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Maungakakamea (Rainbow Mountain)

Site Number:	716
Ecological District:	Atiamuri
Source of Information:	Wildland Consultants (2014a)
Digital Scale:	1:5,000
Data Source:	WRAPS Ltd 2012
Regional Council:	Waikato
1998 Site Number:	Not identified as a site in Shaw and Beadel (1998)
Current Tenure:	Unprotected
Site Area:	c. 55.1 ha
Altitude Range:	c.400-740 m
Bioclimatic Zone:	Lowland - submontane
Grid Reference:	NZTM E1895633, N5753443
Description and Assessment:	The description and assessment below covers the entire natural area, which is mainly within a protected area. The Maungakakamea SNA comprises several small unprotected areas within the larger Maungakakamea natural area and these are shown on the SNA site map. The significance assessment is based on the ecological values of the entire natural area which the Maungakakamea SNA is a part of. Note: vegetation types not present in the SNA are not shown in this site sheet, however they are presented in Wildland Consultants 2014a.

VEGETATION		LANDFORM
CODE	TYPE	
5	Mānuka/water fern-<i>Carex secta</i> shrubland Mānuka forms a canopy c.2-4 m high with prostrate kānuka and mingimingi scattered throughout. Other species present include whekī-ponga, whekī, karamū, broom, and grey willow. The groundcover is dominated by water fern and <i>Carex secta</i> , with local patches of raupō where there is a high water table. Whauwhaupaku, kōhūhū, and kāmahī occur around the margins of this type, and locally throughout. Several crack willow are present.	Wetland at toeslope
6	Nonvegetated raw-soilfield Geothermally-altered soil, mud, sinter, explosion craters, and fumaroles.	Flat, hill, hillslope

Indigenous Flora: The following species characteristic of geothermal vegetation occur here¹: prostrate kānuka (At Risk-Naturally Uncommon), *Schizaea dichotoma* (At Risk-Naturally Uncommon), *Dicranopteris linearis* (At Risk-Naturally Uncommon), a small population of *Nephrolepis flexuosa* (At Risk-Declining), and *Schizaea* sp. (cf. *S. fistulosa*). *D. linearis* is known from only c.23 sites in New Zealand. Four orchid species - *Calochilus paludosus*, *C. robertsonii*, *Petalochilus alatus*, and *Stegostyla atradenia* (all At Risk-Naturally Uncommon) - have been recorded at the site¹ (Rotorua Botanical Society 2006) but were not recorded in 2004 or 2010.

Other species typical of geothermal habitats present include mānuka, tūrutu, *Lycopodiella cernua*, *Morelotia affinis*, monoao, and bracken.

Other species of interest present in the wider reserve area¹ are *Ileostylus micranthus*, *Thelymitra carnea*, *T. nervosa*, *T. ixioides*, *T. pulchella*, *T. pauciflora*, and *Psilotum nudum* (see species list, Rotorua Botanical Society 2006), however these species may not be present in the areas of geothermal vegetation and habitats.

¹ Refers to entire Maungakakamea natural area

Fauna:	Common indigenous bird species typical of the habitat are present ¹ , including North Island robin, spur-winged plover, grey warbler, welcome swallow, fantail, bellbird, Eurasian blackbird, and Australian magpie. New Zealand Dabchick (Threatened-Nationally Vulnerable) have been recorded from one site within Maungakakamea natural area.
Notes on Overall Condition:	The geothermal vegetation in this site ¹ is surrounded by a relatively large area of indigenous vegetation within Rainbow Mountain Scenic Reserve. There are public access tracks to some of the geothermal areas, and these tracks appear to be well maintained and adhered to. However, stock have access to a small area of geothermal activity found in 2010 by the authors of Wildland Consultants (2014a) in the north of the site. This small area was in poor condition and should be fenced to exclude stock.
Change Relative to Shaw and Beadel (1998):	Unknown
Threats/Modification/Vulnerability:	<p>Wilding pines are the key invasive plant species in areas of geothermal vegetation. Whilst geothermal hot spots appear to be resistant to weed invasion, wilding conifers¹ are a threat to some areas of prostrate kānuka scrub which occurs on cooler soils, particularly on the eastern side of the site². Considerable pine control has been undertaken by Department of Conservation in recent years, and the current population of pines in geothermal areas is now very low (<1% cover of the area in which geothermal vegetation occurs).</p> <p>Crack willow (<1%) and grey willow (<1%) are present alongside stream margins. Gorse (<1%) and Spanish heath (<1%) are present in geothermal areas alongside Kerosene Creek Road and site margins. Willow-leaved hakea (<i>Hakea salicifolia</i>) (1-5% cover) has become more common on the north faces of the reserve. Chinese privet (<1%) is also present on the north-facing slopes.</p> <p>Human impacts are minimal and are mainly associated with recreational use restricted to clearly defined tracks. In the past, orchid collectors have been a major threat to the orchid populations, however there have been no recent reports of collecting.</p> <p>Domestic livestock are not a threat to most of this area, however horses and sheep have access to the northern part of the site near SH38 (see F1 on site map).</p> <p>Surrounded by indigenous vegetation in Rainbow Mountain Scenic Reserve, farmland, roads, and plantation forest.</p>
Risk Assessment:	<p>Grazing: Risk to site - low; Timeframe - low.</p> <p>Pest plants: Risk to site - low; Timeframe - low.</p> <p>Human impacts: Risk to site - low; Timeframe - low.</p>
Significance Level:	National (Table 1 - Criteria 1, 3, 5, 7, 9; Table 2 - Factor 8).

¹ Conifers previously recorded in the reserve prior to control works being undertaken include bishop pine (*Pinus muricata*), lodgepole pine, European larch (*Larix decidua*), black pine, maritime pine, radiata pine, and strobilus pine (*Pinus strobus*) (Rotorua Botanical Society 2006).

² Refers to entire Maungakakamea natural area.

**Significance
Justification:**

This site² is of national significance because it is a good quality, relatively large example of geothermal vegetation and includes nationally uncommon habitat types (geothermally heated dry ground, fumaroles; Williams *et al.* 2007; Holdaway *et al.* 2012). The site² also contains a good quality representative example of an ecological sequence grading from geothermal vegetation to tall forest over an elevation gradient of 380-743 m (see Nicholls 1974; Clarkson 1981b; Beadel 1995a).

The site has² a high diversity of vegetation types related to thermal activity, subsequent cooling, and succession after periodic burning (Watt 1986). The geothermal vegetation is a good example of the distinctive vegetation zones which progress over increasingly cool ground into indigenous scrub and forest. The variety of vegetation types is matched by few other reserves in the South Auckland Land District (Clarkson 1981a).

Eight plant species classed as 'At Risk' have been recorded at the site: prostrate kānuka, *Schizaea dichotoma*, *Nephrolepis flexuosa*, *Dicranopteris linearis*, *Calochilus paludosus*, *C. robertsonii*, *Caladenia alata*, and *C. atradenia*.

Field Work Required:

No field work is required.

Notes:

A geophysical assessment of the surface geothermal manifestations at this site² is presented in Appendix 4 (Wildland Consultants 2014a). This assessment was undertaken in 2010.

References:

Beadel and Bill (2000); Bycroft (2006); Clarkson (1981a & 1982b); Rotorua Botanical Society (2006); Watt (1986); Wildland Consultants (1998, 2004c, 2012, & 2014).