea wetland forest of Ngati Rangiteaorere near Te Ngae. Most remaining wetlands are largely willow-dominant, although they still retain a very significant indigenous component. Low-lying land adjacent to the lake was previously largely wetlands, which have been drained and developed. These wetlands played a major role in buffering the lake from nutrients and sediment sourced from the inflowing catchment. Remaining wetlands, albeit degraded, continue to play key roles in protection of lake water quality, and this is the case for all of the lakes. Geothermal vegetation and habitats at Sulphur Bay are very significant, also providing breeding and loafing habitat for a diverse range of indigenous birds, including a winter flock of dabchick.

### 6.7.2 Lake Rotoiti

The main inflow is the Ohau Channel, with many small inflowing streams. Drainage is via the Kaituna River (also known as the Okere River ) to the coast. The level is controlled within a narrow band by the control gates at Okere.

The catchment is a mixture of indigenous forest, lakeshore residential, farmland, exotic plantation forest, and wetland.

The lake margins have reasonably extensive areas of indigenous forest: Hinehopu to Puketapu Point, Okahutoroa Bay to Wharetata Bay, Te Akau Point, Te Weta Bay to Kuharua Point, and Te Arero Bay. Forest is largely secondary, although some primary forest remains and has been logged in parts, such as between Hinehopu and Puketapu Point. Pohutukawa occur commonly on lake margins, with local northern rata and pouhtukawa - rata hybids. Although small, an outstanding remnant of maire tawake (swamp maire) forest is present at Te Arero Bay.

Lakeshore residential settlements are present at Okere, Okawa Bay, Tumoana Point, Tapuaekura Bay, Hauparu Bay, Te Ruato Bay, Gisborne Point - Tuarae Point - Te Waiiti Point - Whenuakura Point, and Hinehopu. Some of these settlements, such as Okere and Otaramarae, are nestled within secondary indigenous forest dominated by rewarewa/kamahi.

Wetlands are present at Lake Te Hapūa, Te Arero Bay, Wharetata Bay, Wairau Bay, Ohau Channel, and Lake Ngawhero (a small lake adjacent to Rotoiti). Lake margin wetlands with emergent wetland

plants such as raupo (*Typha orientalis*) and kuta (*Eleocharis sphacelata*) are present at Okere, Te Weta Bay, Otaramarae, Te Arero Bay, Wharetata Bay, and at the Ohau Channel. Shallow shorelines have well-developed indigenous turf communities. Aquatic macrophytes, predominantly exotic species, are abundant in deeper water.

Geothermal activity is present in various sites, such as Manupirua Bay and Wharetata Bay, and is visibly evident on the hillsides at Tikitere.

Exotic plantation forest is present on the northern and southern sides of the lake but has a shoreline strip of indigenous vegetation.

Most, if not all, margins associated with farmland have been retired and either planted or allowed to regenerate naturally.

Rotoiti provides outstanding habitat for water birds, including large populations of little shag, little black shag, black shag, dabchick, and scaup. Trout are common and indigenous fish, such as koaro and bullies, are present, along with kōura and kakahi. Rotoiti is a major sport fishery.

### 6.7.3 Lake Rotoehu

Various small streams flow into the lake. There is no surface outflow and the lake is thought to drain, sub-surface, to the heads of streams to the north. Lake level is governed by long-term rainfall.

There are large areas of farmland in the catchment, on the southern and western sides of the catchment, but all lake margins have been retired and fenced.

Much of the northern and eastern sides of the catchment have a cover of exotic plantation forest but the lake margin is secondary indigenous forest. A road abuts the margin in the south-eastern corner, with small settlements at Ngamimiro Bay and Otautu Bay, and at Morehu Road.

Te Wairoa Bay, in the southeastern corner of the lake, is very shallow, with an extensive turf community and a buffering margin of raupo reedland. Emergent wetland vegetation is also present in the sheltered heads of many other bays. A reasonably large wetland (Waitangi Soda Spring Mire) is present in the southeastern corner and a geothermal spring is also present here.

Rotoehu provides outstanding habitat for water birds, particularly the shallow Te Wairoa Bay, which can have many hundreds of birds present in calm conditions. Trout and indigenous fish, such as koaro and bullies, are present, along with kōura and kakahi.

### 6.7.4 Lake Rotoma

Various small streams flow into the lake and there are three lagoons: Te Matahi in the southeastern corner and Te Onewhero and Whakarewa on the eastern margin. There is no surface outlet, and the lake is thought to drain, via springs, to Lake Rotoehu. Lake level is governed by long-term rainfall. Nearly all farmland in the catchment is in stream catchments that drain into the lagoons, which buffer the high quality lake from the effects of pastoral farming.

A road (SH30) lies adjacent to the lake from, Te Matahi Lagoon to the head of the Whangaroa Inlet, with scattered housing adjacent to the road. Low intensity housing is present between Pangapangoa Bay and Okopua Point.

Indigenous forest is present locally on various headlands, with more extensive areas on the eastern shoreline, and adjacent to the road on the southern and western shoreline. Extensive emergent wetland vegetation is present in Whangaroa Inlet, and locally elsewhere.

There is a substantial amount of exotic plantation forest in the catchment, on the western, northern, and eastern sides, but with a strip of indigenous vegetation present adjacent to the lake.

Rotoma provides outstanding habitat for water birds, including dabchick and scaup. Trout are common and indigenous fish, such as koaro and bullies, are present, along with kōura and kakahi .

### 6.7.5 Lake Tarawera

Tarawera is a large lake with scattered small inflowing streams and two larger streams at Wairua and Wairoa, the latter draining from Lake Rotokakahi. Lake Ōkāreka drains to Lake Tarawera via a managed outlet (known as the Lake Ōkāreka Outlet). Drainage from Lake Tarawera is via the Tarawera River and Tarawera Falls to the coast. Most of the catchment is indigenous forest, with the shoreline also being mostly indigenous forest, the only major exception being the section of lakeshore residential settlement between Te Toroa Point and Otumutu Bay. Even the latter section contains a large amount of secondary indigenous cover, and Kariri Point is not developed and has a cover of mahoe-dominant forest. Most indigenous vegetation is secondary, having developed following the Tarawera eruption in 1886. Successional development following the eruption has been of considerable scientific interest, particularly on Mount Tarawera.

Indigenous forest is largely kamahi-dominant, with extensive areas of treefernland. Pohutukawa is locally common on lake margins, with a complex mixture of pohutukawa and northern rata adjacent to the Tarawera outlet. Emergent wetland vegetation is present in more sheltered embayments such as Otumutu Bay, Te Wairua, and Boatshed Bay. Shallow shorelines have well-developed indigenous turf communities. Aquatic macrophytes, predominantly exotic species, are abundant in deeper water.

Tarawera provides outstanding habitat for water birds, including substantial populations of dabchick and scaup. Trout and indigenous fish, such as koaro and bullies, are present. Kōura and kakahi are also present. Tarawera is a major sport fishery.

### 6.7.6 Lake Ōkāreka

Ōkāreka is a moderate-sized lake with scattered small inflowing streams, draining to Lake Tarawera via a managed outlet (known as the Lake Ōkāreka Outlet) on the eastern shoreline. Parts of the catchment are farmed but much is indigenous forest and the shoreline from the outlet to Millar Road is secondary indigenous forest, largely kamahi-dominant.

Emergent wetland vegetation is present in various locations adjacent to the settlement. A natural wetland is present between Millar Road and the lake, and an excavated and planted wetland is present south of Acacia Road.

Lakeshore residential extends from Acacia Road (Taumaihi Point) to Boyes Beach (Millar Road).

The section of previously-farmed shoreline (between the outlet and Acacia Road) is now retired and fenced.

Ōkāreka provides outstanding habitat for water birds, including dabchick and scaup. Trout and indigenous fish, such as koaro and bullies, are present, along with kōura and kakahi.

### 6.7.7 Natural character photographs

The following four photographs illustrate that natural character remains intact over large portions of the lakes.

**Figure 9: Lake Rotoiti - shoreline of mixed landuses; natural forestry, farmed and settlement.**

**Figure 10: Lake Tarawera.**

Figure 11: Lake Ōkāreka.

Figure 12: Lake Ōkāreka .

# 7 CULTURAL LANDSCAPE OF THE ROTORUA TE ARAWA LAKES

As noted previously, the Rotorua Te Arawa lakes have significant historical and cultural importance. Many significant events have occurred at particular locations on or around the lakes. Food harvesting or collection sites were noted for their ability to provide food for people. Descriptions of these sites or areas and their significance are outlined below.

## 7.1 Lakes and associated iwi/hapū

The lakes involved in this project are listed below along with iwi/hapū associations. It is also acknowledged that not all areas of shoreline are involved in the lakes structure baseline assessment. Refer also to the attached maps.

**Rotorua**

Ngati Whakaue, Ngati Uenukukopako, Ngati Rangiteaorere, Ngati Te Takinga, Ngati Parua, Ngati Rangiwewehi, Ngati Hurunga.

**Rotoiti**

Ngati Te Takinga, Ngati Hinerangi, Ngati Tamateatutahi/Kawiti, Ngati Hinekura, Ngati Rongomai, Ngati Makino, Ngati Te Rangiunuora, Ngati Pikiao, Ngati Te Rangiunuora.

**Rotoma**

Ngati Makino, Ngati Tamateatutahi/Kawiti, Ngati Awa, Ngati Tuwharetoa ki Kawerau.

**Rotoehu**

Ngati Makino, Ngati Tamateatutahi/Kawiti.

**Tarawera**

Tuhourangi, Ngati Wahiao, Ngati Rangitihi.

**Ōkāreka**

Ngati Whakaue, Ngati Uenukukopako, Ngati Tarawhai, Tuhourangi.

Tribal or hapū boundaries around lake shorelines are not defined accurately by map lines or coordinates. Many still are defined by landmarks, such as a 'line' from a totara tree to a certain ridge top, or a stream mouth to a swamp edge, or one pā site to another. The most relevant maps were drawn by Don Stafford in his book Landmarks of Te Arawa Volumes 1 and 2, based on current tribal occupation, but areas have changed hands many times over the years since the arrival of Te Arawa.

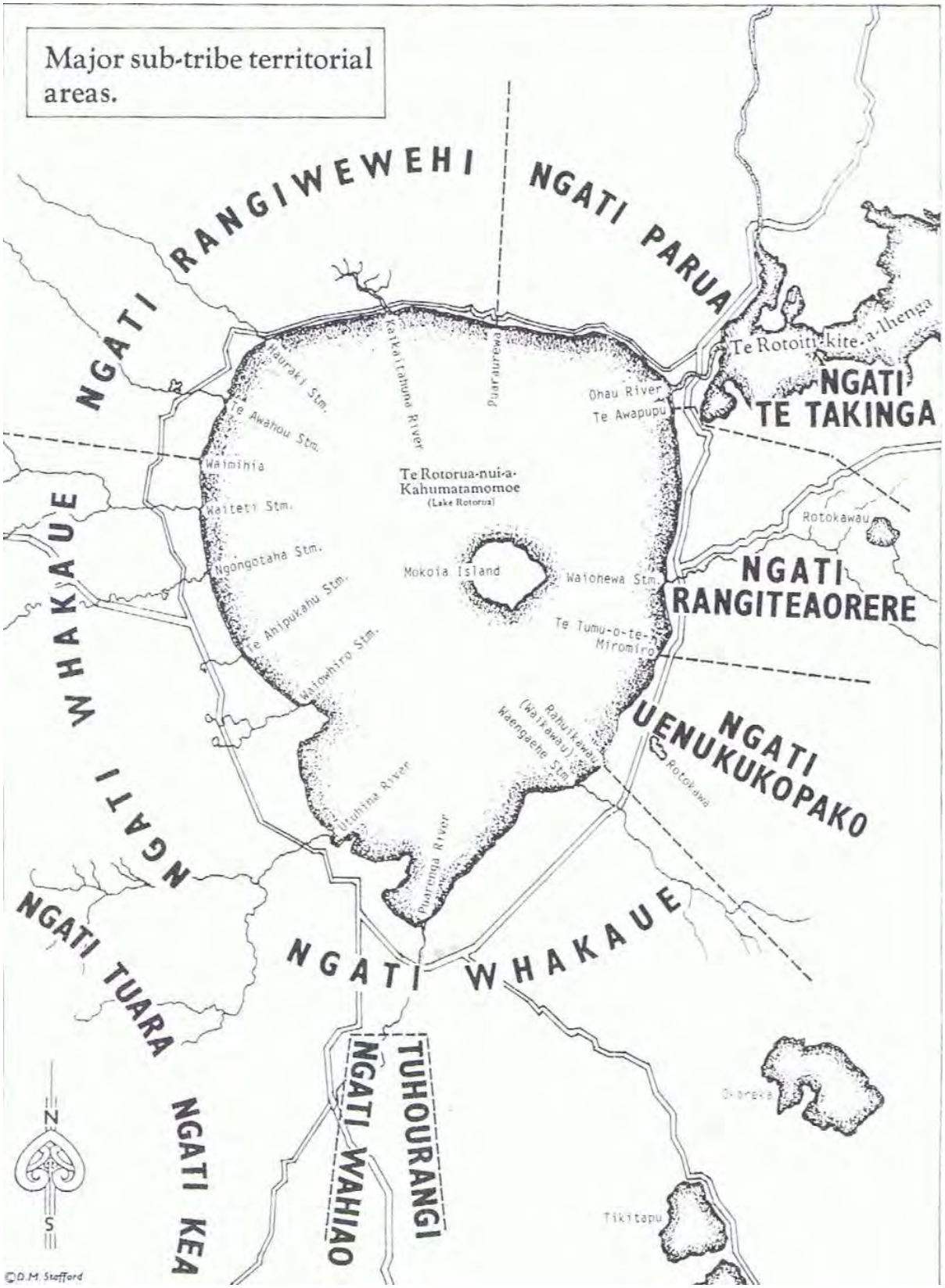



Figure 13: Iwi/hapū affiliations to Lake Rotorua. Source: Stafford, D.M. Landmarks of Te Arawa

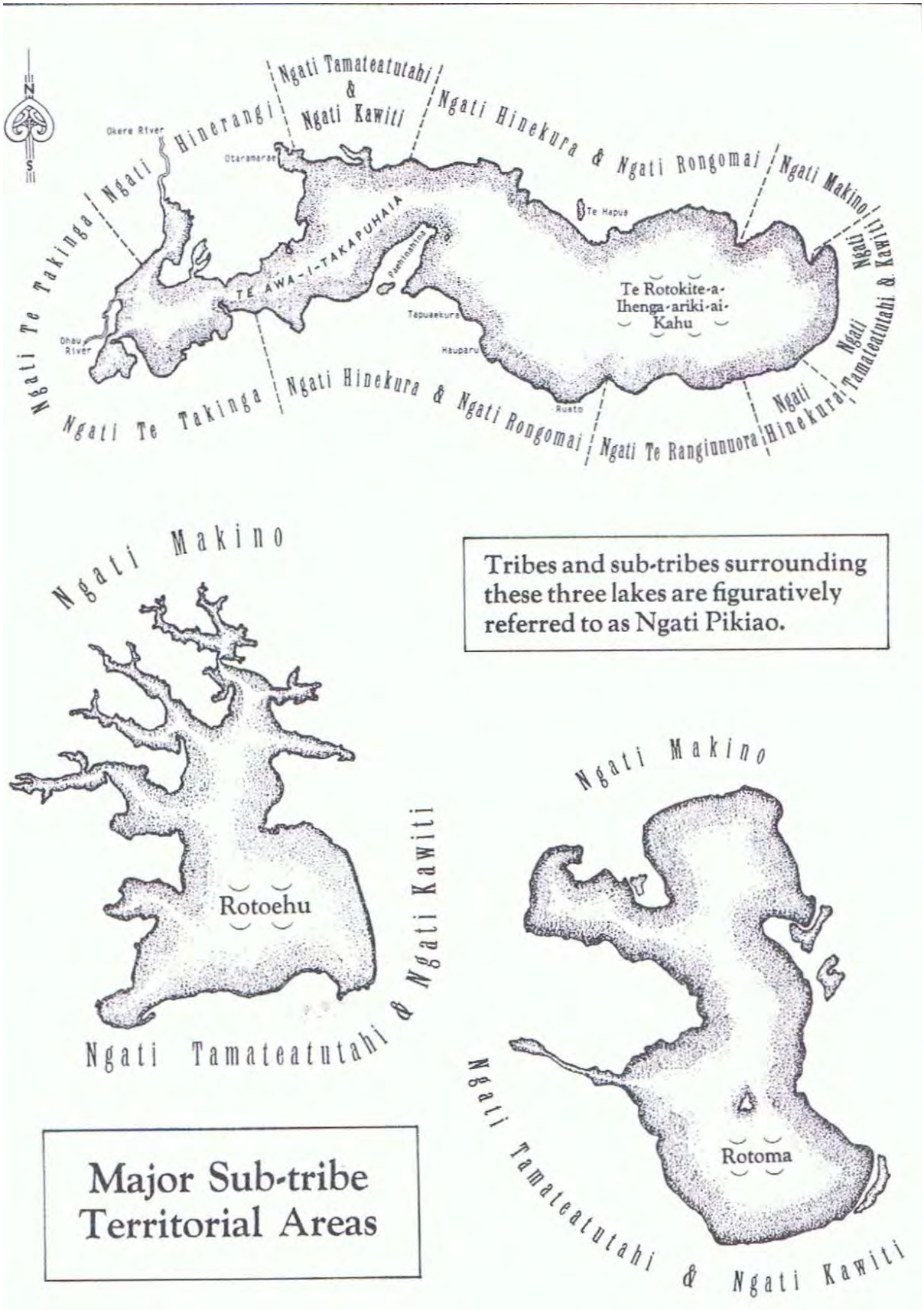



**Figure 14: Iwi/hapū affiliations to Lakes Rotoiti, Rotoehu and Rotoma. Source: Stafford, D.M. Landmarks of Te Arawa.**

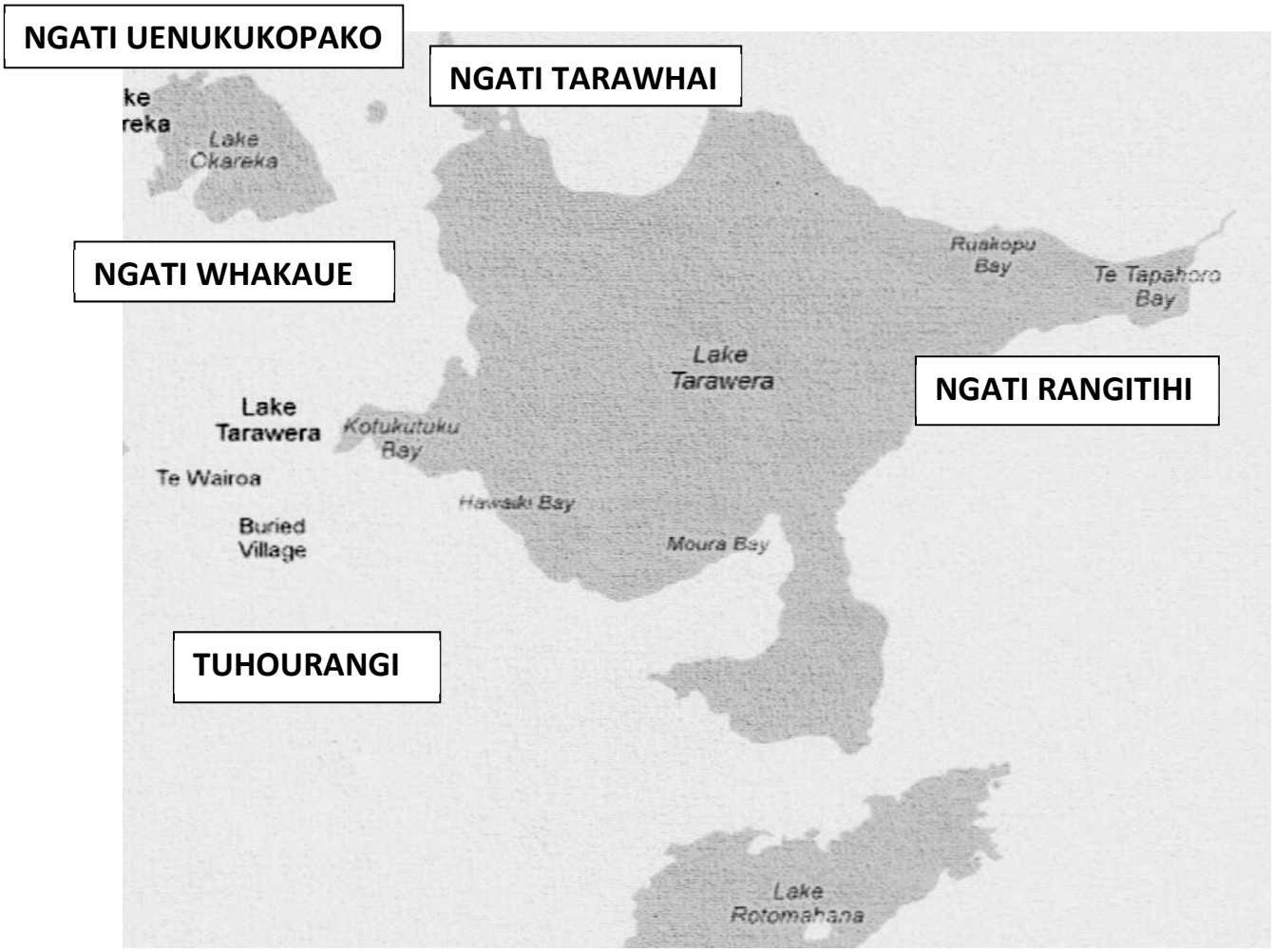



Figure 15: Iwi/hapū affiliations to Lakes Tarawera and Okareka. Source: Toi Ora

## 7.2 Iwi Management Plans

Some iwi/hapū around the shores of certain lakes have, over the past 10 years, developed, published and filed their Iwi Management Plan documents with the Rotorua District Council and BOPRC. These documents are taken into account when the issue of lakes structures is being considered and discussed by either council.

Most current Iwi Management Plans were written before Treaty of Waitangi claims were settled and, consequently, many may need to be reviewed to further assist councils in how these plans through the treaty settlement process can be recognised and acknowledged and given effect.

Iwi Management Plans that are current and make reference to lake structures in their documentation must be taken into account and given effect to, should the situation arise, in accordance with the BOPRC Regional Water and Land Plan (Policy 17).

Iwi/hapū that do not have an Iwi Management Plan have the opportunity to discuss lakes structure issues with iwi/hapū who have a process of engagement established, otherwise may have to rely on the Resource Management Act or the Historic Places Act to assist in any controversial lakes structure decisions.

## 7.3 Pā Sites – fortified villages

Many pā sites still exist around the shores of the Rotorua Te Arawa lakes and all are archaeological sites identified by the NZ Archaeological Association (NZAA) on their Archsite website. Most of these pā sites stretch from high hilltop points down to the lake edge. All archaeological sites recorded or unrecorded are protected by the Historic Places Act. Most pā sites are located on maps in Don Stafford's books, Landmarks of Te Arawa Volumes 1 & 2. Lake Ōkāreka and Lake Tarawera have not been covered as they were to be included in a planned Volume 3, along with Lake Okataina. Site information sheets on the NZAA website give pā names and a brief history in most cases.

Unless an archaeological authority has been granted by the NZHPT, a proposed lake structure that seeks to attach to or impact on an archaeological site will be declined. It is noted that most pā sites stretch from high hilltop points down to the lake edge. Accordingly, maps showing pā sites are indicative only and field assessment is required. All archaeological sites recorded or unrecorded are protected by the Historic Places Act. It is illegal to destroy, damage or modify an archaeological site without an archaeological authority from the NZ Historic Places Trust.

## 7.4 Waahi Tapu – sacred places

Not all waahi tapu are archaeological sites. Some natural features around the lake shores, such as kohatu (rocks), repo (swamps), ana (caves), puna (springs), ngawha (hot pools), motu (islands) are regarded as waahi tapu by various hapū for many different reasons, for example, Iriirikapua, Te Kuri a Te Roi, Motutara, Te Rua o Umukaria, Te Ana o Tunohopu. Most of the above natural features have, at some time in local Māori history, been associated with death, burials, or battles, taniwha, or blood spillage. Over centuries and fluctuating lake levels, many of these waahi tapu may now be above or below a lake surface or margin.

The Historic Places Act defines waahi tapu as "places sacred to Māori in the traditional, spiritual, religious, ritual or mythological sense": a very broad definition that encompasses all sites significant to Māori. There are very few sites in the Te Arawa region that are registered with the NZ Historic Places Trust as waahi tapu. Many, however, are listed on the Rotorua District Council's District Plan, thanks largely to Mr Don Stafford.

Boffa Miskell has published maps and names of sites of significance to Māori, around the shores of the lakes Rotorua, Rotoiti, Rotoehu, and Rotoma. As most of these names are those researched and gathered by Don Stafford it does not include sites around lakes Ōkāreka and Tarawera.

The site information given to and gathered by Don Stafford, and to a lesser extent Boffa Miskell, is the cultural and intellectual property of those iwi/hapū that live on, and/or have mana whenua over those sites. Consultation with iwi/hapū and or a relevant iwi authority is paramount when proposed new structures are being considered. Site information does not always include the entire story. Iwi/hapū will only give information that they are willing to share with the public and often very sacred sites or information is withheld by them, hence the need for consultation.

## 7.5 Mahinga Kai – traditional food gathering places

Te Arawa Lakes (Fisheries) Regulations 2006 sees the return of management of customary non-commercial fishing to Te Arawa. The fisheries regulations provide for kaitiakitanga, establishment of komiti whakahaere (fisheries committees) and the development of mahire whakahaere (fisheries plans) for Te Arawa's five taonga species, kōura, koaro, kakahi (fresh water mussel), tuna (eel), and inanga, including morihana (carp).

Traditional species of fish and shellfish are still gathered at certain times of the year from most lakes. Some lakes were more renowned than others for their abundance of kōura, inanga, kakahi, morihana, toitoi (bully), or tuna. Other native species have disappeared since the introduction of trout. Traditional methods of gathering these native species are still used. The materials used to make the traditional snare or net device may have changed but the methods used to make the catch are the same.

Kōura is probably the most desired of all the traditional food sources. Many kaumatua, during their final days, are known to request a meal of kōura before they die. Kōura is often referred to as a "kinaki"; a delicacy to add relish to a feast. Most of the lakes and streams in the Te Arawa district have kōura. The traditional tau or kōura trap is still used as well as the "rama kōura" method. Rama kōura is where a gatherer will use a lamp/torch and walk along shallow lake edges at night when the kōura come into the shallow waters to feed during the late spring and summer months. The gatherers catch them either in their hands or with a korapa (long handled scoop net). In areas where there are a high density of lakes structures, this practise is almost impossible.

## 7.6 Mahinga Raranga/Whatu – traditional plant gathering places

Harvesting of traditional resource plant materials from many lakes is still practised, but not as often as it once was. Harvest is mainly for weavers of traditional Māori garments, artefacts and art works, who gather harakeke, raupo, toetoe, paopao, and paru from traditional harvesting places around the lake edges.

Weavers of traditional garments, mats, and kits will gather plant materials from their own lake resource areas first. If there are none there they will go to the lake of a related iwi/hapū. Lists are provided of the tribes which belonged to each lake. This custom also relates to traditional foods.

All of the resources listed in the previous sections of this report are available from other areas not near a lake edge, such as a swamp or roadside or a drain or forest edge. The two plants that grow best in the lakes are paopao (also known as kuta) and raupo. The deeper the water where these plants grow, the longer the whenu (weft and warp strips) that weavers can work with. Both raupo and kuta once grew prolifically around all the lakes in the district and would have helped to filter nutrients out of the water.

The cultural impacts of the removal of plant resource materials to make way for proposed lake structures, should be avoided, or at least mitigated.

# 8 BUILT DEVELOPMENT

## 8.1 Overview

The Rotorua Te Arawa lakes are highly scenic. Sheltered shorelines, in particular, provide desirable settlement sites, especially where good fishing or growing conditions occur on north-facing sites or food-rich wetlands. Iwi/hapū settlements surrounded the Rotorua Te Arawa lakes well before European arrival, and well before planning provisions were developed. Many of these prime locations have now been subdivided and are covered with housing and lifestyle developments. Lake structures invariably occur in association with and adjacent to human development, servicing residential, lifestyle, or recreational purposes.

Sheltered shorelines are most suitable for boat houses and for mooring boats on jetties and there is a direct correlation with the densities of structures in these locations, for example Boat Shed Bay and Otumutu Bay at Lake Tarawera; Otaramarae at Lake Rotoiti. Hence the density of lake structures is greatest where road access and settlements occur, especially north-facing and east-facing shorelines, scenic locations, sheltered bays and inlets for example, Gisborne Point, Okere Arm, Te Weta Bay, and Otaramarae inlet at Rotoiti. More exposed shorelines, especially those with shallow water, are undesirable for larger boats for example, Mourea on Lake Rotorua.

Land use zoning is used to control subdivision and development, and largely reflects the reality of existing built development. These zones are available as a data layer on current planning maps.

Lakes structures - such as shoreline retaining walls - have also been developed to 'tame' physical processes such as wave erosion. Many shoreline retaining walls do not have resource consents, and may not have required a consent when they were constructed.

Jetties allow boats to be moored for recreational and commercial boating, providing dry access for users. Boat houses are used to store boats either on the water for larger heavy timber boats or with boat ramps and/or trolley rails on dry land.

The need for any of these structures, or numbers of them, is beyond the scope of this assessment. Anecdotal comments suggest usage of most private lake structures is very low, in terms of days of use per year.

## 8.2 Number and type of consented lake structures

The approximate number of structures currently recorded is summarised in the following table.

Table 3: Types and numbers of structures on the margins of the Rotorua Te Arawa lakes. Data is from BOPRC records. Note that structures using other descriptors, unconsented structures, or combined structures, are not included.

| Structure type | Number of structures |
|---|---|
| Boat ramp | 27 |
| Boat shed | 164 |
| Jetty | 554 |
| Mooring | 30 |
| Ramp | 68 |
| Retaining wall | 3 |
| Slipway | 46 |
| **Total** | **892** |

The following photographs provide examples of the built environment adjacent to the six lakes.

Figure 16: Lake Tarawera, from above Spencer Road, looking towards Te Wairoa.

Figure 17 Hinehopu, Lake Rotoiti

Figure 18: Okere Arm, Lake Rotoiti.

Figure 19: Okawa Bay ,Lake Rotoiti.

# 9 VIEWING AUDIENCE

## 9.1 Visual catchment

The visual catchment of the Rotorua Te Arawa lakes includes the entire lake surfaces and the surrounding land extending to the skylines.

The viewing audience is an important consideration. The lakes are visible to the general public from land, roads, parks and reserves, from the water (by kayak or boat), and from aircraft. Tourism and commercial users of lodges, cafes, and accommodation enjoy the lake environment as part of the visual amenity. Private views are available from urban and lifestyle properties, marae, and accommodation providers.

## 9.2 Key viewing audiences

The key viewing audiences comprise people using the following:

- Lakeside parks and reserves (Crown and council for example, Scenic, Esplanade, Recreation Reserves);
- Lakeside roads – scenic drives (viewshafts, vistas and lookouts);
- Viewing points (for example, rest areas);
- Boat ramps and popular boating destinations;
- Boats, kayaks, and other lake users (views from the lake);
- Urban areas and lodges - visual amenity from dwellings and accommodation.

Figure 20 Rotorua Lake front walkway is a viewing location for thousands of visitors

# 10 LAKE STRUCTURE DESCRIPTIONS

## 10.1 Introduction

It is important to fully understand the different types and use of lake structures. This section uses photographs, drawings, and text to describe the various lake structures.

## 10.2 Shoreline walls

Various shoreline structures have been developed for the following reasons; for erosion control, to create a controlled edge or mowing strip, as abutments for jetties, to create berths for vessels, for reclamations, and for lining filled areas and excavations. Shoreline walls have been built in a variety of materials, most commonly timber but also stone, rubble, cast concrete, and various re-used materials, including tyres.

Heights and lengths of walls vary. For example, the Rotorua Central Business District foreshore walls are over 500m long and the Ohau Channel diversion wall is 1.2 km long. Heights are typically 0.6-0.9m, though this is site-dependent and alters with variations in lake levels.

**Figure 21: Okere Arm, Lake Rotoiti: Lakeshore wall doubles as marina wharf in an excavated embayment.**

**Figure 22: Hinemoa Point, Lake Rotorua: shoreline wall of rock rip rap and timber to protect against wave action.**

## 10.3 Jetties

There is a huge variety of jetties around the Rotorua Te Arawa lakes, with varying shapes, lengths, and widths. Shapes vary from simple finger jetties to L, V, or Y configurations depending on prevailing winds and currents. They often have associated walls for jetty abutments plus various buffers made of tyres or proprietary plastic fittings and also bollards or kick rails for mooring boats. Jetties are typically of timber construction and frequently include steps or ramps to accommodate changes in ground levels. Jetties may have various attachments, such as assorted decks, fences/screens, boat cradles, hoists, and pontoons.

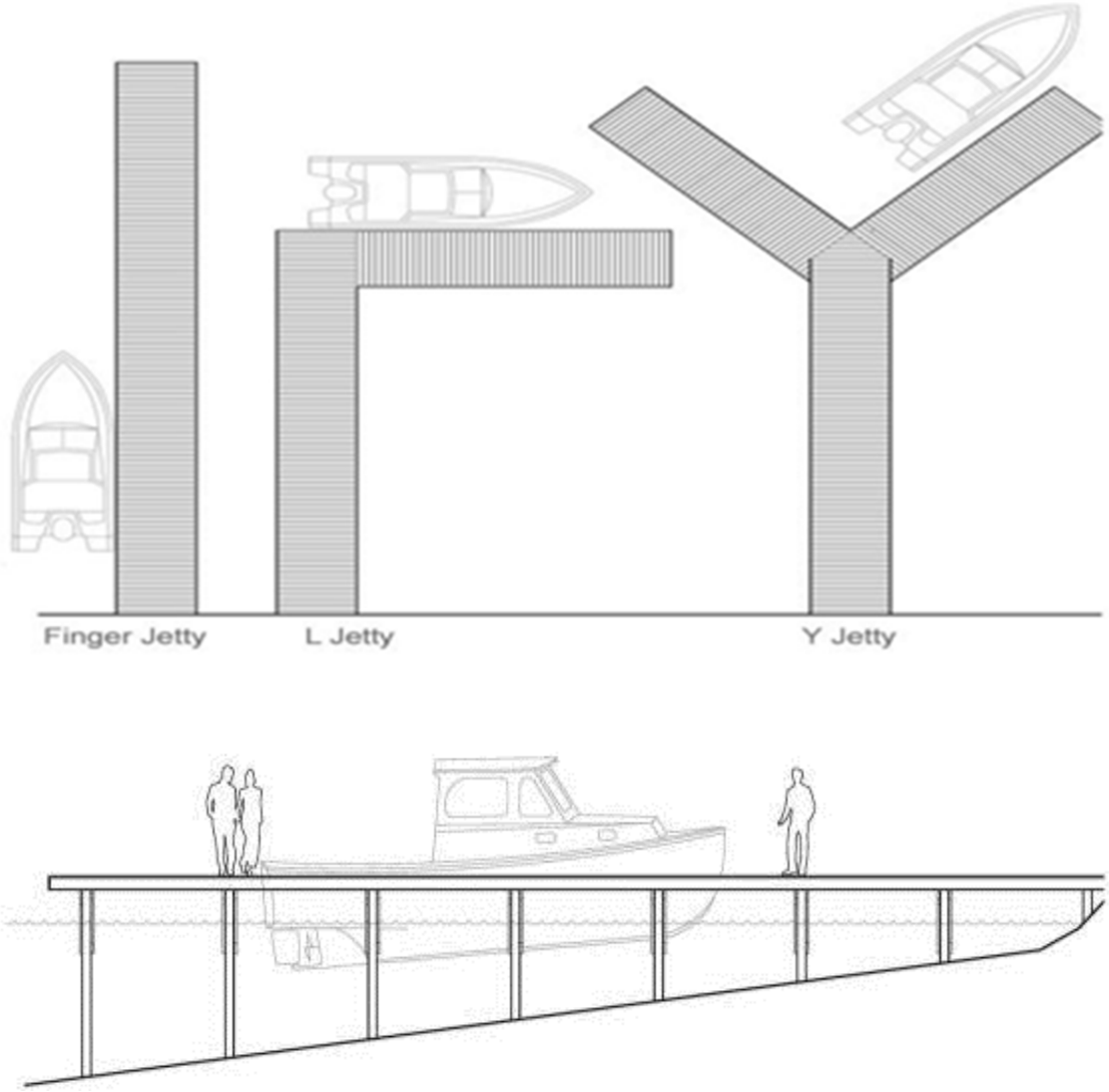



**Figure 23: Different types of jetties and their uses.**

Construction of a jetty can involve vegetation clearance and excavation of lake bed for channels in shallow water. Jetties are frequently associated with construction of shoreline walls for abutments and wave erosion, and other structures such as boat ramps and boat houses.

**Figure 24: Private jetties at Otaramarae, Lake Rotoiti (10 jetties within 130m with closest just over 7m apart, longest45m).**

**Figure 25: Public jetty at Te Wairoa, Lake Tarawera (length approximately 21m).**

Some jetties also include white paint, lighting and navigation aids, tyres, and other assorted buffers. A few have vertical palings from the deck surface to the water for shelter from wind and waves. Handrails and tall posts are sometimes present.

Figure 26: Jetty with vertical palings, Lake Rotoiti.

Jetties are of variable lengths, typically about 12-15m long, and often have returns and additional berths constructed in all manner of L or Y shapes at lakeward ends. A few private jetties are up to 25-30m long. The longest jetties are public structures, associated with tourism at the Rotorua CBD Lakefront. Widths also vary, but are typically 1-1.5m across.

The effect of the jetties on natural character is to reduce the naturalness and increase the built-ness.

The density of jetties varies, with the greatest density typically being associated with denser housing, or where there is good natural shelter. There are areas with a solitary jetty, usually where there is a large section or property and other areas where every dwelling appears to have a jetty. Some jetties are shared and have multiple owners.

Figure 27 Jetties with accessories and water craft at Lake Okareka

## 10.4 Boat houses and boat sheds

There is a wide range of boat storage buildings around the Rotorua Te Arawa lakes, some located on land where boats are stored dry, and others partly or mostly over the water where boats are stored floating. Boat sheds are mainly located adjacent to housing developments either adjacent to private land, but with some on public reserves. This assessment deals only with the boat houses over the

water, although the landscape and visual effects are typically very similar. Boat sheds on land often have boat ramps or tracks with boats launched from purpose-built cradles or trailers. Boat sheds over the water often include internal decking to provide dry access onto the boat by the users.

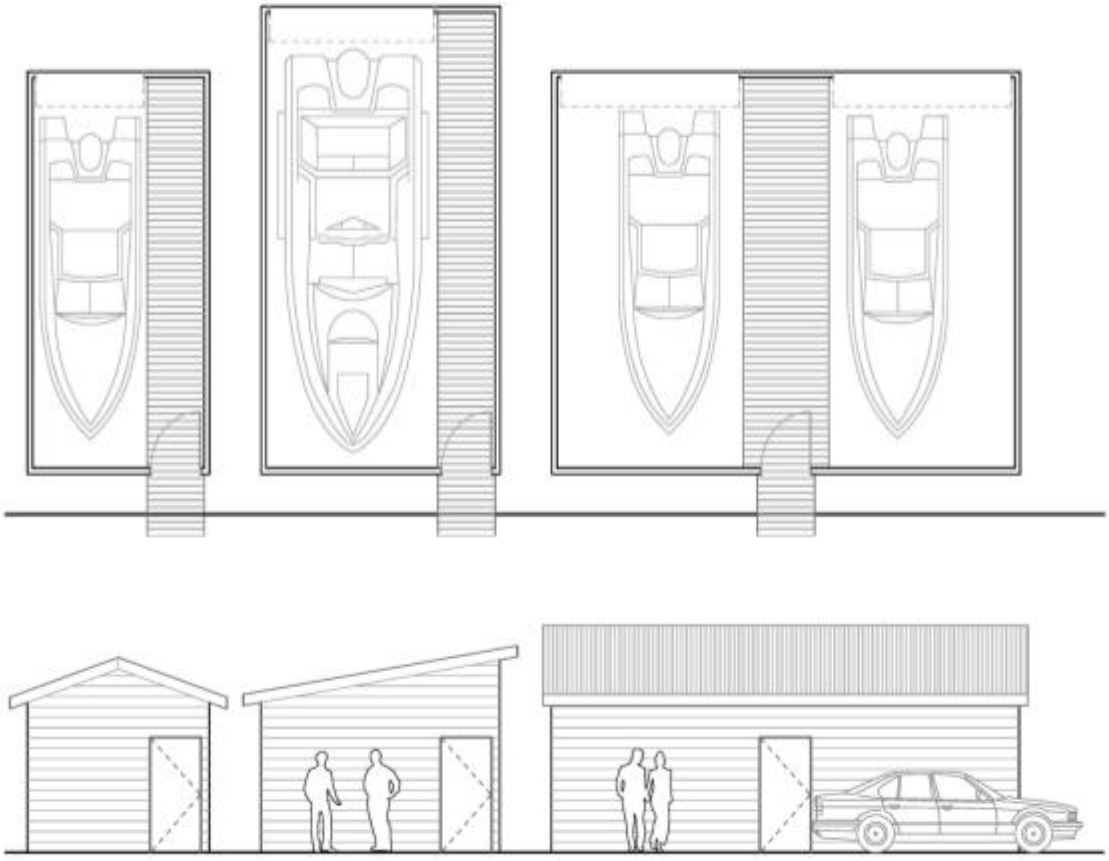


Figure 28: Typical floor plans and elevations of boatsheds.

Figure 29: Boat sheds are located on land (centre with green door) and over the water (right with brown door).

Figure 30: Cluster of approximately 11 individually-designed separate boat houses at Otaramarae, Lake Rotoiti.

Boat houses are typically simple garage-like designs with either pitched or gabled roof lines, and are usually constructed of timber and iron. In typical New Zealand fashion, no two are ever the same. However they typically have a lockable pedestrian door on the landward side and vehicle type doors lakeside (rollers, tilt, or hinged). Boat houses are linked to dry land by way of boardwalks, decks and walls, often with steps and ramps to accommodate grade changes.

Figure 31: Strip of approximately 25 commercial style boat houses at Boatshed Bay, Lake Tarawera.

The bulk and scale of individual boat houses is generally small, although there are a few commercial-scale boat houses, that dominate some shorelines. Some of the individual boat sheds and strips of boat sheds have considerable scenic character, while others detract from the surrounding natural character.

## 10.5 Boat ramps and slipways

Boat ramps and slipways also include structures used to launch or retrieve boats from the water. These are often solid concrete ramps, but also include various rail and timber structures. They vary in slope and angle and extend from landward garages or pads to below water level. Boat ramps follow the slope of lake bed, to allow boats to float off. They all require some excavation of the lake bed for piles and posts, and usually include a jetty for mooring and dry access.

**Figure 32: Jetty with adjoining slipway and rails at Lake Tarawera.**

**Figure 33: Private commercial jetty and board walk at left, with public boat ramp and jetty on right. A privatecommercial slipway with trolley is located between the two jetties. Te Wairoa, Lake Tarawera.**

Figure 34: Public jetty and boat ramp at Sulphur Point, Lake Rotorua.

# 11 LANDSCAPE AND NATURAL CHARACTER MAPPING

## 11.1 Jurisdiction and assessment

Various organisations have statutory roles and responsibilities in the management of lakes structures on the lakebed and associated lands. The Regional Council is responsible for the administration of the surface of the water, and administering resource consents for lake structures on the lake beds. Rotorua District Council is responsible for administrating some parts of the adjacent land, and also administers all building consents. Te Arawa Lakes Trust and Land Information New Zealand have a formal agreement through the Lakes Settlement Act which ensures that approval must be sought for new and/or modification to existing lakes structures. A Guide to Lake Structures brochure is available on the BoPRC website, www.boprc.govt.nz.

The lake bed and water body are not fixed, with water levels changing dependent on rainfall. For example, during the period of this assessment, the lakes were high and many structures were under water. In practice identification of the extent of the lake bed on a particular site is impractical. Shoreline walls have considerable landscape and visual effects but it may be unclear whether they require resource or building consent/s.

People experience both the waterscape and the adjacent landscape as one. It is difficult to find waterscape views that do not include a land backdrop. Many of the most scenic views include shoreline reflections. Shoreline walls are difficult to manage as they are cross-boundary, in jurisdictional terms, and their purpose may not be for recreational activity, like other lake structures. In this regard, a joint or common approach to the management of shoreline walls would be of advantage, to ensure cohesive consideration of visual and landscape effects.

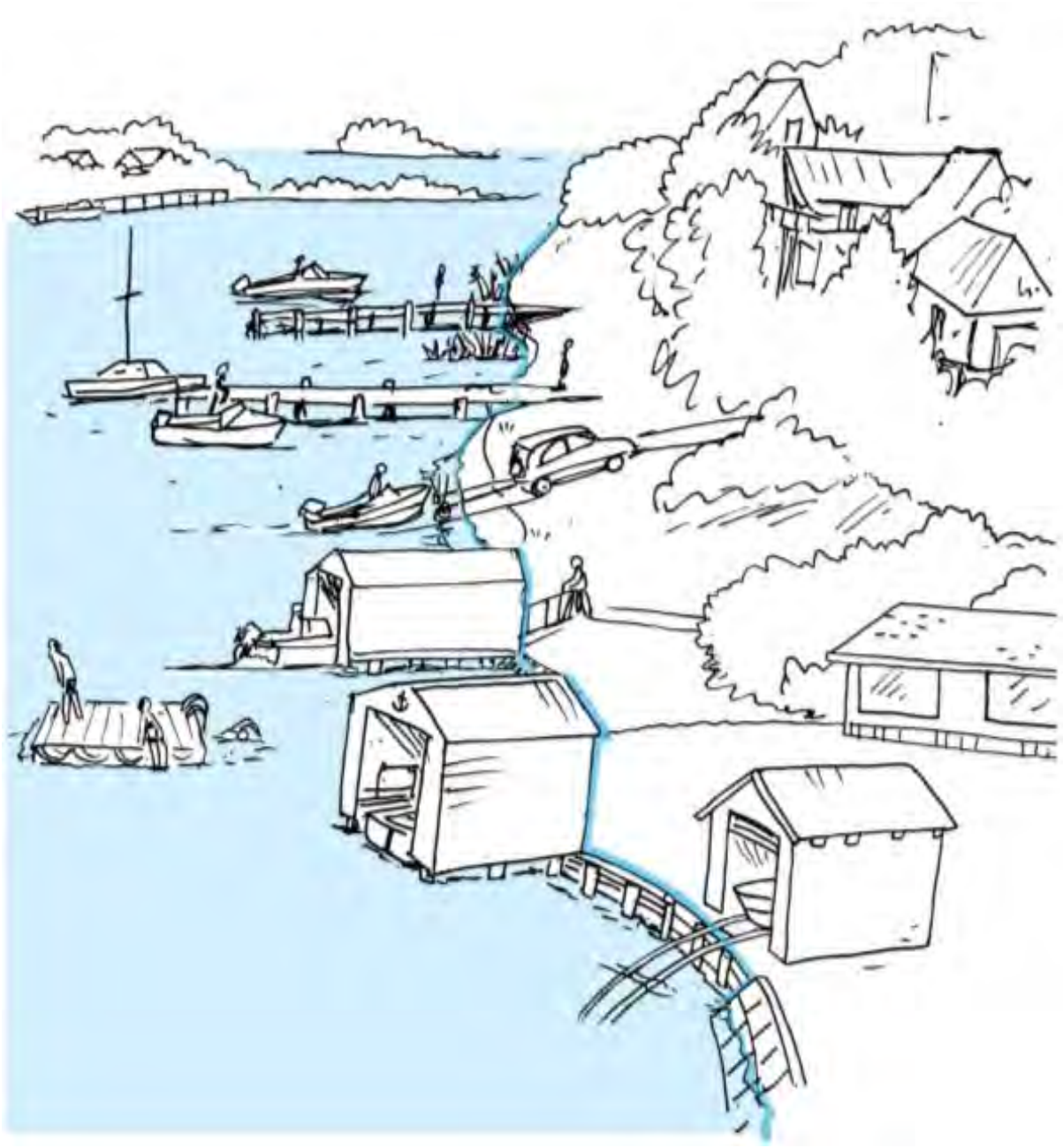


**Figure 35: Diagrammatic representation of approximate administration boundary between Bay of Plenty Regional Council and Rotorua District Council, shown as a heavy blue line.**

Figure 36: Structures within vegetation at Otaramarae, Lake Rotoiti.

An assessment of the landscape and visual effects restricted to lake structures in isolation to their settings is contrary to best practice landscape architecture. This is because context and locality are critical components of landscape. This assessment therefore considers the whole landscape although recommendations and conclusions are targeted to the provision of criteria for Consent Officers dealing with lake structures.

This assessment has considered more than one scale of potential effects. The mapping compiled for this project provides a broad outline of where natural character is dominant on lake margins and where 'development is prominent'. Where natural character is dominant, preservation-oriented management is appropriate. In the areas mapped where development is prominent, settled areas can be broken down further on an application-by-application basis into three categories:

- Development blends in;
- Development contributes interest;
- Development is prominent.

This requires a measure of judgement and is discussed further later in this report. More detailed investigation may be required for specific sites and structures.

## 11.2 Mapping

Mapping of existing landscape, vegetation, and land use has been used to indicate areas where structures are likely to have greater or lesser landscape and visual effects. This section outlines the methodology used for analysis of how proposed, existing, or altered structures may impact on landscape, cultural, amenity, or natural character values.

All six lakes are ONFLs. The ONFL layer was generated in the "Outstanding Natural Features and Landscapes Review in Inland Bay of Plenty" (Boffa Miskell, February 2009), which followed a 1997 ONFL study by the same authors.

Indigenous vegetation layers are based on the national Land Cover Data Base 2 (LCDB2; Ministry for the Environment 2004). A high correlation between the vegetation layers and natural character was observed and confirmed during the site visits. From a distance, indigenous and exotic vegetation both comprise a visual greenbelt and contribute to natural character and visual amenity, though older more developed indigenous areas are clearly more natural.

Settlements reflect Rotorua District Council urban zones. Lake structures are associated with residential or recreational development. Reserves allow the public to obtain access to the lakes for recreational use and enjoyment (Section 6(d) of the Resource Management Act).

This report does not address stormwater outlets and other significant public infrastructure, such as the Okere Gates. These structures are subject to separate planning requirements, and specific consents.

By reviewing the maps, a particular application on any given site can quickly be categorised as being within either 'natural character dominant' or 'development prominent' 'zones'. This is a proxy for a particular location, being either more or less sensitive to development. For example, a site within an ONFL, with significant indigenous vegetation, undeveloped, within public views, and of high cultural significance would be very highly sensitive to development. Another example, with no significant indigenous vegetation, modified land, in a built-up residential area with existing structures, no landward public access or viewing and no cultural sites would be much less sensitive to development, but would benefit from enhancement/mitigation. Most applications for lake structures will sit between these two extremes.

Maps showing 'natural character dominant' and 'development prominent' shoreline have been produced for this project. These are based on NZMS 50 series and the LCDB2 maps, with a degree of interpretation based on detailed local knowledge. LCDB2 vegetation class boundaries were used to define areas where natural character is dominant, and this has been tested through site visits and adjusted where settlement sits within vegetation or where vegetation extends in a narrow strip along the shoreline between built development and a lake margin.

There are four maps in appendix 4 covering the six lakes which show the entire shoreline classified as being either natural character dominant or development prominent.

# 12 ASSESSMENT OF EFFECTS

## 12.1 Types of effects

Landscape and visual effects of lake structures fall broadly within the following types:

- Effects on Outstanding Natural Features and Landscapes (ONFL);
- Effects on natural character;
- Effects on visual amenity and scenic values;
- Experiential effects on recreation users and public access.

## 12.2 Effects on Outstanding Natural Features and Landscapes

A matter of national importance in the Bay of Plenty Region is that all six lakes are ONFLs, having been assessed using Bay of Plenty Regional Policy Statement (RPS) Appendix F criteria for natural features and landscapes (see section on previous landscape assessments). The landward extent of these has been refined using LCBD2, to help define contiguous naturally-occurring indigenous vegetation, with some local ground-truthing.

Criteria for identification of ONFLs and natural character have been well tested by the Environment Court and are accepted by landscape architects as best practice.

Landscape effects on the ONFLs are the alteration to the lake edge, by earthworks and structures. Lake edges are sensitive to landscape change. All existing and proposed structures have incremental and usually adverse effects on the shoreline. As a basic principle, given that all of the lakes are ONFLs, adverse changes to lake edges should be avoided.

## 12.3 Effects on natural character

Large sections of the lake shores have high natural character, as assessed using the natural character criteria in the BOP Regional Policy Statement (Appendix F). Natural character values are very high for islands, peninsulas, rocks and cliffs, and bays and inlets, especially where naturally-occurring contiguous indigenous vegetation is present.

Landscape context is very important for the assessment of landscape effects. In areas of high natural character, with no built development, even single jetties or boat houses can detract from and have adverse landscape and visual effects. Development in these areas should be avoided unless there is clear public benefit, and potential adverse effects are remedied through sensitive site selection and design.

Resource consents for lake structures are at a scale of detail usually dealt with by district councils. This means that strategic regional provisions and constraints mapping are generally too high level to apply to an individual property or application. Other approaches are required to manage such effects, including quantitative measurements (scale and extent, density) plus site-specific assessments, including evaluation of potential net conservation benefits or voluntary mitigation.

Where development within a natural character dominant area provides for the maintenance and enhancement of public access to and along the lake shores, and rivers (RMA S6(d)) it may be justifiable to allow structures, where they would otherwise be inappropriate for private purposes. Such development should, however, be located and designed to be recessive and constructed in a sensitive manner. Locations other than natural character dominant shorelines are still preferable.

**Figure 37 Jetties on Rotorua lakefront reserve**

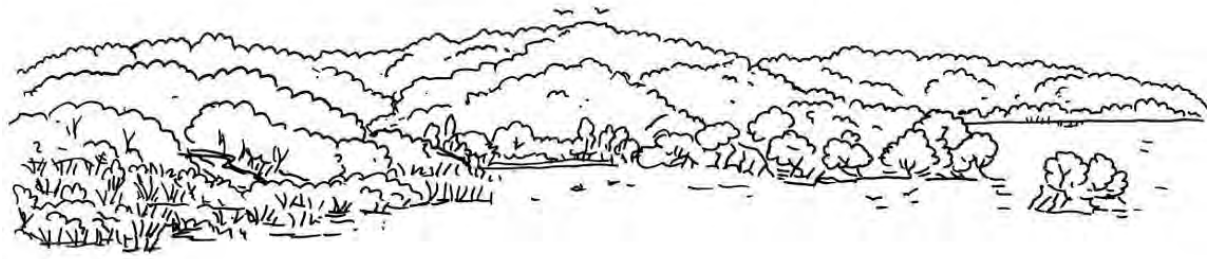
Criteria for assessment of the effects of proposed structures on natural character have been developed and are provided later in this report, including assessment of potential effects on:

- Landscape and natural character;
- Ecology;
- Cultural and historic;
- Public access and use.

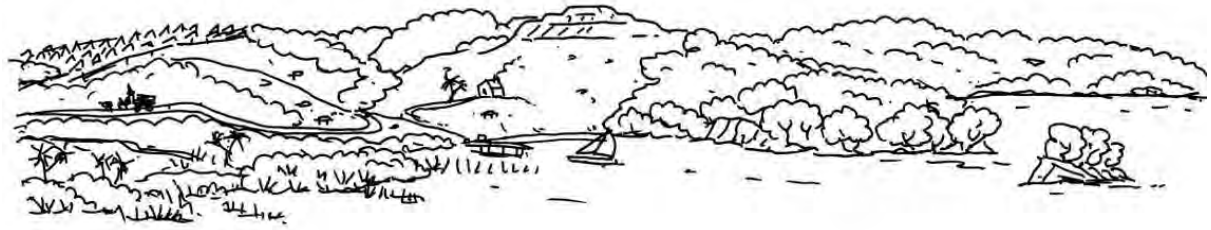
The series of illustrations below is intended to show how the removal of vegetation, plus increasing the scale and density of built development, affects natural character. The basic landform is the same through the series.

The first illustration shows a pristine landscape with intact landform and vegetation cover. The series of illustrations progressively shows how land use change to pasture or, to a lesser extent exotic pine plantation, results in substantial landscape and visual change. The introduction of buildings and lake structures, with associated human possessions, changes landscapes. Vegetation clearance and development result in the loss of 'wilderness character'. The series then shows how the introduction of further development, including lake structures, progressively and incrementally alters and degrades the same scene, while the third and fourth illustrations shows extensive large scale development, while still maintaining some mature vegetation. Whether the result is adverse depends, to some degree, on design and construction quality, preferences, and whether there is a public benefit.

Figure 38: Illustration of how, over time, an environment can change with addition of built forms.



Pristine landscape with the landform and vegetation cover intact.



Introduction of development, including lake structures.

Additional development.

Extensive large scale development.

At some point, loss of indigenous vegetation is so great that regeneration of indigenous plants no longer occurs naturally and the character is changed permanently. Retention of significant tracts of indigenous vegetation, able to provide a seed source for recolonising adjacent urban areas, is highly desirable for maintaining representative habitat. Good local examples include the retention of kamahi, rewarewa, kahikatea, pohutukawa, and rimu.

The series of photographs on the double pages following further illustrates the following:

- Natural character dominant;
- Development prominent;
- Development that blends in;
- Development as a point of interest.

## 12.4 Effects on visual amenity and scenic values

Visual amenity is a combination of natural features and landscapes, natural character, and the arrangement and integration of human modification. Seasons, aspect, weather, and light conditions all influence visual amenity and scenic values. These ephemeral effects, especially natural lighting, can magnify or obscure adverse effects.

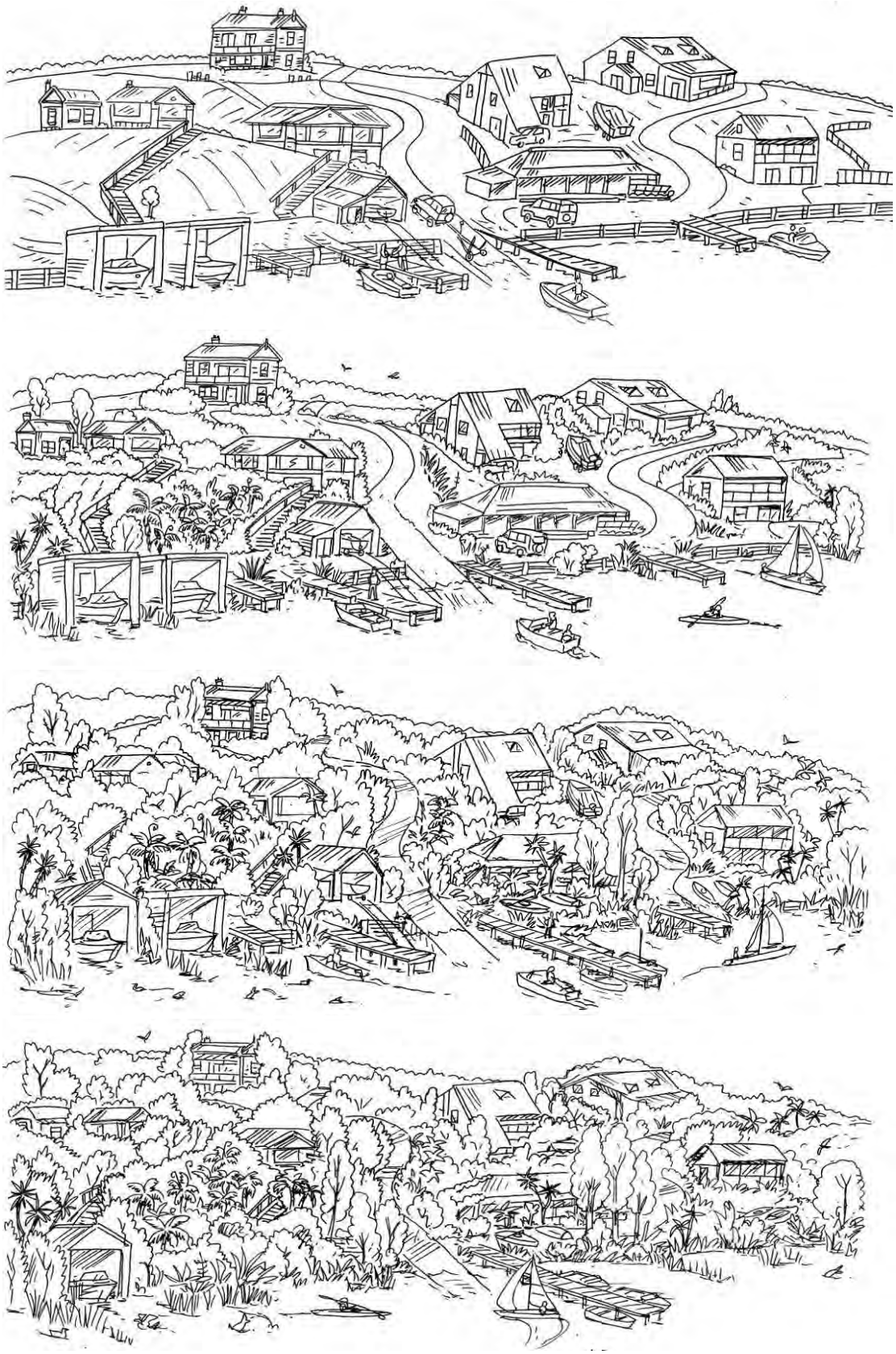
Visual amenity and scenic values are subject to individual preferences.

**Figure 39 Everyone will perceive this view of Okere Arm somewhat differently**

Extensive sections of shoreline around the Rotorua Te Arawa lakes have high visual amenity and scenic value. This is most apparent where the original landform and landcover remain, and also where buildings and structures nestle into the surrounding vegetation, particularly where indigenous vegetation is dominant.

The following illustrations are intended to help show how interactions between vegetation and built development, with a complex mixture of natural and built landscapes. 'Natural' refers mainly to the vegetation; its maturity and extent, whether it is mainly indigenous, and whether indigenous vegetation is regenerating naturally. 'Built landscape' refers to buildings and structures, and includes consideration of bulk and scale, location and design, materials and colours, and density.

**Figure 40: Illustrations of built forms located in un-vegetated environment at top, and changes over time with growing vegetation, with fully vegetated scene at bottom.**



natural character dominant

natural character dominant

natural character dominant

development prominent

development prominent

development prominent

development prominent

development blends in

development blends in

development blends in

development as a point of interest

development as a point of interest

# DIAGRAM ILLUSTRATING NATURAL CHARACTER DOMINANCE

PRISTINE - WILD
Natural systems expressed
Landform fully intact
Landcover in natural state
Habitat is natural with abundant indigenous fauna

Natural character remains over large parts
Some landuse change forestry farming
Even single buildings stand out
Remote rural character
Regeneration  of indigenous plants common

Further clearance of vegetation
Indigenous  isolated to remnants
Subdivision for urban use
Habitat loss alters fauna mix
Planting of exotic species
Regeneration commonly weeds species

watercourses altered,
sediments and nutrients
extensively earthworked
regrowth largely exotic
paucity of indigenous fauna
DEVELOPMENT PROMINENT

March 2012

ROTORUA TE ARAWA LAKES
BASELINE LANDSCAPE ASSESSMENT

# DEVELOPMENT PROMINENCE

vegetation cleared, landform altered
subdivisions with view protection/ vegetation height controls
new and larger dwellings and structures
limited design controls for buildings walls and structures

gardens and vegetation soften buildings
plants grow in moist and suitable soils and conditions
materials weather and colours fade
shoreline and margin plantings
community aspirations; privacy, natural qualities

Vegetation matures over years and decades
Houses fade or painted recessive colours
Indigenous vegetation attracts birds
Indigenous regeneration starts
Buildings contribute to character
Edges soften and  naturalise around lake

Removal of derelict or surplus structures
Shared jetties and ramps
Indigenous regeneration common
More mature vegetation provides habitat and food source
Indigenous fauna more adundant
DEVELOPMENT BLENDS IN

March 2012

ROTORUA TE ARAWA LAKES
BASELINE LANDSCAPE ASSESSMENT

The series of illustrations above shows how vegetation can soften and mitigate effects of built development, and increase natural character.

- The first illustration shows a highly developed urban scene, without planting, and with some inappropriate development on skyline ridges, and extensive lakes structures.
- The series below then progressively adds young vegetation, design controls such as eaves, recessive colours and design interest in the following two illustrations.
- The bottom illustration shows the effect of mature vegetation, in terms of softening development and also the effect of removal of lakes structures.

Apart from an apparent dominance of vegetation or buildings, a scene can still be 'scenic' or 'ugly' depending on the location, arrangement, design, finishes, and colour of the structure(s). This is largely about how buildings sit, or blend in, and respond to their surroundings.

Vegetation can soften and even remedy effects, subject to the following:

- Maturity and type of vegetation behind, between, and in front of buildings and structures;
- Maturity and type of natural vegetation on the lake shore and margins;
- Maturity and type of vegetation at abutments and against lake structures;
- Extent and mitigation effect of aquatic vegetation and adjacent wetlands.

Evaluation of how well built development blends in depends on the following:

- Location of structures; whether they avoid skylines, lake edges, significant vegetation;
- Bulk and scale of buildings and structures;
- Density and arrangement of buildings and structures, including distance from a lake;
- Apparent depth and layers of buildings, whether view shaft restrictions prevent mitigation;
- Building design, orientation, materials and colours.

### 12.4.1 Areas where built development blends in

Some sections of shoreline have high natural character values due to regenerating indigenous vegetation or established exotic plantings. They are unlikely, however, to be mapped as ONFLs because the vegetation does not have sufficiently high ecological values. Scenic 'development prominent' areas are invariably well vegetated, and nature still has visual dominance but development blends in and sits within the landscape. These areas tend to have significant amounts of indigenous vegetation amongst housing development, either landward or shoreward, and development is of a scale, extent, and variety that adds to scenic character. The lake edge is also likely to be partially-vegetated and buildings are softened with plantings of a scale greater than the buildings themselves. There is often rising ground or large trees behind buildings or other structures.

Attributes of areas where development blends in are likely to include some or all of the following:

- Small settlements or settlements broken into smaller clusters and strips by green belts;
- Buildings avoid skylines, islands, peninsulas, and are set back from shoreline to varying degrees;
- Design is of small or modest scale, or, if larger, appears small in that context;
- Indigenous vegetation is valued and incorporated, rather than being removed;
- Materials and building colours are recessive and of a similar reflectance to the surroundings;
- Design incorporates features that cast shadows and avoid glint and glare;
- Large areas remain undeveloped to the sides, in front of, and behind the structures.

Examples of areas where built development blends in are shown in the photographs labelled "Built development blends in".

### 12.4.2 Areas where built development contributes a point of interest

There are examples of buildings which are fully visible from a lake but which contribute to the scenic values and visual amenity, as a result of meritorious design or appearance. This includes some heritage and cultural sites such as marae, churches, and attractive houses, but also includes small crafted baches and rustic, charming, or quaint baches with associated buildings and structures.

Whether buildings and structures contribute a point of interest is subjective, with various perspectives possible, however, good design can be assessed. Attributes of good design include the look and function or workings of the building or structure being of a high standard and blending in.

Examples of lake structures that contribute a point of interest are shown in the photographs labelled "Development as a point of interest". These include public jetties beside the public boat launching ramps at Tarawera and Ōkāreka, the church at Ohinemutu, marae, the boat sheds at Otaramarae, and various private dwellings and structures.

### 12.4.3 Areas where development is fully or mostly exposed to view

Some settlements have dense concentrations of dwellings without any mitigation. There may be viewshaft covenants or agreements, and perhaps an aversion to vegetation near buildings or dislike of trees or certain indigenous plants. Shoreline walls may be constructed to provide mowing strips to edge lawns. These are often invisible from the dwellings but create adverse effects as viewed from the lake, especially where a wall extends over more than one property.

Examples of where development is dominant are shown in the photographs labelled "Development dominant".

## 12.5 Experiential effects on recreation users and public access

Lake structure values and effects are highly experiential and, by definition, are accompanied by some degree of associated human activity. This can be positive where lake edge reserves provide for

boat launching, community jetties, and parks and walkways for public recreation, use, and enjoyment. Experiences can also be negative; such as where Esplanade Reserves are spatially and behaviourally privatised by adjacent landowners through encroachments, barrier fencing, or planting, and where legitimate public use is discouraged and visitors made unwelcome. Structures in the lake bed, such as jetties, can impede access along the shoreline and lake shallows, and present a safety hazard, in the case of slipway rails hidden underwater.

Structures generally have a recreational purpose and the activity itself also contributes to the effects. For example motor boats, water skiing, and jet skis are noisy activities that draw the eye. These are usually concentrated where recreational and urban development is most dense, or in separate ski zones. There is also a highly seasonal aspect to the effects of lake structures and their use. The Rotorua Te Arawa lakes come alive with human activity and use during a few days or weeks over summer and public holidays.

Provision of public access to the lakes is a matter of national importance (RMA Section 6(d)) and needs to be considered as part of any lake structure consent application.

It is noted that, in combination, private structures can have a negative effect on public access. This could be due to hazards, number or scale of lake structures, or prominence. A reduction in the number of lake structures is desirable in places, and could be achieved through a variety of mechanisms, such as community facilities or shared jetties and the use of community "lakecare" groups to help repair and replant sections of lake shore where there is a common community of interest.

## 12.6 Other effects

A number of factors were noted during the project that affects the assessment of some structures. These can be identified as ephemeral and seasonal factors, as outlined blow.

### 12.6.1 Ephemeral factors

Light conditions have a large impact on appearance. Direct sunlight, in particular, can make light-coloured and reflective structures stand out. Similarly, structures in shadows or dappled light are often naturally-camouflaged. Time and natural processes also have an impact. Timber weathers and commonly fades and blends into views. This is due to uneven fading and bleaching, mould and algae growths, and timber grain weathering differentially. Nails and fixings go dull or rust and surface wear unevenly, due to wind and waves and general wear and tear.

Plants also naturalise on and around structures.

### 12.6.2 Seasonal factors

Seasonal factors also make a big difference. Small recessive structures may have few effects until public and summer holidays, when people fill a scene with water craft and human activity. Most of the photographs used in this assessment were taken during the period December 2011 to March 2012, when waters levels were relatively high. Effects will be different with low lake levels, when more of the lake structures will be visible.

Data on usage of structures is hard to determine, so has not been used to inform this assessment. Anecdotally, usage of many lake structures appears to be limited, with many structures being commonly used for just a few days each year.

# 13 CULTURAL IMPACTS OF STRUCTURES

## 13.1 Background

Current lakes structures (jetties and boat sheds) have been in existence for some years and most were built at a time when there was little or no prior consultation with local iwi/hapū. A condition of the Te Arawa Lakes Settlement 2006 allows for existing structures on the beds of Te Arawa lakes to remain.

The Te Arawa Lakes Settlement has now given local iwi/hapū, via the Te Arawa Lakes Trust, the ability to determine the appropriateness of new lakes structures and modification of existing lakes structures via the lease process, that could impact on the significant places referred to above.

## 13.2 Impact of existing structures

### 13.2.1 High density areas

Numbers of existing structures in high density areas (such as Gisborne Point, Lake Rotoiti) should be decreased where possible, by non-renewal of jetty licences and encouraging neighbouring properties to share one jetty between two properties. This could halve the impact of jetties on traditional mahinga kai areas. As an example, rama kōura is now rarely practised around Gisborne Point because of the closeness of the many jetties that kōura gatherers have to go over, under, or around.

### 13.2.2 Hazardous areas

Underwater hazards have been created where rail lines run into the lake from an onshore boatshed. Some are still used and others are not, but they remain underwater on the lake bed. Rama kōura is a mahinga kai practised at night and the rail lines are a hazard that should be removed where possible and an alternative used for example, a ramp with wheeled trolley or trailer. Unused rail lines should be removed, by their owners.

### 13.2.3 Highly sensitive areas

Some existing boat sheds at Kariri Point on Lake Tarawera are probably the most culturally sensitive and inappropriate. Although not registered with the NZ Historic Places Trust as such, the site is regarded as waahi tapu by the Tuhourangi people. The offending boatsheds are attached to the waahi tapu, which was set aside as 'an inalienable cemetery reserve in 1895'. Boatshed owners trespass over waahi tapu land whenever they use the boatsheds. The cultural impact of structures in this area is high and incompatible with the cultural values. Trustees of the land block, Rotomahana Parekarangi 6G2B, could file court proceedings to pursue the aim of having existing structures removed.

Most wharenui (meeting houses) are orientated towards the lake. The immediate area around a wharenui is keep clear of structures to ensure that the lake can be viewed, principally from the wharenui and secondly from other marae buildings. This is referred to as a 'cone of vision'. The cone of vision also works in reverse, to ensure that wharenui (and marae) can be viewed from the lake waters.

### 13.2.4 New structures

The granting of permits for any new structures and modification of existing structures must take into consideration impacts that the structure could have on any of the cultural features listed above, and potential adverse effects should be avoided or mitigated.

Where traditional plant resources are removed to make way for future structures, developers should be required to replant another area nearby with that plant species, to mitigate the cultural impact resulting from any loss of this resource.

Figure 41 Some structures have been constructed in culturally inappropriate locations (Kariri Point, Tarawera)

## 13.3 Baseline assessment methodology

The following items require consideration to ensure potential cultural impacts are minimised, when assessing any new, or modification to an existing, lake structure.

- Assess cultural significance of the sites that structures are located within the vicinity of. Engagement with iwi/hapū, via the Te Arawa Lakes Trust, is vital.
- Structures proposed within the vicinity of archaeological sites need an archaeological authority from the NZ Historic Places Trust.
- Reduce numbers of jetties in high density areas. Sharing of one jetty between adjacent properties should be encouraged.
- Avoid removal of traditional resource plants where structures are sited.
- Developers of proposed new structures should first engage with mandated spokespersons for the local iwi/hapū, via the Te Arawa Lakes Trust.
- Proposed new structures and modification of existing structures must not interfere with the 'cone of vision' of a marae .
- Natural features or waahi tupuna (ancestral places) that are of special significance to iwi/hapū should not be compromised by a proposed lake structure.

Most sites significant to iwi/hapū, around the six Te Arawa lakes evaluated in this project have not been adversely affected by lakes structures, although this could change with future applications.

# 14 CUMULATIVE EFFECTS

## 14.1 Definition

Cumulative effects are changes to the environment caused by a human action in combination with other past, present and future actions. For the purposes of this baseline landscape study, cumulative effects must include the consideration of effects of development landward of the shoreline on land administered by Rotorua District Council. That is, cumulative effects occur when, in combination, the lake structures in a locality significantly affect the lake landscape and natural character.

**Cumulative effects occur when the addition of one lake structure in combination with existing lake structures potentially tips the natural character from nature dominant to a development prominent state.**

In the following illustration, the boat sheds are an example of development being prominent. The upper part of the illustration is an example of adverse cumulative effects. Both of these examples also effectively 'privatise' this length of shoreline. In the upper section of the illustration, boat sheds are 'mass produced' and have less character than in the strip of individually-designed boat sheds below, which have various sizes, forms, gaps, materials, and colours. Boat sheds of the lower type are commonly featured in various artworks and photographs, and can contribute a point of interest.

Figure 42: Illustration to show potential prominence of boatsheds.

In the following illustration, the jetties provide another example of development prominence, and constitute an example of adverse cumulative effects.

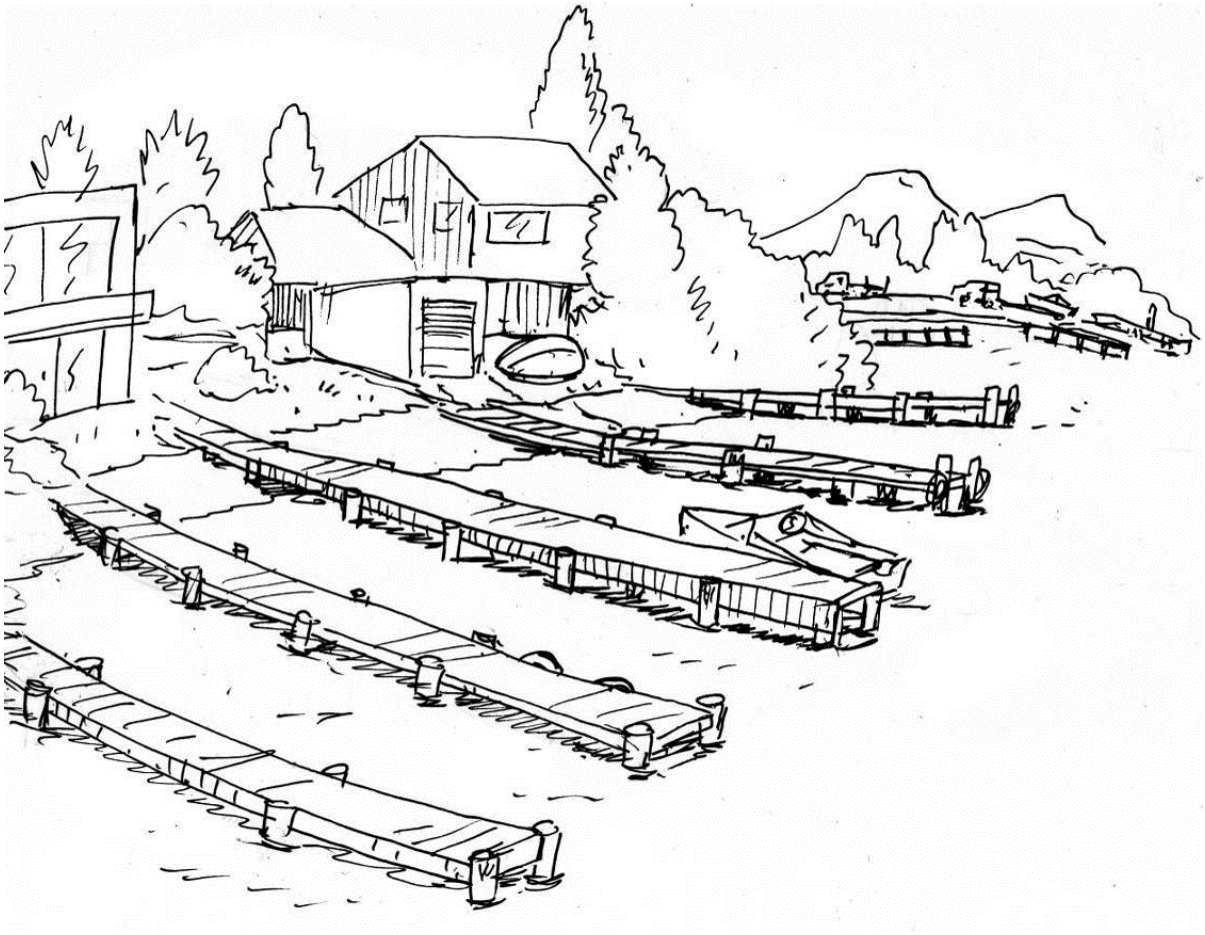


Figure 43: Illustration to show prominence of structures (jetties) and resulting adverse effects.

In the context of this report, cumulative effects occur where there are multiple structures within close proximity, the effects of which can be exasperated by uniformity.

## 14.2 Examples of cumulative effects

Examples where the cumulative effects of lake structures have reached a point where the landscape is compromised, include parts of; Lake Rotorua (for example, adjacent to the CBD, Kawaha Point, Ngongotaha, and Hamurana); Lake Rotoiti (for example Okere Arm, Te Weta Bay, Otaramarae, Gisborne Point, Tumoana, and Okawa Bay); Lake Ōkāreka, and Spencer Road at Lake Tarawera.

There is a problem when too many structures affect landscape features, natural character, prevent access, reduce visual amenity, restrict regeneration of naturally-occurring indigenous vegetation, or impinge on or reduce wildlife habitat. In these instances, landscape restoration of the adjacent ONFL will need programmes to consider the density and quantity of structures, as well as ensuring that lake structures blend in.

Options to address these effects could include increased and on-going education, or participation in community groups established to help develop improvement programmes.

Many non-commercial jetties are used rarely, perhaps only a few times a year. It is noted that, in places where jetties are not present, people seem happy to launch boats at public ramps and use the

lake shore for short stay use. Consideration of jetties, their use and who they serve, needs careful evaluation.

# 15 SPECIFIC ADVERSE EFFECTS OF STRUCTURES

Different kinds of structures have slightly differing effects. These are often magnified when they occur with the same types of structures, or in combination with other structures.

## 15.1 Prominent locations

Structures should be located clear of locally significant natural features and landscapes, such as islands, peninsulas, vegetation or trees, where they split and divide beaches or bays and preferably where shadows and vegetation can or will partially soften their effects. Prominent locations should be avoided.

Similarly, arrangements of structures that increase the apparent bulk and scale of built development are undesirable.

## 15.2 Shoreline walls

Walls can be visually dominant, especially when viewed from closer to shore, and often contribute to areas where lake structures have the worst cumulative effects. From the water, walls affect the greatest length of shoreline of all the structure types. They also impede the functioning of natural systems such as beach formation and they limit or prevent natural revegetation. They disturb the natural resilience and interplay of microclimate, changes to the lake shore, and also to vegetation and habitat.

Where there are extensive lengths of shoreline walls they can have considerable adverse landscape and visual effects. This is especially the case where they are part of a continuous series of structures linking adjacent jetties and walls. Walls become progressively more prominent with greater height. They are least prominent where camouflaged by vegetation, in shadow, weathered, or darker in colour.

Where water is deeper, walls are used as a substitute for jetties. Uses include mooring and dry access to water craft. They are also used to provide a tidy edge to grass, as viewed from adjacent dwellings. This provides a 'clean' view of grass to water from properties but creates a hard un-softened edge as viewed from the lake.

Walls are also erected to control wave erosion of the lake margin and protect lawns. Wave action on lake margins is a natural process that has been going on for millennia. Natural treatments of the lake margins are preferable.

Lake margins are naturally dynamic and resilient, varying with rising and falling water levels, with the weather, and seasonally. Vegetation, habitat, and natural succession occur accordingly. Walls

interfere with these natural processes and should be avoided as they prevent naturally dynamic lake margin changes over time.

Walls are often associated with terraced retaining structures on an adjacent property. This is an example of where an assessment of a specific lake structure becomes problematic, given that landscape effects are shared with the land-based structures in the general vicinity.

Few of the lake margin walls are consented, even though they have significant landscape and visual effects. It is often unclear whether walls are in the lake or on land. This becomes a site-specific jurisdictional issue.

## 15.3 Jetties

Of all the lake structures, jetties generally protrude the greatest distance into the lakes and clearly pierce the lake and water edge. Jetties also cause the greatest apparent alteration in shoreline shape through increasing the length of shoreline. This is amplified because they have two sides and, being on the lake edge, can also be reflected in the water.

For travellers around and on the lakes, jetties invariably indicate the presence of adjacent building development and other lake or land structures.

Well over half the jetties, about 300, are sited on Lake Rotoiti, with over 100 at Spencer Road, Lake Tarawera, and fewer than 100 on Lake Rotorua. Lake Ōkāreka has about 40, and Rotoma and Rotoehu have less than ten each. Jetties are the most visually apparent of the lake structures, and make up the majority of resource consents.

Cumulative effects of jetties are greatest as they relate to their sizes, spacings, and extent. Locations with a high density of jetties include:

- Te Karaka Bay, Otaramarae, Lake Rotoiti, with 11 jetties – average spacing approximately 16m, closest approximately 7m;
- Gisborne Point, Lake Rotoiti, with 37 jetties – average spacing approximately 33m, closest approximately 11m.

Densities of jetties vary, with the greatest density typically being associated with denser housing, especially where there is good natural shelter and the best recreational boating. For example, Gisborne Point is well known as an area with a highly-developed shoreline and high holiday usage.

Some recent jetties have been built with oversized joists and stand out more than those with smaller 200mm joists. White paint, lighting, and navigation aids, tyres and assorted buffers, vertical palings to the water, handrails and posts all make jetties appear more prominent. Larger boats with higher freeboard tend to have higher jetties, which are more visually prominent and create the greatest barrier to access around the lake shore.

Jetty construction can involve vegetation clearance and excavation of lake bed for channels in shallow water. Jetties are frequently associated with construction of shoreline walls for abutments to protect against wave erosion, plus boat ramps and boat houses for boat launching and storage.

The effect of jetties on natural character is to reduce naturalness and increase the degree of built urban character. As can be seen from the illustrations elsewhere in this report, even a single structure with its associated use permanently changes the shoreline character.

Public jetties associated with public boat ramps provide temporary moorings and promote public access, use, and enjoyment of the lakes. The large, long, and extensive jetties at the Rotorua CBD have a particular commercial and tourism purpose, and also provide for high-use dry access to various tourism ventures such as seaplanes, jetboats, water taxis, and larger vessels.

## 15.4 Boat sheds

The Rotorua Te Arawa lakes are unusual in having so many boat sheds, and in many cases these arguably contribute scenic character and visual amenity to the development prominent sections of shoreline. Of the 164 boat sheds consented on the lakes, approximately 84 are at Rotoiti, approximately 67 are at Tarawera, and approximately 9 are at Ōkāreka.

Bulk and scale of the larger commercially scaled boat houses, such as Boatshed Bay and Otumutu Bay at Lake Tarawera, detract from the natural character of the lake margins. Further development of this scale should require site-specific assessments and very robust review.

Some boat sheds contribute points of interest and scenic character to the lakes, while others detract from the surrounding natural character. This is subjective and requires a judgment to be made based on the specific location, whether it is of good design, and whether the design blends in.

## 15.5 Boat ramps and slipways

Boat ramps and assorted slipways are either concrete structures, or timber-rail structures extending from the shoreline or boat sheds. There are about 27 boat ramps, 68 ramps, and 46 slipways around the Rotorua Te Arawa lakes.

Concrete ramps are usually at or following ground level and, if well weathered, tend to blend into the lake shore and are hard to distinguish from the lake. They are also relatively easy to walk across for people walking around the shoreline.

**Figure 44: Typical slipway rail, partly hidden under water.**

Timber and rail slipways allow boats to be launched from above the water from boat sheds or elevated shorelines. Like jetties, these impede people walking around the shoreline and crossing the rails, creating a hazard. Below water level they are hard to see, but above water level they are evident as structures, as viewed from the lake. Many slipway rails appear to be derelict.

Boat ramps and slipways may require some excavation of the lake bed during installation.

In summary the specific adverse effects of structures described in this section relate to prominent locations, shoreline walls, jetties, boat sheds, boat ramps, and slipways.

# 16 CONCLUSIONS

The six Rotorua Te Arawa lakes - Rotorua, Rotoiti, Rotoehu, Rotoma, Ōkāreka, and Tarawera - are all Outstanding Natural Features and Landscapes. The lakes also have high natural character over much of their shorelines, especially where there is contiguous naturally-occurring indigenous vegetation.

**Figure 45 There are many spectacular views around the Rotorua Lakes**

This assessment has considered the whole landscape but with the recommendations and conclusions targeted to the provision of guidelines for Consent Officers dealing with individual lake structures. Ideally, Bay of Plenty Regional Council, Te Arawa Lakes Trust, Land Information New Zealand, and Rotorua District Council will work together on applications, to produce a seamless management outcome for the entire landscape.

The lakes have been mapped to show “natural character dominant” and “development prominent” shorelines using the LCDB2 cover classes adjusted through site visits undertaken for this project. There is a correlation between outstanding landscapes which include areas of naturally-occurring indigenous vegetation and areas of high natural character. Some development prominent shorelines have high scenic value and contribute considerable visual amenity.

## 16.1 Natural character dominant

Undeveloped and unbuilt lake shore is desirable; to break up and prevent shoreline sprawl, to preserve natural character, and to sustain natural systems. Significant lengths of shoreline are still intact on the margins of the Rotorua Te Arawa lakes. These are generally unmodified lake shore areas with little or no development, and few or no buildings or structures, and may involve a mixture of the following:

- Landcover which is mainly indigenous or partially indigenous (as per LCDB2);
- Established indigenous vegetation is present on adjacent lake shore riparians, scarps, and wetlands;
- Rotorua District Plan Rural A zoned farmland, exotic plantation forest without built development and sections of undeveloped shoreline longer than approximately 200m;
- Few, if any, lake structures are present;
- Possibly within the mapped ONFL layer.

Structures within these areas are undesirable because there is a high probability of adverse landscape and visual effects. Preservation-oriented management of natural character dominant shorelines is desirable, to ensure that natural systems are sustained. Site-specific landscape assessments are important, to conserve natural character in a sustainable manner.

Site-specific landscape assessments should incorporate:

- Use of the RPS criteria sets for landscape and ecology;
- Evaluation of natural character
- Review drawings showing location, dimensions, materials and colours of structure;
- Photographs of the locality, from the proposed site and towards the site from nearby public reserves, roads, and the lake;
- Visual audience assessment (especially from launch ramps, reserves, and roads);
- Effects on indigenous habitat and wildlife (removal, modification);
- What is proposed to remedy and mitigate for adverse effects (planting, pest control, enhancement);
- Whether there is any public benefit involved, for example, improvement in natural character or access; and
- Recognition of cultural landscape indicators, such as, Kohatu (rocks of cultural significance), and landmarks.

Areas where natural character is dominant are shown on the photographs labelled “Natural character dominant” and marked as such on the project maps for each of the six lakes.

## 16.2 Development prominent

These modified lake shore areas include residential dwellings, commercial and industrial developments, hard surfaces, and structures. They involve various mixtures of the following:

- Building development is prominent – housing, boat sheds, walls and jetties;
- Consented lake edge structures already exist (a history of structures);
- Shoreline walls and lawns feature on the lake edge;
- Buildings are not mitigated.

There are various subsets within the development prominent areas including:

- Areas where built development blends in;
- Areas where built development contributes a point of interest;
- Areas where development is fully or mostly exposed to view.

## 16.3 Ways to reduce the impacts of existing structures

Planning guidelines and criteria for assessment have been used in the past, however these need to be reviewed to recognise and acknowledge the statutory roles and responsibilities of iwi and hapū in planning provisions through the treaty settlement process. Previous criteria address conservation values, access along the shoreline, and public recreation and use. A more extensive set of criteria is presented, as set out below, to ensure that lake structures do not adversely affect the six lake ONFLs.

## 16.4 Landscape criteria for lake structures

Is the site within a 'natural character prominent zone'? Or is the site within a 'development prominent zone'? Refer to the relevant sections below for specific objectives and tests, and assessment criteria for all sites. These criteria can be applied to both proposed and existing structures.

### 16.4.1 Natural character dominant shoreline

**Overall Objectives**

- To avoid adverse effects on cultural/historic , landscape, or ecological features.
- New structures should not be placed in areas where natural character is dominant, and site-specific landscape assessments should be provided for all such proposed structures.
- Ensure that potential adverse effects are avoided.

**Key Tests**

- Is the structure necessary?
- Is there an alternative to the structure?
- Does the structure provide a clear public benefit?
- Does the structure significantly assist public access to the lake shore or public reserves and walkways?
- Is the structure needed for critical infrastructure purposes?
- Is there an over-riding case supporting the structure?

### 16.4.2 Development prominent shorelines

**Overall Objectives**

- To avoid incremental and cumulative adverse effects.
- To remedy and reduce existing adverse and cumulative effects.
- Ensure that structure(s) fit well within the existing environment.
- Ensure that potential adverse effects are avoided, remedied or mitigated.

**Key Tests**

- Is the structure necessary?
- Are similar public or private structures present locally?
- Demonstrate that potential sharing has been explored with other parties.

### 16.4.3 Guidance for considering effects of lake structures

**(a) General Information Requirements**

i. Has consent of Te Arawa Lakes Trust and Land Information New Zealand been obtained?
ii. Where exactly is the structure located ?
iii. What is the type of structure?
iv. What is the design and dimensions of the structure?
v. What types of materials, finishes, and colours are to be used?
vi. What lake structures are currently within 200 metres and what are they used for?
vii. What are the distances to the nearest lake structures?
viii. Are there shoreline walls at the site?
ix. What alternatives have been considered?
x. Will the number of existing structures remain the same at this site?
xi. What type and frequency of public use is expected?
xii. What type and frequency of private use is expected?
xiii. Will there be any modification of the lake bed? If so, describe any excavation or other disturbance.
xiv. Is any screen planting proposed, or other mitigation?
xv. Do existing structures (including any shoreline walls) have a resource consent?

**(b) Cultural/Historic**

i. Have the relevant hapū been consulted?
ii. What are the relevant hapū views on the structure?
iii. Is the Wairua (spirit or soul) / Mauri (life principle) of the locality going to be affected?
iv. Is the site within 400m of a marae?
v. Is the site within 400m of a pā?
vi. Is the site within 400m of a waahi tapu site?
vii. Is the site within 400m of an archaeological site?
viii. Is the site within traditional mahinga kai (for example kōura or kakahi harvest area)?
ix. Is it within a traditional mahinga raranga/ whatu? (for example, raupo or harakeke harvest area)?
x. Will the structure impede access to the shoreline and shallows for harvesting?
xi. Are there underwater hazards (for example, hidden slipway rails)?

**(c) Landscape and Natural Character**

i. Is the structure located in or adjacent to a sensitive location: islands, peninsulas, bush areas, prominent sections of shoreline?
ii. Will construction and use at the site require alteration of the landform or shoreline (for example, earthworks, filling, abutments, retaining walls)?
iii. Is the size and scale of the structure the minimum needed for the purpose?
iv. Will the design of the structure blend in with the existing environment?
v. Will the structure have adverse effects on natural character?
vi. What is the existing type and level of shoreline development? Examples include; Rotorua CBD lakefront, numerous obvious houses and lake structures, numerous lake structures

but building development less obvious, scattered jetties/ structures, individual structure, no other structures (describe).

vii. Will the waterscape be affected by the structure?
viii. How will scenic values and visual amenity of the locality be affected?
ix. Do or will the buildings and lake structures blend in?
x. Do existing (or proposed) buildings and structures contribute a positive point of interest, for example, heritage, marae, quaint or rustic, charming?
xi. How visible will the structure be, for example from public walkways, reserves, roads and viewing locations?
xii. Is visibility at the scene important?
xiii. Can potential adverse effects be mitigated? (Describe existing/proposed mitigation).

**(d) Public Access/Use**

i. Is the structure on or adjacent to publicly owned land?
ii. Does the structure provide for public access to the lake, or other benefits? Is this significant?
iii. Is there any commercial use or activity associated with the structure?
iv. Will the structure generate or promote additional activity on the lake?
v. Will public access to the lake shore and lake bed be affected?
vi. Will the structure impede public access along the shoreline and shallows?
vii. Are there further effects generated from access to and from the structure?
viii. Are there ancillary effects from use of the structure (for example, vessels, vehicles, noise)?

**(e) Ecology**

i. What is the ecological character of the shoreline (for example, hard shoreline, beach, swampy or poorly-drained, emergent wetland vegetation, slope covered with indigenous vegetation, pasture, retaining wall, lawn, other)?
ii. Is the site located in a relatively sheltered embayment or on an exposed shoreline? Describe the site.
iii. Will any terrestrial landcover be altered? What is it?
iv. Is the site a shoreline roost for water birds?
v. Will any naturally-occurring indigenous vegetation be removed?
vi. Is vegetation at the site or nearby ecologically significant?
vii. Are there lake bed turfs at the site? If so, will they be adversely affected?
viii. Is the site, and the adjacent open water habitat, subject to frequent use by water birds?
ix. Are threatened species (plants or fauna) present or do they utilise the site seasonally or on an occasional basis? Terrestrial? Aquatic? Water birds?
x. Does the site provide significant habitat for aquatic biota (for example, kakahi - freshwater mussel, kōura, trout), and are those biota likely to be adversely affected?
xi. Is the structure likely to provide any possible positive ecological contributions? Examples might include roosts for kawau (shag), potential nesting sites for dabchick (weweia).
xii. Is pest control being undertaken along the adjacent shoreline?

xiii. Will any emergent wetland plants be cleared (for example, raupo, kuta)?
xiv. Is there potential to plant emergent wetland plants (for example, raupo) to provide visual screening?
xv. Should the dimensions of the structure (for example, jetty length) be limited to avoid potential adverse effects on water bird habitat?

### 16.4.4 Mitigation measures

All mitigation measures will need to be site-specific, although options to lessen potential effects could include:

- Designed to "blend in" with appropriate design features that are sensitive to the natural character of the locality. This relates to location, size and dimensions and construction detailing.
- Through consideration of alternatives such as sharing structures, or some community benefit such as Lake Care Groups.
- Minimising and avoiding visually distracting accessories, use of neutral and low reflective finishes and colours. For example, use rough sawn finishes and design to create shadows.
- Planting to screen and soften structures, and to visually anchor structures to the surroundings. This might be linking planting to existing areas of vegetation or other new shoreline plantings.
- To provide offset habitat benefits through planting and/or pest management.

# 17 REFERENCES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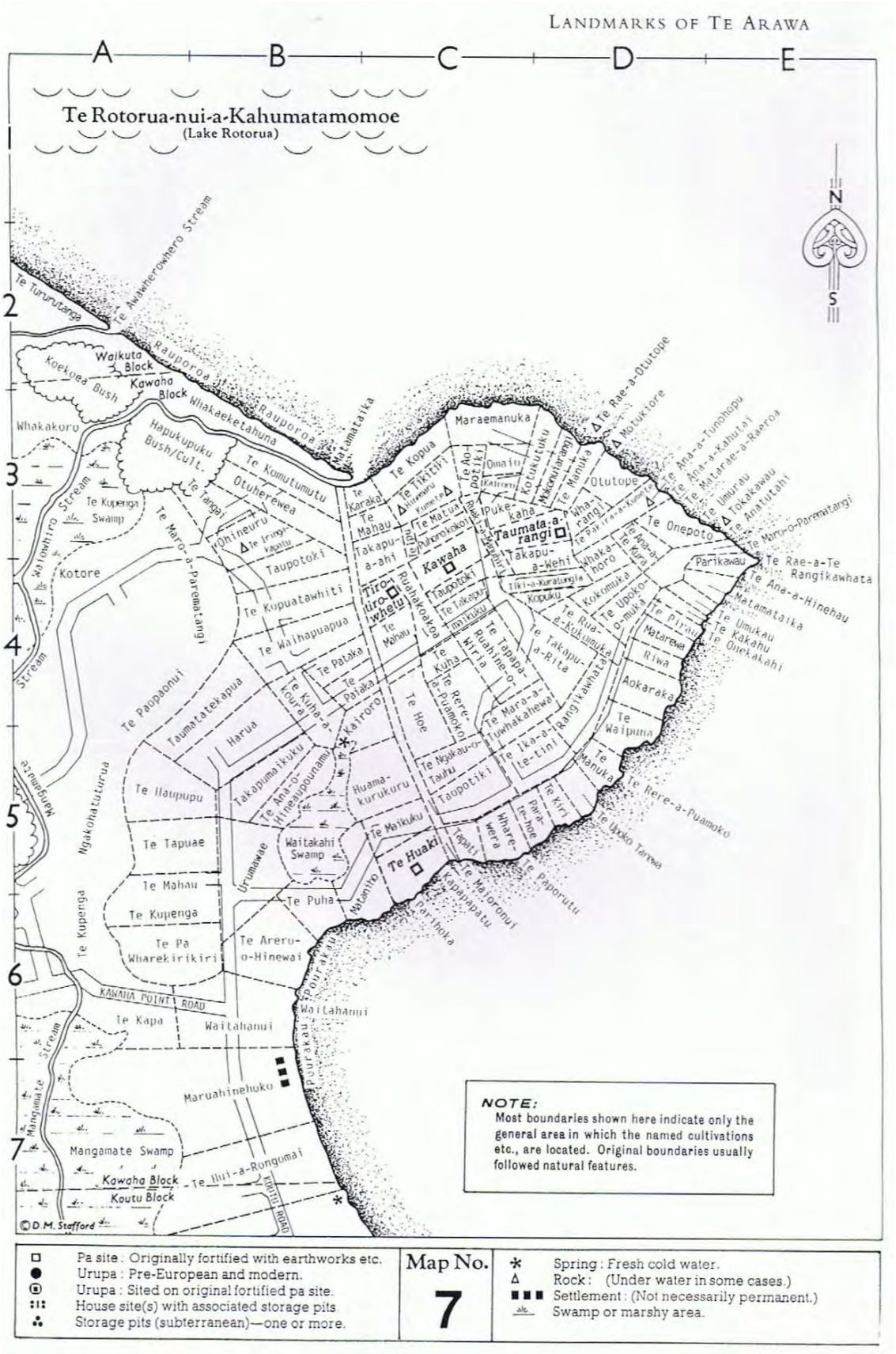
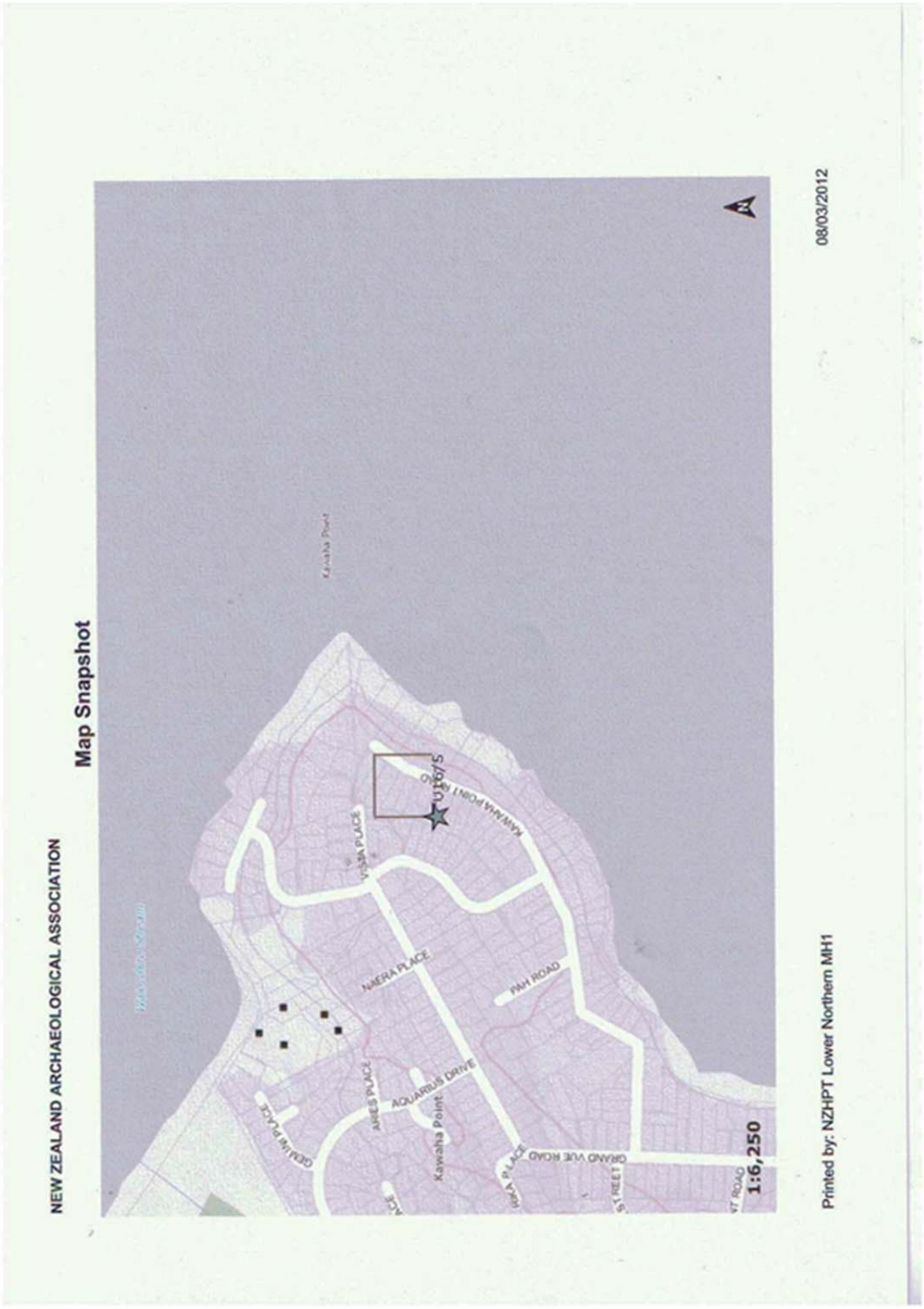
Stafford, D. 1996, Landmarks of Te Arawa, Volume 2.

# 18 APPENDICES

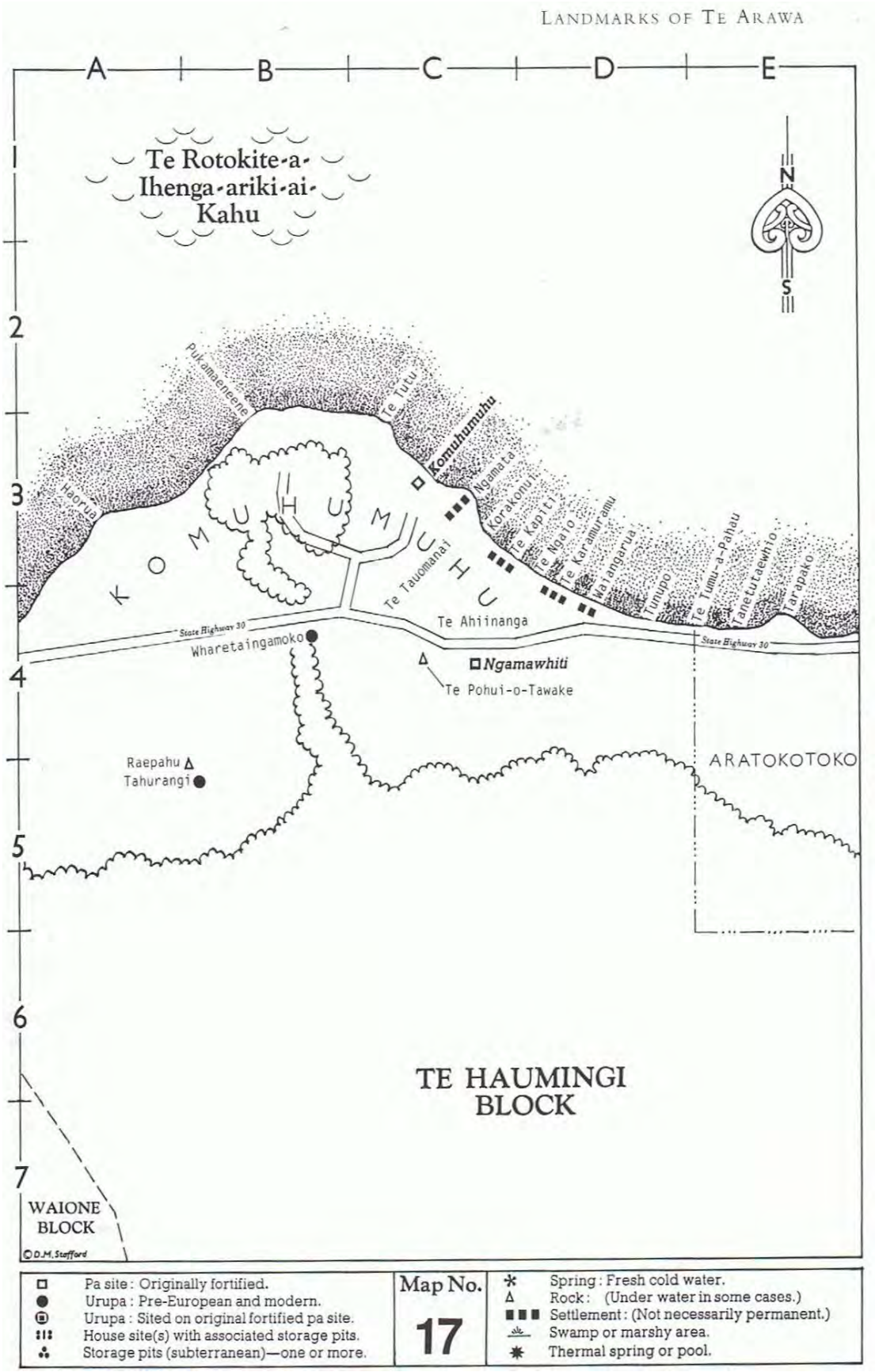
## 18.1 Appendix 1: Maps showing cultural landscape



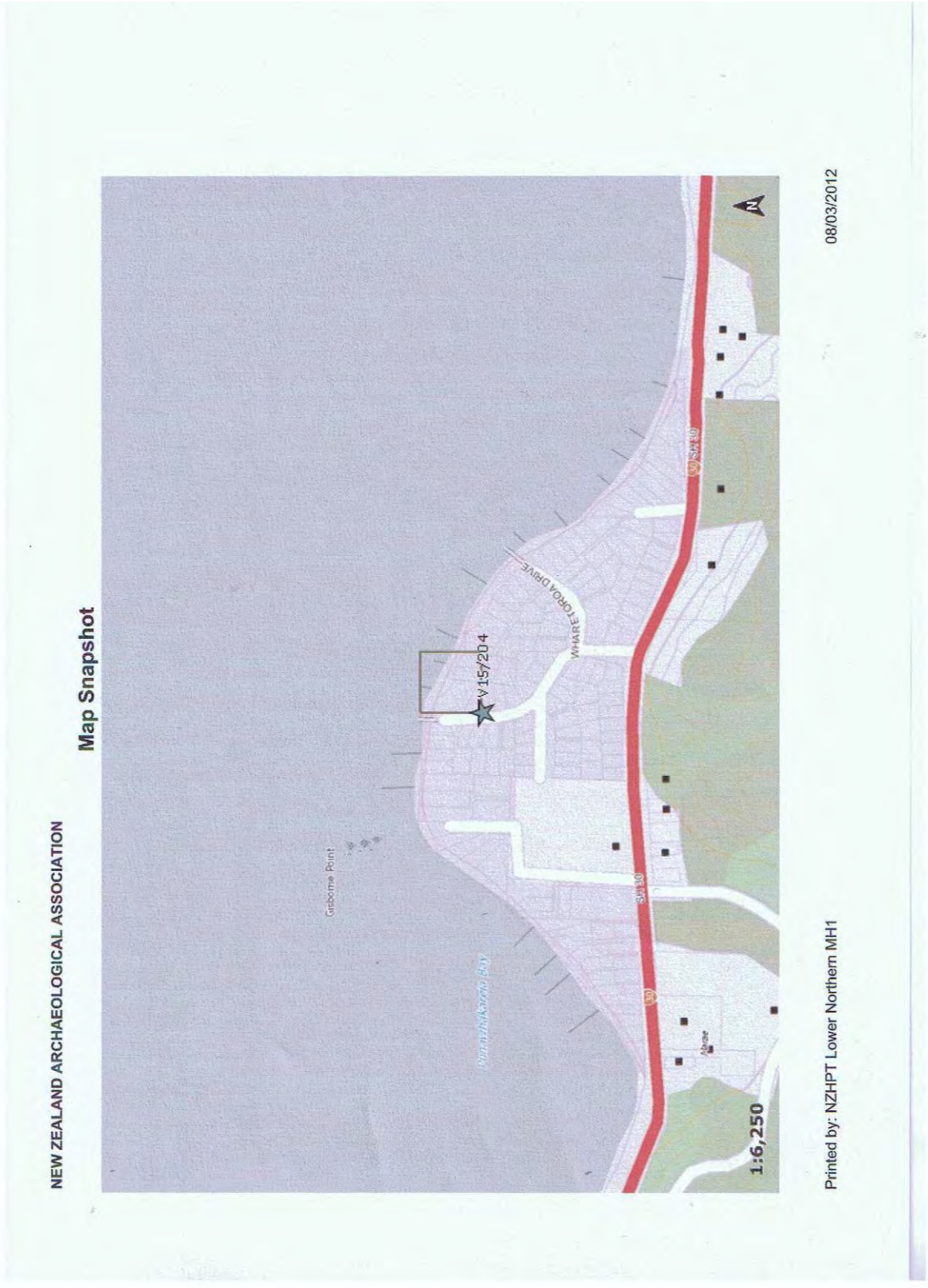

Map 1: Map showing sites of cultural and/or historical significance, Kawaha Point, Lake Rotorua, taken from Stafford, D. 1994



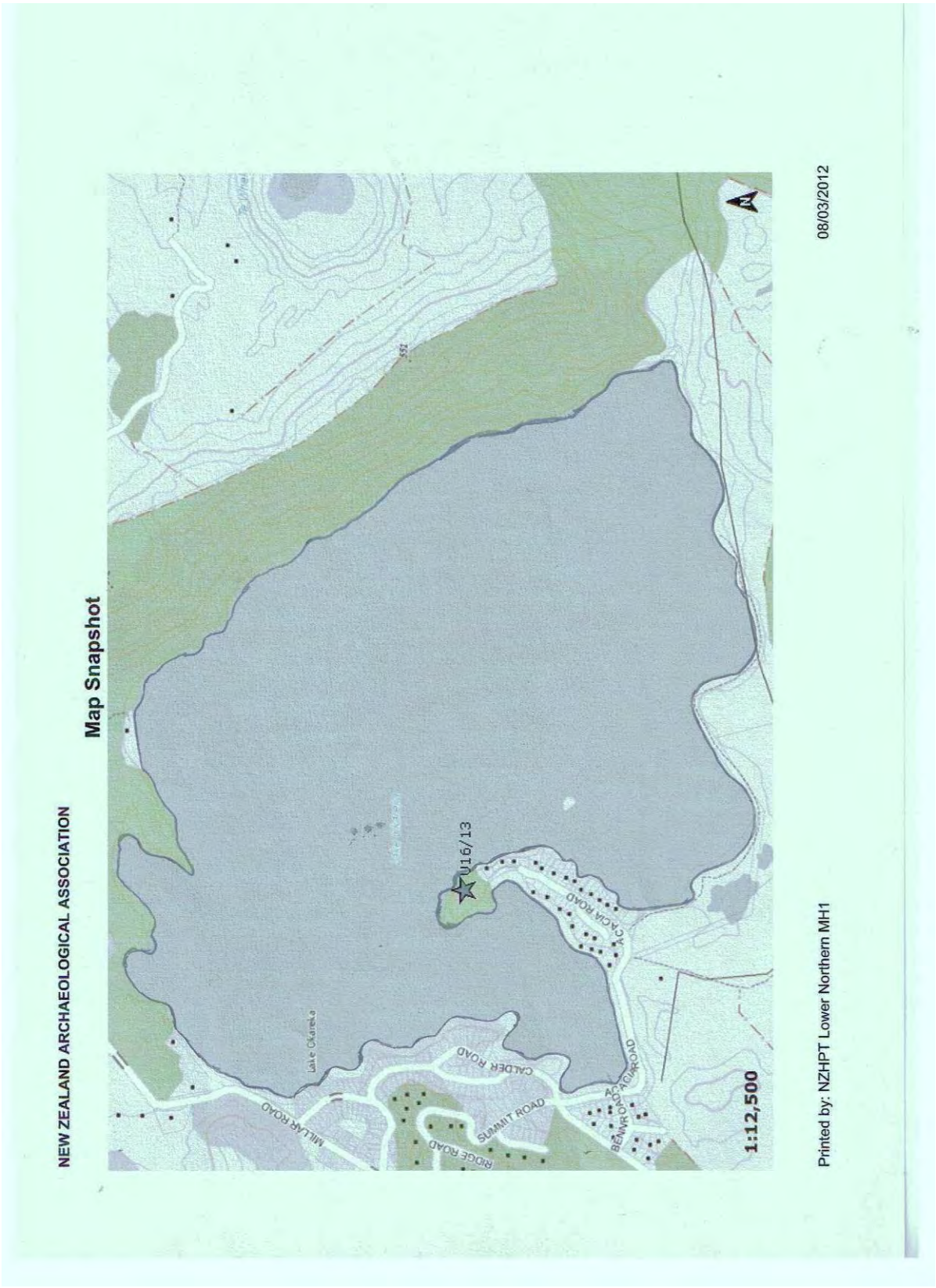

Map 2: Archaeological site U16/5 at Kawaha Point, Rotorua, taken from NZHPT records



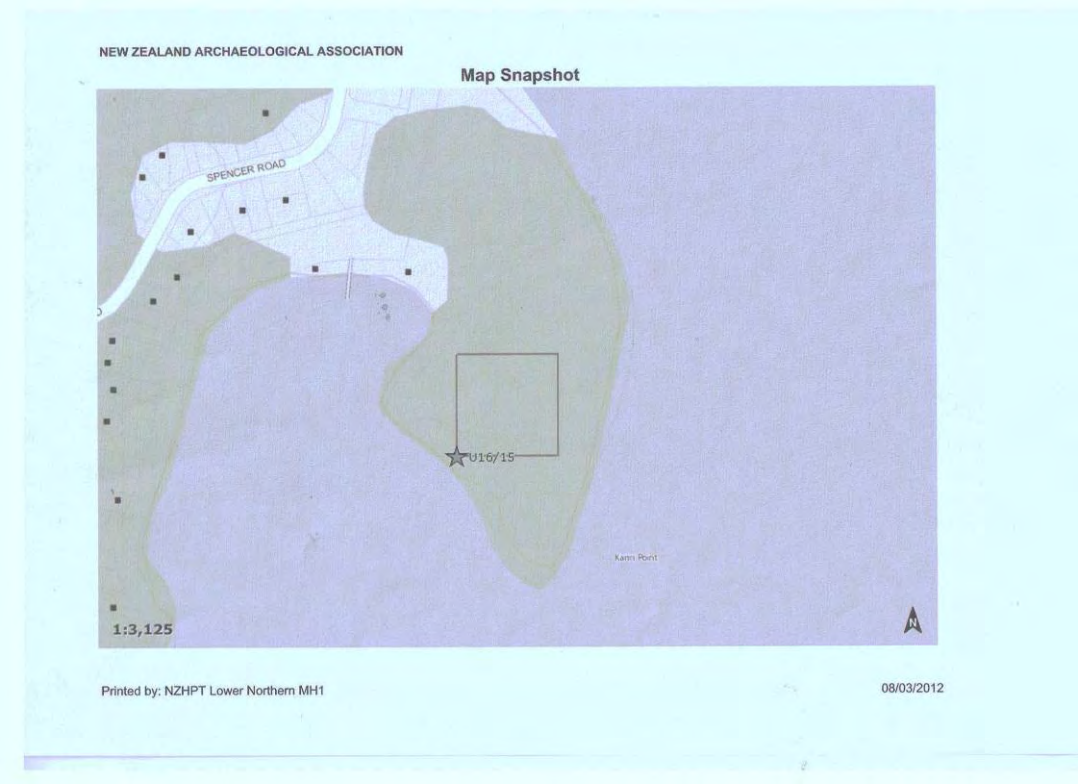

Map 3: showing sites of cultural and/or historical significance, Gisborne Point, Lake Rotoiti, taken from Stafford, D. 1996



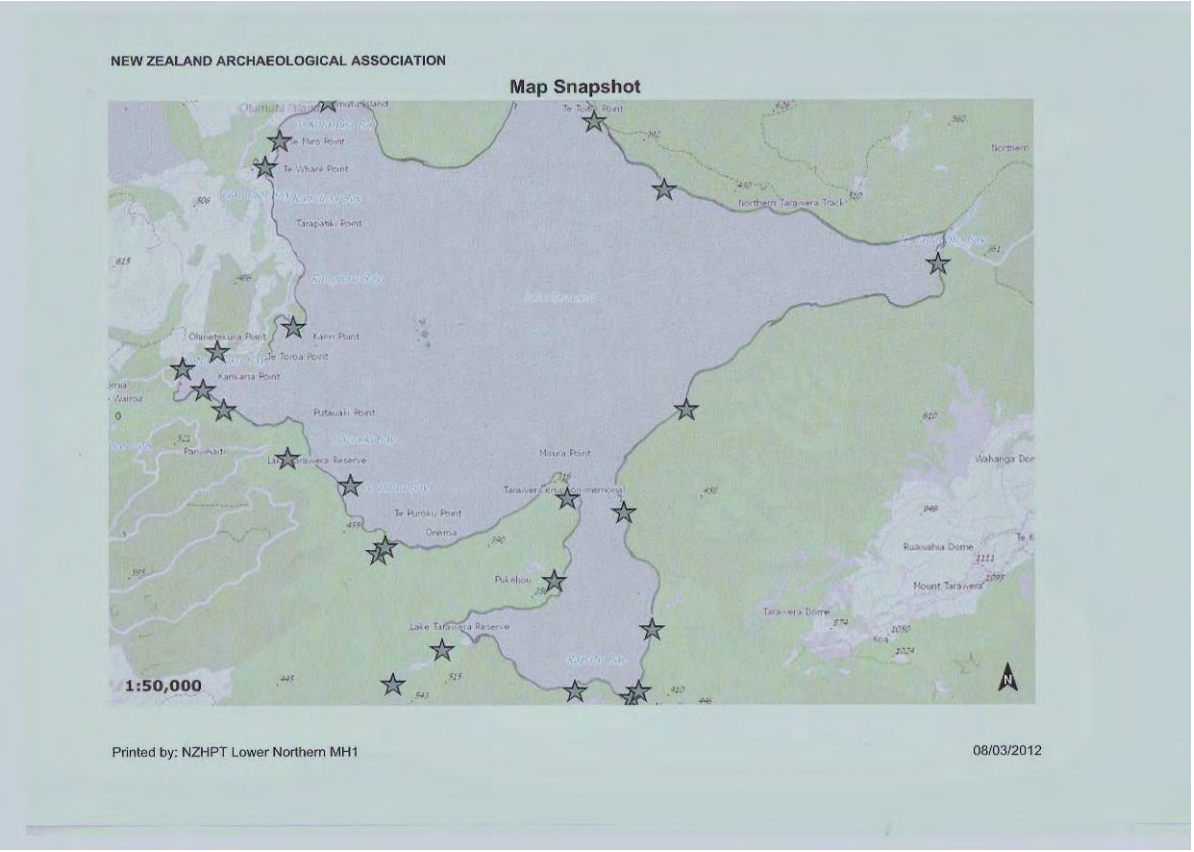

Map 4: Archaeological site V15/204 at Gisborne Point, Rotorua, taken from NZHPT records



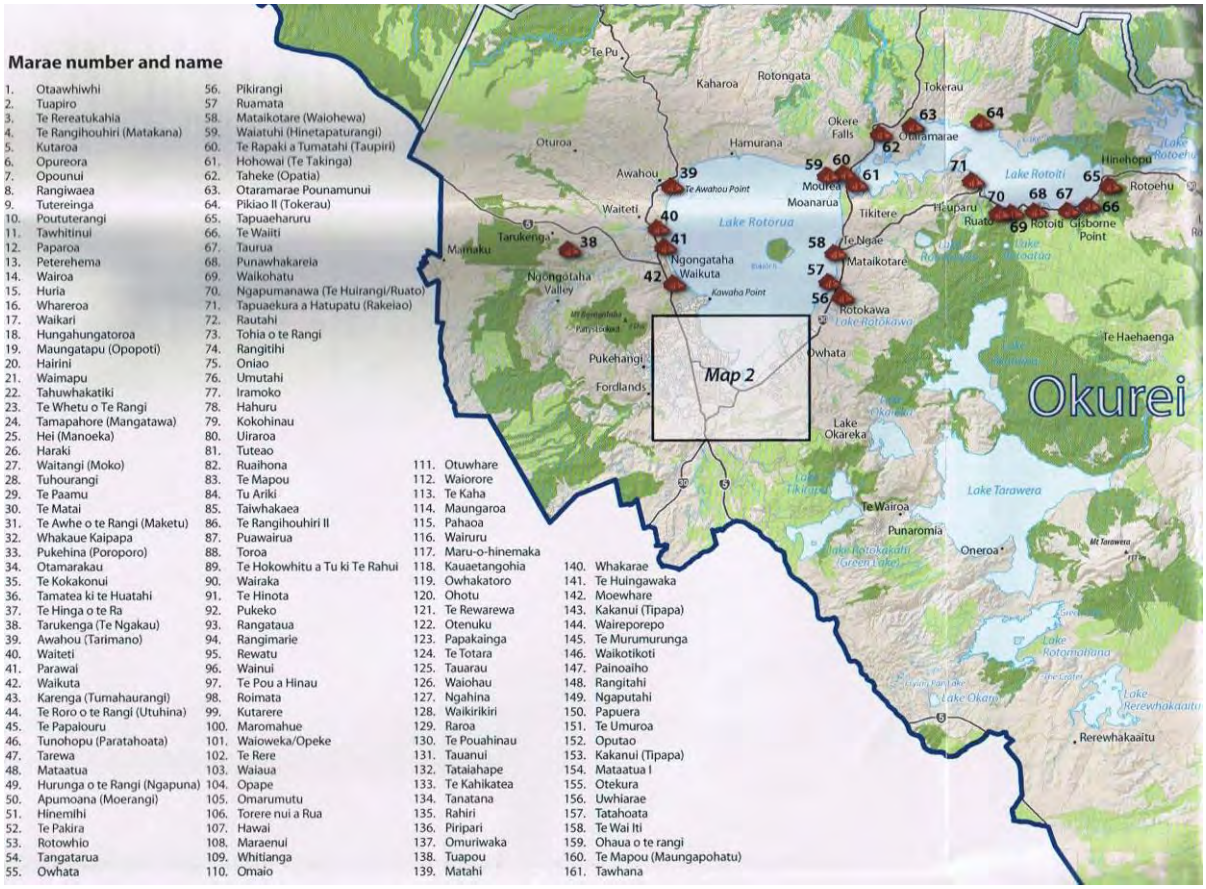

Map 5: Archaeological site U16/13 at Lake Okareka, taken from NZHPT records

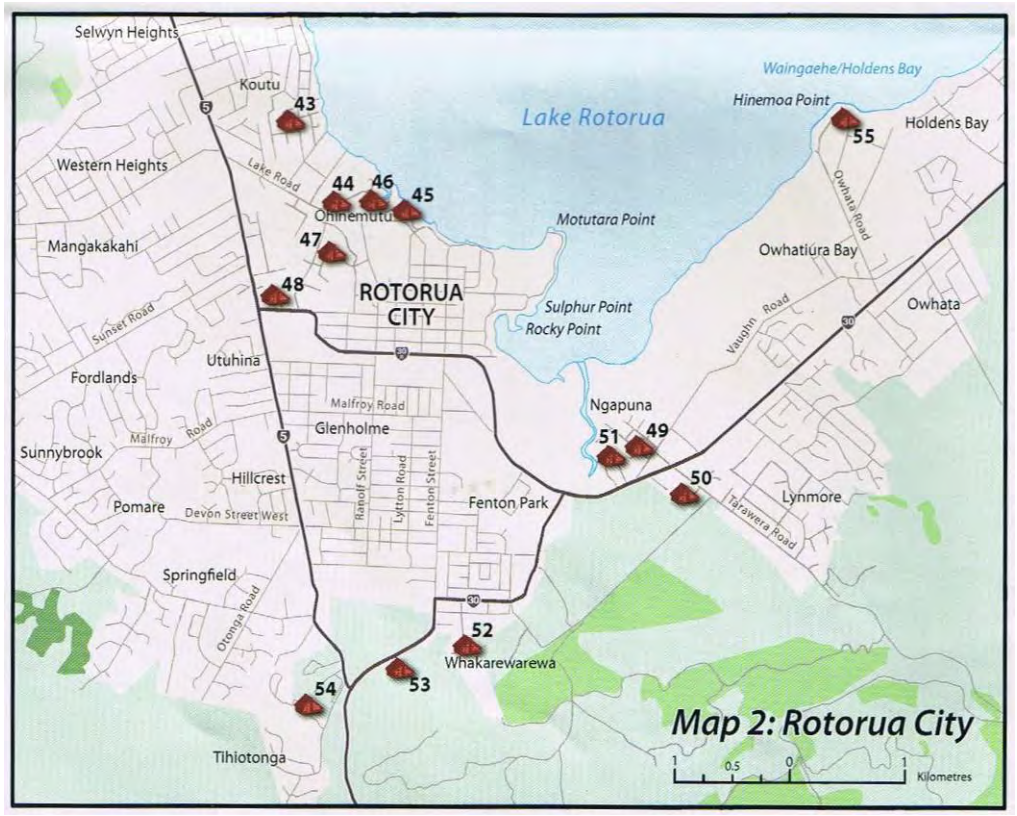



Map 6: Archaeological site U16/15 at Kariri Point, Lake Tarawera, taken from NZHPT records




Map 7: Archaeological sites at Lake Tarawera, taken from NZHPT records




Map 8 & 9: Marae in the Rotorua Te Arawa Lakes rohe, taken from Rotorua District Council records

## 18.2 Appendix 2: Outstanding Natural Features and Landscapes Review in inland Bay of Plenty

OFNL Descriptions drawn from this report for the six lakes follow.

Lake Rotorua ONFL53 is described as *"the entire water body including any areas of contiguous naturally occurring vegetation or wetland."* Greater levels of aesthetic coherence between margins and lake to the north. Highly memorable particularly in relation to Mokoia Island and Caldera landscapes. Mokoia Island ONFL 54 includes the whole island feature and native vegetation.

Lake Rotoiti ONFL57 is described as the "Entire lake including areas of contiguous naturally occurring vegetation and prominent landform features such as vegetated headlands and points (for example, Motuoha Point, Motutawa Point and Te Akau Point on lake edges). Excludes areas of lakeside settlement (such as Otaramarae, Gisborne Point, Rotoiti and Hinehopu), and development as well as areas of forestry and exotic trees. Includes Lake Rotoiti Scenic Reserve in the northwestern lake edge. Semi coastal bioclimatic zone featuring a variety of forest types dominated by rimu/tawa with pohutukawa, kohekohe and kamahi and tawari forest and cliff vegetation. Landforms include undulating to steep slopes and scarps flatlands and wetlands. High Cultural significance." Intact lake edges characterised by indented lake edge, enclosed bays and headland features. Unsettled lake edge is largely uncompromised (natural)…Lake edge headland and upland bush areas (particularly in the north east) are more intact.

Lake Rotoehu ONFL71 is described as the "entire lake including areas of contiguous naturally occurring vegetation and prominent, steep, lake peninsula/ ridgelines landform features defined by deeply indented narrow shoreline bays. Includes Lake Rotoehu Scenic reserve on the lakes northern shores and slopes which contains a good example of secondary vegetation contiguous with lake edge reed lands and wetlands. Excludes areas of development (Otautu Bay) and lake edge upland pastureland and forestry areas."

Lake Rotoma ONFL72 is described as the "entire water body including areas of contiguous native bush, wetlands, prominent headland landscape features and adjacent lagoons and bays. Excludes lakeside development of Lake Rotoma settlement to the southwest. The Rotoma eruption created a caldera comprising of two basins, one on the northern side and one on the southern side. The lake is drained via subsurface outflows. Issues concerning the water quality of the lake include the effects of cattle entering the lake for drinking water as well as the existing and future septic tank installations. Formed by the Rotoma eruptions, this eastern-most lake has two distinct basins. The lake has a small outflow through porous pumice substrate to Lake Rotoehu, and has some outflow to groundwater. Lake Rotoma is the cleanest of all the Rotorua Lakes, with around 11 metres depth water clarity and no invasive lake weeds. This is likely to be because only 15% of the catchment is in pasture, and this is not intensively farmed. However, the lake has a high risk of lake weed infestation from nearby Lake Rotoehu or other lakes."

Lake Ōkāreka ONFL61 is described as the "entire lake including areas of contiguous naturally occurring vegetation and prominent landform features particularly on the north and eastern on lake edges. Excludes areas of development and settlement to the west and exotic forestry. Includes Lake Ōkāreka Scenic Reserve that is of particular scientific interest due to the monitoring of successional

forest processes post 1886 Rotomahana eruption - vegetation includes various forest, grassland and shrubland types." North-western lake slopes are of high natural character.

Lake Tarawera ONFL64 is described as the "Entire lake including areas of contiguous naturally occurring vegetation and prominent landform features on lake edges including undulating to very steep hill country scarps and terraces (Kaharoa terrace), flats and gullies. Excludes significant areas of development and exotic trees. Part of wider Rotorua Lakes system of unique geothermal features and lakes and the recently active (within the last 1000 years) Tarawera volcanic complex consisting of a matrix of lakes within a plateaus and rolling hill country and mountainous volcanic features and scarps. Includes Lake Tarawera Scenic Reserve (also includes lake Tarawera marginal strip stewardship area). Vegetation types include a variety of forest types including pohutukawa forest, kohuhu-mahoe-manuka forest, kanuka forest, kamahi forest in lowland bioclimatic zone exhibiting variable recovery following 1886 eruption. Culturally significant." Highly coherent landform and landcover landscape patterns. Dominant natural character except Spencer Rd settlement. Adjacent contiguous ONFLs include Mt Tarawera and Makatiti Dome.

## 18.3 Appendix 3: Lake Rotorua Landscape, Eastern Lakes, and Northern Lakes Landscape Assessments

The Rotorua District Council (RDC) has commissioned three landscape assessments, relevant to this project for; Lake Rotorua, the Northern lakes and the Eastern Lakes. A summary of relevant extracts follows.

### 18.3.1 Lake Rotorua Landscape Assessment

*"This report identifies and describes 11 Landscape Types and 37 individual Landscape Character Areas within those larger Landscape Types. These areas have been defined and mapped on the basis of:*

- *Underlying geology and associated topography;*
- *Existing landcover;*
- *Land use capability;*
- *Natural drainage patterns;*
- *Existing cultural land uses; and*
- *Settlement patterns.*

*Eight ONFLs have been identified within the study area (see Outstanding Natural Features and Landscape Assessment Criteria Worksheets and Appendix 1: Map 13). Four are relevant to this project:*

- *"Lake Rotorua: A defining landscape and feature of the district, with geothermal as well as cultural / historic values and national recognition.*
- *Hamurana Springs: A fresh water spring and associated amenity landscape representative of wider hydrological processes that characterise Lake Rotorua and the District.*
- *Hamurana Caldera Rim: A representative area of steep caldera rim scarp that exemplifies the wider topographic feature of the Lake Rotorua caldera that defines much of the Lake catchment.*
- *Mokoia Island: A defining landscape feature and vegetated island landscape that is a key component of Lake Rotorua landscape and of high cultural significance."*

### 18.3.2 Northern Lakes Landscape Assessment

*"This report identifies and describes 9 Landscape Types and 41 individual Landscape Character Areas within those larger Landscape Types.*

*Ten ONFLs have been identified in the study area (see Assessment Criteria Worksheets) and Appendix 1: Map 13: The five of some relevance are:*

- *Lake Rotoiti (4.1)*
- *Lake Rotoehu (5.1)*
- *Lake Rotoma and Caldera (6.1)*
- *Makatiti Dome North Eastern Slopes (8.1)*

- *Tarawera Ridge (8.3)*

### 18.3.3 Eastern Lakes Landscape Assessment

*Seventeen Outstanding Natural Features and Landscapes (ONFLs) are identified in the Eastern Lakes Landscape Assessment study area, including the following:*

- *Lake Ōkāreka (33 ,1)*
- *Ōkāreka Southern Hill Slopes and Lake Margins (33.4)*
- *Arataha (34.2)*
- *Makatiti Dome (36,1)*
- *Mount Tarawera (36.2)*
- *Lake Tarawera (37,1)*
- *Tarawera River Valley (37.5)*

## 18.4 Appendix 4: Maps showing "natural character dominant" and "development prominent" shorelines with Marae, archaeological & culturally significant sites

## 18.5 Appendix 5: Album of photographs


**Data Acknowledgment**

Contains data sourced from Land Information New Zealand under CC-By

Report: xxxx
Client: BOPRC
Ref: 01 0087
Path: E:\gis\Willie\Rotorua_Lakes_Baseline\mxd
File: \Rotorua_Lakes_Baseline_Landscape.mxd

# Natural Character Values
## Lake Rotorua

0 2.5 5 km


Wildlands
www.wildlands.co.nz, 0508 WILDNZ

| | |
|---|---|
| Scale: | 1:50,000 |
| Date: | 12/04/12 |
| Cartographer: | RPB |
| Format: | A3R |


**Data Acknowledgment**

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# Natural Character Values
## Lake Rotoiti

0 2.5 5 km



Wildlands
www.wildlands.co.nz, 0508 WILDNZ

| | |
|---|---|
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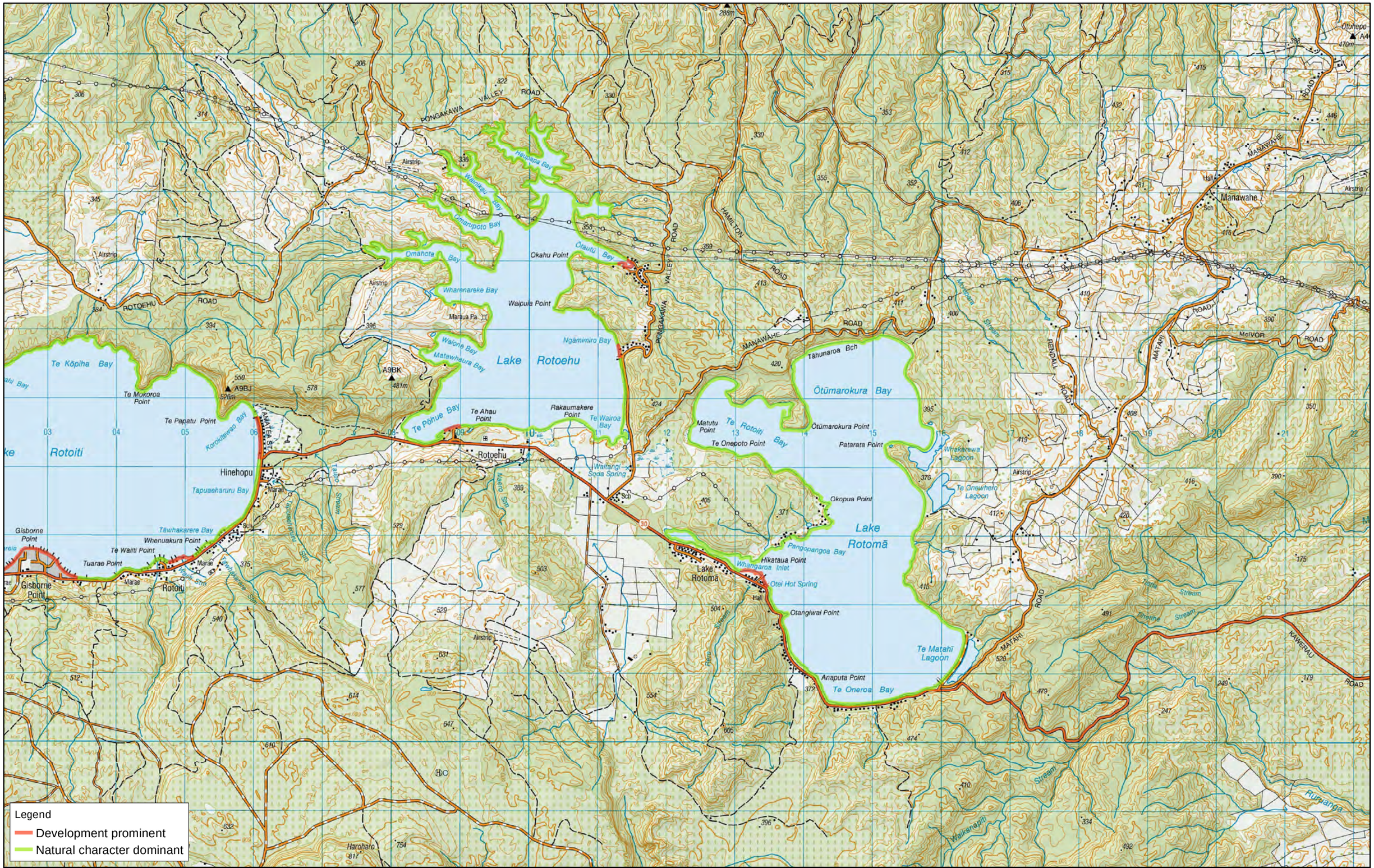


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# Natural Character Values
## Lake Rotoehu, Lake Rotoma

0 2.5 5 km



Wildlands
www.wildlands.co.nz, 0508 WILDNZ

| | |
|---|---|
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| Cartographer: | RPB |
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# Natural Character Values
## Lake Tarawera, Lake Okareka

0 2.5 5 km



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www.wildlands.co.nz, 0508 WILDNZ

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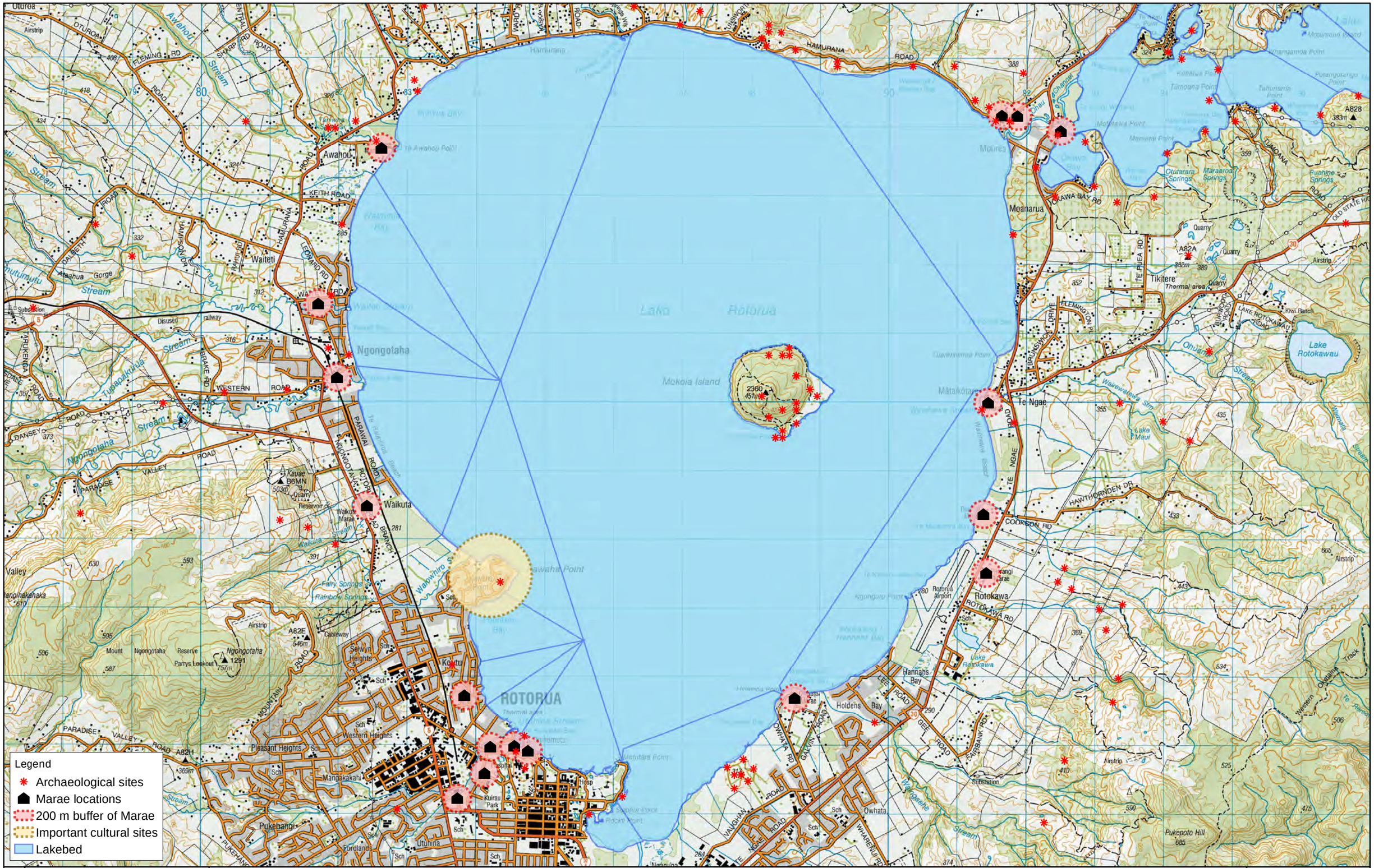


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Archaeological sites and Marae locations sourced from Bay of Plenty Regional Council

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# Cultural Landscape
# Lake Rotorua

0 2.5 5 km


Wildlands
www.wildlands.co.nz, 0508 WILDNZ

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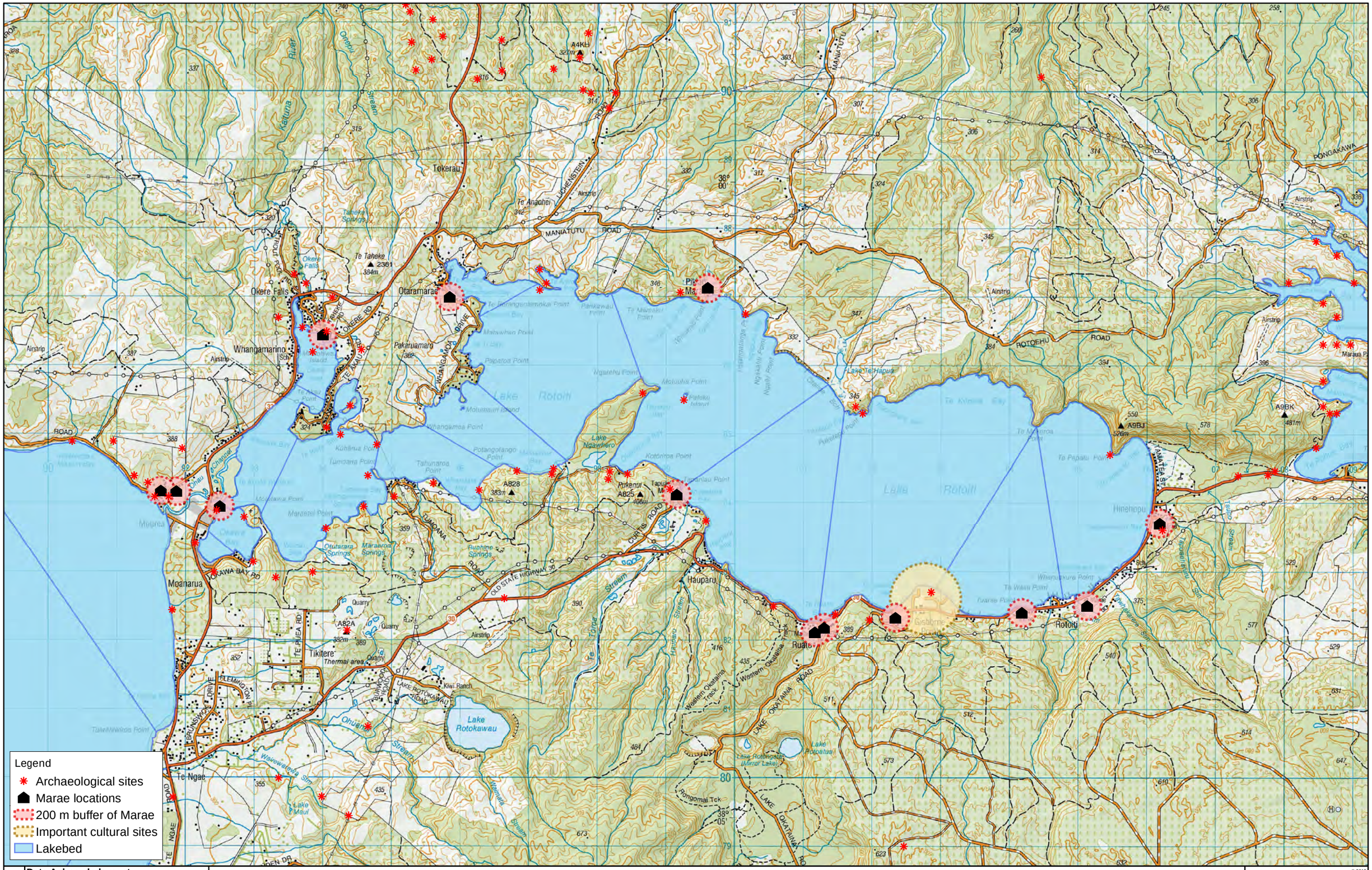


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# Cultural Landscape
## Lake Rotoiti

0 2.5 5 km


Wildlands
www.wildlands.co.nz, 0508 WILDNZ

| | |
|---|---|
| Scale: | 1:50,000 |
| Date: | 12/03/12 |
| Cartographer: | RPB |
| Format: | A3R |

Legend

- Archaeological sites
- Marae locations
- 200 m buffer of Marae
- Important cultural sites
- Lakebed

**Data Acknowledgment**

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Archaeological sites and Marae locations sourced from Bay of Plenty Regional Council

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# Cultural Landscape
## Lake Rotoehu, Lake Rotoma

0 2.5 5 km



Scale: 1:50,000
Date: 12/03/12
Cartographer: RPB
Format: A3R

Legend

- Archaeological sites
- Marae locations
- 200 m buffer of Marae
- Important cultural sites
- Lakebed

N

**Data Acknowledgment**

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Archaeological sites and Marae locations sourced from Bay of Plenty Regional Council

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# Cultural Landscape
# Lake Tarawera, Lake Okareka

0 2.5 5 km



Wildlands
www.wildlands.co.nz, 0508 WILDNZ

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Date: 12/03/12
Cartographer: RPB
Format: A3R

# PHOTOGRAPH ALBUM PHOTOGRAPH SEQUENCES


## KEY

X Land based photographs (car access)

→ Water based photographs (from vessel kayak, Harbour master)









Lake Rotorua









Lake Rotorua








Lake Rotorua









Lake Rotorua








Lake Rotorua









Lake Rotorua









Lake Rotorua









Lake Rotorua









Lake Rotorua









Lake Rotorua









Rotoiti, Okere Arm









Rotoiti, Okere Arm









Rotoiti, Okere Arm









Rotoiti, Okere Arm









Rotoiti, Otaramarae


Rotoiti, Otaramarae









Rotoiti, Otaramarae

Rotoiti, Otaramarae









Rotoiti, north shore









Rotoiti, north shore









Rotoiti, north shore









Rotoiti, north shore








Rotoiti, north shore

Rotoiti, north shore









Rotoiti_south shore, Gisborne Pt, Hinehopu









Rotoiti_south shore, Gisborne Pt, Hinehopu









Rotoiti_south shore, Gisborne Pt, Hinehopu









Rotoiti_south shore, Gisborne Pt, Hinehopu









Rotoiti_south shore, Gisborne Pt, Hinehopu









Rotoiti_south shore, Gisborne Pt, Hinehopu









Rotoiti_south shore, Gisborne Pt, Hinehopu









Rotoiti_south shore, Gisborne Pt, Hinehopu









Rotoiti_south shore, Gisborne Pt, Hinehopu









Rotoiti_south shore, Gisborne Pt, Hinehopu

Rotoiti_south shore, Gisborne Pt, Hinehopu









Rotoiti, Okawa Bay









Rotoiti, Okawa Bay

Rotoiti, Okawa Bay



Rotoehu


01.02.2011 13:47


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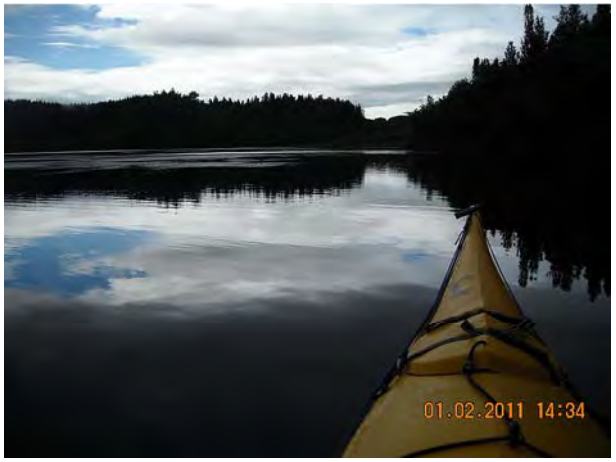
01.02.2011 14:10


01.02.2011 13:45


01.02.2011 13:59

Rotoehu







Rotoehu


PLEASE READ BEFORE LAUNCHING
Weed Cordon in Place
This weed cordon has been installed to help stop the spread of aquatic weeds.
Please remove all weed from your boat, trailer and gear before launching and retrieving your boat.
The entrance to the weed cordon is to your left. Flashing beacons will mark the inside and outside corners of the cordon entrance after dark.
Normal navigational rules apply at the entrance and inside the cordon. Please restrict boat speed to 5 knots within the cordon and until the 200m marker buoy is reached.
This weed cordon is supported by:

Rotoma


Matahi Spit
Reserve


Matahi Spit
Reserve


Matahi Spit
Reserve


JETTY IS
CLOSED

Rotoma

Rotoma









Tarawera









Tarawera









Tarawera









Tarawera









Tarawera









Tarawera









Tarawera









Tarawera









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Okareka









Okareka



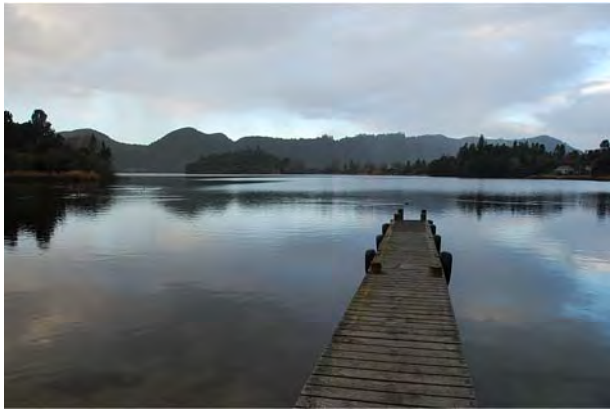






Okareka









Okareka









Okareka









Okareka









Okareka









Okareka









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Okareka

Okareka