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Wharepapa Road Thermal Areas

Site Number:	SNA571
Ecological District:	Atiamuri
Source of Information:	Wildland Consultants (2014a)
Digital Scale:	1:5,000
Data Source:	WRAPS 2007
Regional Council:	Waikato
1998 Site Number:	Not identified as a site in Shaw and Beadel (1998).
Current Tenure:	Unprotected
Site Area:	3.6 ha
Altitude Range:	290-305 m
Bioclimatic Zone:	Lowland
Grid Reference:	NZTM E1890687, N5742971

VEGETATION		LANDFO RM	EXTENT
CODE	TYPE		
1	Prostrate kānuka scrub A small area of prostrate kānuka scrub to 3 m tall. Occasional blackberry, Mercer grass, Chinese privet seedlings, and sheep's sorrel in the understorey.	Gentle slope	<0.1 ha
2	Mānuka scrub Mānuka-dominant scrub (1-4 m tall) surrounds geothermal features, with scattered blackberry and occasional prostrate kānuka.	Flat	c.0.8 ha
3	Mānuka-mingimingi scrub Mānuka (2-5 m tall) with mingimingi, patches of mingimingi-bracken scrub, and occasional prostrate kānuka. Scattered to local emergent radiata pine are present in parts of the site. Radiata pine, several oaks (<i>Quercus</i> sp.), and silver birch are present on the margins.	Flat	c.0.3 ha
4	Mānuka-prostrate kānuka-exotic species scrub Mānuka, prostrate kānuka, and Chinese privet scrub to 7 m tall. Open areas dominated by mingimingi. Common understorey species include Yorkshire fog, Himalayan honeysuckle, blackberry, Chinese privet seedlings, and Khasia berry.	Flat	c.0.9 ha
5	Silver birch-Chinese privet/blackberry-(prostrate kānuka) scrub Occasional to local silver birch and Chinese privet are emergent over blackberry scrub, with scattered broom and patches of prostrate kānuka. Browntop and Yorkshire fog present in the understorey. Fumaroles and small mud pools present in parts of this type.	Flat/gently rolling	<0.1 ha
6	(Prostrate kānuka)/rank exotic grasses grassland Occasional prostrate kānuka over mixed exotic grassland species, including Indian doab, wild seradella (<i>Ornithopus perpusillus</i>), hawksbeard (<i>Crepis capillaris</i>), browntop, Mercer grass, catsear, and lotus. Soil temperature was 15 °C at 5 cm depth on a winter morning in 2010.	Flat	<0.1 ha
7	(Machaerina arthrophylla)/mixed exotic grasses-nonvegetated raw-soilfield grassland Emergent <i>Machaerina arthrophylla</i> is present over rank exotic grasses and herbs, including browntop, catsear, white clover, sheep's sorrel, sweet vernal, and <i>Gonocarpus micranthus</i> . Approximately 25 × 50 m of geothermal activity, including fumaroles, mud pools, and heated bare soils is present. Scattered pumice rocks are common.	Gently sloping/flat	c.0.1 ha
8	Nonvegetated raw-soilfield (vi) Sinter terrace, hot pools, occasional prostrate kānuka and mānuka. Scattered patches of Indian doab and hawksbeard. (vii) Patches of arrow grass on sediments from geothermal springs. Overflow from geothermal springs, 98 °C during field survey in 2010. (viii) Steaming ground. Five fumaroles. Occasional sheep's sorrel, Yorkshire fog, and annual poa (<i>Poa annua</i>). Small patch of sinter present. (ix) Occasional mingimingi on margins with scattered oaks and overhanging silver birch.	Flat	c.1.1 ha

VEGETATION		LANDFORM	EXTENT
CODE	TYPE		
	(x) Nonvegetated raw-soilfield, including a mud pool. Scattered arrow grass, Yorkshire fog, and <i>Machaerina arthropophylla</i> are present on downstream overflow margins of the mud pool. (xi) Bare ground, geothermal water. Occasional prostrate kānuka to 3 m tall, mānuka seedlings, arrow grass, and <i>Lachnagrostis</i> sp.		
9	Geothermal water Several features are present. These are briefly described below with their location shown on the map. (i) Geothermal water in a drain, surrounded by exotic grasses, including reed sweet grass, Yorkshire fog, and curled dock (<i>Rumex crispus</i>). (ii) Hot pool. (iii) Geothermal pool surrounded by mossfield. <i>Gonocarpus micranthus</i> on margins. Spring is surrounded by exotic grasses. (iv) Geothermal spring in ditch surrounded by rank exotic grasses, particularly reed sweetgrass and Yorkshire fog. The temperature was c.47°C in 2010 with green and orange algae present near spring outflow and drainage channel. (v) A mud pool surrounded by sheep's sorrel and grazed pasture grasses. Timber has been thrown into the mud pool.	Open water	c.0.2 ha

Indigenous Flora: Small populations of both geothermal kānuka (At Risk-Naturally Uncommon) and *Campylopus* sp. are present; both are endemic species restricted to geothermal areas. Other species characteristic of geothermal habitat include mingimingi, mānuka, and water fern. The presence of *Machaerina arthropophylla* at this site is of botanical interest.

Fauna: Pied stilt (At Risk-Declining) use habitats at this site from time to time (observed at the site in 2010), though it does not represent habitat of considerable importance for the conservation of this species. Common indigenous and introduced bird species typical of the habitats are likely to be present, including Australasian harrier, spur-winged plover, grey warbler, Australian magpie, pukeko, fantail, welcome swallow, house sparrow, Eurasian blackbird, goldfinch, and skylark. Mosquitofish were recorded in drains.

Notes on Overall Condition: Most of the site comprises small and isolated geothermal areas surrounded by farmland. The geothermal areas have been highly modified by dairy farming and the dumping of rubbish and are in poor condition. Parts of the site are fenced to exclude stock and have geological features of high significance (see Appendix 4 for a geophysical assessment of features at this site). Pest plants are common, but there is good potential habitat for indigenous geothermal plants to increase their cover and diversity in these areas with appropriate management. The values of the site are likely to improve if geothermal features are fenced to exclude stock.

Threats/Modification/Vulnerability: *Invasive Exotic Plants:* Several exotic species occur in each of these areas and are likely to continue to increase in extent under current management. Key weed species present are rank pasture grasses (26-50% cover), Khasia berry (1-5% cover), blackberry (6-25% cover), oaks (1-5% cover), silver birch (1-5% cover), and pine species (including radiata pine, maritime pine, lodgepole pine) (5-25% cover). Silver birch and pines could damage geothermal features if they fall into them.

Human Impacts: Rubbish disposal is the main human-related threat to these areas. Rubbish, which includes litter, fencing material, white-ware, and garden refuse, has been dumped on the sinter terraces and geothermal sediments.

Several drainage channels from the hot pools extend across the farmland, and these have lowered the water table and altered ground temperatures. Several geothermal baths are present at the site. Until recently, one of the pools was also used by pig hunters to clean their pigs. Harvesting of trees has caused considerable damage to geothermal features at one location. Many features are threatened by farming activities (see below).

Grazing: Most of the areas are currently fenced, but the fences are in poor condition in places, allowing livestock access.

- Risk Assessment:** Grazing: Risk to site - medium; Timeframe - medium.
Vegetation clearance: Risk to site - high; Timeframe - high.
Wildling pines: Risk to site - high; Timeframes - high.
Other pest plants: Risk to site - high; Timeframes - medium.
- Significance Level:** This site has been divided into two parts, A and B (see site map).
- A. Regional (Appendix 7 - Table 1 - Criteria 3, 4, 5, 6; Table 2 - Factors L, M, N)
 - B. Local (Appendix 7 - Table 1 - Criterion 5; Table 2 - Factor S)
- Significance Justification:**
- A: These areas are of regional significance because, when considered together, they form a moderate-sized area of geothermal habitat that includes nationally uncommon ecosystems (geothermally heated dry ground, fumaroles; Williams *et al.* 2007; Holdaway *et al.* 2012). These areas also contain small populations of an 'At Risk' plant species (geothermal kānuka), but do not represent habitat of considerable importance for the conservation of this species.
 - B: These areas are of local significance because they contain small, disjointed, degraded examples of nationally uncommon habitat types (geothermally heated dry ground, fumaroles; Williams *et al.* 2007; Holdaway *et al.* 2012).
- Field Work Required:** No, this site was most recently surveyed in 2004.
- Notes:** Given (1996) assessed the botanical value of many of the geothermal sites in the Waikato Region, and in that study this site was classed as Category B - the second highest category.
- Features 2 and 12 are listed in Waikato Regional Council (undated) as "South (SE) Spring" and "Opaheke Spring" respectively.
- A geophysical assessment of the surface geothermal manifestations at this site is presented in Appendix 4.
- References:** Beadel and Bill (2000); Given (1995 & 1996); Spring-Rice (1996); Waikato Regional Council (undated); Wildland Consultants (2004c, 2009, 2012, & 2014).