

## 4.5 Rotorua Geyser Fields and Geothermal Sites

### SITE LOCATION

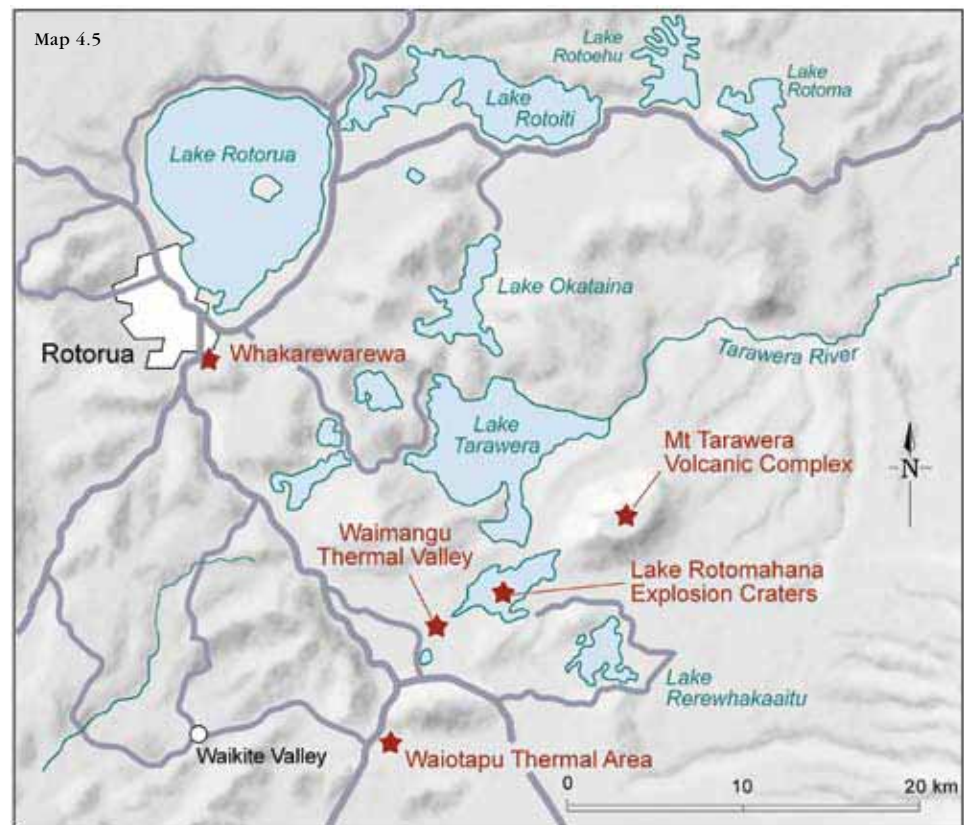
The site lies within the Rotorua and Okataina Volcanic Centres of Rotorua District in the Bay of Plenty region of the North Island. The localities making up the site lie within an arc extending 25 km to the east and south of Rotorua City, generally lying between Lat. 38° 05' and 38° 20' and Long. 176° 15' and 176° 33' E.

### SITE DESCRIPTION

The site warranting immediate consideration is a serial site consisting of five localities (see Map 4.5) which contain the most outstanding geyser fields, geothermal phenomena, and associated volcanic landforms, namely:

- Whakarewarewa geyserfield;
- Waimungu thermal valley;
- Waiotapu thermal area;
- Mt Tarawera Volcanic Complex (including 1886 eruption fissure); and
- Lake Rotomahana explosion craters.

In the longer term, consideration should be given to extending the site to include two of the Rotorua Lakes, Okataina and Tarawera, and to smaller geothermal fields such as Maungaongaonga and Te Kopia, which are managed by the Department of Conservation without tourism facilities.





Pohutu Geyser, Whakarewarewa.  
Destination Rotorua

## VALUES THAT MAY JUSTIFY WORLD HERITAGE LISTING

The geysers, fumaroles, hot springs and boiling mud pools of Rotorua are some of the geothermal wonders of the world. The scale of these high temperature geothermal phenomena found in the Rotorua geyser fields and geothermal sites is rare internationally. The five localities that make up the proposed Rotorua site encompass the best of these phenomena that remain in a natural, unexploited state.

The Natural Heritage Advisory Group consider that the proposed site probably meets natural heritage criteria (vii) and (viii) and possibly criterion (x), because of the highly specialized biodiversity at some of the sites.

### *Criteria (vii) and (viii)*

- The geothermal features within the site include geysers, fumaroles, sinter terraces, alkaline chloride springs, acid chloride mud pools, caldera lakes, mud volcanoes, and collapse pits. Many of these features are among the 19 Rotorua district geothermal and volcanic features of international significance listed within the NZ Geopreservation Inventory.
- Geysers are the most spectacular of geothermal phenomena and are certainly considered to be *superlative natural phenomena* (criterion vii). **Whakarewarewa geyserfield** has the greatest concentration of geysers in the world, with smaller geysers at **Waiotapu** and **Waimangu**. Together, they are the best examples of geothermal fields in the Southern Hemisphere and considered by many experts to be one of the three best examples of geyser fields anywhere in the world (the other two are Yellowstone National Park in the USA and the ‘Volcanoes of Kamchatka’ in Far Eastern Russia – both natural World Heritage sites).

Nga Puia o te Papa hot spring,  
Waimangu thermal valley.  
Les Molloy



- **Waimangu thermal valley** has the distinction of being the only major geothermal field whose formation has been observed in historic times (a result of the 1886 Tarawera eruption). Among its many interesting features, the remarkable inverse relationship between the levels of Inferno Crater Lake and the rate of hot water discharge from Echo Crater (Frying Pan Lake) 500 metres away, is a unique geothermal phenomenon of international importance.

Tarawera eruption landscape  
 - looking NE along along the  
 1886 Tarawera Rift, from Frying  
 Pan Lake and Waimangu thermal  
 valley (bottom), across Lake  
 Rotomahana to Mt Tarawera.  
 Another volcano, Putauaki (Mt  
 Edgecumbe), is in the distance.  
*Lloyd Homer, GNS*

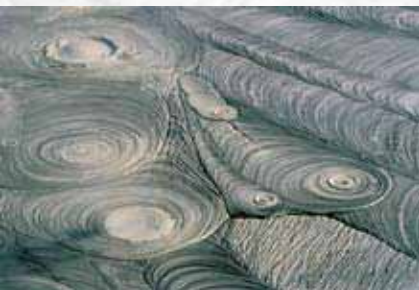


- **Waiotapu** contains the colourful metallic sulphide sinters of Champagne Pool, Artist's Palette and Primrose Terrace and the remarkable Mud Volcano on Loop Road.



Colourful metallic sulphide  
 sinter around hot pool,  
 Waiotapu.  
*Destination Rotorua*

- **Mount Tarawera** is the outstanding example of the many rhyolitic lava domes which encircle Rotorua. Together with the many lake-filled calderas, the lava domes stand as evidence of the extremely destructive pyroclastic eruptions that have formed the Rotorua landscape over the past 250,000 years. Mt Tarawera is the youngest of these domes, the summits of its three large domes rent by the spectacular and colourful 7 km-long rift of the 1886 Tarawera eruption.
- **Lake Rotomahana** is the historic site of the internationally famous Pink and White Terraces, known to Maori as Otukapuarangi and Te Tarata respectively. These majestic siliceous sinter formations stepped down to the former lake level before they were destroyed in the 1886 Tarawera eruption. Today, the lake occupies the largest craters excavated along the Tarawera Rift during the eruption.
- **Lakes Okataina and Tarawera** have the most natural settings of the 11 major Rotorua Lakes, which occupy historic eruption craters and calderas in the site vicinity. Most of the catchment of Lake Okataina is protected in Lake Okataina Scenic Reserve, and most of the southern and eastern catchments of Lake Tarawera are within Lake Tarawera and Mangatiti Dome Scenic Reserves.



Top: Sphagnum moss, Emerald Pool, Waimangu thermal valley.  
*Rod Morris*

Centre: Boiling mud, near Waiotapu.  
*Destination Rotorua*

Lower: Pohutu Geyser at sunset, Whakarewarewa.  
*Destination Rotorua*



### ***Criterion (x)***

The geothermal fields are habitats for a number of highly specialized shrubs, ferns and orchids capable of withstanding the steam, hot and acidic soils, and toxic minerals in the geothermal ground waters. Some of these plants are endemic to the area.

### ***Cultural criteria***

The Advisory Group is aware that the Rotorua geothermal features are taonga to tangata whenua Te Arawa, who desire the safeguarding of their interests in these taonga as guaranteed under the Treaty of Waitangi. The Advisory Group recommends that the proposed site also be assessed for its significance as a potential cultural World Heritage site, prior to it being advanced to nomination.

## **INTEGRITY, MANAGEMENT AND RISK ISSUES**

The site has a number of significant integrity, management and risk issues which need to be addressed before it could be nominated for evaluation as natural World Heritage.

First, not all the site components have legal protection under the Reserves Act or Conservation Act. For instance, the summit of Mt Tarawera and the beds of the lakes are private land and they could obviously not be included in any nomination without the agreement of the owners.

Second, features within the site which are protected, do not have the highest level of legal protection (e.g. they are generally scenic reserves). None of the features have a 'nationally-important' legal status such as nature reserve, national reserve, or national park. In addition, some of the sites (e.g. Waimangu and Waiotapu), although protected as scenic reserves under the Reserves Act, are subject to leasehold agreements allowing them to be managed for tourism by private businesses. The leaseholders would need to agree to any World Heritage nomination.

Third, the site has no single, umbrella management authority, or an overall management plan. The Advisory Group consider that this is not a serious impediment if all stakeholders agree to develop a co-ordinated conservation management strategy as a pre-requisite for World Heritage listing. Indeed, the placement of the proposed site on the New Zealand tentative list could act as a spur to all parties to work co-operatively to achieve greater legal protection and integrated management for the Rotorua Geothermal Field.

Fourth, there is a risk associated with the threat of any further exploitation of geothermal energy within or adjacent to the site. The Whakarewarewa geysers were seriously affected by over-exploitation from steam bores in their vicinity until the government stepped in to regulate in order to restore the vitality of the field in the mid-1980s.

Fifth, all locations are subject to significant numbers of tourist visits and there is a need for on-going monitoring of these impacts on the fragile geothermal phenomena.

Overall, the Advisory Group consider that although there has been historic damage to parts of the site, its addition to the New Zealand tentative list would add a significant level of conservation awareness and international recognition of its outstanding universal values. World Heritage listing would certainly add value and engender much greater cohesion in the protection and management of the site.