

TABLE 2. IMPORTANT GEOLOGICAL SITES AND LANDFORMS IN THE OTANEWAINUKU ECOLOGICAL DISTRICT (FROM KENNY AND HAYWARD 1996)

IMPORTANCE & VULNERABILITY*	NAME	GRID REF.	RAP OR PNA
B3	Pleistocene marine sequence and faunas	V15 375627	Ohinekoao (RAP 27)
B3	Braemar Road Tephra Section	V15 396548	
C2	Taheke Geothermal Field	U15 048497	Taheke Geothermal (RAP 15)
C3	Okere Falls hydro-electricity station	U15 039486	Okere Falls Scenic Reserve

* Importance rankings (Kenny and Hayward 1996) are:

- A International scientific importance
- B National scientific, educational or aesthetic importance
- C Regional scientific, educational or aesthetic importance

Vulnerability rankings (Kenny and Hayward 1996) are:

- 1 Highly vulnerable to complete destruction or major modification by humans
- 2 Moderately vulnerable to modification by humans
- 3 Unlikely to be damaged by humans
- 4 Could be improved by human activity
- 5 Site already destroyed (not necessarily by human activity)

Yellow-brown pumice soils: this group covers virtually the entire ecological district except for the Whakamarama Plateau and the minor Manawahe sector. They are derived from rhyolitic ash and lapilli widespread during eruptions in the Okataina (east of Rotorua) and Taupo Volcanic Centres, converted by the action of climate and organisms into a suite of sandy to gravelly soils with varying degrees of weathering and fertility.

Central yellow-brown loams: these soils, derived from older pumiceous ash beds, occur on the Whakamarama Plateau. In general, topsoils are brownish black and about 20 cm deep; and subsoils yellowish brown friable sandy loams, with a moderately developed nutty structure. They are relatively strongly leached.

Six sites in Otanewainuku Ecological District have been recorded as being of regional significance for their soils (Arand *et al.* 1993). These sites contain good quality examples of several soil types (for example: Mangawhea, Manawahe, Tarawera, Pukemaku, Kaharoa, Oropi, Otanewainuku and Whakamarama soils) of the ecological district. Good quality examples of these soils are uncommon.

TABLE 3. IMPORTANT SOIL SITES IN THE OTANEWAINUKU ECOLOGICAL DISTRICT (FROM ARAND *ET AL.* 1993)

I ¹	S ²	V ³	NAME	GRID REF.	RAP OR PNA
3	• Only example of Mangawhea soils in this inventory.	3	Carrie Gibbons Scenic Reserve	V15 176537	Carrie Gibbons Scenic Reserve
3	• Good examples of Kaharoa and Oropi soils are uncommon.	3	Mangapouri Scenic Reserve	U15 911510	Mangapouri Scenic Reserve
3	• Good example of recent and older soils formed from volcanic ash under native vegetation. • Good examples of Pukeamaru and Manawahe soils are uncommon. • Most Manawahe soils have been developed for sheep and dairy farming.	3	Mangaone Scenic Reserve	V15 305477	Mangaone Scenic Reserve
3	• Good examples of Whakamarama soils are uncommon.	3	Otawa Scenic Reserve	U14 965767	Otawa Scenic Reserve
3	• Good examples of Kaharoa soils are uncommon.	3	Penny Road Scenic Reserve	W15 599483	Penny Road Scenic Reserve
3	• Good examples of Whakamarama soils are uncommon.	3	Puketoki Scenic Reserve	U14 731813	Puketoki Scenic Reserve

1 1 = International

- contains the best example of a soil (generally a soil group) or soil-vegetation or soil-landform association that is unique to New Zealand (or these latitudes).
- contains a soil that is naturally uncommon or greatly reduced in extent in other parts of the world.
- contains a wide range of extensive soils with a relatively unmodified vegetation cover.
- has been studied in detail and is known internationally.

2 = National

- contains the best or a “classic” example of a soil (either a soil group or a mapping unit) or a soil-vegetation or soil-landform association in New Zealand.
- contains a soil or soil-vegetation or soil-landform association that is nationally uncommon or reduced in extent.
- contains a moderate range of extensive soils with a relatively unmodified vegetation cover.
- has been studied in detail and is known nationally.

3 = Regional

- contains the best regional examples of a soil (generally a mapping unit) or a soil-vegetation or soil-landform association.
- contains a limited range of soils under vegetation that is relatively unmodified.

2 Significance

- This is an explanation of the features of the site that make it worthy of inclusion in the inventory.
- Where possible, each mapping unit is represented by three sites to try to cover the variability of the mapping unit.

3 Vulnerability

1 = site has no formal protection of soil, vegetation or other scientific or scenic values; soil and/or vegetation threatened by modification.

2 = formal protection of the site has been proposed or is being negotiated; soil and/or vegetation threatened by modification; most parts formally protected.

3 = site is formally protected; no foreseeable threat to soil and/or vegetation.

In general, sites with legal protection (for example: national park, scenic reserve, covenanted) and Department of Conservation stewardship land are rated “3”; areas that have been formally recommended for protection are rated “2”; and most other sites are rated “1”.

CLIMATE

The following description of the climate of Otanewainuku Ecological District was compiled from Quayle (1984) and Ministry of Works (1962).

The Otanewainuku Ecological District is rather sheltered by inland ranges from the prevailing westerly winds. Contrasts occur between both coastal and inland situations, and between high and low country, with respect to both diurnal and annual variation. Average daily maximum temperatures over 20°C are recorded in most areas between December and March but rarely exceed 30°C.

While upland areas may receive rain with airstream from any direction, most of the district receives a large part of its annual rainfall during periods of onshore winds from the north to north-east. Rainfall varies from 1400 mm near the coast to up to 3000 mm over the Whakamarama and Mamaku Plateaus.

Winds come predominantly from the westerly quarter, with occasional north-east gales on the Kaimai Range. Spring is the windiest season. The high country to the west and south shelters the lowlands, which receive less wind than many other parts of the country. In summer, occasional foehn wind conditions of high temperatures and low humidities coincide with a prolonged dry spell, and cause rapid drying out of vegetation. The occurrence of frost and fog varies considerably. Cloud is frequent over the Kaimai Range. The average annual frequency of frosts varies from about five per year near the coast to over 50 per year for inland areas. Light snow falls on land above about 470 m about once every three years.

BIOCLIMATIC ZONES

Four bioclimatic zones have been recognised; coastal, semi-coastal, lowland and sub-montane, determined mainly by indicator plant species (see Figure 3). They are:

Coastal: The coastal zone extends from the coast to the inland limit of pohutukawa as a dominant canopy species. This zone extends approximately 1 km inland from the coast and the vegetation is often exposed to salt-laden winds. Characterised by a range of different species dependent on the site, for example: sand dune species, salt marsh species, pohutukawa, taupata, houpara, ngaio, and karo.

Semi-coastal: Extends from the coastal zone to the inland limit of kohekohe. This may be up to about 30 km from the open coastline, depending on landform and substrate.

Lowland: Extends from the semi-coastal zone inland to the upper limit of tawa.

Sub-montane: Occurs above the lowland zone. Only applies to Te Weraiti, on the Kaimai Range.

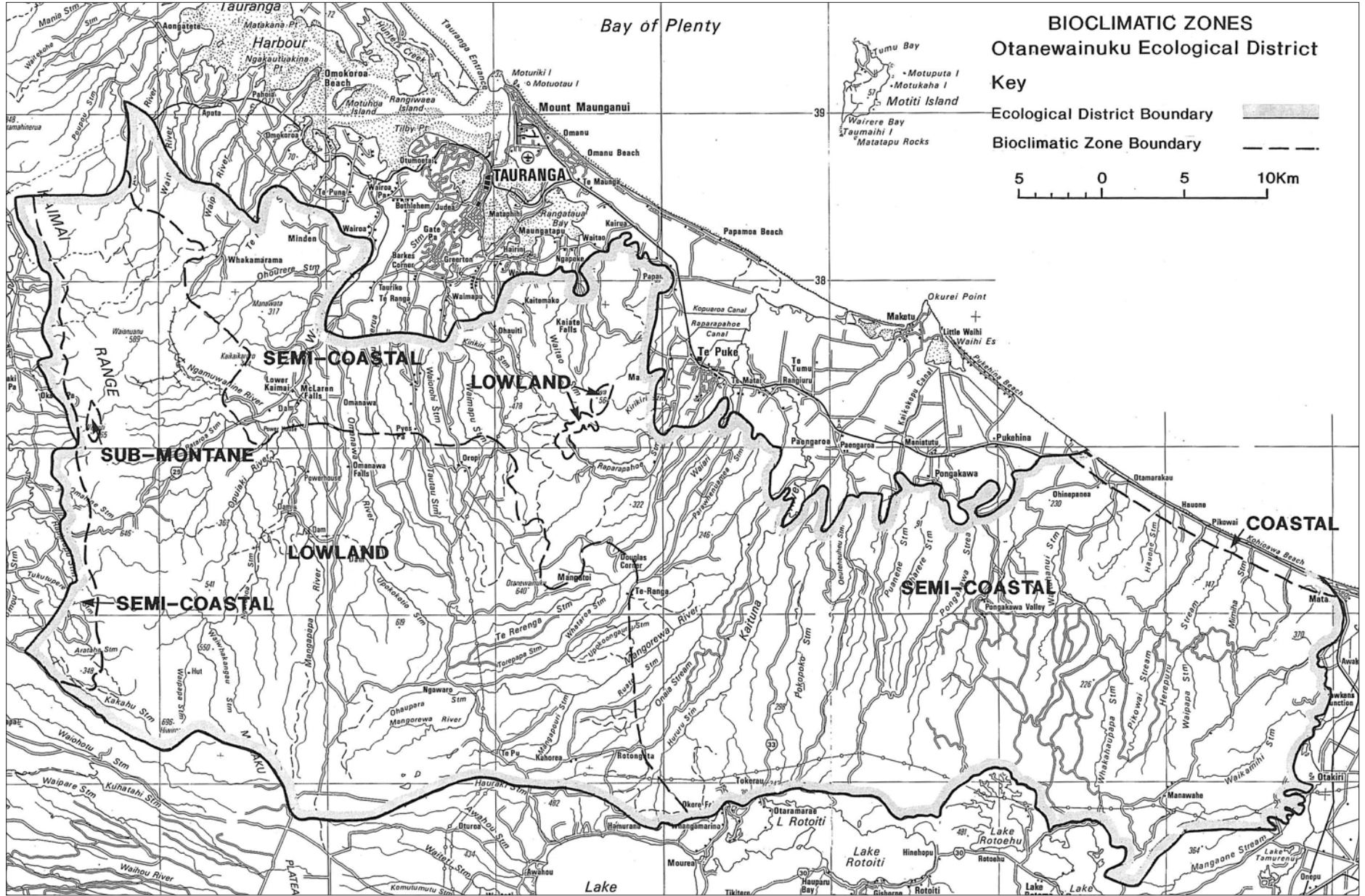


Figure 3. Bioclimatic zones, Otanewainuku Ecological District.