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## Waiotapu North

<b>Site Number:</b>	SNA573
<b>Ecological District:</b>	Atiamuri
<b>Source of Information:</b>	Wildland Consultants (2014a)
<b>Digital Scale:</b>	1:5,000
<b>Data Source:</b>	Bay of Plenty 0.25m Rural Aerial Photos (2015-17)
<b>Regional Council:</b>	Waikato
<b>1998 Site Number:</b>	Not in Shaw and Beadel (1998). Site No. U16/1 in Wildland Consultants (2004b).
<b>Current Tenure:</b>	Unprotected
<b>Site Area:</b>	44.4 ha
<b>Altitude Range:</b>	350-420 m
<b>Bioclimatic Zone:</b>	Submontane
<b>Grid Reference:</b>	NZTM E1894827, N5750525

VEGETATION		LANDFORM	EXTENT
CODE	TYPE		
1	<p><b>Prostrate kānuka-mingimingi-mānuka scrub</b> Prostrate kānuka (c.0.3-3 m tall) forms a dense cover with mingimingi locally co-dominant, mānuka and kānuka common throughout and occasional emergent kāmahī and wilding pines. Mānuka is common to dominant in wet areas and along stream margins. The groundcover comprises scattered bracken and water fern. Wilding pines, Japanese cedar (<i>Cryptomeria japonica</i>), broom, and blackberry are common on the margins of this area. Pine control has been undertaken in parts of this vegetation type.</p>	Sides of crater, flat, riparian margins, and lake margins	c.33.6 ha
2	<p><b>Exotic pine/mānuka-mingimingi scrub</b> Mānuka and mingimingi (2-4 m high) dominate the canopy within these areas. Emergent wilding pines (radiata pine and black pine (<i>Pinus nigra</i>)) are generally scattered throughout but form small groves in places. Black wattle, prickly mingimingi, whekī, whekī-ponga, and broom are also scattered throughout. The groundcover is sparse, with scattered <i>Gleichenia microphylla</i>, tūrutu, and <i>Hypolepis distans</i>, and several <i>Dicranopteris linearis</i> plants. Several heated pools, seepages, boiling mud, and heated ground patches are present.</p>	River terraces, flat, and gently undulating	c.4.1 ha
	<p><b>Blackberry scrub</b> Located about 30 m north of the bridge in the northeast of the site (c.E1896462 N5751308). Steam was seen rising from an area of blackberry scrub.</p>		Not mapped
3	<p><b>Prostrate kānuka shrubland</b> Dense prostrate kānuka forms a canopy ranging from 0.3-4 m high with mingimingi scattered throughout. Locally scattered prickly mingimingi, monoao, wilding pines, and occasional patches of <i>Lycopodiella cernua</i> are present.</p>	Hillslope, gently rolling	c.2.6 ha
4	<p><b>Nonvegetated raw-soilfield</b> This includes heated ground, sinter pavements, hot water springs and seepages, boiling mud, and steaming ground.</p>	River terraces, flat, and gently undulating	c.1.2 ha
5	<p><b>Geothermal springs, water, mud pools, geothermal stream and sinter</b> Geothermally-influenced lakes and pools, mud pools, mud pools surrounded by raw-soilfield, occasional hot springs.</p>	Flat and craters	c.2.9 ha

<b>Indigenous Flora:</b>	Geothermal kānuka (At Risk-Naturally Uncommon) and <i>Dicranopteris linearis</i> (At Risk-Naturally Uncommon) are present. A small population of <i>Lycopodiella cernua</i> , a species which is characteristic of geothermal areas, is also present.
<b>Fauna:</b>	Common indigenous and introduced bird species typical of the habitat are present, including tui, grey warbler, fantail, tomtit, silvereye, Australasian harrier, bellbird, and welcome swallow. Pied stilt (At Risk - Declining) were observed nesting on the site by Beadel and Bill (2000). Possum and pig sign was evident in 2004.
<b>Notes on Overall Condition:</b>	Small to moderate sized areas of geothermal vegetation, many with impressive geothermal features, separated by plantation forest, exotic scrub, and farmland. The site links the geothermal habitats of Waiotapu South with the Maungakakamea (Rainbow Mountain) and Ngapouri sites. A diverse range of geothermal habitats are present at this site.
<b>Change Relative to Shaw and Beadel (1998):</b>	Probably little change.
<b>Threats/Modification/Vulnerability:</b>	<p><b><i>Invasive Exotic Plants:</i></b> Invasive exotic plants dominate the margins of these areas. Although extensive wilding pine control has been undertaken since 2004, wilding pines are still common (5-25% cover). Other pest plant species present include apple (&lt;1% cover), blackberry (1-5% cover), broom (5-25% cover), climbing rose (<i>Rosa</i> sp.) (&lt;1% cover), cotoneaster (&lt;1% cover), grey willow (1-5% cover), and Spanish heath (1-5% cover). Blackberry and grey willow are often common on geothermal stream margins.</p> <p><b><i>Human Impacts:</i></b> This site has well maintained roads, and Kerosene Creek is a popular bathing area for tourists and locals, however the larger areas of geothermal vegetation are seldom visited as most cannot be seen from a main road.</p>
<b>Risk Assessment:</b>	Plantation forest management: Risk to site - medium; Timeframe - high. Pest plants (wilding pines): Risk to site - medium Timeframe - high. Other pest plants: Risk to site - medium; Timeframe - medium.
<b>Significance Level:</b>	Regional (Appendix 7 - Table 1 - Criteria 3, 5; Table 2 - Factor 9).
<b>Significance Justification:</b>	Waiotapu North is of regional significance because, in association with 'Waiotapu South' and 'Maungakakamea (Rainbow Mountain)', it comprises a relatively large example of geothermal habitat, which includes nationally uncommon habitats (geothermally heated dry ground, fumaroles; Williams <i>et al.</i> 2007; Holdaway <i>et al.</i> 2012), and provides important habitat for two 'At Risk' plant species: geothermal kānuka and <i>Dicranopteris lineraris</i> . If protected from the adverse effects of plant and animal pests and of adjacent land use (e.g. discharges, erosion) the site will maintain its ecological sustainability over time.
<b>Field Work Required:</b>	No field work required.

**Notes:**

Ecological surveys and assessments were undertaken of the parts of this site managed by Kaingaroa Timberlands in April 2004 (see Wildland Consultants 2004a). These areas were identified as “high conservation value forest” using the Forest Stewardship Council criteria for assessment of high conservation value forests.

Parts of the geothermal vegetation and habitats are not protected and are subject to grazing; extensive areas are also dominated by pest plants. The unprotected areas provide important linkages between the protected areas of geothermal habitat and regular management of pest plants, particularly wilding trees, should be undertaken. These areas should be monitored regularly. A restoration plan should be prepared and implemented to enhance the highly significant ecological values of this site. Formal protection is recommended. Part of this site is adjacent to Landcorp Protective Covenant (U16117).

A geophysical assessment of the surface geothermal manifestations at this site is presented in Appendix 4. This assessment was undertaken in 2010.

**References:**

Beadel and Bill (2000); Given (1996); Beadel and Bishop (1997); Given (1995), Wildland Consultants (2004a, b, & c, 2009, 2012 & 2014).