

TRADITIONAL USE OF GEOTHERMAL RESOURCES BY NEW ZEALAND MAORI

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ABSTRACT:

Geothermal resources were revered in traditional times throughout Aotearoa (New Zealand). In the Taupo Volcanic Zone, geothermal energy was utilised for many purposes including cooking, heating, bathing, and food growing. The geothermal resources were regarded as **natural** treasures by the Maori people. These treasures were preserved for future generations by guardians (kaitiaki) who would live in the area. The understanding between Maori and the taha wairua (**spiritual** dimension), did not allow improper use of or disrespect for physical resources to go unpunished. Development of geothermal resources by people other than Maori has raised a number of issues regarding kaitiakitanga (guardianship) and rangatiratanga (full authority) over the resources.

This paper covers Maori traditional use of the geothermal resources in the Taupo Volcanic Zone. It has been put together using existing research done by the New Zealand Waitangi Tribunal and information from early explorers

1.0 INTRODUCTION

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| 'Ko Tongariro te maunga | Tongariro is the mountain |
| Ko Tongariro te awa | Tongariro is the river. |
| Ko Taupo te Mama | Taupo is the sea |
| Ko Ngati Tuwharetoa te iwi | Tuwharetoa is the tribe |
| Ko Te Huhu te Tangata | Te Huhu is the man |
| Tihi Mauriora' | |

All natural resources in the Maori tradition were 'taonga', or valuable natural treasures, derived from gods. In a very special way Maori were aware that their possession of them was on behalf of someone else in the future. Myths and legends support a holistic view encompassing spiritual and physical dimensions.

In 1840 many of the Maori leaders and representatives of the Queen of England signed the Treaty of Waitangi. The Treaty extinguished Maori sovereignty and established that of the Crown. **Natural** resources are covered in the Treaty by the term 'taonga katoa' which implies Maori treasures, namely: knowledge, language, heritage resources and more, all inherited from ancestors. This important term was translated in the English version of the Treaty as "other properties". The Treaty was believed to signify a partnership, but this was never attained, due to similar examples of misunderstandings and unhonoured conditions.

As the Treaty was not honoured by the Government, Maori have watched the development of laws enacted by the government deprive them of privileges secured in the Treaty of Waitangi. In 1975 The Waitangi Tribunal was established to make recommendations to the Crown on claims relating to the Treaty. To prepare claims for the hearings Whakapapa are recited; this identifies the iwi or hapu who have mana whenua and so kaitiakitanga and rangatiratanga over the resources. The ownership of the geothermal resource is still not resolved although claims for Ngawha and the Rotorua areas have been heard.

This traditional view of resources has always differed fundamentally from that of the European settlers (Pakcha) who came to Aotearoa in the 19th century. Maori and Pakcha each had a very different world view. Maori traditionally did not compartmentalise resources into separate components.

The preservation of physical resources for future generations is a part of the concept of kaitiakitanga. Exploitation of the geothermal resources can not be confined to traditional uses, as Maori have a commitment to provide for their families in a changing economic

environment. The development of geothermal resources by other parties has resulted in complex situations between the developer and tangatawhenua, due to the lack of understanding and recognition of rangatiratanga and kaitiakitanga, by the developers. Development requiring massive geothermal fluid withdrawal has destroyed many of the manifestations used traditionally by Maori. Some measures can be enforced to preserve thermal features. The **deep** geothermal resources themselves are not in danger of over exploitation: at present only the top 1-2 km of an enormous heat resource is mined (M.P Hochstein pers comm).

In Maoridom it was believed that human existence was subordinate to the physical and **spiritual** components which combined to form the total environment. Geothermal resources are a case where resources were not isolated. Traditional evidence indicates that thermal springs were the face or eye of the geothermal taonga. Maori understood that thermal **springs** and the underlying geothermal activity were one and the same thing, and that particular pools were connected to other surface manifestations. Maori people have long connected the ngawha and puia with the centres of volcanic activity that are still active.

The geothermal resource in the Taupo Volcanic zone (Fig.1) is a highly esteemed taonga of the Ngati Awa, Te Arawa and Ngati Tuwharetoa tribes. The tribes have centuries of association with the resource. The tradition attached to the areas with the tribes, areas of "wahi tapu" (sacredness) exist this is explained further in the paper.

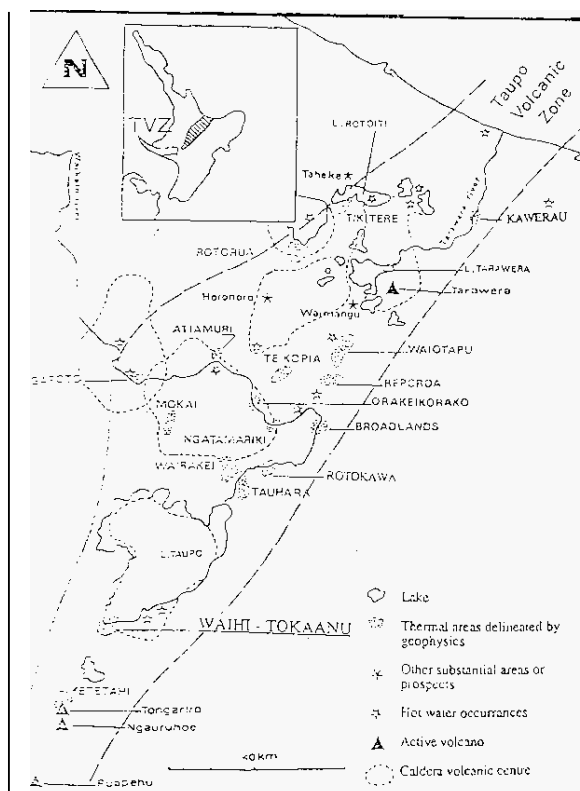


Figure 1: Taupo Volcanic Zone, North island New Zealand

2.0 LEGENDS

The geothermal resources encountered in the Taupo Volcanic Zone are referred to as the legacy of Ngatoroirangi. The account of the legacy of Ngatoroirangi is one that is associated with descendants from the Te Arawa canoe. "**Mai Maketu** ki Tongariro" from the prow of the canoe at Maketu to the stern Tongariro (Stokes 1991).

Mountains, rivers and lakes, are physical features which have been recorded in myths and legends since time immemorial. Each feature on the landscape had special meaning and significance. Maori legends and songs **speak** of the spiritual connection that they have with this resource. Maori extended their deep sense of spirituality to the whole of creation. In their myths and legends they acknowledged gods and other beings who bequeath all nature's resources to them (Wai 22, 1988).

Ngatoroirangi, Tohunga of Tu Arawa canoe, journeyed inland from Maketu in the Bay of Plenty to Tongariro. On the **slopes** of Tongariro, nearly freezing to death, he called to his sister for help. The following account of the legacy of Ngatoroirangi was recorded by Dr Ferdinand von Hochstetter in 1959.

"I reproduce the peculiar legend as I heard it from the mouth of the Chieftain Te Heuheu at Lake Taupo. Among the first voyages who came from Hawaii to New Zealand, **was** the chief Ngatoroirangi (i.e. Heaven runner, the traveller in the heavens). He landed at Maketu on the East Coast of the North Island. Thence he made his way with the slave Ngauruhoe to explore the new country. He travels through the district, stamps springs of water from the ground to succour the mountains and glimpses to the south a great mountain. Tongariro (literally towards the south). This mountain he determines to climb in order to survey the whole country from its summit. He comes to Lake Taupo in the inland plains. Here the bushes **tear up** his great cloth of kiekie leaves. The shreds strike root and become Kowhai tree's. Then he climbs the snow clad Tongariro; higher up, however, it is so cold that chieftain and slave are in danger of freezing. Ngatoroirangi therefore calls his sister who remain at Wakari (Whakaari) to dispatch him fire. The sisters hear the call and send sacred unquenchable fire that they brought with them from Hawaii. They send it by means of two taniwha (spirits of the mountain, and water living underground) Pupu and Te Haeata (Te Pupu and Te Hoata), by a subterranean passage to the peak of Tongariro. The fire came just in time to save the chieftain. When, however the latter wished to offer it to his slave, so that he could warm himself. Ngauruhoe was dead.

To this present day the hole which the fire rises in the mountain, i.e. the active crater of Tongariro, is known by the name of the slave Ngauruhoe. Since, however, the fire was the soared fire from Hawaii, it still burns strongly today, and burns along the whole stretch between Wakari (Whakaari) and Tongariro, at Motou-Hora, Okakaru, Roto-ehu, Rotoiti, Rotorua, Rotomahana, Paeroa, Orakeikorako, Taupo, at every point where it shot up when the two Taniwha brought it underground. Hence the innumerable hot springs" (Hochstetter, 1959 P140). (correct spelling in brackets)

This account is one of many that exist; similar versions with variations involving the sisters travelling with the heat, sending gods or demons, or the sisters being called to in Hawaii, not Whakaari. Always, the route the two taniwha **took** is consistent with that of Te Heuheu.

The following version is also often heard:

The sisters who were **hack** in Hawaii, heard his call and set out at once. They rested and lit a fire at Whakaari (White Island) which is an **active** volcano in the Bay of Plenty, and then they made their way underground to Tongariro: sparks fell from their fire at Waitapu, Ohaaki, Rotokawa, Tapuacharuru and Tokaanu, creating hot springs, geysers and boiling mud pools in these places. At Tongariro the sisters fire warmed Ngatoroirangi but it came too late for Ngauruhoe; the crater of the mountain became his tomb, and its peak is known by his name. Then Ngatoroirangi took the fire and hurled it into the crater, where it still burns. His sisters returned to the Bay of Plenty initiating as they went thermal activity at Waimahana, Whakarewarewa, Ohinemutu and Tikitere (Orbell 1985).

Physical features were named to commemorate myths that surround them. One example being Tongariro, when Ngatoroirangi thought he was dying of cold; his wards were 'Ka Riro Au Te Taonga'. Ngatoroirangi was chanting these words on the summit of the Mountain we call Tongariro (Maxwell 1991).

Myths also associate the mountains as being part of moving. One of the most well known myths is the tale of the warrior mountains, love far Pihanga. In the days when the world was young the great mountains stood on the heart of 'Ika a Maui' (North Island New Zealand). They were gods and warriors. Taranaki stood southwest of Ngauruhoe, Tauhara, and Edgumhe to the northeast.

Pihanga was the sought after mountain, her fame and beauty spread to the far corners of the land, each of the four mountains wooed her and wished her to be his wife. The mountains battled for her hand Tongariro emerged victorious. The defeated departed, Taranaki travelled towards the setting sun carving out the mighty Whanganui river. Mount Edgumbe journeyed northwards and Tauhara heavy in heart lingered to gaze back at Pihanga and now stands at the northern shore of Lake Taupo (Potter 1987).

The sighting of a phantom canoe on Lake Tarawera is deeply embedded in the mythology surrounding the 1886 eruption of Mt Tarawera. Guide Sophia, a well respected guide at the terraces, on her return from guiding some visitors, saw a war canoe, full of warriors. The canoe was moving swiftly as if pursued by the enemy. It was an omen, Sophia met with the Landlord of the Hotel at Wairoa and said "I shall never go back to the Terraces, something is going to happen." A few days later the forces of nature broke out and Tarawera erupted. Lake Rotomahana erupted destroying the Terraces and **surrounding** villages; 150 people were killed. Sophia is reported to have thought the eruption was punishment from a demon called Tama-o-hoi, who long before had been imprisoned in the mountain by Ngatoroirangi.

3.0 KAITIAKI (CARETAKERS OF THE RESOURCE)

In many cases, particular resources formed a central cultural component between hapu or iwi and their traditional territory. Particular springs in a region may **have** been used by all hapu from the time of ancestors. Springs were used by ancestors in early times for ceremonies. Events occurring through time accumulated history and enhanced the magical qualities of a pool.

The hapu living in the immediate vicinity of the pools or springs acted as the kaitiaki or steward guardian on behalf of all the hapu. One of the major functions of the Kaitiaki was to nurture and preserve the resource for future generations. Use by other hapu may have been due to the geographic position of the springs, traditionally a crossroad for Maori travelling in the region. The seasonal uses by the larger iwi will be discussed further.

There was a system of tapu (sacred) rules which combined with the Maori belief in gods having overall responsibility for nature's resources, served effectively to protect **these** resources from improper exploitation. To disregard or disobey any of the rules of tapu was to court calamity and disaster (Wai 304, 1991)

The spiritual properties of an area are of importance, and are wahi tapu (sacred) due to incidents involving ancestors. The wairua (spirit) of a feature or area has qualities to be respected and feared, because if not properly acknowledged can cause ill to those who defile it.

4.0 DIRECT USE

In traditional Maori terms the springs were not a single isolated phenomenon, but springs were seen as the face or eye of the resource. The **surface** components of the resource have been given specific names ranging from boiling mudpools (ngawha paruparu) to sulphur deposits (kupapa) (Maxwell 1991). Puia, ngawha and waiariki are terms which **have** been used by Maori to distinguish between geysering pools, boiling pools and warm pools.

Icelanders distinguish 'hverjar', 'namur' and 'laugar', as Maori **make** a distinction between puia, ngawha and waiariki. The puia of New Zealand correspond to springs called 'hverjar' in Iceland. Hverjar can be either permanent flowing boiling springs or intermittent hot water discharges. Surface manifestations at Tokaanu, Orakeikorako and Rotorua, include many intermittent geyserlike springs which were referred to as 'puia'. Puia has also describes a crater or volcano, for example the crater lake at Ruapehu an andesitic volcano at the Southern end of the TVZ, (Hochstetter 1959).

The **areas** with geothermal activity provided warmth, heat for cooking, therapeutic healing qualities from mud and hot pools. kokowai (red ochre) and areas for paruparu preparation (black dye).

In general, the favoured sites for permanent settlement were within easy reach of forest, water in river or lake, cultivable land and geothermal areas (Stokes, 1991).

Medicines have been used for centuries, and I outline a few below; these medicines are a taonga to the various hapu and should remain so, thus my discussion is brief.

Bathing in pools was believed therapeutic for various skin diseases (eczema, rashes etc). Various pools were used for different ailments: leprosy, arthritic and rheumatic ailments, could be treated in different pools all found in the same area.

Sulphur was mixed with pork fat and applied directly to any skin disease, "hakihihi". It was also ingested whole, to combat internal diseases. Maori also had special medicines for people who got burnt by the hot water or steam, the following is an example from Rotorua, "shells from fresh water shellfish 'kakahī' were ground up to the consistency of talcum powder, next rekereke was applied and then rendered fat, to seal the burn (Maxwell 1991).

The ingestion of some thermal waters, eg Waitangi at Rotorua, was said to help people overcome stomach complaints. Often the waters ingested have been found to be predominantly bicarbonate-chloride waters.

Some of the pools and springs as mentioned before are 'tapu'. The wairua (spirit) of the manifestation can be due to past events or due to activities for which the area is used. Examples of 'tapu' manifestations are: pools used for burial or hatching the dead, areas used for child hinh and pools used by women menstruating.

Areas were often used by the whole iwi for seasonal digging of the raw material needed to make kokowai (a red dye made from thermally altered clay prepared by heating and mixing with oil and/or water depending on its desired use). The periodic use of the thermal areas for root digging and collection of kokowai did not necessarily indicate continuous occupation. The treasures the Maori held dearly (taonga) were often not mentioned to travellers for fear of their exploitation.



Figure 2: Swimmers at Orakei Korako, with geyser in the background. Villages were often built on thermal areas. The warm pools were popular hatching places, and food was easily cooked in baskets lowered into hot pools (from Orbell 1985).

5.0 CASE STUDIES

Same descriptive paragraphs of well known areas occupied traditionally by Maori

5.1 Te Tarata and Otukapuarangi (Pink and White Terraces)

Te Tarata and Otukapuarangi were the focus of an international tourist industry already in the 1850s. The Ngati Tuhourangi people became an affluent tribe as the tourist industry in New Zealand began to develop. The world became aware of an unsurpassed geothermal spectacle of which Hochstetter said: "They baffled description"

The following observations were made by Dieffenbach on his travel. "When we arrived on the crest of these hills, the view which opened was one of the grandest I had ever beheld. Let the reader imagine a deep lake of a blue colour surrounded by verdant hills, in several islets, some showing the bare rock others covered with shrubs, while on all of them steam issued from a hundred openings between the green foliage without impairing its freshness: on the

opposite side a flight of broad saps of the colour of white marble with a rosy tint, and a cascade of hoiling water falling over them into the lake" (Dieffenbach 1843 P381).

At Rotomahana 1882-83 (prior to the eruption) it was observed that the local Maori had taken full advantage of the resource. On the edge of the lake square shallow baths had been constructed, the sides being formed of large stone slabs set upright, edge to edge and the water led into them by ducts from various springs that bubbled up everywhere from the ground. A platform in the area was also constructed by laying broad stone slabs over a spring for drying karaka and tawa berries, the stones were heated to a temperature necessary for drying purposes (Wilson 1884)

Rotomahana was a Ngati Tuhourangi stronghold right up to the Tarawera eruption in 1886. This meant that this tribe had a monopoly over the booming tourist industry before the Terraces were destroyed in the eruption. Ngati Rangitahi another local tribe, and Tuhourangi disputed over lands at Rotomahana for many years, peace was reached in 1855. The lives of Tuhourangi and Ngati Rangitahi were drastically changed after the eruption. Surrounding arable land and the terraces they were so reliant on as income were destroyed. The tribes relocated around Rotorua and in the Coromandel.



Figure 3: The cold basins, White Terraces, Rotomahana (1880), pools like these were used for healing, relaxation and a chance to korero (talk)

5.2 Waihi

At the southern end of Lake Taupo Hochstetter visited Waihi where hot springs discharge at the shore of the lake. The local inhabitants, Ngati Turumakina had fitted up for themselves several hatching places where they conducted the water into basins at temperatures of 34°C. The foreshore near the village was changed lower in 1846 and 1910 by large landslides. The 1846 event destroyed the ancient village of Te Rapa.

The following account of Te Rapa was recorded by Dieffenbach (1839-1841).

"Where the shore joins the delta of the Waikato* there is a narrow belt of flat land, on which stands the village of Te Rapa. Behind it the hills rise to about 100ft above the Lake. In ascending the ground is found to be of high temperature; the surface is often bare, or scantily covered with mosses or lichens: it is formed of red and white clay of soft and alkaline nature, which the natives use instead of soap, and sometimes eat. Gaseous effluvia seem to have converted the rock of the hill, which is Basalt and sometimes amygdaloid, into this clay. When we approach the top of this amphitheatre of hills the scene which presents itself is very striking. Vapours issue from hundreds of crevices, and in most of these places there are shallow springs, the bottom of which is a soft mud, into which a stick can easily be driven ten feet. The temperature of the water is 200°-212°F. In some springs it has an argillaceous and others a sulphurous taste. A subterranean noise is continually heard, resembling the working of a steam engine or the blast of an iron foundry. By placing some fern over a crevice, and their food (potatoes, kumara or pork) upon it, natives have a ready and convenient oven" (Dieffenbach 1843 P339-340).

Above the shuns at Waihi is the thermal area Hipaua named after the largest thermal feature of it the Hipaua fumarole. The area is characterised by bare steaming ground, fumarolic activity and occasional pools. It was at the foot of the steaming hills that the ancient village of Te Rapa was overwhelmed by a landslide. The great Maori chief Te Heuheu Tukino II (Mananui) was killed along with 60 of his whanau.

* Dieffenbach refers to Tongariro river as Waikato in his records.

During the month of May 1846 Taupo experienced unusually heavy rainfall which flooded the rivers throughout the district. The heavy rain caused **small** slips to occur with the result that the little valley (Waimatai) in the course for three days, formed a lake. As the lake rose there were further **slips** and then the barrier burst, and the water, red clay, mud and rocks went thundering down the hill toward the lake and Te Rapa. The avalanche swept everything before it and overwhelmed Te Rapa. It happened during early hours of the morning **when** people were asleep and all were hurried under the muddy thermal clay **except** for a few that fled to the hills nearby. It is said that during the night before the landslide there was a thunderstorm. Te Heuheu rose at midnight, went outside and recited incantations to his gods to pacify the elements. His ancestral spirits did not heed him and instead invoked Ruaimoko the subterranean god, to destroy him.

The remains of the Chief and his wife were taken to Pukawa north of Waihi till their final resting place at the top of Tongariro. The choice of resting place on Tongariro was opposed by a neighbouring chief, who considered that such a burial would give force to a claim by the descendants of Te Heuheu to a mountain which the Te Heuheu line did not have the sole right. The bodies were secretly deposited on the mountain.

A resolution of the tension created within Tuwharetoa by the mountain burial was to come 60 years later. In 1910, in order to fulfil the terms to create the Tongariro National Park, the remains were brought down from the mountain to be buried in a vault provided by the Government. When the bones were moved to Waihi, one of the carriers broke the law of tapu by jumping over a cooking fire. When he was returning with a party the following day a landslide came down from Hipaua again and he was killed.

5.3 Wairakei

The geothermal resources at Wairakei were used by several tribes in Tuwharetoa, Ngati Rauhoro maintain rights of kaitiakitanga and rangatiratanga over the Wairakei area. It has been reported that the encampments of temporary dwellers processed kokowai and fished for trout amongst other activities (Stokes 1991).

Kokowai was a valuable commodity used in ceremonial exchanges of goods which cemented tribal relations. The use for kokowai died when European dyes were introduced.

The resources of Wairakei, which were highly valued were kokwai and the healing powers of the hot pools Matarakutia. Ferns were also collected at different times of the year. Areas of "wahi tapu" exist all around the Wairakei thermal area. The exact location is known to the members of the hapu. Karapiti is an area (Craters Of The Moon) which is of special concern to the hapu. There are legends surrounding the large fumarole, from which the area was named involving a maiden with her child jumping into the fumarole.

Kirihihineka steam was named by local people for its smoothing effect on skin after bathing. Matarakutia, which Tuwharetoa used to cure leprosy or ngerengere. Piroriro "new skin" was the source springs that had curative properties cleansing and invigorating (Stokes 1991). The tragedy of development in the Wairakei field has been the loss of 22 geysers. By May 1964 after commissioning in 1958 of the geothermal plant, only one geyser was still playing. With continued extraction of steam and ground subsidence in the area, the geysers, hot springs, and mudpool have been replaced by steaming ground and a few fumaroles. The taonga in this area were numerable but due to time shortage I am unable to expand any further.

*Destroyed under roof collapse 1981

DISCUSSION AND CONCLUSION

I have discussed how the Maori communities used the resource as an integral part of their lives. It was used for bathing, cooking, cleaning, healing, mediating, burial preparation and in some cases burial itself.

Maori have watched the implementation of the laws enacted by the Government from 1840 to the present; they have all tended to deprive them of privileges secured in the Treaty of Waitangi. In 1975 the Waitangi Tribunal Act was passed and this has enabled the Maori to prepare claims to the Government for land and resources which have been lost to them. The ownership of the geothermal resource is still not qualified although claims for Ngawha and the Rotorua area have been heard and recommendations made.

The detail of Maori description and understanding of the geothermal resources is hardly surprising; their lives and customs were integrated with their physical environment. Knowing that the resource extended below the surface, Maori took a characteristically holistic approach to the taonga.

In many cases the geothermal "taonga" formed a central component of the cultural relationship between hapu and iwi and their traditional territory. Springs may have been used by all hapu of a region from the time of ancestors. Such history of tribal usage would reflect the magical qualities of the waters of the springs. It might also reflect the fact that the springs were traditionally a crossroads for Maori travelling. The hapu who traditionally lived in the immediate vicinity of particular springs may have tended the springs on behalf of the whole iwi. Maori believed there to be an interconnection between the springs and other surface manifestations. The resource is seen by them as one entity, the surface and subsurface components being inextricably linked.

The legacy of Ngatoroirangi has been carried down through the centuries orally and more recently as written transcript. Whakari (White Island) was the first place that the resource appeared. It was the beginning of the trail of heat through the Taupo Volcanic Zone.

GLOSSARY

hapu aggregation of whanau (family) where whanau is the association of close relatives
 iwi Maori tribe, summ total of it's hapu
 kaitiaki steward or caretaker
 ngawha geysering boiling pools
 puia boiling pools
 taniwha supernatural being, can dwell above or underground, has many forms
 rangatiratanga or tino rangatiratanga full authority
 taonga treasure, prized thing of cultural and/or spiritual significance.
 tangatwhenua people of the land
 tapu sacred
 tohunga high priest
 waiariki warm pools
 whakapapa genealogy
 whanaufamily
 whaunaunga extended family

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