The Impact of Environmental Changes on Lake Waikaremoana and Lake Waikareiti, Te Urewera

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Figures

Abbreviations

AJHR	*Appendices to the Journals of the House of Representatives*
ANZ	Archives New Zealand
CCL	Commissioner of Crown Lands
CH	Chairman or woman
Con	Conservator
DG	Director General
doc	document (on record of documents)
DOC	Department of Conservation/Te Papa Atawhai
ECHB	East Coast Hawke's Bay Conservancy
ECNZ	Electricity Corporation of New Zealand
F&G	Fish and Game New Zealand
ft	feet
GM	General Manager
HBRC	Hawke's Bay Regional Council
HO	Head Office
IA	Department of Internal Affairs
KD	Kaitawa Datum
LS	Lands and Survey Department
M	Marine Department
m	metres
m^3/s	cubic metres per second
MA	Department of Maori Affairs
MD	Moturiki Datum
Min	Minister
n.a	no author
n/d	no date
n.p	no place (of publication) or no publisher
NPA	National Park Authority
NZED	New Zealand Electricity Department
NZPD	New Zealand Parliamentary Debates
para, paras	paragraph(s)
T&P	Department of Tourist and Publicity
THC	Tourist Hotel Corporation
THR	Department of Tourist and Health Resorts, abbreviated in footnotes as TD
TPK	Te Puni Kokiri

UNPB	Te Urewera National Park Board
US	Under Secretary
WAS	Wellington Acclimatisation Society
WB	Wildlife Branch, Department of Internal Affairs
WR&GC	Wairoa Road and Gun Club
#	number (on records of document)

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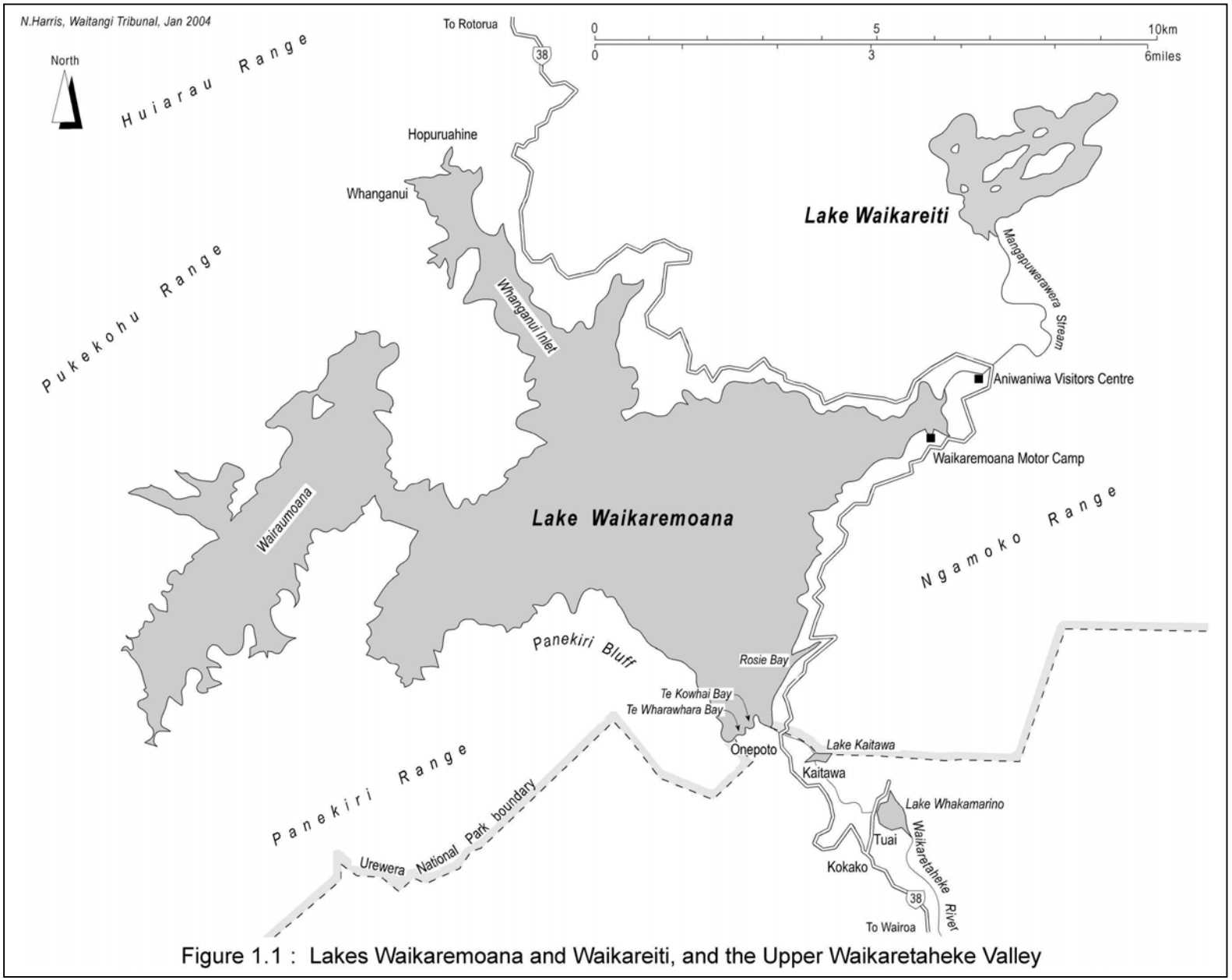

Figure 1.1 : Lakes Waikaremoana and Waikareiti, and the Upper Waikaretaheke Valley

Chapter 1: Introduction

1.1. Introduction

The focus of this report is on the impact of Crown actions or lack of action on the environments of Lakes Waikaremoana and Waikareiti and the customary resource use practices of the Waikaremoana iwi. We have chosen not to separate the land from the lake. The lakes, the lake shores and the surrounding forests are interwoven in the world view of the claimants. Similarly, the lakes and their surrounds form a single entity in the conceptualisations placed on the area in National Park plans and publicity. To the north and the west, Lake Waikaremoana adjoins and interfaces in an intimate manner with the Urewera National Park (figure 1.1). To the south and the east, alongside Provincial State Highway 38, there is a mix of Maori land, public land, and private land. The upper valley of the Waikaretaheke River, downstream from the lake outlet, is a small portion of the study area but one which is very significant in terms of recent human occupation and the impact of recent hydro-electric power development on the land, the hydrology, and the ecology of this area.

This opening chapter sets the scene by identifying and fitting together the main natural features and by presenting a summary timeline. It then sets out the general and specific grievances brought to the Tribunal by each of the claimants. It concludes by describing the terms of the environmental research commission within the larger set of Te Urewera evidence and reporting on the manner in which the research tasks were divided up and carried out by the several researchers.

1.2. The Natural Environments

Lake Waikaremoana is the deepest lake in the North Island and the fourth largest after Taupo, Rotorua and Wairarapa. It is located in steep hill country on the flanks of the Huiarau range, to the north-west, and the Panekiri and Ngamoko ranges to the south-east. According to the geologist Marshall the lake was created when two very large landslides converged to form the massive rock and debris dam which blocks the path of the Waikaretaheke River as it flows southwards towards the Wairoa River and the Pacific Ocean.[1] The first and largest of the two landslides fell from the Puketapu escarpment to the

[1] P Marshall, 'The Origin of Lake Waikaremoana', *Trans NZ Institute*, vol 57, 1927, pp 237-244. Geologists use the terms dam and barrier for natural features and make a distinction between the two. Engineers reserve

west of the Waikaretaheke River. The second, from the east, was smaller and more recent and consists of larger rocks that contain numerous crevasses through which water can pass.[2] The combination of the two created the debris dam behind which Lake Waikaremoana was formed. Marshall estimates that the lake would have taken some ten years to form once the path of the river was blocked. Radiocarbon dating of trees submerged by the new lake suggests that it formed some 2200 years ago. The presence of tephra from the Waimihia volcanic eruption on top of the larger landslide suggests that portion of the dam is at least 3300 years old.[3] The depth of the lake, the clarity of its waters, and the forested nature of its surrounds all contribute to its natural beauty.

Creation legends provide graphic descriptions of the formation of the lake. Ngati Ruapani, Tuhoe and Ngati Kahungunu will each share their own creation stories with the Tribunal. Stokes, Milroy and Melbourne, following Best and drawing on Tuhoe sources, have already given us this description:

> Waikaremoana fills the broken hollows and gorges of the land which were formed in the fierce struggle of Haumapuhia, the child of Maahu transformed into a taniwha. Haumapuhia had offended Maahu who threatened death. Haumapuhia called on other spiritual powers of the ancient people for aid and was transformed into a taniwha which desperately sought escape to the sea, to the great ocean of Kiwa. The struggle began at Te Puna a Taupara and it is the agitation of the waters from arms and legs threshing about that inspired the name Waikaremoana - Ka hokari nga ringa me nga waewae, katahi ke pokare te wai, koia i kiia tona ingoa ko Waikaremoana — ko te pokaretanga o te wai.[4]

Stokes, Milroy and Melbourne emphasize that the geological history and the traditional history are linked: together they explain the creation of the several arms of the lake. They continue:

> The struggles of Haumapuhia are also symbolic. The way westward was barred by the Huiarau but in the process the Wairaumoana was formed. The way north at Whanganui was also barred by the Huiarau. Gradually Haumapuhia tried various eastern routes and formed the other arms of the Lake. Finally an escape seemed possible to the south. Already great disruption in the land had been caused by efforts to force an underground passage through the ranges. In the gorge of Waikaretaheke, Haumapuhia was held fast, whether by the emergence into the light of day which caused taniwha strength to fail, or

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the use of the term dam for purpose-built constructions. The term dam as used by Marshall is retained in this portion of the report.

[2] D J Lowe and J D Green, 'Lakes' in *Landforms of New Zealand,* edited by J M Soons and M J Selby, (Auckland: Longman Paul, 1992), p 131 and Marshall, pp 237-244

[3] Lowe and Green cite this date in a personal communication with C G Vucetich in 1991

[4] E Stokes, J W Milroy and H Melbourne, *Te Urewera nga iwi te whenua te ngahere: people, land and forests of Te Urewera* (Hamilton:Waikato University, 1986), p 210

> whether the spiritual power and source of that strength had wrought sufficient havoc. The waters backed up and filled the hollows behind Haumapuhia, caught fast among the giant blocks of rock below Panekire, and formed the present lake.[5]

Lake Waikaremoana is an important part of the spirituality and the tribal identities of the peoples who exercise kaitiakitanga over the lake and its surrounds. Lake Waikaremoana is more than 580 metres above sea level and has a surface area in excess of 53 square kilometres. Lake Waikareiti is, by comparison, much higher above sea level and much smaller. It is much older in geological terms and much less accessible. Lake Waikareiti contains six, small, bush-clad islands.[6]

The natural outlet for Lake Waikaremoana is the Waikaretaheke River that is fed by constant seepage through the debris dam and, prior to the hydro-electric power schemes, by intermittent flows over the lip of the dam. ECNZ sources suggest that the lake flowed over this natural barrier some 40 to 50 per cent of the time and that seepage through the dam was in the order of 15 cubic metres per second. Flows and seepage of this magnitude would have been sufficient for eels, certainly, and other fish, possibly, to migrate to and from the sea via the Waikaretaheke River.

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[5] Stokes, Milroy and Melbourne, p 210
[6] Elizabeth Cox, 'Lake Waikaremoana and District Scoping Report', report commissioned by the Waitangi Tribunal, December 2001, p 291

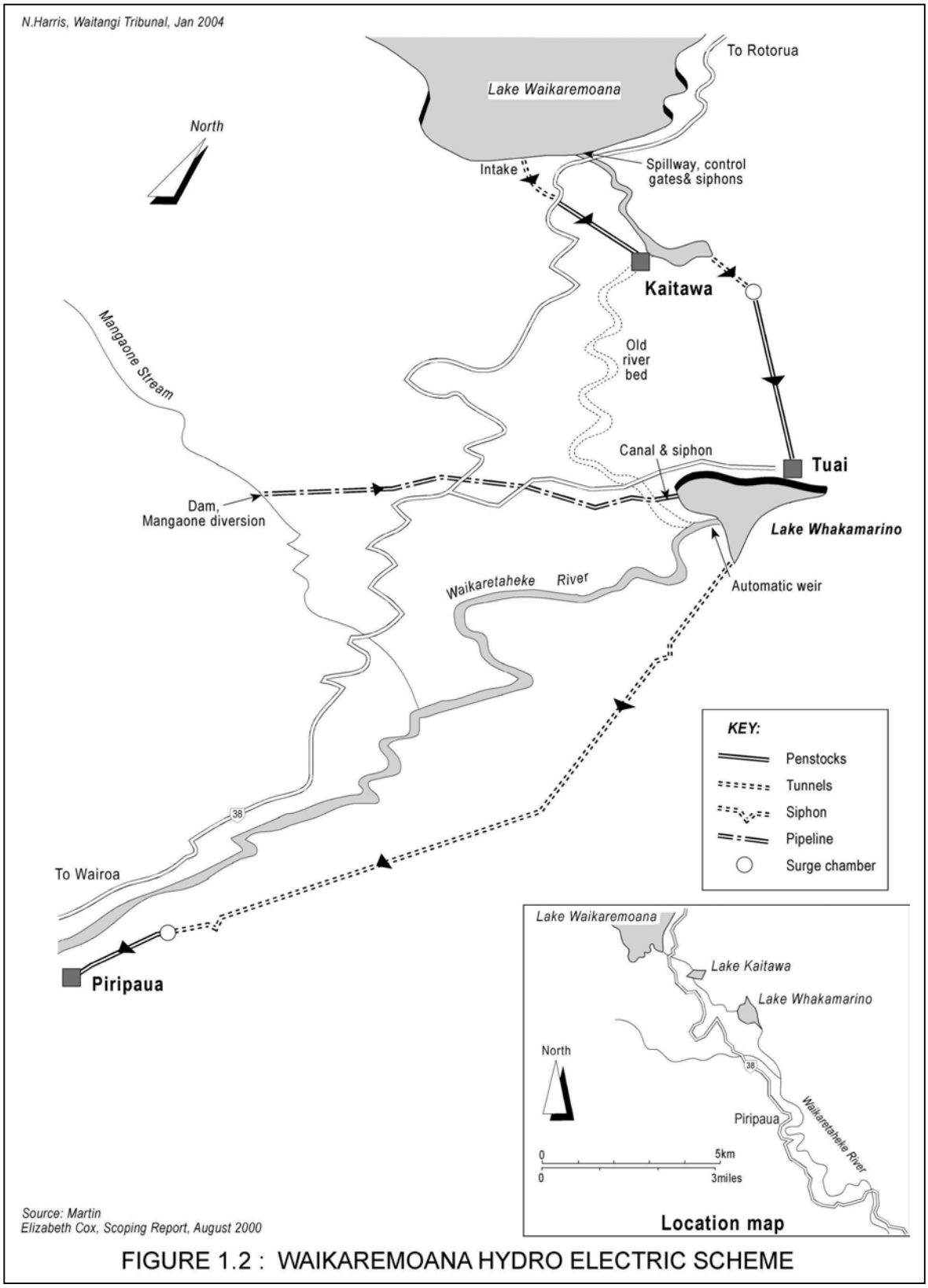

FIGURE 1.2 : WAIKAREMOANA HYDRO ELECTRIC SCHEME

Significant changes were made to Lake Waikaremoana and its debris dam in the 1940s and 1950s (figure 1.2). In the 1940s, as part of an expanded hydro-electric power scheme at Kaitawa downstream from the lake, a tunnel was driven through the debris barrier at Te Kowhai Bay, and a siphon and spillway system was build over the barrier at Te Wharawhara Bay.[7] From 1946 onwards the water of Lake Waikaremoana was thus used for electric power generation, not by raising the lake level as is common elsewhere, but by lowering it as much as five metres. In the decade that followed efforts were made to seal the underwater surface of the debris barrier and the adjacent lake floor in order to reduce the flow of water through underground caverns and the seepage through the permeable materials. These efforts were concentrated in Te Wharawhara Bay, impacting on the lake floor and reducing the natural flow of the Waikaretaheke River.

The valley of the Waikaretaheke River has contained two small lakes that have been considerably reconfigured in the course of hydro-electric power development. Lake Kaitawa, located about one kilometre downstream from the outlet to Lake Waikaremoana, was first modified in 1929 when the Public Works Department constructed a low earth dam.[8] The lake level was raised by some three metres and the area of the lake increased consequently. Further changes to the inflow took place in the 1940s when the Kaitawa power scheme was built. Before public works commenced in 1929 the area of Lake Kaitawa was less than one hectare; by the time the schemes were completed it was close to 6 hectares.

Another 1.3 kilometres downstream from Lake Kaitawa the Whakamarino flat marked the site of an older lake: Lake Whakamarino. This natural lake was fed by the debris laden Kahutangaroa Stream which drains the slopes of the Ngamoko range and was largely silted up by 1926 when Robinson and Packwood show it as a large flat with a small remnant lake.[9] A large earth dam was constructed between 1939 and 1943 and some 30 hectares of the flat was flooded to create a new Lake Whakamarino, reservoir for the Piripaua power station. This new lake also suffered from silt deposition from the Kahutangaroa Stream and,

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[7] G G Natusch, *Power from Waikaremoana* (Gisborne: Te Rau Press, 1992), pp 49-50
[8] Natusch, pp 15-17
[9] I R Robinson and R H Packwood, 'Lake Waikaremoana Power Development', *Proceedings of the New Zealand Institute of Engineers,* vol 12, 1926, pp 275-290. The name of the river is shown as Kahutangaroa in current maps. Genesis has alerted us to recent moves by a number of tangata whenua to correct the spelling to Kahuitangaroa. We await a decision by the New Zealand Geographic Board.

in 1987-88, some 80,000 cubic metres of sediment were dredged out of the lake and deposited nearby in a small valley to the north.[10]

The Waikaretaheke River, in its natural state, maintained a relatively steady flow, protected from flood surges and sustained by natural seepage by Lake Waikaremoana and the debris dam. It was a significant source of food and materials and it provided a passageway for eels migrating between lake and ocean.[11]

The impact of hydro-electric development is best summarised by reference to the diagrammatic presentation shown in figure 1.2. The most decisive changes took place in the 1920s when the flow of the river and the waters of Lake Kaitawa were diverted through tunnels and penstocks to feed the Tuai power station.[12] As a result the riverbed between Kaitawa and Tuai was almost dry for most of each year. The topmost stretch of the river, between Lakes Waikaremoana and Kaitawa, was modified in different ways at different times: beginning with the construction work for the Tuai scheme in the 1920s; continuing with a second round of construction for the enlarged scheme which involved the lowering of Lake Waikaremoana in the 1940s; completed with the partial sealing of the debris dam and the lake floor in the 1950s. By 1956, natural seepage through the dam had reduced from 15 cubic metres per second to something between 4 and 6 cubic metres per second with the flow of the river consequently reduced. Downstream from the new Lake Whakamarino, created in 1942 and 1943, the flow of the river was both reduced and intermittent: when the Piripaua power station is not operating the river flow is as low as 0.2 cubic metres per second; when the power station is operating to full capacity flows in this stretch of water can exceed 40 cubic metres per second. The smaller Mangaone Stream, a tributary of the Waikaretaheke, was diverted into Lake Whakamarino in the 1940s. The bed of this stream is now dry for much of the year.

Lake Waikareiti is much smaller than Waikaremoana, some 384 ha is size, and 878 metres above sea level.[13] The climate is thus colder and the soils adjacent to the lake are less fertile.

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[10] Natusch, page 39 and Exhibit PAC 21 in evidence by Peter Canvin in File ECNZ WP982001T and File 3 held by HBRC

[11] The ability of eels to bypass the natural waterfalls in the Waikaretaheke River is questioned by Genesis who indicate that their view is based on the evidence of experts, including NIWA scientists. The capacity of eels to travel overland in wet conditions has been observed in other regions. The authors do not, at this stage, have evidence specific to the Waikaretaheke valley. Further investigation is needed.

[12] Natusch, p 39

[13] Rodney Gallen and Allan North, *Waikaremoana Wairau-Moana Waikare-Iti: a Concise History of the Lakes, the People and the Land,* Te Urewera National Park Board, 1977, p 43

It is surrounded by forest and contains six small, forested, islands (figure 1.1). Access is by track only and the majority of those who visit are trampers or day visitors. Gallen and North, writing for the National Park in 1977, describe the lake in these words:

> History seems to have forgotten Lake Waikareiti: no kainga were built on its shores; no battles were fought over it, although it was used as a retreat by Ngati Ruapani in times of war or danger. In the very early days all the contiguous tribes planted gardens around its shores, but the soil is poor, and the growing season short. The only fish in the lake originally were the diminutive maehe, but rainbow trout have been introduced. At one time wildfowl were numerous on the lake, including whio, and weweia [blue duck and little grebe]. They were snared by driving them into nets slung low across the water. Nowadays few are seen; all is silent, deserted and still.[14]

The scientific record, the written reports and the oral evidence provided by the claimants are similarly silent about Lake Waikareiti. It is frequently named along with Lake Waikaremoana and briefly mentioned as a place of great beauty. It is rarely described in any detail.

1.3. An Environmental Time Line

The history of Waikaremona and its surrounding area has been well set out in other documents prepared for the Tribunal and will be expanded by evidence presented by the claimants. A number of broad overviews of Te Urewera history are available, in particular Anita Mile's *Te Urewera* district report from 1999 and more recently the two volumed commissioned reports by Judith Binney, *Encircled Lands* covering the period from Eurepean contact until 1912.[15] Also of note here is an overview history by Evelyn Stokes, J Wharehuia Milroy and Hirini Melbourne.[16] Richard Boast's report, *The Crown and Te Urewera in the 20th Century,* provides an overview of the years after 1912.[17] Cathy Marr has provided an overview of these events with regard to the land in the vicinity of Waikaremoana, and further detail regarding the alienation of the blocks (and reserves in those blocks) around Lakes Waikaremoana and Waikareiti can be found in reports by O'Malley, Stevens and Innes.[18] Michael Belgrave and Grant Young have explored customary rights to Waikaremoana lands from a Ngati Kahungunu perspective.[19]

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[14] Gallen and North, *Waikaremoana Wairau-Moana Waikare-Iti* , pp 43-44
[15] Anita Miles, *Te Urewera,* Waitangi Tribunal Rangahaua Whanui Series, 1999; Judith Binney, 'Encircled Lands Part One: A History of the Urewera from European Contact Until 1978', and 'Encircled Lands Part Two: A History of the Urewera 1878 – 1912' reports commissioned by the Waitangi Tribunal, 2002
[16] Stokes et al., *Te Urewera: Nga iwi te whenua te ngahere,* 1986
[17] Richard Boast, 'The Crown and Te Urewera in the 20th Century: A Study in Government Policy', report commissioned by the Waitangi Tribunal, 2002
[18] Vincent O'Malley, 'The Crown's Acquisition of the Waikaremoana Block, 1921 – 25', report commissioned by the Crown Forestry Rental Trust, 1996; Emma Stevens, 'Report on the History of the Waipaoa Block, 1882

Ben White has addressed legal issues relating to lakes and rivers in New Zealand and the history of the title to the two lakes been discussed by Emma Stevens.[20] Brad Coombes' two-volume report explores the environmental history of those lands from 1895 to 2003.[21] Suzanne Doig has discussed freshwater fisheries in the inland waterways of Te Urewera (but specifically excludes these two lakes from her report).[22] In addition the establishment and management of the Urewera National Park is discussed by S K L Campbell. Following a scoping report by Elizabeth Cox a report on tourism, conservation and hydro development at Waikaremoana was completed by Tony Walzl.[23] Given this large body of research regarding the Waikaremoana area, it seems helpful, for the purposes of this report, to identify some important events and provide a time line that will assist us in relation to environmental events (Figure 1.3).

– 1913', report commissioned by the Crown Foresty Trust, 1996; Craig Innes, 'Waikaremoana Reserves', report commissioned by the Waitangi Tribunal, 2003

[19] Michael Belgrave and Grant Young, 'Te Urewera Inquiry District and Ngati Kahungunu: Customary Rights and the Waikaremoana Lands, report commissioned by the Crown Forestry Rental Trust, 2003

[20] Ben White, *Inland Waterways: Lakes,* Waitangi Tribunal Rangahaua Whanui Series, 1998; Emma Stevens, 'The history of the Title to the Lake-bed of Lake Waikaremoana and Lake Waikareiti', report commissioned by the Crown Forestry Rental Trust, 1996

[21] Cathy Marr, 'Crown impacts on Customary Interests in land in the Waikaremoana region in the Nineteenth and Early Twentieth Century', report commissioned by the Waitangi Tribunal, 2002; Brad Coombes, 'Cultural Ecologies of Te Urewera Making 'scenes of nature and sport' – Resource and Wildlife Management in Te Urewera, 1895 – 1954' and 'Cultural Ecologies of te Urewera II, Preserving ' a great national play area' – Conservation Conflicts and Contradictions in Te Urewera, 1954 – 2003', both prepared for the Crown Forestry Rental Trust, 2003

[22] Suzanne Doig, 'Te Urewera Waterways and Freshwater Fisheries', commissioned by the Crown Forestry Rental Trust, 2002

[23] S K L Campbell, 'Urewera Overview Project Four: Te Urewera National Park, 1952-75', Crown Forestry Rental Trust, 1999; Cox, 'Waikaremoana Scoping Report', 2001; Tony Walzl, 'Waikaremoana: Tourism, Conservation & Hydro-Electricity (1870 – 1970), report commissioned by the Waitangi Tribunal, 2002

Figure 1.3 Environmental Timeline

1896	Urewera District Native Reserves Act
1897	Release of trout into lakes
1898	Game sanctuary established
1901	Release of deer
1903	Scenery Preservation Act
1903	Lake House Resort
1915 - 1918	Native Land Court hearings into Maori claims to the lake-bed
1918	Native Land Court confirms that the lake-bed is owned by Maori
1918	Power scheme investigations
1921-23	Temporary Tuai Power Scheme constructed
1926-29	Tuai Power Scheme constructed
1930s	Highway completed from Wairoa to Rotorua via Waikaremoana
1938 - 1943	Piripaua Power Scheme constructed
1943 - 48	Kaitawa Power Scheme constructed
1944	Appellate Court confirms that the lake-bed is Maori owned (see 1918 and 1971)
1948- 55	Sealing of lake bed near outlet
1954	Opening of Te Urewera National Park
1965	Tourist Hotel Corporation takes over Lake House
1971	Agreement on lease of lake-bed to Crown reached (see 1944)
1972	Lake House demolished
1991	Resource Management Act
1997	Protests at Lake
1998	Joint Ministerial Inquiry
1999	ECNZ transfers Waikaremoana power stations to Genesis Power

1.3.1. Scenery Preservation, Recreational Fishing and Tourist Promotion

Government interests in recreational fishing and scenery preservation date back to the nineteenth century. [24] The acclimatisation societies, with government support, introduced rainbow and brown trout from the 1890s onwards and Lake Waikaremoana was made a game sanctuary in 1898. Rangers were appointed under the Animal Protection Act and the Fisheries Act to police the sanctuary from 1903 onwards.[25]

State interest in tourism was formalised when the Government set up the Department of Tourism and Health Resorts. Shortly afterwards the new department opened Lake House at Waikaremoana and placed boats and launches on the lake. Elizabeth Cox reports on the implications of this for Maori living alongside the lake:

> As early as 1903, the superintendent of the Tourist Department wrote to the Surveyor - General asking that his department ensure that none of the people living in the region run horses, cattle or sheep in the bush around Waikaremoana as the Government 'is spending large sums of money in developing Waikaremoana as a Tourist Resort and destruction of the bush in the vicinity would undoubtedly depreciate its value in that respect.'[26]

Elsdon Best, the former secretary to the Urewera Commission and a founding member of the Polynesian Society, was commissioned in 1896 to write a promotional book *New Zealand Tours: Lake Waikaremoana ' the Sea of Rippling Waters'*.[27] Tourism at Lake Waikaremoana, encouraged by the Department of Tourism and Health Resorts, continued to be an important activity for the next seven decades. From the 1930s and 1940s onwards the emphasis began to change.

State Highway 38 was completed through to Rotorua in the 1930s and the number of summer campers and trampers increased alongside the visitors who stayed at Lake House. In July 1954 the catchment area of Lakes Waikaremoana and Waikareiti was gazetted as National Park.[28] The Tourist Hotel Corporation took over Lake House in 1965 and operated

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[24] See Cathy Marr, Robin Hodge and Ben White, *Crown Laws, Policies and Practices in relation to Flora and Fauna, 1840-1912,* Waitangi Tribunal Publication, 2001 and Geoff Park, *Effective Exclusion? An Exploratory Overview of Crown Actions and Maori Responses concerning the Indigenous Flora and Fauna, 1912-1983,* Waitangi Tribunal Publication, 2001

[25] Cox, p 59 cites the *New Zealand Gazette*, 12 August, 1903, p 1818

[26] Cox, p 59

[27] Cox, pp 58-59. A number of versions were published with variant titles. See, for example, Elsdon Best, *Waikare-moana, the Sea of Rippling Waters: the Land, the Lake, the Legends,* (Wellington: Govt Print, 1897)

[28] Department of Conservation *The Urewera National Park Management Plan,* (Gisborne: Department of Conservation, 2003), p 5

it until 1972 when it was closed and demolished.[29] The focus of interest at Waikaremoana had clearly shifted from tourism to national park.

1.3.2. Hydro-electric Power

The Crown had a double interest in the economic use of the Waikaremoana area. Tourism had been firmly on the agenda from the 1890s onwards. Interest in the use of Lake Waikaremoana for hydro-electric power generation came a little later. In the opening decade of the twentieth century the Napier Chamber of Commerce urged government to build a power generation plant at Lake Waikaremoana.[30] Government proceeded cautiously, exploring the options at Waikaremoana and weighing these against other proposals for schemes closer to major sources of demand. Investigations were carried out by Public Works Department engineers Parry and Birks in 1912 and 1916 and by consulting engineer Hay in 1918. Local Government and community organisations continued to lobby Government and organised a major expedition to the lake in 1918[31]. In July 1920 the Government agreed to build a power scheme at Tuai in the upper Waikaretaheke valley and to proceed immediately with a small, temporary power station which would provide power for the Wairoa district and the construction project.[32]

There was a first flurry of construction activity in 1920 and 1921. The road from Wairoa to Waikaremoana was upgraded and work began on a transmission line from the site of the temporary station to Wairoa. Lake Kaitawa would provide the head of water and the temporary station would be located on the edge of the Whakamarino flat, 200 metres below. The penstocks were put in position in 1921 and the generators in 1922. The temporary station at Tuai was opened in March 1923 and leased to the Wairoa Power Board.

Planning for the larger Tuai scheme continued and construction work commenced in 1926.[33] A temporary construction village was placed on the Whakamarino flats. Lake Kaitawa was raised by three metres and the Waikaretaheke River diverted into the enlarged lake (figure 1.2). Penstocks were built to carry the water from the lake to the new Tuai power house. A large labour force was employed, work proceeded rapidly, the new generators were commissioned in January and July 1929, and the official opening was held in November of the same year.

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[29] See section 3.3 below
[30] Natusch, pp 7-9
[31] Natusch, pp 8-9, Some 42 visitors including 8 MPs made the trip from Napier to Wairoa by ship then travelled to on to Waikaremoana in motor vehicles. The expedition took seven days and included civic welcomes, sightseeing and concerts. The party was welcomed and provided with a meal at Waimako marae.
[32] Natusch, p 9

The Tuai scheme was seen as one component in a larger Waikaremoana set. Plans for the second component, the Piripaua power scheme, were approved in 1937 and construction work carried out between 1938 and 1943.[34] The Mangaone River was diverted, a dam was constructed and the Whakamarino Flats were flooded to create Lake Whakamarino, immediately downstream from the Tuai power station (figure 1.2). Tunnels and penstocks carried the water to a new power station in the former bed of the Waikaretaheke River. Married quarters for the construction scheme were located close to the intake at Lake Whakamarino, single quarters near the Piripaua power station.

As work on the Piripaua scheme neared completion in 1943, the construction effort moved up the valley to Onepoto to begin a new Kaitawa scheme immediately adjacent to Lake Waikaremoana.[35] Tunnel, headgate, siphon, and spillway were constructed to draw water from Lake Waikaremoana and make it available for power generation (figure 1.2). Temporary siphons became operational at Te Wharawhara Bay in 1946, generators were installed in the new power station in 1947, and the scheme was completed in 1948. The period of intense construction work was complete and the majority of staff moved on to other projects. A smaller number of workers, contractors, and engineers were involved in efforts to seal the lakebed and close off the natural waterways through the debris dam. These continued between 1948 and 1955 and marked the completion of an extended period of construction work involving a large labour force living and working in the Waikaretaheke valley.[36] A succession of large construction camps was replaced by the smaller and more permanent Tuai village and a number of other houses, no longer required elsewhere, were moved to Onepoto.[37]

1.3.3. Litigation and Protest

Ownership of the lake as well as ownership of the land has been contested.[38] The Crown assumed that it owned all the lakes in New Zealand but Maori have challenged that assumption. In 1913 and 1914, when the Crown began to assert its control over the lake in the interests of tourism and recreational fishing, Tuhoe, Ngati Ruapani, and Ngati Kahungunu petitioned the Native Land Court to investigate the ownership of the

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[33] Natusch, pp 13-25
[34] Natusch, pp 33- 39
[35] Natusch, pp 41-47
[36] Natusch, pp 49-50
[37] Natusch, p 57
[38] Ben White, *Inland Waterways: Lakes,* Waitangi Tribunal Rangahaua Series, 1996. See also Cox, section 3.1.

Waikaremoana lake-bed. Hearings were held over four years and the Court found that the lakebed was Maori customary land.

The Crown lodged an appeal in 1918 but it took 26 years before the appeal was heard. 'In the intervening years', wrote Cox, 'the Crown continued to act as if it was the owner of the lake'.[39] The Crown appeal was heard in 1944 and the original decision about Maori ownership was confirmed.

Intermittent and drawn out negotiations followed. Title was awarded to the owners and in 1971 the lakebed was leased to the Crown on a 50 year lease with perpetual right of renewal.[40] Two lists of owners were identified – one as Tuhoe and one as Ngati Kahungunu – and title to the lakebed was vested in two trust boards, one the Tuhoe-Waikaremoana Maori Trust Board and the other the Wairoa-Waikaremoana Maori Trust Board. Under the terms of the lease the Crown is to administer the leased land 'in accordance with the National Park Act' and pay rentals to the owners. The reserves on the northern shore of the lake are not part of the lease. Owners of these lands have right of access from the lake to their lands, and from their lands to the lake or the road at all times. The Department of Conservation is required to consult with tangata whenua about the management of the National Park and the leased area.[41]

The outcome, and the manner in which the lease has been administered by the Department of Conservation, have not been accepted as satisfactory by all Maori owners. During the 1990s Nga Tamariki o Te Kohu, supported by other groups and individuals, reoccupied reserves on the northern shore of the lake and challenged the right of the Department of Conservation to curtail the customary collection of food and materials. Conflict and challenge escalated into high profile protest and the appointment of a Joint Ministerial Inquiry in 1998. Evidence presented to this inquiry sits alongside evidence presented by Waikaremoana Maori to the Tribunal in the Urewera inquiry.[42]

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[39] Cox, pp 55-56
[40] Cox, pp 56-57 provides detailed and perceptive insights into the interplay between iwi, Crown and trust boards in the period between 1944 and 1971. The terms of the lease are contained in an appendix to the Lake Waikaremoana Act 1971
[41] Ibid
[42] J K Guthrie and J Paki, 'Joint Ministerial Inquiry: Lake Waikaremoana. Report to the Minister of Maori Affairs and the Minister of Conservation, 27 August 1998. (Report of the Joint Ministerial Inquiry into Lake Waikaremoana, August 1998)

1.4. Claims Concerning the Impacts of Environmental Changes at Waikaremoana

Leanne Boulton has provided the information necessary to write the following overview of claims concerning the impact of environmental changes on Lakes Waikaremoana and Waikareiti and the impact of Crown actions on the customary practices of the Waikaremoana people.

1.4.1. The Initial Claims

A number of individuals and groups with Tuhoe, Ngati Ruapani and Ngati Kahungunu origins have lodged claims with the Waitangi Tribunal in relation to Lake Waikaremoana and/or Lake Waikareiti. In March 1987 a claim (Wai 36) was lodged by 'James Wharehuia Milroy and Tamaroa Raymond Nikora on behalf of the Tuhoe-Waikaremoana Maori Trust Board and the Tuhoe Tribe.'[43] They alleged that the:

> ownership and control of the lands in the area of Lake Waikaremoana and the waters of the lake have been denied to Tuhoe, or not recognised by the Crown.

They are concerned that the mana of the lake is denied to Tuhoe as is the full use and benefit of the lake.[44]

With regard to specific actions and omissions of the Crown which caused environmental changes to the lake they contend that:

- 'In the 1970s the Crown carried out the blocking of natural underwater outlets on Waikaremoana without obtaining the permission of the Maori owners and in breach of the Public Works Act.'[45]
- 'The Crown has enacted legislation to protect the habitat of trout but failed to enact legislation to protect the habitat of tuna and other indigenous fish which are of great importance to Tuhoe.'[46]

The Wai 36 claimants also have grievances relating to Crown actions in regard to the management of the lake. They contend that: 'The Crown failed to provide for Tuhoe's rightful role in the management of rivers, waterways and fisheries within the Tuhoe rohe.'[47]

In 1992, Te Kotahi Tait lodged a claim (Wai 333) on behalf of himself and the Tuhoe-Waikaremoana Maori Trust Board in relation to the hydro-electricity scheme at Lake

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[43] Wai 36 Statement of Claim, n/d (received 31 March 1987)
[44] Wai 36 Statement of Claim, n/d (received 31 March 1987), section E 10.
[45] Wai 36 #1.1(a) Consolidated Statement of Tuhoe Claims, 15 February 2000, p 26
[46] Wai 36 #1.1(a) Consolidated Statement of Tuhoe Claims, 15 February 2000, p 27
[47] Wai 36 #1.1(a) Consolidated Statement of Tuhoe Claims, 15 February 2000, pp 28 – 29

Waikaremoana.[48] These claims relate particularly to the actions and omissions of the Crown that infringed the rights of iwi and hapu as owners of the lake and its bed after they were awarded ownership by the court in 1918. The claimants contend that:

- The Crown has constructed hydro-electric works at Lake Waikaremoana without any consent or approval of the owners of Lake Waikaremoana for the use of Lake Waikaremoana for hydro-electric generation purposes.
- The Crown has not paid compensation or negotiated any settlement or arrangement for the use of Lake Waikaremoana or the use of the bed of Lake Waikaremoana for hydro-electric generation purposes. [49]

In particular they contend that in the course of constructing the Hydro-scheme the Crown modified Lake Waikaremoana. The claimants contend that:

> Hydro-electric structures (outlets, siphon, tunnels etc) continue to occupy the bed of LakeWaikaremoana the property of the Maori owners … [and that] The Crown has carried out other constructions on the lake-bed namely the blocking of natural underwater outlets on the lake-bed the property of the owners of Lake Waikaremoana without the approval of the owners. The Crown or its agents intend to attend further such works[50]

In 1996 'Rangi Paku on behalf of all beneficiaries of the Wairoa-Waikaremoana Maori Trust Board' lodged a claim (Wai 621) with almost identical contentions.[51] They contend that:

- The Crown has constructed hydro-electric works at Lake Waikaremoana without any consent or approval of the owners of Lake Waikaremoana for the use of its lakebed and waters for hydro-electric generation purposes.
- The Crown has not paid any compensation or negotiated any settlement or arrangement for the use of Lake Waikaremoana, its lakebed or waters for hydro-electric generation purposes to the Claimant group who were subsequently confirmed owners[52]

The Claimants allege that they have suffered prejudice as a result of Crown actions. In particular:

- the Hydro-electric structures (outlets, siphon, tunnels etc) continue to occupy the bed of LakeWaikaremoana the property of the claimant group; and
- the Crown's continued use of lakebed and waters for the purposes of electrical power generation' [53]

Further claims were lodged with the Tribunal by Peter Keepa, by Trainor Tait and Hinemoa

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[48] Wai 333 Statement of Claim, 17 January 1992
[49] Wai 333 Statement of Claim, 17 January 1992
[50] Wai 333 Statement of Claim, 17 January 1992
[51] Wai 621 Statement of Claim, 12 September 1996
[52] Wai 621 Statement of Claim, 12 September 1996
[53] Wai 621 Statement of Claim, 12 September 1996

Herewini and by Sydney (Hirini) Paine. Peter Keepa lodged a claim (Wai 761) on behalf of himself 'and other members of the Maori known as Tuhoe of the Urewera.' This claim alleges that the Crown breached the Treaty of Waitangi by:

- wrongful recording [of the] ownership and control of the lake;
- denying the Tuhoe full use and benefit of the lake in accordance with the customs of the Tuhoe;
- utilising the lake in a way that has affected the ability of the Tuhoe to enjoy the lake, in the manner previously established, prior to the Crown involvement and actions.[54]

Trainor Tait and Hinemoa Herewini lodged a claim (Wai 937) 'for and on behalf of themselves and the descendants of Noa Tiwai (aka Noa Harawiri)' for their 'traditional lands' including 'Lake Waikaremoana and Waikareiti and the Waikaremoana reserves on the banks of these lakes and all of their environs.'[55] The claim is a general one which:

> relates to the areas of land, lakes, rivers, fisheries and other resources in the traditional rohe of the claimants and to the Crown dealings with the ancestral lands and resources of the claimants in this rohe and subsequent acts or omissions by the Crown that were and remain in breach of the principles of the Treaty of Waitangi.[56]

However, they do allege specifically that the Crown was responsible for the 'pollution and mismanagement of lakes and waters.'[57]

The claim of Sidney (Hirini) Paine (Wai 795) relates to the effect of the hydro-schemes at Waikaremoana on wildlife:

> We the claimants contend that the Waikaremoana Hydro-electric scheme operational activities have caused a marked decline of the whio (blue duck) species and disrupted their places of habitation, and forced remaining numbers to relocate to more remote locations. Further we contend that the waio are Taonga tuku iho, of special significance to the Tuhoe peoples, and were of great customary value in a number of respects to the Tuhoe peoples.[58]

In August 2002 a claim was lodged 'by Dr Rangimarie Turuki Rose Pere for and on behalf of Waikaremoana and its constituent iwi/hapu namely: Ngati Rongo, Ngati Hinanga, Ngati Hinekilira [sic], Te Whanau Pani and Ruapani-Tuhoe'.[59] These claimants contend that:

> 4.1 The Crown has consistently and repeatedly:

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[54] Wai 761 Statement of Claim, 12 September 1998
[55] Wai 937 Statement of Claim, n/d, (received 3 July 2001)
[56] Wai 937 Statement of Claim, n/d, (received 3 July 2001)
[57] Wai 937 Statement of Claim, n/d, (received 3 July 2001)
[58] Wai 795 Statement of Claim, n/d (received 26 August 1999)
[59] Wai 1013 Statement of Claim, 13 August 2002

(a) failed to recognise and protect the rangitiratanga of the hapu of Waikaremoana and their laws, customs and property in terms of the Treaty and its principles;

(b) exercised policy and law making authority and capacity using the resources of Maori actively to the detriment of the rangatiratanga, customs, laws and property of Maori, including the hapu of Waikaremoana;

(c) the requirement, in section 7 of the Resource Management Act 1991, for persons exercising functions and powers under that Act to have particular regard to Kaitiakitanga fails to recognise the hapu of Waikaremoana's practices and principles of Kaitiakitanga and, as such, has resulted in the insufficient involvement of the hapu of Waikaremoana on decisions relating to historical sites within its rohe.

(d) failed to comprehend and recognise the detrimental environmental effects their policies and law making authorities would have on the customs and laws of the hapu of Waikaremoana, especially where they pertain to their intrinsic relationships and customary use, occupation and enjoyment of their lands and estates, fisheries and other benefits and failed to identify:

(i) the rangatiratanga of the hapu of Waikaremoana; and

(ii) the extent of customary rights exercised by the hapu of Waikaremoana;

(e) failed to adhere to the principles of the Treaty by not ensuring the hapu of Waikaremoana retained environmental control in respect of their lands and estates, rivers, water, space, forests, minerals, fisheries, and taonga;

(f) failed to preserve continued rangatiratanga and use and occupation by the hapu of Waikaremoana of their lands and estates, forests, fisheries and other resources and benefits of the hapu of Waikaremoana through Maori laws and customs, by the introduction of certain policies and legislation.[60]

In January 2003, Jennifer Takuta-Moses lodged a claim 'on behalf of her constituent hapu in Waikaremoana which include Ngati Hinekura and Te Whanau Pani'.[61] Although the focus of this claim is the social and economic impact of Crown policies this is inevitably connected to changes to the environment. In particular the claimants contend that

> As Ngati Hinekura and Te Whanau Pani lost control of their land, their access to resources became restricted. Combined with the clearance of fern and bush land this eventually destroyed the floral [sic] and fauna resource base. The accelerated soil erosion associated with land development also impacted riverine and estuarine resources, resulting in significant loss of kaimoana.[62]

1.4.2. The Particularised Claims

In preparation for Tribunal hearings in the Urewera Inquiry District scheduled to begin in late 2003, counsel for the claimants submitted particularised statements of claim to the Tribunal during the interlocutory process in July 2003. These were circulated to counsel for the Crown who then submitted a statement of response. The Tribunal then prepared a

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[60] Wai 1013 Statement of Claim, 13 August 2002, section 4.1
[61] Wai 1037 Statement of Claim, 27 January 2003
[62] Wai 1037 Statement of Claim, 27 January 2003, section 3.4

Statement of Issues summarising claimant contentions and Crown responses to each of these contentions. The discussion of the claimants' key issues draws on this statement of issues.

Environmental issues are just one of the components of the cluster of claims which relate to Waikaremoana. Issues to do with the ownership of lands and lakes, with the socio-economic impacts of the loss of land and forced relocations from the north of Lake Waikaremoana to small blocks of land in the Waikaretaheke valley and the complex of environmental and social impacts of hydro-electric power construction are interwoven. The key issue that underlines most of the statements of claim discussed in this report is the ownership of Lake Waikaremoana.

Ownership of the Bed of Lake Waikaremoana

The claimants contend that 'in June 1918 the Native Land Court awarded ownership of Lake Waikaremoana to Tuhoe, Ngati Ruapani and Ngati Kahungunu owners.'[63] There was a long interval between this decision and the issue of a title to the Maori owners for the lakebed in 1954.[64] Of particular relevance to this report are the claimants' allegations that 'from 1918 to 1944, while the decision of the Native Land Court was under appeal, the Crown continued to operate as though it owned Lake Waikaremoana.'[65] In doing so, claimants allege the Crown 'failed to uphold their customary and legal ownership of the Waikaremoana lakebed.'[66]

Infringements of the Rights of Iwi and Hapu as Owners of the Bed of Lake Waikaremoana

The claimants contend that, as a result of the Crown's presumption that it owned Lake Waikaremoana the Crown took or allowed actions to take place which infringed the rights of the Maori owners of the lake. These actions altered the waters, bed and foreshore environment of the lake without prior permission of the Maori owners. Claimants allege that:

- From the late nineteenth century the Crown authorised the stocking of the lake with trout, issuing fishing licences, appointing rangers and running tourist services. [The Crown acted thus] despite complaints from 1905 onwards by Urewera hapu about the impact of sport fishing.[67]

[63] Urewera Statement of Issues, 28.1
[64] Urewera Statement of Issues, 28.6 & 28.9
[65] Urewera Statement of Issues, 28.8
[66] Urewera Statement of Issues, 28.13
[67] Urewera Statement of Issues, 28.2

- From 1918 to 1944 the Crown changed the lake radically and permanently for the purpose of power generation, while continuing with its practices of stocking the lake with trout, issuing licences and appointing rangers.[68]
- Between 1926 and 1948, the Crown constructed the Tuai, Piripaua and Kaitawa power stations at Waikaremoana, in the process erecting structures on and [disturbing] the bed of Lake Waikaremoana.[69] They did this without the consent of Urewera and Waikaremoana iwi and hapu, without paying them any compensation, and when the Crown did not have title to the lake.[70]
- Following the lowering of the lake level, as a result of the Crown's hydro-electric schemes, the Crown treated the exposed lakebed as its own property. The Crown trespassed extensively on the exposed lakebed, including a road and a variety of structures.[71]
- The Crown 'empowered, encouraged and colluded with' the Wairoa County Council to, without consultation, prevent owners of the lakebed receiving building permits on exposed lakebed. The County Council prevented further building by zoning the area as Proposed Reserve.[72]
- The Department of Conservation has allowed the building of a variety of structures on the foreshore, despite the fact that the lease in the schedule of the 1971 Act did not envisage this. Nor was there any consent from the owners for such a variation in the lease.[73]

Right to Use Water for Lake Waikaremoana for Hydro-electric Purposes

The claimants contend that:

> The Crown prevented Urewera and Waikaremoana iwi and hapu from exercising their right to develop and exploit their waterways, including Lake Waikaremoana, for the purpose of electricity generation with the enactment of the Water Power Act 1903 and its successor Acts. Through these Acts, until the Electricity Amendment Act 1987, the Crown reserved to itself the sole right to use water in lakes, falls, rivers, or streams for the purpose of generating or storing electricity[74]

Acknowledgement and Protection of the Spiritual Significance of the Lake Waikaremoana

The claimants contend that:

> The hydro-electric works have affected and damaged wahi tapu of importance to Maori in the Waikaremoana area, and the Crown has failed to have due regard for the spiritual significance of the lake to Waikaremoana iwi and hapu.[75]

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[68] Urewera Statement of Issues, 28.8
[69] Urewera Statement of Issues, 28.7
[70] Urewera Statement of Issues, 28.28
[71] Urewera Statement of Issues, 28.16
[72] Urewera Statement of Issues, 28.17
[73] Urewera Statement of Issues, 28.26
[74] Urewera Statement of Issues, 28.35
[75] Urewera Statement of Issues, 28.4.

Acknowledgement and Protection of the Kaitiakitanga Rights to Lake Waikaremoana

In general claimants contend that: 'The Crown failed to take account of the spiritual significance of Waikaremoana to the Urewera hapu and the impact of the Crown's interference in their kaitiakitanga.'[76] In particular claimants contend that the actions of the Crown that interfered with their kaitiakitanga included but were not limited to the following: -

- The Crown permitted Pakeha tourists to fish in the Waikaremoana lakes for exotic and native species, without the permission of Waikaremoana hapu and despite objections from Waikaremoana hapu.[77]
- The Crown prevented Urewera and Waikaremoana iwi and hapu from exercising their right to develop and exploit their waterways, including Lake Waikaremoana, for the purpose of electricity generation … [78]

Acknowledgement and Protection of Access and Use Rights to Lake Waikaremoana

The claimants make two broad allegations regarding Crown actions that restricted their access to the resources of Lake Waikaremoana and Lake Waikareiti:

- The Crown restricted the rights of the hapu of Waikaremoana to utilise the mahinga kai, rongoa, and other resources of Waikaremoana lands and waters both prior to and subsequent to the establishment of the Urewera National Park.[79]
- As part of its promotion of tourism at Waikaremoana, the Crown restricted the ability of Waikaremoana hapu to fish in their lake and hunt on the surrounding lands, including their own lands.[80]

Environmental Changes and Damage to the Lake Water, Bed and Foreshore

Claimants contend that the Waikaremoana hydro-electric scheme constructed and operated by the Crown has caused environmental damage to the bed, waters and foreshore of Lake Waikaremoana:

- The hydro-electric works at Waikaremoana [have] had a detrimental affect on the environment of the lake, rivers and surrounding lands, including damage to fisheries, erosion and the lowering of the lake by up to 10 metres.[81]
- The Crown mismanaged Waikaremoana and refused to listen to the owners in relation to leasing the bed.[82]

In particular the claimants allege that the following events or activities have had a detrimental effect on the Lake Waikaremoana environment:

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[76] Urewera Statement of Issues, 28.29
[77] Urewera Statement of Issues, 28.58
[78] Urewera Statement of Issues, 28.35
[79] Urewera Statement of Issues, 28.60
[80] Urewera Statement of Issues, 28.59
[81] Urewera Statement of Issues, 28.48
[82] Urewera Statement of Issues, 28.25

- The Crown actively encouraged and participated in the introduction of exotic fish species, in particular trout, without consultation with Waikaremoana Maori. This has caused ongoing damage to the indigenous fisheries of Waikaremoana and Waikareiti.[83]
- The Crown used land and waters of Waikaremoana hapu for purposes associated with the introduction of exotic species of fish, including hatcheries, without payment, despite claims for payment.[84]
- Poor control of tourism and recreational use of Waikaremoana lands and waters has led to pollution and the introduction of exotic waterweeds, algae and parasites such as giardia.[85]
- The lowering of the lake caused by the hydro scheme has created a dry strip of land belonging to the Maori owners. This Maori land has been disturbed by squatters and people accessing the lake.[86]

Consultation with and Involvement of Iwi and Hapu in the Management of Lake Waikaremoana

Claimants contend that there has been a general failure on the part of the Crown to consult with them or to involve them in the management of Lake Waikaremoana:

- The Crown excluded Urewera hapu from any role in lake management while the Crown and others trespassed, gained economic benefit from and modified the environment in and around the lake.[87]
- The Crown's offer of redress and ongoing payment to the Urewera hapu was made in such a way as to interfere with the owners' rights to benefit from that payment and with the owners' rights to be involved in ongoing management of Waikaremoana.[88]

The claimants further allege that the Crown failed to consult with them or involve them in the management of the lake in a number of particular circumstances:

- The Crown has not consulted with Urewera and Waikaremoana iwi and hapu over the management of the lake for hydro-electric generation purposes.[89]
- From 1904, the Crown operated a launch on Lake Waikaremoana despite the protests of Waikaremoana hapu and without payment to them.[90]

Three of these relate to the period after 1971 when the Crown was leasing the lake from Urewera Maori owners. The first is general: 'The Crown mismanaged Waikaremoana and refused to listen to the owners in relation to leasing the bed.'[91] The next two are more specific:

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[83] Urewera Statement of Issues, 28.56
[84] Urewera Statement of Issues, 28.57
[85] Urewera Statement of Issues, 28.61
[86] Urewera Statement of Issues, 28.49
[87] Urewera Statement of Issues, 28.16
[88] Urewera Statement of Issues, 28.32
[89] Urewera Statement of Issues, 28.42
[90] Urewera Statement of Issues, 28.54
[91] Urewera Statement of Issues, 28.25

- The Department of Conservation has allowed the building of a variety of structures on the foreshore, despite the fact that the lease in the schedule of the 1971 Act did not envisage this. Nor was there any consent from the owners for such a variation in the lease.[92]
- The Friends of the Urewera, monitoring the actions of the Department of Conservation, have no authority to do so under the lease.[93]

In summary, the claimants allege, in relation to the waters of the lake and the lake-bed itself that the Crown:

- constructed hydro-electric structures on the lake floor;
- mismanaged Waikaremoana;
- stocked the lake with trout and managed and utilised that fishery, issuing licences, appointing rangers and running tourist services; and
- failed to have due regard for the spiritual significance of the lake to Waikaremoana iwi and hapu.

In particular the claimants allege that hydro-electric works at Waikaremoana had a detrimental effect on the environment including:

- damage to fisheries;
- lowering of the lake level by up to 10 metres;
- erosion of exposed lakebed (as a consequence of the lowering of the lake level);
- damage to indigenous fisheries of Lake Waikaremoana and Lake Waikareiti caused by introduction of trout; and
- Pollution of lake water and introduction of exotic waterweeds, algae and parasites such as giardia caused by poor control of tourism and recreational use of Waikaremoana lands and water.

The claimants set these environmental concerns (the topic of this report) within a wider context: the Crown failed to gain permission from the iwi and hapu; the Crown refused to listen to the Maori owners of the lake; the Crown, by its promotion and management of tourism restricted the rights of iwi and hapu when it denied them full use and benefit of the lake; the Crown dispossessed iwi and hapu of mahinga kai, birding, cultivation and gathering rights on the lake shores [94]; the Crown retained the economic benefits of the lake without redress or payment to the Maori owners; the Crown failed to recognise the rights of

[92] Urewera Statement of Issues, 28.26
[93] Urewera Statement of Issues, 28.27

iwi and hapu to exercise kaitiakitanga; the Crown prevented iwi and hapu from exercising a development right to exploit the land and its waterways.

Crown Actions relating to the Foreshore of Lake Waikaremoana

The claimants allege that the Crown treated the lake-bed exposed by the drop in lake level as its own property by constructing a road and authorising a variety of structures and preventing Maori owners of the lake-bed from building on the exposed lakebed/foreshore. In particular, they allege that the Crown allowed the Department of Conservation to build a variety of structures on the foreshore, without a condition in the lease or permission of the owners. These actions, they allege, impacted on Maori ownership, kaitiakitanga and ability to access and use the lakebed. Specifically, in the context of this report, they allege that there were environmental impacts:

- Pollution of lake water and introduction of exotic waterweeds, algae and parasites such as giardia caused by poor control of tourism and recreational use of Waikaremoana lands and water; and
- Disturbance of the foreshore by squatters and people accessing the lake.

Crown Actions relating to Rivers, Streams and Waterways including the Waikaretaheke River

While the research brief for this environmental report places the primary emphasis on Lakes Waikaremoana and Waikareiti, it also required us to consult with affected claimants to determine the issues of particular importance for them.[95] We did this and, as we recorded the oral interviews, we quickly became aware that the claimants see the lakes and their surrounds as a single entity, place an intentional emphasis on rivers and streams and customary use of these resources and have a large number of very specific concerns about Crown actions in the upper Waikaretaheke valley.[96] We have thus searched the statements of claim for references to these topics and report them now. We begin with general references to rivers and waterways, then move to statements which are more explicit about actions in the Waikaretaheke valley.

Some of the claims made with respect to rivers and waterways are expressed in general terms without naming particular streams or rivers. The Tuhoe-Waikaremoana Trust Board, for example, in their consolidated statement of claim refer to ‘rivers, waterways and fisheries’. The Board expresses it thus:

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[94] Wai 937, Statement of Claim, section 5
[95] See section 1.5 below
[96] See section 1.1 above

- Tuhoe has retained and exercised its tino rangatiratanga over the rivers, waterways and fisheries within the Tuhoe rohe. The Crown has consistently failed to recognize and provide for Tuhoe's rights in respect of the said rivers, waterways and fisheries.
- Tuhoe maintain tino rangatiratanga over all rivers, waterways and fisheries situated within the Tuhoe rohe.
- The Crown has failed to recognize and protect Tuhoe's rights in respect of the rivers, waterways and fisheries within the Tuhoe rohe which has prejudiced Tuhoe.
- The Crown enacted legislation such as the Water and Soil Conservation Act 1967, Public Works Acts and the Resource Management Act 1991 which failed to recognize and protect Tuhoe's rights.
- The Crown enacted legislation such as Coal Mines legislation and applied the *ad medium filum aquae* rule to dispossess Tuhoe of its rivers, waterways and fisheries.
- The Crown has failed to provide for Tuhoe's rightful role in the management of rivers, waterways and fisheries within the Tuhoe rohe.[97]

'Waterways including lakes' receive similar mention in the Panekiri Tribal Trust Board Claim but the emphasis is primarily on Lake Waikaremoana. [98] Ngati Kahungunu in its Wairoa ki Wairarapa claim includes 'rivers and customary rights'. The claimants say that they have been deprived of owning and management of the rivers within their rohe, including the Mohaka, the Wairoa, Ngaruroro, Tutaekuri and other rivers.[99] Te Okoro Joe Runga, for the Tareha Taraia Trust, sets 'mana awa' alongside 'mana moana' in the claim and asserts 'the failure of the Crown to define the precise equity of its Treaty partner in natural (fresh) waters'.[100] Peter Keepa, for Tuhoe of the Urewera, includes 'the Urewera and their lakes and rivers'.[101]

Hirini Paine for Tuhoe Potiki is more explicit about natural waters and the nature of the despoilment: the link is made to 'TINO RANGATIRATANGA …. provided for under Article (II) …. over all those natural waters found lying in the ecological catchment referred to as the Waikaremoana catchment'. [102] The claim continues in these words:

> We state and reiterate that all these natural waters are TAONGA commonly referred to as WAI MAORI or WAI TIPUNA and as such we emphasize the diverse traditional and contemporary values attached to these waters. They are fundamental taonga that underpins our foundation as a uniquely individual people and culture, the recovery of which is vital to the restoration of our generation, and our future generations, total wellbeing.

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[97] Wai 36, Consolidated Statement of Tuhoe Claims, section 8, pp 28-29
[98] Wai 144, Statement of Claim, amendment 1.1(a), pp 1-2
[99] Wai 201, Statement of Claim, section 3.13, p 7
[100] Wai 687, Addition to Statement of Claim, 18 Feb 1998, para 10
[101] Wai 761, Statement of Claim, para 2 under 'Relief sought', p 2
[102] Wai 795, Statement of Claim, para A), page 1

The Wai 795 claimants elaborate:

> Further we state that the Crown introduced certain acts/policies in regard to water that's primary function was, or resulted in, a manner consistent with confiscation of our water taonga and grossly weighted in the favour of the Crowns' sole interest and aspirations, contrary to and excessively far removed from, the true intent of that Treaty document, being the spirit of goodwill and partnership.

They also have an extended and very specific statement about the relief sought relating to the waters – TE WAIKAUKAU O NGA MATUA TIPUNA:

> (I) Legislative recognition and exclusive title of ownership and full and absolute authority that is our Tino Rangatiratanga as provided and guaranteed under Article II of the Treaty of Waitangi over those described waters, be returned and rest with the Iwi TUHOE POTIKI, as was the original position prior to Crown intervention. Non negotiable.
>
> (II) Compensation (fair) as a result of substantial financial profits, acquired as a direct result of Crown enactment that, via the utilization of the waters of Lake Waikaremoana for Hydro/ Power generation, was unlawfully acquired, without the expressed authority of the true and rightful owners as decision makers.
>
> (III) Compensation (fair) as a result of such human related activities initiated as a result of Crown action that have contributed to the despoilment and lack of quality and purity of those said described waters.
>
> (IV) Compensation (fair) as a direct result arising from Crown polices that have provided for human related activities and in the application of a variety of such human related activity for whatever purpose, may have caused or contributed to the:
>
> a) Desecration of Wahi Tapu
>
> b) Environmental damage (e.g. land slippage, soil erosion)
>
> c) Indigenous species habitat destruction (water reliant)
>
> d) Loss of indigenous species (water reliant)
>
> e) Decline of indigenous species (water reliant)[103]

Trainor Tait and Hinemoa Herewini for the descendants of Noa Tiwai bracket lakes and streams together and direct their claim to 'the lakes and their environs'.[104] They specify environmental impacts in these words:

> The Claimants say further that their lands and resources including wahi tapu have been damaged, depleted and polluted by Crown land management practices, including indigenous forest destruction, exotic afforestation, pollution and mismanagement of lakes and waters, accelerated soil erosion and flooding.[105]

Desmond Renata claims on behalf of Ngati Ruapani who specify that they have always lived on the Tukurangi and Taramarama blocks in the Waikaretaheke valley. As 'Ahi ka'

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[103] Wai 795, Statement of Claim, para C) page 3
[104] Wai 937, Statement of Claim, para 3.1 and 2.2

and 'Tangata whenua' they claim compensation for 'the use, and alienation of our Ancestral Lands, Forests and Waterways that the Crown acquired through their Acts and Legislation, for roads, housing, buildings, sewage-systems, schools, recreational facilities, in the construction of their State Owned Enterprise with all its utilities, that being, the Hydro-electric Power Scheme at Waikaremoana.'[106]

This particular clause in the claim is their most direct pointer to the environmental impacts described by the Renatas in their oral evidence. Interlinked with this are claims for compensation for: lands taken; lands wrongly recorded; lands taken for public works and returned to other parties; wahi tapu, ancient pa and garden sites not reserved; survey fees charged and double charged. [107]

The Tuhoe-Waikaremoana Trust Board, in addition to their paragraph 8, quoted in full above, is very explicit about the importance of rivers, waterways and fisheries. The Trust Board is also very explicit about the actions of the Crown in relation to hydro-electric power schemes:

> 6.4 The Crown enacted legislation including the Water Power Act 1903 and subsequent Public Works Acts which denied Tuhoe the right to derive income from Waikaremoana by hydro-electricity generation, and which Acts gave the Crown extensive powers to use Waikaremoana for hydro-electricity generation to the economic detriment of Tuhoe.
>
> 6.5 In 1944 and following the Crown erected structures associated with the Kaitawa Power Station on Waikaremoana:
>
> - The Crown erected hydro-electricity outlets, siphons and tunnels and other structures without obtaining the permission of the Maori owners.
>
> - The Crown failed to pay compensation to the Maori owners for the erection of the structures.
>
> - The Crown failed to pay the Maori owners a fair economic return for access to Waikaremoana for the purpose of generation of hydro-electricity.
>
> 6.6 In the 1970s the Crown carried out the blocking of natural underwater outlets on Waikaremoana without obtaining the permission of the Maori owners and in breach of the Public Works Act.
>
> 6.7 In 1988 the Crown purported to transfer its hydro-electricity assets situated on Waikaremoana to ECNZ without obtaining the permission of the Maori owners.
>
> 6.8 The Crown has failed to compensate the Maori owners for use of Waikaremoana for hydro-electricity generation purposes for the period from 1946 to 1998,

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[105] Wai 937, Statement of Claim, para 6.1 p 6
[106] Wai 945, Statement of Claim, section 1 on p 1
[107] Wai 945, Statement of Claim, sections 3, 5-10 and 12-15

> despite Waikaremoana being one of the few economic resources owned by Tuhoe.[108]

The Wairoa-Waikaremoana Maori Trust Board is equally explicit about the policies and actions of the Crown and uses almost identical language. The emphasis in on the lakebed and waters but a number of the actions alleged in the claim relate equally to the Waikaretaheke valley. Items (iv) to (viii) are worded thus:

> (iv) The hydro-electric structures (outlets, siphons, tunnels etc) continue to occupy the bed of Lake Waikaremoana the property of the claimant group; and
>
> (v) by the Crown's continued use of lakebed and waters for the purposes of electrical power generation; and
>
> (vi)The effect of blocking the outlets on the bed of Lake Waikaremoana the property of the Claimant group, has been to increase the flow of water through the power stations and decrease the control and ownership of said waters which the owners of said waters which the owners may exercise to their own benefit, and
>
> (vii) The proposed alienation of the Crown's ownership interests in Electricity Corporation assets which are the said hydro-electric generating power stations, and structures rather than retaining Crown ownership and control for future Treaty settlement;
>
> (viii) The failure of the Crown in the alienation process referred to above to place the lands and all interests in land upon which these hydro-electric schemes have been constructed in a land bank so as to satisfy Treaty grievances arising from peoples who constitute the beneficiaries of the Claimant group.[109]

The Trust Board asserts that the Crown has 'failed to ensure to the claimant group their undisturbed possession and control of all waterways, riverways, which lie within their tribal authority (Rangatiratanga)'.[110] Environmental impacts are thus interwoven with claims to do with land, compensation, involvement of iwi in decision-making and the development rights of iwi.

1.5. The Environmental Research Commission

The intent of this report is to provide an historical analysis of environmental issues affecting Urewera Maori in relation to Lakes Waikaremoana and Waikareiti in the Twentieth century. This research is commissioned by the Waitangi Tribunal to meet a perceived gap in the existing Urewera inquiry research (appendix 1)

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[108] Wai 36, Consolidated Statement of Tuhoe Claims, paras 6.4 to 6.8, pp 26-27
[109] Wai 621, Statement of Claim, section 2(b) paras (iv) to (viii) pp 2-3
[110] Wai 621, Statement of Claim, section 2(c), p 3

The Waikaremoana environmental evidence will form one major component of the larger Urewera Inquiry casebook. We have already noted that Lake Waikaremoana is a significant part of the identity and the resource base of Te Urewera Maori. Specialist reports have been provided by Walzl (A37), Stevens (A85), Marr (A52), Cox (A8), Doig (A75), Boast (A109), Coombes (A121, A133) and Murton (A82 and forthcoming). Evidence on the social and economic impacts of Crown actions at Waikaremoana is contained in these reports – in some cases with reference to Te Urewera as a whole and in other cases more specific to Waikaremoana. Additional evidence will be presented on the land and property ownership dimensions of the inquiry. The environmental report is designed to support those reports and complete the Waikaremoana cluster of evidence.

The environmental report has been prepared by a team of researchers who have brought a range of skills and insights to the task. The Waitangi Tribunal has commissioned: Dr Robin Hodge, an environmental historian and an independent researcher; Dr Garth Cant, a geographer from the University of Canterbury; Ms Leanne Boulton, an historian on the staff of the Waitangi Tribunal. The three members of the team named above have been joined by Mr Craig Innes who searched Archives for material for this report. Dr Vaughan Wood, a Post Doctoral Scholar from the Universities of Otago and Canterbury, has worked in partnership with Dr Cant. Dr Wood has written chapters five, six and seven of the report.

The Direction Commissioning Research[111], attached as appendix 1, requires the compilation of a research report examining environmental impacts affecting Lakes Waikaremoana and Waikareiti. It has seemed appropriate to us, in the context of the Urewera research as a whole and for the reasons set out in section 1.4 above, to see the lakes in the context of the surrounding forests and watersheds and to include the upper valley of the Waikaretaheke along with the immediately adjacent Lake Waikaremoana. In terms of ecology, Maori worldview and National Park management the lakes and their surrounds are a single entity. In terms of the environmental impact of hydro-electric construction and hydro-electric generation the events and the configurations which have affected Lake Kaitawa, the Whakamarino Flat and the Waikaretaheke River and its tributaries are an integral part of the larger hydro-electric story.

[111] Hodge, Cant and Boulton Research Commission, 21 October 2003 (Wai 894 record of documents, doc 3.63). See Appendix 1

Within this broad commission are three more general strands: the extent to which Waikaremoana Maori have retained ownership, management and access to customary resources; the effect of environmental impacts (if any) on those rights and resources; and the level of consultation and ongoing involvement of Waikaremoana Maori in the management of Lakes Waikaremoana and Waikareiti. In paragraph 1(b) the direction provides a checklist of actions which may or may not have impacted on the rights and the resources of the claimants. These include:

- Excavation and installation of hydro-electric works on the Waikaremoana lake-bed;
- Long-term impacts of the hydro-scheme on Lake Waikaremoana;
- Alteration of the levels in Lake Waikaremoana;
- Water pollution (sewage, oil leakage from hydro works, other sources);
- Granting of resource consents for hydro-electric and other purposes;
- Impact of military exercises conducted by the NZ Army and Airforce;
- Provision of water and power supply to local Maori communities at Waikaremoana;
- Impact and control of tourism activities including tramping, hunting, boating and fishing;
- Construction of works affecting lakes (including, tracks, roads, bridges, jetties, lodges, houses, tramping huts and sewage facilities);
- Introduction, acclimatisation and management of fisheries and other organisms in the lakes;
- Conservation authorities' (including Urewera National Park) policy and practices in relation to the lakes; and
- Water quality of the lakes: extent to which it has been affected by land run-off, terrestrial poisoning programmes etc.[112]

The researchers were asked to consult the affected claimant groups to determine the issues they consider to be of particular significance. It was as a result of these consultations that we became aware of the importance of the forests surrounding the lakes, and of the land and water resources of the upper Waikaretaheke valley. We were asked to conduct interviews with claimants and we did so in November 2003.

The commission asked us to consider the impacts of army and airforce exercises. In the time available we were unable to gain access to the files of the New Zealand Defense Force, including those relating to the Special Air Service, for the period from 1979 to the present. Neither was there information provided by the claimants in oral evidence. We are thus unable to report on this component of the claim.

Similarly the commission asked us to consider the impacts of land run-off and terrestrial poisoning programmes on the water quality of Lakes Waikaremoana and Waikareiti. This is not covered in this report as it was the understanding of the project team, at the point where this prioritization was made, that the catchment areas of both lakes have remained in forest and have not been subject to 1080 drops.

1.6. The Organisation of the Research

The research reported on here draws on and extends a substantial body of work done by Waitangi Tribunal staff and other commissioned researchers during the last five years. It combines insights provided by: Waitangi Tribunal documents; archival sources held by Archives New Zealand, government departments and Genesis Power; evidence presented to the Waikaremoana Commission of Inquiry 1998; information and submissions contained in the resource content files of the Hawke's Bay Regional Council; and oral evidence collected in the course of field interviews at Lake Waikaremoana and transcribed by Leanne Boulton. This material has been supported by a wide variety of published books, reports and scientific papers.

The research team met for an initial briefing and working session, convened by Ralph Johnson, in Wellington in October 2003. Leanne Boulton and Craig Innes were able to provide the commissioned researchers with a detailed overview of the archival material already searched and copied. We were greatly assisted by an extended schedule, prepared by Leanne Boulton, which identified items by repository, agency, and reference number and prioritised them in the context of this project. As the task progressed Craig Innes continued to search Archival sources while Leanne Boulton sorted and dispatched the material to the researchers and co-ordinated the project.

Ralph Johnson, Leanne Boulton, Robin Hodge and Garth Cant were able to go together to Lake Waikaremoana for three days in November 2003. This enabled the research team to become familiar with the field area and collect oral evidence from claimants who have had a long-time involvement with the lake, its surrounds and its resources. The interviews were structured according to a common pattern: we provided the claimants with an overview of our task, a map of the area and a time line of important events relating to the lake. We then encouraged them to tell us their stories about their lakes, their customary resources and the

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[112] See Appendix 1, para 1(b)

ways in which the actions of the Crown had affected their use of these resources. We asked supplementary questions within this framework. The interviews were taped and subsequently transcribed. The project was carried out between November and February at a time when claimants and Tribunal staff were active in Tribunal hearings elsewhere in Te Urewera and when many Lake Waikaremoana residents were involved in the summer holiday surge of activity. Not all claimant groups and very few kuia and kaumatua were available for interview during our November visit and it proved impracticable for us to set up interviews at the end of January.

We were able to record extended interviews with Desmond and Erina Renata from Ngati Ruapani (Wai 945), Reay Paku and Teariki Mei from the Wairoa-Waikaremoana Maori Trust Board (Wai 621) and a larger group including Trainor Tait, Lorna Taylor and Mrs Rangi Paku from Nga Rauru o Nga Potiki, also known as the descendents of Noa Tiwai (Wai 937). We were not, for the reasons set out above, able to interview Tuhoe claimants, the Tuhoe-Waikaremoana Maori Trust Board or kuia and kaumatua identified by Ngati Ruapani. An interview with Te Okoro Joe Runga from Kahungunu-Rongomaiwahine and the Tareha Taraia Trust was scheduled and then postponed because of ill health.

Our awareness of the lakes, the management environment and the research context was greatly assisted by interviews with: Chris Ward, Scientific Officer from the Department of Conservation in Gisborne; Glenn Mitchell at the National Park Headquarters at Aniwaniwa; scientist Anna Taylor in Christchurch; James Waiwai, Chair of the Waikaremoana Maori Committee. Mr Waiwai is not himself a claimant but is widely respected by those who are claimants and by officials and researchers from the Department of Conservation and Manaaki Whenua/ Landcare.

As the project progressed we required access to additional archival resources. Jarrod Bowler and Tracey Hickman were invaluable in locating and copying material from the Genesis archives and files. Vaughan Wood was able to visit the Hawke's Bay Regional Council in February and was given direct access to files containing the resource consent applications and related evidence for Waikaremoana.

The project was completed within a very tight time frame. We are conscious that we have drawn on a very wide range of archival and other primary materials and that we have heard significant oral evidence. We are equally conscious that there are other archives not consulted and other kuia and kaumatua not interviewed.[113]

The organisation of the project was set out in the project brief. Garth Cant and Vaughan Wood were responsible for matters to do with hydro-electric development and governance. Robin Hodge was asked to examine the impacts of recreational fishing, tourism and the operation of the National Park.

1.7. The Organisation of the Report

The substantive report that follows is organised into two parts representing the two main prongs of Crown involvement in the Waikaremoana area. The first, written by Robin Hodge, deals with tourism, conservation and recreational fishing. The second, written by Vaughan Wood, looks at hydro-electric power development and the impacts of this on Lake Waikaremoana and the Waikaretaheke valley.

The three chapters written by Hodge in part 1 draw on reports by Brad Coombes, 'Making 'Scenes of Nature and Sport' – Resource and Wildlife Management in Te Urewera, 1895–1954',[114] and 'Preserving 'a Great National Playing Area' – Conservation Conflicts and Contradictions in Te Urewera, 1954–2003, [115] Suzanne Doig 'Te Urewera Waterways and Freshwater Fisheries',[116] and Tony Walzl 'Waikaremoana: Tourism, Conservation & Hydro-Electricity (1870–1970',[117] The primary sources of greatest importance for these three chapters are the archives of: Fish and Game New Zealand, Wellington Region; the Departments of Conservation; Lands and Survey; Tourist and Publicity; Te Puni Kokiri.

The chapters written by Wood in part 2 have drawn on a wide variety of technical and scientific reports by the succession of agencies that have had responsibility for hydro-electric power development and the more recent monitoring of its impacts. Some of these

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[113] The researchers were, for example, unable to examine Lands and Survey and Department of Conservation files held in Gisborne and Aniwaniwa. See section 4.1
[114] Brad Coombes, 'Making 'Scenes of Nature and Sport' – Resource and Wildlife Management in Te Urewera, 1895–1954', report commissioned by the Crown Forestry Rental Trust, May 2003
[115] Brad Coombes, 'Preserving 'a Great National Playing Area' - Conservation Conflicts and Contradictions in Te Urewera, 1954-2003', report commissioned by the Waitangi Tribunal, September 2003
[116] Suzanne Doig, 'Te Urewera Waterways and Freshwater Fisheries', final report commissioned by the Crown Forestry Rental Trust, October 2002
[117] Tony Walzl, 'Waikaremoana: Tourism, Conservation, & Hydro-electricity, 1870-1970', report commissioned by the Waitangi Tribunal, October 2002

are published, others are held in archives and others in the working files of Genesis Energy. Papers from the Proceedings of the New Zealand Institute of Engineers and the monitoring reports and scientific papers prepared by Dr Anna Taylor and her colleagues as part of the current monitoring process have been invaluable. The writings and personal communications provided by Chris Ward of the Department of Conservation, along with the material relating to Genesis Energy's applications, helped to set these in a wider perspective.[118] Among the most useful reports are the unpublished ECNZ report, 'Waikaremoana Power scheme: Assessment of Effects on the Environment' prepared by Emma Christmas and Bill Chisholm, and Tony Walzl's Waitangi Tribunal Report, 'Waikaremoana: Tourism, Conservation, and Hydro-electricity (1870-1970)'.

The organisation of the chapters within part 1 follows the chronology of Crown involvement at Lake Waikaremoana from the 1890s onwards. Chapter 2 entitled 'Trout – Introduction to the Lakes and Fishery Management' examines fisheries in Lakes Waikaremoana and Waikareiti. It begins with the life histories and environmental requirements of indigenous fish found in the lakes and with their traditional use by Waikaremoana Maori. It then covers the introduction and acclimatisation of brown and rainbow trout by acclimatisation societies from 1896 and the way in which the fisheries have been managed under different regimes.
Chapter 3 is on 'Tourism at Lake Waikaremoana – Pollution of the Waters'. It relates how increasing numbers of visitors inevitably required the provision of accommodation that increased the potential for pollution of the lakes. This chapter examines pollution in Lake Waikaremoana, caused by the release of sewage into the waters from different types of accommodation, and how it has affected Waikaremoana Maori.

Chapter 4 is entitled 'Conservation – Policy and Practice'. It examines Crown conservation policy and practice in relation to Lakes Waikaremoana and Waikareiti and the extent to which Waikaremoana Maori have been involved in governance and management.

Part 2 contains two chapters which examine the nature and impact of hydro-electric power development and one which explores issues to do with governance. Chapter 5 examines the history of hydro-electric development by the Crown at Lake Waikaremoana and in the upper Waikaretaheke valley. In doing so, it describes how the various power schemes

[118] These latter files are held by the Hawke's Bay Regional Council, Napier

altered the hydrological landscape and river ecology, and also discusses the impacts on the two remaining reserves for Waikaremoana Maori, Te Kopani and Heiotahoka.

Chapter 6 reviews the history of the lake levels and how Crown manipulation of lake levels since 1946, which has entailed its lowering by between three and 13 metres, have affected the character of the lake edge and its shallow-dwelling biota.

Chapter 7 considers the ongoing governance of the lake as a water resource and the management relationship between the Department of Conservation, Genesis Energy, and Waikaremoana Maori organisations. The potential ramifications of privatising electricity generation at the lake are also discussed. The concluding chapter, eight, provides an overview of the findings in each of the two substantive parts.

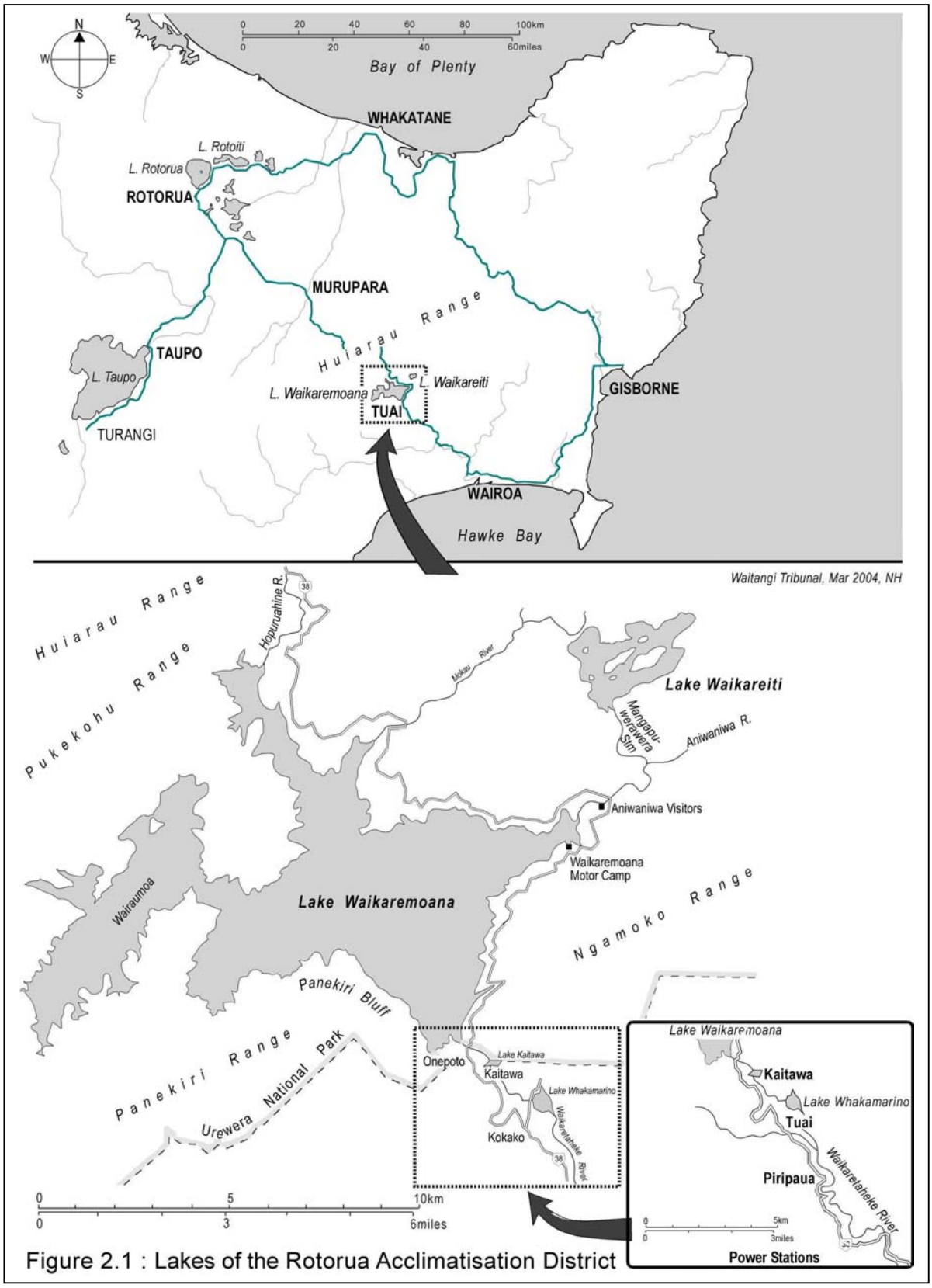

Figure 2.1 : Lakes of the Rotorua Acclimatisation District

PART I:

Chapter 2: Trout – Introduction to the Lakes and Fisheries Management

2.1. Introduction

This chapter examines fisheries in Lakes Waikaremoana and Waikareiti. It begins with the life histories and environmental requirements of indigenous fish found in the lakes and with their traditional use by Waikaremoana Maori. It then covers the formation of acclimatisation societies from the 1860s, their statutory role in the introduction, acclimatisation, and management of trout species to New Zealand, and protective legislation for exotic fish species. The chapter then examines the introduction of brown and rainbow trout to the lakes from 1896, the involvement of Waikaremoana Maori, and the way in which the fishery has been managed under different administrations.

Trout were introduced to the lakes as an additional food resource and tourist attraction after an agreement reached in the years 1894–96 between the Premier, Richard Seddon, and Tuhoe representatives. Today, some claimants interviewed by Suzanne Doig and during our research dispute their ancestors asked for trout to be released. The implication of the agreement was that Tuhoe would release, manage, and own the trout resource. Although the agreement was included in legislation, the necessary regulations to effect Tuhoe control and management were not passed. Waikaremoana Maori assisted in the initial introduction of trout to Waikaremoana seemingly by chance more than arrangement. Later they provided land and some labour for the trout hatchery at Lake Waikaremoana between 1926–29 but since then appear not to have been involved with the management of the trout fishery.

2.2. Indigenous Species in Lakes Waikaremoana and Waikareiti

2.2.1. Indigenous Fish

The *Te Urewera National Park Management Plan* lists 12 different species of indigenous fish found in the national park. They are:

- koaro *(Galaxias brevipinnis)*;
- short-jawed kokopu *(Galaxias postvectis)*;
- banded kokopu *(Galaxias fasciatus)*;
- blue-gilled bully (kokopu) *(Gobiomorphus hubbsi)*;
- red-finned bully *(Gobiomorphus huttoni)*;

- long-finned eel (tuna) *(Anguilla dieffenbachii)*;
- short-finned eel (tuna) *(Anguilla australis)*;
- common bully (toitoi, kokopu) *(Gobiomorphus cotidianus)*;
- common smelt (koeaea) *(Retropinna retropinna)*;
- Cran's bully (kokopu *(Gobiomorphus basalis)*;
- torrentfish *(Cheimarrichthys fosteri);*
- dwarf galaxis *(Galaxis divergens)*.[119]

Not all of these fish inhabit Lakes Waikaremoana and Waikareiti. Because half of New Zealand's 35 indigenous fish species spend part of their life cycle at sea, and because, in Western scientific opinion, the lakes have been formed by landslides, fish species in them have become landlocked and complete their life cycle without marine migration.[120]

Waikaremoana has populations of common bully, common smelt, and koaro.[121] Both species of eel are found in low densities.[122] Smelt were not naturally present in the lake but were introduced in 1948 to provide additional food for trout.[123]

Koaro, which was or is called maehe at the lakes[124], is the main galaxiid species in Waikareiti. They are rare but still 'reasonably common' in Waikareiti because it has only rainbow trout.[125] Koaro were once the most abundant fish in many inland lakes but the introduction of trout and smelt greatly reduced their populations.[126]

Throughout the nineteenth and twentieth centuries there have been differing opinions on the species and numbers of indigenous fish in the lakes. In 1841, William Colenso found

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[119] East Coast Hawke's Bay Conservancy, *Te Urewera National Park Management Plan*, (Gisborne: Department of Conservation Te Papa Atawhai, 2003), p 17. The Maori names given in brackets are from *Te Urewera National Park Management Plan Draft*, 8 September 2003, (http://www.doc.govt.nz/Explore/001~National-Parks/Te-Urewera…/049~Appendix-Two)
[120] DOC, *Native Fish are Neat*, undated, (http://www.doc.govt.nz/Conservation/00…als/00~Native-Animals/Native-Fish.asp, 13 November 2003)
[121] Emma Christmas and Bill Chisholm, 'Waikaremoana Power Scheme: Assessment of Effects on the Environment', vol 2, April 1998, pp 52, 125, citing 1996 reports by R R Strickland
[122] *Management Plan*, 2003, p 17
[123] P Dickinson, 'Report on Lake Waikaremoana', visited 5 to 10 September 1950, p 2, IA 1, W2578, 78/37, ANZ Wellington
[124] Suzanne Doig, 'Te Urewera Waterways and Freshwater Fisheries', Report Commissioned by the Crown Forest Rental Trust, October 2002, p 19. She notes that Elsdon Best said it was called raumahehe at Ruatahuna.
[125] D K Rowe and E Graynorth, *Lake Managers' Handbook: Fish in New Zealand Lakes*, Wellington: Ministry for the Environment, June 2002, pp 10, 11, 19
[126] Rowe and Graynoth, p 19

shellfish in the lake and said he was told that shellfish were the only living things in it.[127] In 1896, when trout were first liberated in Waikaremoana, F W Rutherford said he was told by Maori that there were no eels in the lake. Rutherford saw a large number of 'bullies'.[128]

Elsdon Best in his book, *Waikaremoana: The Sea of Rippling Waters*, mentioned only two fish species in Lake Waikaremoana: the maehe, which he described as a small species of kokopu taken by Maori at the season when the fish congregated at a small rivulet near the Waikopiro Stream, and the eel. He noted that the maehe was said to be the only fish in the lake but that some Maori reported that eels had been 'introduced in late times' from the Waikaretaheke River. Best also noted that koura were in Waikaremoana. At Lake Waikareiti he noted that 'the diminutive maehe' was the only fish found in these waters.[129]

A report by the Rotorua ranger, William Cobeldick, in 1923 noted that koura were not plentiful; that tou tou [common bully] and inanga [whitebait, a *Galaxias* species] were visible in fair quantities; and that insect life was thriving.[130] In 1944, the Rotorua Conservator of Fish and Game listed koaro as being in Waikaremoana 'at one time' when they were known as 'maihi' or 'maehe'. They had disappeared from the lake, he said, some time before his transfer there in 1925.[131] The conservator added that, during his time at Wairoa, kokopu were rarely seen and koura were not numerous.[132] A survey by Peter Mylechreest in 1978 listed koaro as present.[133]

In 1950 a Fisheries Officer, P Dickinson, considered it 'certain' that, before the hydro schemes, eels had had access to Waikaremoana from Waikaretaheke River. They could, he said, find their way either through seepage cracks in the lake's bed or over the outlet when the lake was overflowing. He had been informed that large eels had been seen and some taken in the lake in recent years. It had become impossible for young eels to reach the lake

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[127] Rodney Gallen and Allan North, *Waikaremoana: A Brief History of the Lakes of the Urewera National Park*, (n.p, Te Urewera National Park Board, 1977), p 28
[128] 'Rutherford's Record of the Release', *Wairoa Star*, 10 September 1996, Eastern Region Fish and Game New Zealand, Rotorua
[129] Elsdon Best, *Waikare-moana: The Sea of the Rippling Waters*, reprint, (Wellington: Government Printer, 1975), pp 35, 40, 42, 100. Doig considered that Best underestimated the extent of Te Urewera fisheries, Doig, p 16. Both she and Brad Coombes warn of the need to be aware of Best's interpretations in light of his Eurocentric position; Doig, p 36; Brad Coombes, 'Making 'scenes of nature and sport' – Resource and Wildlife Management in Te Urewera, 1895–1954', report prepared for the Crown Forest Rental Trust', May 2003, pp 4–6
[130] Wm Cobeldick, 27 September 1923, TO 45/41 vol 1, ANZ Wellington
[131] Kean to Bennett, 25 May 1944, F W3129, IA 52/3, vol 1, ANZ Wellington
[132] Kean to Bennett, 25 May 1944, op cit
[133] ECNZ 'Waikaremoana Power Scheme', p 52

because of an electronic eel barrier installed below Piripaua station that was considered by the operator to be 100 per cent effective. Most of the eels turned and swam off downstream as soon as they reached the electronic field. Those that did not were killed by the electrodes.[134] Today, the low number of eels in Waikaremoana is attributed to hydro electricity structures.[135] These form barriers to adult eel migration to the Pacific Ocean to breed and the return of young eels to the lake.

Chris Ward, Conservancy Advisory Scientist with the Department of Conservation in Gisborne, believed the opposing stories of no [or few] eels on the one hand and, on the other, the presence of large legendary eels in the past, can be reconciled. He suggested that young eels could have been taken to the lake and grown enormous there before either being caught or dying out. Ward remarked that some eel biologists believe that, prior to the hydro scheme, a major waterfall below Kaitawa would have been likely to impede all but a very few elvers.[136]

But waiata of Waikaremoana Maori mention the presence of eels.[137] In addition, Rodney Gallen and Allan North cited Waikaremoana Maori beliefs that ancestors became taniwha. 'One of these was Hine-Wai, who became a huge eel which lived in a deep pool of the Hopuruahine River at Te Takapau-a-Hinewai'.[138]

Indigenous fish are described as secretive and are often nocturnal. They prefer habitat with cover, such as overhanging vegetation, logs, large boulders, or undercut banks for shelter. Koaro in lakes can grow to 270 millimetres in length. The giant kokopu grows up to 580 millimetres long. Bullies can reach 100 millimetres. Koaro feed on a wide range of invertebrates, fish eggs, and sometimes snails and bullies. The giant kokopu feeds on terrestrial and aquatic invertebrates, and small fish. Bullies feed on benthic (bottom-dwelling) invertebrates and crustaceans. They possibly also play a role in lake ecology by influencing the structure of the zooplankton community.[139]

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[134] Dickinson, 'Report', pp 5, 6, op cit
[135] *Management Plan*, 2003, p 17; R R Strickland, 'Fish of the Wairoa River, Hawke's Bay', A Report to the Fuel Resource Group, Electricity Corporation of New Zealand, Hamilton, May 1996, p 50
[136] Interview Chris Ward, 10 September 2003
[137] Strickland, p 50
[138] Gallen and North, p 12
[139] Rowe and Graynoth, pp 18–23. See also Wendy Pond, 'The Land with All Woods and Water', Waitangi Tribunal Rangahaua Whanui Series, 1997, Chap 5 citing R M McDowell, *New Zealand Freshwater Fishes: A Natural History and Guide*, (Auckland: Heinemann Reed and MAF Publishing, 1990)

2.2.2. Fish as a Resource for Waikaremoana Maori

In her report, 'Te Urewera Waterways and Freshwater Fisheries', Suzanne Doig outlined the traditional and continuing importance to Maori of indigenous fish, waterfowl and edible plants, found in the rivers and streams of Te Urewera. She described their use of eels, inanga, the now extinct upokororo or grayling, kokopu, koaro, and ducks that were found in large numbers on Waikareiti.[140] I have found very little, and conflicting, information on how Waikaremoana Maori used their fish resources at the lakes, prior to the exotic introductions, in the manner of river fishing described by Doig. The fish biologist, R R Strickland, was told of a fishery based upon eels in Waikaremoana.[141] But, in an interview, Desmond Renata of Tuai said that no one ate the eels out of the lake because

> it was a spiritual thing was placed on that lake so it must have been all our dead that have died in that lake. So eels were never eaten from there … Even today we don't eat the eels out of there. We've still got that thing about our dead, many have died, you know thousands of people have died in that lake and we've never, because we believe the eels have eaten them'.[142]

Waikaremoana Maori netted considerable quantities of other fish in the past. Best wrote of their catching the maehe, as noted above. In 1944 the Rotorua conservator stated that he had learned from Mahaki Tapiki, whom he described as a very old Maori then passed away, that Maori used to net indigenous fish in Lake Waikaremoana 'in some quantities'. Between 1925 and 1929, the conservator said, Maori did not take indigenous fish and koura and he not think that Maori 'of the present day spend any time in securing this form of food.'[143]

Waikaremoana Maori use of indigenous fish resources is an important point. Their use was part of discussions in the 1940s on Crown compensation for the lakes. Waikaremoana Maori asked for an annual grant, as Maori of Rotorua and Taupo had received for use of their lakes, partly on account of the destruction of fish-feeding grounds due to the lowering of the lake. But the Crown responded that it 'is not seriously suggested that Waikaremoana was ever a significant source of food – in fact Waikaremoana contains only one minor species of fish'. H G R Mason, when he was Native Minister between 1943 and 1946, said that there might have been rightful basis for Rotorua and Taupo claims where the lakes

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[140] Doig, pp 15–31
[141] Strickland, p 50 citing a personal communication from Rose Pere
[142] Interview Desmond and Erina Renata, 10 September 2003
[143] Kean to Bennett, 25 May 1944, F W3129, IA 52/3, vol 1, ANZ Wellington

were a material source of food but he did not see that Waikaremoana Maori could claim any substantial amount.[144]

2.3. The Introduction of Trout Species to New Zealand

2.3.1. New Zealand Acclimatisation Societies

European settlers considered indigenous fish to be sparse and to lack the qualities of 'fighting' recreational fishes that they had been accustomed to in Britain. Therefore, in settler opinion, the native species needed to be augmented. While some individuals attempted introductions of desirable species like trout and salmon, most introduction and acclimatisation was carried out by provincial acclimatisation societies.[145] The societies were part of a worldwide movement and imperial policies in the nineteenth century through which plants and animals were transferred between colonies and European colonising powers. Transferrals to European countries were intended to enhance food supplies. This motivation also applied to New Zealand but, here, the acclimatisation societies became associated more with introductions of species for sport.[146]

The earliest societies in New Zealand formed in the 1860s. Many acclimatisers were influential men, including premiers, politicians and provincial superintendents, from the upper and middle classes in Britain for whom recreational fishing was important but who also wanted to prevent in New Zealand the exclusive, punitive game laws associated with the sport in Britain. In lists of early participants and committee members there are no obviously Maori names except that of Wi Hutana who was a Life Member of the Wellington Acclimatisation Society.[147]

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[144] 'Notes on Waikaremoana Claim', undated, MA 5/13/78 pt 1, box 36, W2459, ANZ Wellington

[145] R M McDowell, *Gamekeepers for the Nation: The Story of New Zealand's Acclimatisation Societies, 1861–1990*, (Christchurch: Canterbury University Press, 1994)

[146] Robin Hodge, 'Acclimatisation and Wildlife Management', in *Crown Laws, Policies, and Practices in Relation to Flora and Fauna, 1840–1912*, Cathy Marr, Robin Hodge, Ben White, Waitangi Tribunal Publications, 2001, pp 227–231

[147] Annual Report Wellington Acclimatisation Society 1896, p [2], Wellington Region Fish and Game Zealand, Palmerston North. See also society histories: The Society, *Ashburton Acclimatisation Society: 100 Years, 1886–1996*, ([Ashburton]: Ashburton Acclimatisation Society, 1986); W C R Sowman, *Meadow, Mountain, Forest and Stream: The Provincial History of the Nelson Acclimatisation Society, 1863–1968*, (Nelson: Nelson Acclimatisation Society, 1981); Clifton R Ashby, *The Centenary History of the Auckland Acclimatisation Society, 1867–1967*, ([Auckland]: n pub, [1967]); W A Sullivan, *Changing the Face of Eden: a History of the Auckland Acclimatisation Societies, 1861–1990,* (Auckland: Auckland/Waikato Fish and Game Councils, 1996) [as noted by Coombes]; R C Lamb, *Birds Beasts and Fishes: The First Hundred Years of the North Canterbury Acclimatisation Society*, (Christchurch: North Canterbury Acclimatisation Society, 1964); A H Stock, *History of the Southland Acclimatisation Society*, (Invercargill: Southland Acclimatisation Society, 1916); Joyce M Wellwood, *Hawke's Bay Acclimatisation Society Centenary 1868–1968*, (n p: H. B. Acclimatisation Society, 1968)

In October 1867, at the same time as protective legislation for salmon and trout was passed, the acclimatisation societies were given statutory recognition, legal authority, and some finance, to advance their work. The Animals Protection Act 1867 provided for the societies to register their formation with the Colonial Secretary and for this to be notified in the *New Zealand Gazette*. All animals 'turned out' into the wild by any registered society were vested in that society's chairman for up to two years. The Act provided for the revenue collected from licence fees and fines to be partly used for the salaries of rangers who were appointed by the society but warranted by the Governor. The acclimatisation society of the relevant district received the balance of the revenue.[148]

2.3.2. Acclimatisation Societies and Lakes Waikaremoana and Waikareiti

The societies whose actions and policies impacted upon the lakes were Hawke's Bay, Wairarapa, and Wellington. The Hawke's Bay Acclimatisation Society, one of whose members was apparently the first person to release trout at Waikaremoana, was formed in 1868.[149]

The Wellington Acclimatisation Society, which was to successfully release trout into Lake Waikaremoana, was formed in 1871. In 1885 it amalgamated with the Wairarapa Acclimatisation Society which had been organised three years previously. In that year, 1882, the Wairarapa society erected hatching boxes and obtained from the Canterbury Acclimatisation Society 10,000 brown trout ova, which members successfully hatched out and liberated.[150] While the Wairarapa and Wellington society was named for both societies for several years following the amalgamation, it had become the Wellington Acclimatisation Society by 1888.[151] The hatchery construction was enlarged and improved in 1885 and 1888.[152] Between mid-May and mid-August each year, trout were netted by the society's curator to strip them of their eggs. Ova were taken to the hatchery to develop and the trout released back into the river. The society not only released ova and fry into the waters of its own district but sold the fish to other societies.[153]

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[148] Animals Protection Act 1867, ss 3, 6, 32, 33
[149] Wellwood, p 43
[150] Wairarapa Acclimatisation Society, First Report, 1884, p [3]; Wellington F&G, Palmerston North
[151] Annual Reports from 1884 to 1888 of Wairarapa, Wellington and Wairarapa District, and Wellington Acclimatisation Societies, Wellington F&G, Palmerston North
[152] Annual Reports WAS, 1885 p [1] and 1888 p 9, Wellington F&G, Palmerston North
[153] See Annual Reports, WAS, Wellington F&G, Palmerston North

The other group involved in the area of the lakes was the Wairoa Acclimatisation Society. Its formation date is unknown but its rules were registered and gazetted in 1901.[154] It was de-registered in 1908.[155] Sometime later, possibly 1918, the Wairoa Rod and Gun Club was formed.[156] Members kept a watch on the lakes and lobbied the Government for land at Waikaremoana on which to build a cottage and wharf. The Tourist Department approved a site at Rosie Bay in 1921 at a nominal rental but the lease was not signed until 1928 because of discussions relating to the area of land and length of the lease.[157] By 1931, the cottage had not been built, the lease for five years had expired, and the Tourist Department declined to renew it.[158] The club may have built a boatshed on the chain reserve fronting the lease.[159] A 1929 map of the lake, hanging in the Department of Conservation's Visitor Centre at Aniwaniwa, shows the location of the lease.

Lakes Waikaremoana and Waikareiti are presumed to have been in the Hawke's Bay society's district until 1901.[160] They were then gazetted to come under the Wairoa Acclimatisation Society.[161] In 1907, the Rotorua Acclimatisation District was defined to partly include Whakatane, Wairoa and Hawke's Bay counties.[162] In the following year, the Rotorua Acclimatisation District was extended and appears to have encompassed the lakes by the inclusion of the whole of the county of Whakatane.[163] As already noted, the Wairoa Acclimatisation was de-registered in 1908. This was after the Tourist and Health Resorts Department had been gazetted as the acclimatisation authority for the Rotorua and Taupo lakes acclimatisation district in 1907.[164]

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[154] Rules of the Wairoa County Acclimatisation Society, 4 April 1901, *New Zealand Gazette*, 1901, no 36, p 870
[155] Registration of Wairoa Acclimatisation Society Cancelled, 9 May 1908, *New Zealand Gazette*, 1908, no 38, p 1386
[156] See 'Wairoa Rod and Gun Club: Chairman's Annual Report', *Wairoa Star*, 23 April 1928, TO 1, 45/41 vol 1, ANZ Wellington
[157] WR&GC to Min Lands, 28 September 1921; GM THR to Min THR, undated [1923]; and *Wairoa Star*, Annual Report, both in TO 1, 45/41 vol 1, ANZ Wellington
[158] GM TD to Min TD, 2 November 1931, TO 1, 45/41 vol 1, ANZ Wellington
[159] LS Gisborne to US Lands, 27 June 1929, LS 4/19 (closed 30/9/1938), DOC HO Wellington
[160] Walzl, p 61 citing CL 200/2, O'Malley, Supporting Papers, vol 3, p 852
[161] Wairoa Acclimatisation District Defined, 28 September 1901, *New Zealand Gazette*, 1901, no 87, p 1923
[162] Rotorua Acclimatisation District Defined, 18 January 1907, *New Zealand Gazette*, 1907, no 6, p 240
[163] Rotorua Acclimatisation District Extended, 9 May 1908, *New Zealand Gazette*, 1908, no 38, p 1382; Geoff Park, *Effective Exclusion? An Exploratory Overview of Crown Actions and Maori Responses Concerning the Indigenous Flora and Fauna, 1912–1983*, Waitangi Tribunal Publications, 2001, p 526
[164] Ross Galbreath, *Working for Wildlife: A History of the New Zealand Wildlife Service*, (Wellington: Bridget William Books Ltd and Historical Branch, Department of Internal Affairs, 1993), pp 7–9; Regulations for Trout-Fishing Rotorua Acclimatisation District, 21 January 1907, *New Zealand Gazette*, 1907, no 10, p 323

Apart from the changes at regional level, in 1907–08 a change also occurred at national level when the Marine Department took over the administration of freshwater, as well as marine, fisheries.[165] But in 1913, management of the Rotorua Acclimatisation District came under the Department of Internal Affairs.[166] Until 1931, local administration of the Rotorua Acclimatisation District was divided between the Tourist Department and the Department of Internal Affairs. In general, the Tourist Department administered fishing licences and law enforcement while Internal Affairs took over the practical aspects of managing the fisheries. This situation remained until 1931 when Internal Affairs gained sole authority.[167] In 1945, the department's functions were allocated to its Wildlife Division which became the Wildlife Service in 1953.[168] Internal Affairs remained the Crown agency in authority of the fishery when the lakes were gazetted as part of Urewera National Park in 1954. When the Department of Conservation was established in 1987 the Service's functions were reallocated between the Department of Conservation and the Eastern Region of Fish and Game New Zealand which is now the government agency responsible for managing freshwater sportsfish fisheries. The Conservation Department's head office has a

Memorandum of Understanding with the New Zealand Fish and Game Council but can refuse Fish and Game requests in the interest of maintaining intrinsic values under the National Parks Act 1980 and other Acts.[169] The Memorandum of Understanding's purpose is to provide for a framework for a continuing professional relationship between the council and the department at a national level and as the basis for the development of similar agreements at a regional level. Common long-term goals include the 'maintenance and enhancement of sports fish and game resources, while having due regard for indigenous species and natural values, as required by relevant statutes.' Both the department and the council have obligations to the Treaty of Waitangi. The department is required to interpret and administer the Conservation Act 1987 and to administer those Acts in the First Schedule so as to give effect to the principles of the Treaty. The council is required to interpret the Conservation Act and the Wildlife Act so as to give effect to the Treaty principles.[170]

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[165] Galbreath, p 8 citing Findlay to Millar, 8 May 1907 and attached memos, IA 47/7/3 (Burstall collection), Waihau Bay
[166] Galbreath, p 8 citing *New Zealand Gazette*, 1913, p 1791
[167] Galbreath, pp 8, 12
[168] Galbreath, p 41
[169] 'Changes to the Te Urewera National Park Management Plan as a Result of the Submissions and Hearings', undated, MTP 126, DOC Gisborne
[170] 'Memorandum of Understanding Between the Department of Conservation (Head Office) and the New Zealand Fish and Game Council, 26 September 1996, pp 8 (6.3), 6(j); Eastern F&G, Rotorua

The draft management plan of the Eastern Region Fish and Game states that tangata whenua share many common values with Fish and Game New Zealand with respect to sustainable management of natural resources, sustainable harvest of resources, and habitat maintenance and enhancement. Policies include the identification of opportunities to work together on areas of common interest and consultation with iwi on sports fish and game issues that may affect their interests.[171] With regard to trout in Waikaremoana and Waikareiti, I have not seen evidence of consultation between Waikaremoana Maori, Eastern Region Fish and Game, and the Department of Conservation.

2.3.3. Trout – Introduction and a Brief Natural History in New Zealand

The Northern Hemisphere species, brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*), were successfully introduced to New Zealand rivers and lakes from the 1860s and 1880s respectively. The brown trout, both sea and riverine varieties, arrived in New Zealand in 1967 as ova (fertilised eggs) from Tasmania. The ova came from trout which had been transported to that colony three years previously from Britain, as ova themselves packed in ice to keep temperatures down in order to retard egg development. The rainbow trout, also sea and riverine varieties, originally came from California as fry, young, or newly hatched fish. Both brown and rainbow trout have become well-established in New Zealand waters although no sea-migratory rainbows remain.[172]

The main requirements for trout are clean water that does not get warmer than about 20º Celsius in summer or 12º Celsius in winter as higher winter temperatures impair egg survival. They also need gravely bottomed streams for spawning, the production, and fertilisation of eggs. After the eggs have hatched, some of the young establish territories in fresh water while others move to the sea. Some brown trout populations become lake-based. They migrate up tributaries to breed. Rainbow trout mostly spawn in headwaters although others spawn along lake margins.

Trout are carnivores. They consume a wide variety of prey species that include other fish and their eggs, terrestrial insects that fall or alight on the water surface, snails, worms, koura, small frogs, and aquatic insects. Brown trout are more aggressive than rainbows.

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[171] 'Sports Fish and Game Bird Management Plan' draft, Eastern Region of Fish and Game New Zealand, pp 72, 73; Eastern F&G, Rotorua

[172] McDowell, *Gamekeepers*, pp 247–259

Although the two species coexist in some waterways, generally browns will displace rainbows from the best habitat in rivers.[173]

Today, Lake Waikaremoana is a wild fishery that contains both brown and rainbow trout. The only liberations that take place are tagged trout for monitoring purposes as part of the Datawatch programme. Lake Waikareiti is a wild rainbow trout fishery. The lakes are regarded highly by international anglers for the quality of brown trout around Waikaremoana's shoreline, and for the 'wilderness experience'.[174]

2.3.4. Protective Legislation for Trout

2.3.4(a). Salmon and Trout Act 1867

The initial legislation was the Salmon and Trout Act 1867. This Act empowered the Governor to make regulations for the preservation, propagation and fishing for these species. Regulations provided for the species preservation and protection on their importation as young fish or ova; and for prohibitions or restrictions on fishing in rivers or streams where the young had been placed. As the fish grew the Governor could impose or prescribe any conditions and restrictions in respect to salmon and trout fishing. These were:

- the times and seasons when the fish could be caught;
- prohibitions on the use of nets or other devices for taking [any other] fish in rivers or streams where the young had been deposited;
- prohibitions on any practice which, in the Governor's opinion, was detrimental to the fishes' increase;
- the times and places and the manner at and in which nets and other devices employed in taking the fish could be used and the form and mesh size of the nets;
- regulations to prevent the ingress of the fish through channels or sluices cut from the rivers or streams in which they had been released;
- prohibitions on placing lime or any substance deleterious to the fish from getting into the rivers or streams where the fish had been released;
- on any other matter which could relate to the management, protection, and taking of salmon and trout.
- the regulations were to be published in the *New Zealand Gazette*.[175]

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[173] Rowe and Graynoth, pp 14–16
[174] Sports Fish and Game Management Plan, draft, undated, pp 29,53, supplied by Rob Pitkethley, Eastern Region Fish and Game New Zealand, Rotorua

The Act allowed the Governor, by Order in Council published in the *Gazette*, to declare that in any part of the Colony, salmon and trout or other fish could be protected and come under the provisions of the Act.[176]

It allowed the superintendent of a province to appoint people to manage and protect the fishes, and to prevent and detect offences against the regulations. Those people were given the powers and authorities of a constable. They were empowered, at any time or season, to:

- pass along the banks of, or through, rivers, streams, and constructed waterways in areas to which they appointed; or, with a warrant from a Justice of the Peace to pass through a garden or house if that was the only access to the watercourse;
- enter boats and examine fishing gear;
- seize illegal nets and other devices when used illegally.[177]

Later sections of the Act covered the penalty for obstructing an officer, the apprehension of offenders, and the recovery of penalties.[178] The Act made no mention of licences for angling but R M McDowell stated that acclimatisation societies were selling licences and keeping the revenue from 'quite early times'.[179]

McDowell also argued that, while the 1867 Salmon and Trout Act made no reference to the acclimatisation societies or their role in introducing the fish, 'it gave all powers relating to trout and salmon to the Colonial Governor – to control the preservation and propagation of trout and salmon, and the taking of such fish'.[180]

2.3.4(b). Subsequent Legislation

In 1884, the river and stream provision of the Act was amended to include lakes.[181] Provisions of the Fish Protection Act 1877 and its successor, the Fisheries Conservation Act 1884, applied to all fish, whether indigenous or not, and to all waters, including salt and fresh waters. The 1877 Act allowed the Governor to grant anyone or group the exclusive right to use any fishery on payment of prescribed fees and subject to general regulations. It also prevents the purchase or sale of fish.[182]

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[175] Salmon and Trout Act 1867, ss 2, 3
[176] Salmon and Trout Act 1867, s 4
[177] Salmon and Trout Act 1867, ss 5, 6, 7
[178] Salmon and Trout Act 1867, ss 8, 9, 10
[179] McDowell, *Gamekeepers*, p 65
[180] McDowell, *Gamekeepers*, p 56
[181] Salmon and Trout Act 1867 Amendment Act 1884, s 2
[182] Fish Protection Act 1877, ss 4, 5

The 1877 Fish Protection Act contained a clause on the Treaty of Waitangi:

> Nothing in the Act contained shall be deemed to repeal, alter, or affect any of the provisions of the Treaty of Waitangi, or to take away, annul, or abridge any of the rights of the aboriginal natives to any fishery secured to them thereunder.[183]

Although this provision appears to have afforded broad protection to Maori fishing rights under the Treaty, more recently it has been considered 'window dressing' and that 'any Treaty-derived interest in fisheries was limited by the Government's right to make regulations governing the exploitation of fisheries'.[184]

The Fisheries Conservation Act 1884 was amended in 1902 to allow the Minister of Public Works to acquire any land for the establishment of fish breeding or fish-hatcheries, under the Public Works Act 1894. The Governor in Council could set apart streams, waters, or springs for the purpose of fish breeding or fish-hatcheries. Control of the lands could be transferred to, or vested in, any registered acclimatisation society. Any acclimatisation society was permitted to purchase land for camping grounds for anglers and build accommodation.[185] Other sections of the 1902 amendment Act related to land ownership and licences. Section 4 defined 'private waters' as water wholly within the property of one private owner. Fishing rights could not be sold or let. The occupier of the land could fish without paying the license fee.[186]

Section 10 of the 1902 amendment Act provided for the issue of licences and the payment to go to acclimatisation societies.[187] This clause was necessary because it was found in 1902 that sales of licences had been unlawful as the Fisheries Conservation Act 1884 did not make provision for an Order in Council issued in 1892 to permit the sales of angling licences. The Supreme Court advised that the Act gave no authority to require a licence to be taken out to fish, or to impose a fee for the licence. The Court decreed that regulations made under the Act were *ultra vires* and void.[188]

The 1903 amendment Act defined the trout-fishing season. Throughout the colony it was to begin on the first of October each year and conclude on the following thirtieth day of April,

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[183] Fish Protection Act 1877, s 8
[184] Ben White, *Inland Waterways: Lakes*, Waitangi Tribunal Rangahaua Whanui Series, 1998, p 20. He cites the 'window dressing' description in Waitangi Tribunal, *Report of the Waitangi Tribunal on the Muriwhenua Fishing Claim*, 1988, p 85
[185] Fisheries Conservation Act Amendment Act 1902, ss 2 (1-3), 3
[186] Fisheries Conservation Act Amendment Act 1902, ss 4, 5, 6
[187] Fisheries Conservation Act Amendment Act 1902, s 10
[188] McDowell, *Gamekeepers*, p 70

although an acclimatisation society could apply for restrictions to the season within a particular district.[189]

The 1903 amendment Act also allowed the Governor to make regulations for fishing licences. There was to be a uniform licence for trout throughout New Zealand. Licences for the whole season cost one pound for men and five shillings for women and boys at school or under 16. Half-season, single-river, and day licences were available only in any acclimatisation district at sums prescribed by the Governor. Under the same section, it was illegal to allow sheep-dip and flax-mill refuse, in addition to sawdust, sawmill refuse and lime into streams where trout existed or had been liberated. Mining debris was exempted as a pollutant.[190]

The 1906 amendment Act provided for prohibition or regulation of fish during the closed season and for its sale. It also provided for prohibition or regulation of the export of trout and other acclimatised fish. It allowed the Governor to make regulations for the erection and construction of fish-ladders or other means on ingress and egress in waters where trout had been, or might be, liberated, when dams and weirs were constructed. Provision was also made for the netting of trout at the mouth of any river or estuary or at Lake Ellesmere.[191]

In 1908 a concession was made to Te Arawa Maori. The amendment Act of that year allowed the Governor, on the recommendation of the Maori Council of the Arawa District, to issue fishing licences for trout within the district proclaimed under the Thermal Springs Districts Act 1908 at a rate not exceeding five shillings for the whole season. The number of licences was limited to 20 in any one season. The licence

[189] Fisheries Conservation Act Amendment Act 1903, s 2
[190] Fisheries Conservation Act Amendment Act 1903, s 3
[191] Fisheries Conservation Act Amendment Act 1906, s 3

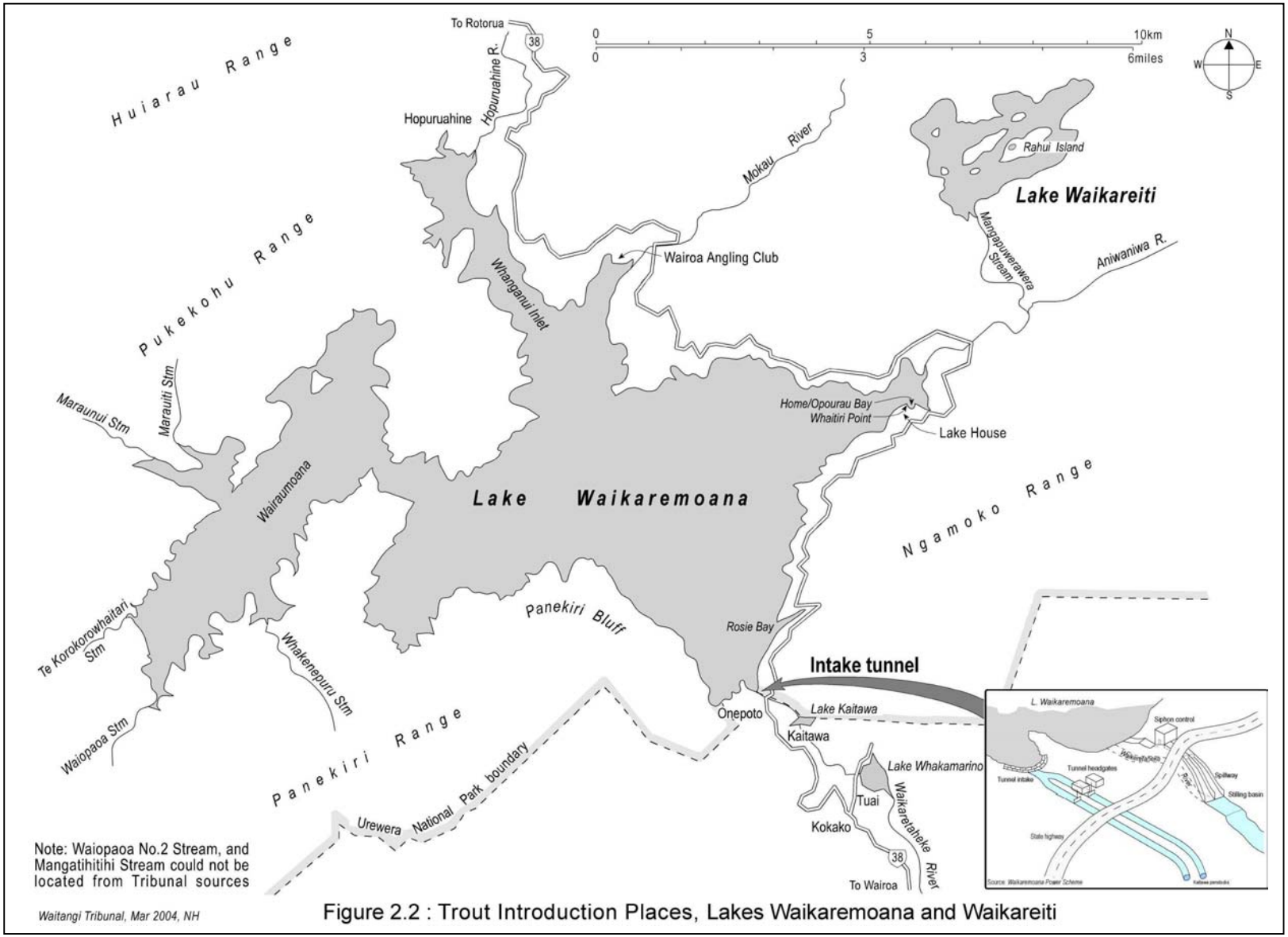

Figure 2.2 : Trout Introduction Places, Lakes Waikaremoana and Waikareiti

authorised the holder to fish for trout for himself and the members of his family and for no other purpose. If the licence-holder breached conditions, the licence could be cancelled and the holder not entitled to a fresh licence during the rest of the season.[192] This concession appears related to the Government's 1907

In 1908 the Fisheries Act consolidated all fisheries legislation. This, with amendments, remained until 1983.[193]

The Fisheries Act 1983 retained the main clauses relating to trout fishing: the licence requirement and regulations for fishing; the prohibition on buying or selling of trout; prohibitions on pollution; and the powers of fishery officers. Special regulations relating to freshwater fisheries could be made.[194]

2.4. Release of Trout into Waikaremoana and Waikareiti

2.4.1. First Releases

During 1883, after the Hawke's Bay Acclimatisation Society had obtained some 7000 English trout ova, one of their members, Mr Preece, took 750 of them to Waikaremoana.[195] These trout seemingly did not survive because, as Brad Coombes noted, they were in bad condition when they arrived in New Zealand having been inadequately transported from England.[196]

The first releases to survive were those liberated by F W Rutherford, the brother of the A J Rutherford, Chairman of the Wellington Acclimatisation Society. In September 1896, Rutherford transported a small consignment of fry to Lake Waikaremoana.[197] He wrote a report on the venture which his brother, A J Rutherford, sent to the Colonial Secretary.[198] The report was also given to the Wellington Acclimatisation Society's council meeting on

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[192] Fisheries Conservation Act Amendment Act 1908, s 2 (1–4)
[193] McDowell, *Gamekeepers*, p 59
[194] Fisheries Act 1983, part v, ss 68, 71, 69, 75; part vi, ss 76–83; part vii, s 90
[195] Wellwood, p 43
[196] Coombes, p 52 citing Wellwood, p 43
[197] Rutherford to Sec Wellington Manawatu Railway Cpy, 8 September 1896, WAS Letter Book February 1896 to October 1902, p 143, Wellington F&G Palmerston North
[198] Rutherford to Col Sec, 7 October 1896, WAS Letter Book February 1896 to October 1902, p 161, Wellington F&G Palmerston North

20 October 1896 but is not in the archive.[199] A brief report was given in the annual report of the society.[200]

On the centenary of Rutherford's liberation, the *Wairoa Star* published his report. Rutherford travelled with 12 cans of trout fry, both brown and rainbow. He got to within 3½ miles of the lake and then hired a sledge, chains, and collars from Arata at the nearby Maori pa, who let Rutherford have them free of charge. The next morning, Rutherford was given the use of the Government boat by the official described as being in charge of 'co-operative works' at the lake. Rutherford hired the two drivers of the wagons that had brought the fry from Wairoa, and two Maori at eight shillings a day each to crew the boat. They deposited brown trout fry in both branches of Whakenepuru Stream, Mangatihitihi Stream {not on topo map??}, Waiopaoa No 2 Stream, Te Korokoroowhaitari Stream, Maraunui Stream, and Marauiti Stream. They put the rainbow fry into Waiopaoa Stream. Rutherford suggested that Lake Waikareiti should be left until a road was made, as the land between the lakes was rough.[201]

In his letter to the Colonial Secretary, A J Rutherford said that the trout were sent 'in part fulfilment of promises made by the Hon the Premier in his letter embodied in 'The Urewera Native Reserve Act 1896'. Rutherford suggested liberating 'as many fish as possible this season' and continuing the work for the next few years. He considered the cost would not be large at perhaps £50 per year and stated that the society would 'willingly undertake the work, and carry it out efficiently and economically in the Public's interest'.[202]

In December 1896, A J Rutherford and Lake Ayson, then curator at the Masterton hatchery but later Inspector of Fisheries, transported a much larger consignment. Both the September and December releases totalled 100,000 brown trout.[203]

The releases involved a considerable operation. In December some 30 cans were put in a second-class government railway carriage in Masterton and taken to Wellington. The Wellington and Manawatu Railway Company hauled the carriage to Longburn where the

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[199] WAS council meeting 20 October 1896, Minute Book September 1884 to May 1899, p 384, Wellington F&G Palmerston North
[200] Copied in Marine Dept to Blane, 10 May 1944, F W3129 IA 52/3, vol 1, ANZ Wellington. The WAS annual reports for 1897 and 1898 are missing from the Wellington Fish and Game archive in Palmerston North
[201] 'Rutherford's Record', *Wairoa Star*, 10 September 1996; op cit
[202] Rutherford to Col Sec, 7 October 1896, Letter Book February 1896 to October 1902, Wellington F&G Palmerston North

government railway took it over again and transported it to Napier. From there the trout were taken by boat to Wairoa and presumably by horse and wagon again from there to the lake.[204]

The letters and reports do not say in which streams or lakes the second consignment of trout were released but some may have been taken to the northern edge of Waikaremoana as Rutherford requested the chief surveyor at Napier to arrange the conveyance of the trout across the lake after their arrival from Wairoa.[205] The initial releases had been in the south and west of the lake. Rutherford said nothing about whether Maori had been asked to help with the second release.

For both the September and the December trips, the Wellington and Manawatu Railway Company was asked to supply return passes for the Rutherfords and Ayson but it seems likely that the Government paid other associated expenses. One list of expenses over six days, which are probably F W Rutherford's costs, came to £10.10s. It included:

- a daily expense of £1 per day £6.6s. 0d.
- horse hire £1.0s. 0d.
- tolls and ferry charges 18s.0d.
- boatmen on lake, 4 at eight shillings each £1.12s.0d.
- express, Napier pier 4s.0d.
- incidentals 16s.0d.

During their December 1896 visit, A J Rutherford and Ayson evidently assessed the lakes and Urewera rivers for further trout liberations. In April 1897 Rutherford again wrote to the Colonial Secretary with proposals not only for Waikaremoana-Wairoa, but also for the eastern slopes of the Urewera country and the Taupo district. For Waikaremoana, he proposed that Ayson should go to the lake that month to build hatching boxes for trout ova at a place about half a mile from the lake that Ayson had reconnoitred the previous December. Ayson would then arrange for a local man to look after the trout ova and give him full instructions on how to treat them. The boxes were estimated to cost £30. Arrangements could then be made in the proper season to transport 'a large quantity' of

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[203] Note, WAS Letter Book February 1896 to October 1902, p 158, Wellington F&G Palmerston North
[204] Rutherford to Wellington and Manawatu Railway Company, 11 December 1896, WAS Letter Book February 1896 to October 1902, pp 178, 179, Wellington F&G Palmerston North
[205] Rutherford to chief surveyor Napier, undated, WAS Letter Book February 1896 to October 1902, p 180, Wellington F&G Palmerston North

trout ova on the point of hatching to the boxes. He then suggested that the officer in charge of 'Co-operative Works' and settlers could liberate the young fish in stream around the lakes and other rivers of the district. He advised that only rainbow trout should be released in Waikareiti, although he did not give a reason.[206]

Ayson must have constructed the hatching boxes because the details of his expenses for them, and his transport of mallard ducks to the lake, came to £30.1s.4d.[207] Of that sum, the materials for the hatching boxes appear to have amounted to £3.0s.8d although the writing is hard to decipher. There is nothing in the archive to indicate how large the boxes were, or their exact location beyond the phrase 'about half a mile' from the lake. They were moved in 1918 to the Tourist Department's reserve, which was closer to Lake House.[208]

In June 1897 Rutherford wrote again to the Colonial Secretary enclosing the account and saying that bad weather and the 'heavy state of the roads' added considerably to the expense. He also enclosed a report from Ayson on the hatching boxes but this is not in the Letter Book. Rutherford said that he intended to take a large consignment of trout ova to the lake in July. He passed on Ayson's recommendation for a track to be cut to Waikareiti to enable men to carry up rainbow trout fry to the lake.[209]

In 1898, 12,000 brown trout were released at Waikaremoana but there are no further details.[210]

In 1902, after its district had been defined the previous year, the Wairoa Acclimatisation Society bought 50,000 brown trout from the hatchery and £25 worth of trout fry in 1903 but there is no mention of the latter's no species or where both purchases were released.[211] Some might have been rainbow trout and released in Waikareiti, given the recommendations for a track to be made to it. The *Urewera National Park Management Plan Draft* in 2003 says that rainbow and/or brown trout were introduced into Waikareiti in 1918.[212] An earlier management plan stated that both rainbow and brown trout had been released into

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[206] Rutherford to Col Sec, 2 April 1897, WAS Letter Book February 1896 to October 1902, pp 231–234, Wellington F&G Palmerston North
[207] Ayson, Details of expenses…, 25 May 1897, WAS Letter Book February 1896 to October 1902, pp 266–267, F&G Palmerston North
[208] Walzl, p 268 citing Cobeldick's report, 27 September 1923, TO 45/41 vol 1, ANZ Wellington
[209] Rutherford to Col Sec, 5 June 1897, WAS Letter Book February 1896 to October 1902, p 263, Wellington F&G Palmerston North
[210] WAS Annual Report 1899, p 17, Wellington F&G Palmerston North
[211] WAS Annual Reports, 1903, p 18; 1904, p [18], Wellington F&G Palmerston North
[212] *Te Urewera National Park Management Plan Draft*, policy 2.9 Sports Fish and Non-Indigenous Game Birds

Waikareiti but, due to unfavourable spawning conditions, browns were unable to compete with rainbows.[213]

The total number of trout ova or fry released in these early years is impossible to enumerate because records were either not kept or have been lost. But by 1903 trout had become well established in Waikaremoana and were said to provide excellent fishing.[214]

2.4.2. Subsequent Releases

Once the lakes were under government, rather than acclimatisation society, management, there were further releases: two or three hundred trout ova were to sent to Waikaremoana for hatching and release in 1910.[215] Between 1914 and 1941, Internal Affairs noted that nearly four million ova and fry had been liberated at Waikaremoana.[216] In 1919 the Rotorua ranger, William Cobeldick released 500 rainbow trout in the lake on Te Rahui Island in Waikareiti.[217] By 1950, Dickinson considered that the lake had been stocked almost continuously although he warned that too much reliance could not be placed on earlier numbers because hatchery losses had to be taken into account.[218]

By 1964 the Lake Waikaremoana fishery was considered self-supporting by the Wildlife Department although this was not expected to continue due to increases in angling demand. The department proposed to stock the lakes initially as an investigative programme by releasing tagged fingerlings to determine growth rates and movements. The department considered that, in perhaps ten years' time, 'heavy stocking' might be required.[219] By 1998, the Waikaremoana Power Scheme report noted that Lake Waikaremoana was stocked annually with 5000 rainbow and 1000 brown yearling trout by the Eastern Region Fish and Game New Zealand. This was for population growth monitoring, the report said, as the fishery was considered to be self-sustaining.[220] But Fish and Game have not stocked Lake Waikaremoana with both rainbow and brown trout since 1998. It has no plans to

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[213] Department of Lands and Survey, *Urewera National Park Management Plan*, (Wellington: Department of Lands and Survey, 1970), p 9
[214] Walzl, p 93 citing Donne to Verity, 27 May 1903, TO 1 1903/67 (Box 42), ANZ Wellington
[215] Walzl, p 99 citing *Wairoa Guardian*, 19 August 1910, TO 1 45/38, ANZ Wellington
[216] Note for file, Ova and Fry Liberations Waikaremoana, undated, FW3129, IA 52/3 vol 1, ANZ Wellington. See also file notes and correspondence in IA 1 78/4 Fish Hatchery, ANZ Wellington
[217] Cobeldick in Hill to GM THR, 6 November 1919, TO 1, 45/38, ANZ Wellington
[218] Dickinson, 'Report on Lake Waikaremoana', visited 5–10 September 1950, IA 1, W2578, 78/37, ANZ Wellington
[219] Walzl, p 493 citing Burstall to UNPB, 4 June 1964, UNP 45 vol II, DOC Gisborne
[220] ECNZ 'Waikaremoana Power Scheme', p 52

recommence stocking in Waikaremoana as the wild fishery provides enough recruitment to produce many more fish than stocking the lake achieves.[221]

Releases into Lake Waikareiti are more uncertain. Despite a request from the Lake House's manager in the early 1930s, for more liberations, the response from Internal Affairs was cautious. The department placed 25,000 fry in 1931 and 20,000 ova in 1932. It considered numbers sufficient to keep Waikareiti stocked with good-condition trout until such time as the track to the lake was improved, more boats were available there, and consequently more anglers.[222] By 1964, the Conservator of Wildlife in Rotorua noted that, 'to the best of our knowledge no smelt has been introduced nor have brown trout … and would also recommend strongly against it' because the department hoped to maintain the status quo in the lake.[223] The lake has not been stocked since at least 1966.[224]

Although the total cost of introducing and maintaining the health of trout in the lakes cannot be quantified, it is evident that the Crown has expended a great deal of money on the project since 1896. Receipts from the sale of fishing licences for Waikaremoana came to approximately £900 between 1952 and 1958 and nearly $29,000 between 1960 and 1967.[225]

2.4. The Release of Trout and Maori

2.4.1. Initial Introductions

Other Urewera reports have examined the involvement of Waikaremoana Maori with the introduction of trout and other exotic faunal food species to the lakes in the years between 1894 and 1896.[226] Key episodes were the 1894 visit to Te Urewera by the Premier, Richard Seddon, and James Carroll, then MP for Waiapu and member of the Executive Council representing the native race; the September 1895 talks in Wellington between Tuhoe chiefs and the Crown; and the passage of the Urewera District Native Reserve Act 1896 which was passed on 12 October 1896. Fisheries and waterways were discussed several times. Both Seddon and Carroll remarked that fish were a source of food, and that Tuhoe asked for the streams to continue to flow as they did, and for the waters to remain unpolluted so that

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[221] Information supplied by Rob Pitkethley, Eastern Region Fish and Game New Zealand, Rotorua, 3 February 2003
[222] GM THR to US IA, 5 May 1933, F W3129, IA 52/3, vol 1; GM THR to Man, Lake House, 18 May 1933, TO 1, 45/41, vol 2; and 7 June 1934, TO 1, 45/38, all ANZ Wellington
[223] Burstall to UNPB, 4 June 1964, UNP 45 vol 1, DOC Gisborne
[224] Information supplied by Rob Pitkethley, 3 February 2003
[225] IA to DG LS, 18 July 1958, F W3129, IA 52/3 vol 2; Valuer General to DG LS, received 16 October 1968, MA 5/13/78 pt 4, box 36, W2459, ANZ Wellington
[226] Doig, pp 55–60, Coombes, pp 43–69, Walzl, pp 40–46

the fish might live. Seddon responded to the 1895 talks with a memorandum summarising the agreement reached with Tuhoe representatives. A Maori language version of the memorandum was signed by Tuhoe representatives before the UDNR Act was passed.[227] The memorandum was reproduced as the Second Schedule to the UDNR Act.

Seddon's letter made several points about trout. One was that Tuhoe had asked for arrangements to be made to stock the rivers with English fish, both to provide Tuhoe with additional sources of food, and as an additional tourist attraction. Seddon's response was that he would ask the curator of the Masterton fish-hatchery for trout to be supplied to Tuhoe. Then, Seddon continued,

> and I will also ask to be furnished with full directions to be furnished to you, so that you may know which are the most suitable places in which to place the fish in the rivers and lakes of your country, and how to look after them.[228]

Seddon's words imply that Maori would manage the trout introductions and subsequent fishery. An inference can therefore be made that Maori would own the fishery. Seddon said that full directions would be given to Tuhoe on the most suitable places to place the fish and on how to look after them. There was thus a statutory intention for Tuhoe, after appropriate instructions, to release, manage, and own the fishery.

But, as this section has shown, Waikaremoana Maori were minimally involved with trout releases which were accomplished by acclimatisation society members and Crown agencies. The first release, in which Maori assisted, was carried out before the Urewera District Native Reserve Bill had passed. Maori were involved fortuitously rather than by consultation. There is nothing in the archive to suggest that Maori were consulted about the first introductions and certainly nothing to suggest that they were provided with full instructions on trout releases and the subsequent management of a trout fishery. There is also nothing to show that they were told their fishing would be circumscribed by regulations for licences and seasons.

Today, on the aspect of Tuhoe's request for fish introductions, evidence from Waikaremoana Maori conflicts with Seddon's words. Several claimants state that the

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[227] Doig, pp 57–58 citing Seddon interview with Tuhoe, J 1 1897/1389 box 1, ANZ, fol 23 (SD, p 5); Binney, 'A History of the Urewera 1878–1912', supporting papers pp 50–51; NZPD, 1896, vol 96, pp 157, 166
[228] Urewera District Native Reserve Act 1896, Second Schedule

Crown released trout without prior permission of Maori owners.[229] Doig has noted that Tuhoe representatives told her that the fish were not introduced at Tuhoe's request.[230] The same point was made by Reay Paku, a representative of the Wairoa-Waikaremoana Maori Trust Board:

> No, that was just a tale that originated just to suit the purpose of the day. The truth of it is that this person had bought trout across over to Waikaremoana for release into the waters of Waikaremoana and one specific area called Waitangi where possibly the purest steel-head trout of today are to be found. The Maoris did not ask for trout, they didn't even know what trout.[231]

As both Doig and Coombes have argued, the introduction of trout to Te Urewera appears to have been as much about recreation for tourists as augmentation of food supplies for Tuhoe. Rutherford, in making the first trout releases, made the point in his letter to Seddon that they would be 'in the Public's interest'.

On the aspects of fishery management and ownership, claimants are right to contend that the Crown allowed them no role, contrary to the implication of Seddon's words.[232] As Doig has said, the Government failed to give effect to the Second Schedule by passing regulations, which section 24 of the UDNR Act allowed but did not require.[233]

2.4.2. Maori Response to Trout Introduction

At least some Waikaremoana Maori believed that Maori continued to own Lake Waikaremoana and had authority and rights in the fishery beyond restrictions imposed by regulations. In 1905 Reneti Hawera of Hopuruahine wrote to Carroll arguing that Maori owned the lake, and that therefore Maori had authority over who could fish there.[234] While he was prepared to allow the caretaker of Lake House to fish for the House, Hawera refused consent to other Pakeha. In letters of 11 April and 27 August 1905, he argued for this position by saying that the Government had been told of it by Hore Whare Rangi who had been a member of the Tuhoe chiefs who spoke to Seddon in Wellington.

Hawera was told by John Ward, manager of Lake House and an honorary ranger, that trout

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[229] See chapter 1 above, Urewera Statement of Issues, 28.2, 28.56 (derived from Wai 621: Wairoa-Waikaremoana Maori Trust Board)
[230] Doig, p 59, citing a personal communication with Tama Nikora, 28 April 2002
[231] Interview, Reay Paku, 11 November 2003
[232] Chapter 1 above, Wai 36#1.1(a) Consolidated Statement of Tuhoe Claims, 15 February 2000, pp 28–29; Urewera Statement of Issues, 28.8, 28.56, 28.58 (derived particularly from Wai 144: Panekiri Trust; Wai 621: Wairoa-Waikaremoana Maori Trust Board; Wai 795: Tuhoe Potiki; Wai 937: Nga Rauru o Nga Potiki; Wai 1013: Dr Rose Pere on behalf of various Waikaremoana Hapu)
[233] Doig, p 58

were not Maori fish. The response of the Acting Superintendent of the Department of Tourist and Health Resorts was equally unequivocal: 'your objection to Europeans catching fish in Lake Waikaremoana cannot be entertained'.[235] Nevertheless the official must have been a little concerned by what Hawera might do next, especially to tourism, because he wrote to Ward, 'I presume he is quite harmless, and not likely to interfere with either visitors, the launch of boats.'[236]

Waikaremoana Maori continued to exercise what they obviously believed were their rights to trout as the promised addition to their fish resource. Between 1906 and 1910 reports spoke of them catching trout throughout the year.[237] Pakeha fishermen from Wairoa were, of course, horrified by what they described as Maori 'poaching', 'decimating the breeding grounds', 'wholesale destruction of fish', and 'unsportsmanlike instincts'.[238] But, from the Waikaremoana Maori viewpoint, they were merely using what had been promised them seemingly without restrictive regulations.

In view of the fact that, in 1947, Lake Waikaremoana was ruled to be the property of 354 Maori owners, and Maori remained in possession of reserved areas of land on the lake's edge, it is arguable that Waikaremoana Maori should have been able to fish without paying the licence. Under section 4 of the Fisheries Conservation Act Amendment Act 1902 the occupier of the land, which included 'private waters', could fish without paying the licence fee. However, the qualifying definition of 'private waters', as water wholly within the property of one private owner, may have necessitated a licence.[239] Certainly Waikaremoana Maori argued that their land entitled them to fish. 'Uriweras (sic) claim the other side of the Lake and say they can kill fish all the year round'.[240]

The Wairoa fishermen also complained that prosecutions were not taken against 'poaching' Waikaremoana Maori because Carroll would not 'sanction proceedings against his own

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[234] Walzl, pp 93–98, citing correspondence between 11 April and 1 September 1905 in TO 1 45/38, ANZ Wellington. Hawera is also given as Hawira.
[235] Walzl, pp 94, 97 citing Ward to Act Sup THR, 11 April 1905 and Act Sup THR to Hawira, 2 June 1905, TO 1 45/38, ANZ Wellington
[236] Walzl, p 98 citing Donne to Ward, 1 September 1905, TO 1 45/38, ANZ Wellington
[237] This section comes from Walzl, pp 99–100
[238] Walzl, pp 99–100, citing Neale to Donne, 5 March 1906 and editorial *Wairoa Guardian*, 19 August 1910, TO 1 45/38, ANZ Wellington. Also Neale to Robieson, 15 April 1910, TO 1, 42/4 pt 2, ANZ Wellington
[239] White, p 156; Fisheries Conservation Act Amendment Act 1902, s 4
[240] Walzl, p 99 citing Neale to Donne, 5 March 1906, TO 1 45/38, ANZ Wellington

kinsmen.'[241] In an undated memo, the Minister for Tourist and Health Resorts asked Carroll to use his influence to have the poaching stopped, as the Minister did not think it advisable to prosecute if poaching could be stopped by other means. The Minister said he understood that hardship might result from prosecutions when Maori relied on birds and fish for a living.[242]

By this time, 10 to 15 years after the first successful release of trout, and subsequent releases, supplies of indigenous fish in the lake would themselves have been greatly reduced by the voracious appetite of trout species. The maehe or koaro may well have become rare by then. Other indigenous fish may also have been threatened. Far from augmenting indigenous fish stocks, trout might virtually have replaced them; thus restricting Waikaremoana rights to utilise their resources, as claimants state.[243]

Few acclimatisers of the time would have had an appreciation of lake ecology and the linkages between predator and prey, as such studies had only commenced overseas in the 1870s and 1880s.[244] Ecological interactions were studied in New Zealand from the 1890s by scientists and observers like Leonard Cockayne and W H Guthrie-Smith on his station, Tutira. Lake Ayson called for academic studies in 1913.[245] If acclimatisers noticed that indigenous fish were becoming scarce, they would probably have attributed this to Darwinist ideas of competitive struggle and Victorian displacement theories on the superiority of European species.[246]

Following their short-lived participation with the fish hatchery management in the 1920s, which is discussed below, Waikaremoana Maori appear to have had little involvement with trout fishing operations. After Urewera National Park was proclaimed in 1954, a group of people, who were interested in the development and welfare of the park, constituted themselves as Tuhoe (Urewera) National Park Association. This association had one member, M Temara, with a Maori name. At a meeting in November 1957, they discussed and made recommendations on a number of aspects relating to the park. On fishing, they argued that this would be an added tourist attraction and source of revenue but they wanted

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[241] Walzl, p 100 citing *Wairoa Guardian*, 19 August 1910, TO 1 45/38, ANZ Wellington
[242] Min THR to Carroll, undated, TO 1, 45/35 vol 1, ANZ Wellington
[243] Chapter 1 above, Urewera Statement of Issues, 28.59, 28.60 (derived particularly from Wai 144: Panekiri Trust)
[244] Peter J Bowler, *The Norton History of the Environmental Sciences*, (New York, London: W W Norton & Company, 1992), p 368
[245] See below

arrangements made for adequate supervision of fishing parties and for the restocking of streams.[247]

2.5. Management of the Fisheries

There were two parts to the management of the fisheries; the regulatory regime under which fishers could catch fish and the practical aspects relating to the growth and health of the fish.

2.5.1. Regulatory Regime

Statutory control of trout by the Crown began thirty years before the fish were released into Lakes Waikaremoana and Waikareiti. Consequently the framework for regulations regarding their taking - the open season, fishing equipment, and licence fee - was well established. In the early years of the twentieth century several sets of regulations were issued relating to the catching of fish. After the passing of the 1902 Fisheries Conservation Amendment Act to legalise the licence fee, regulations were published in July 1903.[248]

The 1903 amendment Act defined the trout-fishing season and licence fees. Throughout the colony, the open season was to begin on the first of October each year and conclude on the following thirtieth day of April, although an acclimatisation society could apply for restrictions to the season within a particular district.[249] Regulations, which allowed for trout fishing from the first October 1903 to 15 April 1904, and the licence fees, were gazetted in September 1903.[250]

In 1904, regulations were issued on the use of 'unsportsmanlike' devices for catching trout. Every trout not exceeding nine inches in length from nose to tip of tail was to be returned alive to the water.[251] Regulations on pollutants were also published in March 1904.[252]

Regulations of direct relevance to Waikaremoana and Waikareiti were published in 1907 when the Governor was empowered in any year to extend the open season for trout fishing

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[246] Ross Galbreath, *Walter Buller: The Reluctant Conservationist*, (Wellington: GP Books, 1989), p 81
[247] Tuhoe (Urewera) National Park Ass to Greig, Chair NPA, recommendations from meeting Ruatahuna 12 November 1957, LS 4/19 (closed 12/8/60), DOC HO Wellington
[248] Order in Council under Fisheries Conservation Acts: Fees and Fines, 1903, *New Zealand Gazette*, 20 July 1903, no 59, p 1623
[249] Fisheries Conservation Act Amendment Act 1903, s 2
[250] Order in Council making Regulations under Fisheries Conservation Acts: Fishing Season and License Fees, 14 September 1903, *New Zealand Gazette*, 1903, no 73, p 2048
[251] Order in Council General Regulations under Fisheries Conservation Acts: Fishing Season, License Fees etc, 5 September 1904, *New Zealand Gazette*, 1904, no 75, p 2157

in the Rotorua Acclimatisation District, which was soon to include the lakes, to 31 May.[253] Regulations were published in August 1907 permitting the issue of licences in the Rotorua district by the General Manager of the Tourist and Health Department. A new regulation restricted daily catches by one person to 20 trout or more than 20 pounds weight.[254]

Regulations published in November 1909 declared the boundaries of the Rotorua Acclimatisation District in the first schedule and regulations for fishing in the district.[255] The regulations were revoked but reissued in 1914.[256]

Today some of the above restrictions no longer apply or have been amended. Trout can be fished throughout the year at Waikaremoana and Waikareiti, except for springs, streams, and their tributaries that flow into Waikareiti. Licences can be bought for the whole season, winter, the week, or for 24 hours in the categories of adult, young adult, and junior. For an adult, the whole season licence fee is $86; winter, $52; week, $34; and day, $17. The minimum length for trout at both lakes is 350 millimetres.[257]

Regulations, as claimants contend, were policed by honorary rangers initially appointed under the Fisheries Conservation Act 1884. William Mayo of Waikaremoana was appointed in 1903; John Patrick Ward of Waikaremoana in 1904; Roland Edgar Neale of Waikaremoana in 1905; and Henry Grout of Waikaremoana in 1906. These names were listed by A P Burke of the Marine Department in 1944. He observed that he presumed no objection had been raised by Waikaremoana Maori to these men being appointed to the duties involved.[258]

Mayo was the first manager of the Tourist Department's Lake House.[259] Ward was the next manager. Neale was probably the son of W A Neale who wrote to the department's

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[252] Order in Council declaring Additional Regulations under The Fisheries Conservation Act 1884 and Amendments, 31 March 1904, *New Zealand Gazette*, 1904, no 27, p 933
[253] Fisheries Conservation Act Amendment Act 1907, s 2
[254] Order in Council General Regulations under Fisheries Conservation Acts, 3 August 1907, *New Zealand Gazette*, no 76, p 2685
[255] Order in Council Regulations for Trout-fishing, Rotorua Acclimatisation District, 22 November 1909, *New Zealand Gazette*, 1909, no 98, pp 3029–3030
[256] Order in Council Regulations for Trout-fishing , Rotorua Acclimatisation District, 27 October 1914, *New Zealand Gazette*, 1914, no 114, p 3876
[257] Fish and Game New Zealand (http://fishandgame.org.nz/forms/General_licence.asp, 19 November 2003); (http://newzealandfishing.com/fishing_regulations/eastern_district.htm, 19 November 2003
[258] Burke to Blain, 29 April 1944, F W3129, IA 52/3 vol 1, ANZ Wellington
[259] Kean to Bennett, 4 August 1932, F W3129, IA 52/3 vol 1, ANZ Wellington

superintendent, T E Donne, in 1905 protesting against Maori 'poaching' of trout, which was discussed above. After the Crown took over control of the fishery in 1907–08, rangers and Crown officers made professional visits to the lake.

2.5.2. Fishery Management

For most of the period of this report, fishery management at Lakes Waikaremoana and Waikareiti has concentrated on the protection of trout species, as claimants contend.[260] This practise, which also occurred in other lakes, was partly because little was known about indigenous fish and partly because the main fisheries, based on rainbow and brown trout, were managed in the interests of recreation and tourism. Indigenous fish were seen only in the context as food for trout, for example when smelt were introduced to Waikaremoana.[261] Today, 'there is a growing interest in the conservation of native fish populations. These are valued for their contribution to biodiversity, and in many cases are now reduced or threatened.'[262] The *Te Urewera National Park Management Plan* in 2003 acknowledged a paucity of data relating to native freshwater fish fauna in the park. It is known, however, that there are landlocked populations of koaro in the small lakes near Waikareiti that may possibly be genetically distinct from other koaro populations within the park.[263]

The fishery at the lakes has been managed to provide sufficient stocks of well-formed, healthy trout. The main management practice in the past was the frequent release of ova and fry into the lakes. The following section examines other practices. It includes the destruction of shags, the building of the hatchery, inspections and scientific management, and the Waikaremoana fish barrier at the water intake for the power stations

2.5.2(a). Shags

In order to protect the trout investment, colonies of black shags (*Phalacrocorax carbo novaehollandiae*) were shot to limit numbers taking trout. The taking of a gun onto the lake was problematic because the lake and an area surrounding it had been declared a reserve for native and imported game in 1911 under the Animals Protection and Game Act 1921-22.[264] Under section 6 of the Act firearms were not permitted in sanctuaries and the Waikaremoana reserve qualified as a sanctuary. But the prohibition could be overcome by

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[260] Chapter 1, above, Wai 36#1.1(a) Consolidated Statement of Tuhoe Claims, 15 Febrary 2000, p 27
[261] Burstall to UNPB, 4 June 1964, UNP 45 vol 1, DOC Gisborne
[262] Rowe and Graynoth, p 3
[263] East Coast Hawke's Bay Conservancy, *Te Urewera National Park Management Plan*, (Gisborne: Department of Conservation, 2003), p 17

issuing a warrant under section 32 of the Act with conditions prescribed in order to comply with section 6.[265] Shooting black shags, for which bounties were paid, was a common practice throughout New Zealand. It was deplored by conservationists.[266] But the practice was supported by acclimatisation society members and anglers.[267] As Coombes has observed, black shags called kawau by Maori, could be revered by Maori for their guardian-like activities, while the young of other shag colonies were consumed as a food source.[268]

2.5.2(b). The Waikaremoana Hatchery

In the early years, the hatchery was an important tool for establishing the fishery as it allowed more flexibility in the timing of the release of trout fry. A report by Cobeldick in 1920 shows how environmental factors affected the collection of ova and therefore the need for flexibility.

> The eggs I stripped at the Mokau Falls this year were all rainbow ova. The brown (Fario) had all finished spawning by the end of August and I only got about one dozen spent kelts [a fish after spawning] Fario in the trout trap. The ova was much later than usual in eyeing, owing to the late run of rainbow fish to the spawning redds, but came on very rapidly as the water rose from 38 degrees to 40 degrees. It was as low as 34 degrees in the heavy snow falls.[269]

As already mentioned, Lake Ayson built hatching boxes at a location about half a mile from the lake in 1897. They were moved in 1918 to the Tourist Department's own reserve by Cobeldick, the Rotorua ranger.[270] In 1919 Cobeldick spent three months at the lakes setting up 10 new hatching troughs and other pieces of equipment and releasing fry.[271] In 1920, when he returned, he found the building had been broken into but he repaired it and made it habitable for a ranger to stay in. Seemingly because of the damage, the Tourist Department agent in Rotorua requested the department not to allow Lake House the use of the building.[272] On his visit in 1922 Cobeldick again found the hatchery had been broken into

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[264] Regulations for Deer-Shooting, Whakatane and Wairoa, 8 April 1911, *New Zealand Gazette*, 13 April 1911, no 30, p 1280
[265] GM THR to US IA, 14 September 1922, F W3129, IA 52/3 vol 1; Frame, Monthly Report, 30 November 1938, IA 1, 51/3, ANZ Wellington
[266] Sanderson, Forest and Bird, to GM T&P, 14 June 1940, TO 1, 45/35 vol 1, ANZ Wellington
[267] See H G Williams, *The Shag Menace*, (Dunedin: H. G. Williams, 1945)
[268] Coombes, pp 215–218 citing Elsdon Best, *Forest Lore of the Maori*, (Wellington: Government Printer, 1942), p 342
[269] Cobeldick, in Hill to GM THR, 19 October 1920, TO 1, 45/38, ANZ Wellington
[270] Cobeldick Report, 27 September 1923, TO 1, 45/41 vol 1, ANZ Wellington
[271] Cobeldick, in Hill to GM THR, 6 November 1919, TO 1, 45/38, ANZ Wellington
[272] Hill to GM THR, 15 December 1920, TO 1, 45/38, ANZ Wellington

and the engine of the outboard motorboat full of water and rust. George Ormond, President of the Wairoa Rod and Gun Club, lent assistance.[273]

This hatchery served for several years but in 1926 was rebuilt at a new site, an operation which involved local Maori and which is now part of a claim.[274] The Assistant Government Ranger at the time, A Kean, apparently asked the chief, Mahaki, to use land at Waimako Pa [Kopani 2] for hatching boxes. Mahaki was agreeable. While the hatching of the ova was in progress, he kept people from interfering with the boxes and saw that no blockage occurred in the water supply during Kean's absence.[275] The Wairoa Rod and Gun Club suggested the Tourist and Health Resorts Department make a grant of £5 to Mahaki and the Minister agreed to this payment.[276]

Kean then requested the department to erect a small permanent hatchery there in the coming season, 1927. Mahaki was agreeable to this. Because of complaints that the lake was not sufficiently stocked with trout, Kean intended to use the hatchery to release a large amount of fry. As Walzl has noted the Minister was concerned that the hatchery was not on Crown land and suggested it should be movable. It was therefore built on skids by the Public Works Department for £50.[277]

The Public Works Department did not follow Kean's plan for making a small dam to provide water for the hatchery. The dam was subsequently found to be in constant need of repair some of which was done by Mahaki. In 1929 Kean suggested improvements should be made to the water supply by connecting a wider pipe from a spring near the dam.[278] Public Works estimated the cost for replacing a wider pipe from dam to hatchery and dam repairs at £22 and a new pipe from the spring to the hatchery at £33.[279] Kean thought that, because the estimates were so high, repairs to the dam would suffice for the present. But if 400,000 ova were to be handled each season, the wider pipe would be then needed. The only other cost would be an extension to the shed as he had sufficient troughs.[280] Approval

[273] Cobeldick, 31 August 1922, TO 1, 45/38, ANZ Wellington
[274] Urewera Statement of Issues, 28.57
[275] Kean to GM THR, 12 March 1927, TO 1, 45/38, ANZ Wellington
[276] Correspondence between GM and Min THR, 18, 22 March 1927, TO 1, 45/38, ANZ Wellington
[277] Walzl, p 270 citing correspondence May 1927, TO 1, 45/38, ANZ Wellington
[278] Kean to GM THR, 26 May 1929, TO 1, 45/38, ANZ Wellington
[279] Gregory to Kean, 10 June 1929, TO 1, 45/38, ANZ Wellington
[280] Kean to GM THR, 12 June 1929, TO 1, 45/38, ANZ Wellington

was given for £3 to be spent on the dam repairs while the wider pipe could be brought up later if necessary.[281]

Whether the dam repairs were done or not is unknown. But, in November 1929, the Tourist and Health Resorts Department decided to remove the hatchery building altogether from Waimako Pa to a place on government reserve land near to the location of the first hatchery. The department could not use the old site as that hatchery had been turned into a cottage for the launchmaster at the lake, R Whaitiri. The lessee of that part of the reserve, Mr Gray, had no objection. The estimated cost for re-erection was £24.18s.6d. The reasons given for the removal were partly environmental as heavy rain and floodwater from the spring flowed into the hatchery. In addition, the wooden dam was on porous clay soil.[282]

The reasons for the hatchery removal were also partly to do with Maori. Ranger Cobeldick noted 'trouble' and 'interference' by natives. Specifically, he mentioned that, without a fence to protect the hatchery building, Maori pigs were 'rooting round and rubbing all the outside troughs which had the young trout in'.[283] But behind these statements lay the refusal by the department to pay Maori rent for the use of their land and water, or to agree to a quid pro quo in the form of free fishing licences.

In October 1929, the month before the department's decision, a group of ten Maori, who were shareholders of Kopani 2 Waimako Pa, wrote to the District Manager in Rotorua about a rental. Mahaki Tapiki, Wiremu Matamua, Wi Mei, Teau Tahaka, Pare Te Kaho, Rawinia Mahaki, Kaho Hapi, Claude Kaho, Motuoruhi Whakamoe, and Karauna Hurae asked that the department either grant five free fishing licences for the use of water, or pay an annual rental of £10. The writers argued that for the first two of three years, when the department was getting full benefit from the hatchery in liberating fish, the department received revenues in fishing licence fees. The Maori writers asked for the rent as 'a matter of fairness'.[284] The department understood that Mahaki did not approve of the request.[285]

When Kean and Mahaki had first agreed to siting the hatchery at Waimako Pa, Kean had suggested to the General Manager in Rotorua that the owners should be paid a small sum

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[281] GM THR to Kean, 17 June 1929, TO 1, 45/38, ANZ Wellington
[282] Cobeldick to Act Dis Man THR, 25, 26 November 1929, TO 1, 45/38, ANZ Wellington
[283] Cobeldick to Act Dis Man THR, 25, 26 November 1929, TO 1, 45/38, ANZ Wellington
[284] Tapaki et al to Hill, 11 October 1929, TO 1, 45/38, ANZ Wellington. Walzl cites the letter in full, p 272
[285] Hill to Act Gen Man, 23 October 1929, TO 1, 45/38, ANZ Wellington

annually for the use of land and water.[286] But the General Manager decided that such a payment should be left in the meantime because 'we do not know where a thing like that might end, especially as there might be several natives with a communal interest in the property'.[287]

On the request from the ten Maori, the District Manager in Rotorua compared the costs of the two alternatives. If, he said, the five free licences could be given on the same basis of one shilling each, as were other native licences to Arawa and Taupo Maori, 'there need be no hesitation as to which is the more economical method of settlement.' He said that, if free licences were granted, an amendment to Part 11 of the Fisheries Act would be necessary. He also said that he assumed that some form of quid pro quo had been paid to the Maori for consent and that the 'present movement would seem to be an additional effort to get something extra'.[288] But, as has been shown, the only payment made was £5 to Mahaki for his help with the temporary hatchery, not the permanent building and water use. The request for rental payment of free fishing licences must have been declined as the hatchery buildings were moved from Waimako Pa.

Today, the department's refusal to grant the free licences, given the Arawa precedent, appears unjust and against the spirit of Seddon's letter. The District Manager's comment on Waimako Pa Maori getting 'something extra' is particularly mean-spirited when that is just what the department received from Maori for the use of land and water for three years. This is especially so in light of the General Manager's 1927 comment when proposals to permanently establish the hatchery were being considered that the department had showed 'a large profit on our acclimatisation vote' in 1926.[289] Given the acknowledged poverty of food sources in the area, and Seddon's promises, it would seem the least the department could have done was to agree to the five free fishing licences. Apparently a request in 1932 by Waipatu Winitana on behalf of Ngati Ruapani for 50 free trout licences was also refused.[290]

In 1938 the Department of Internal Affairs constructed a new hatchery at Tuai because the Crown's tenant, on whose land the previous hatchery was built, pressed for its removal

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[286] Kean to GM THR, 22 May 1927, TO 1, 45/38, ANZ Wellington
[287] Wilson to Kean, 28 May 1927, TO 1, 45/38, ANZ Wellington
[288] Hill to Act GM, 11 October 1929, TO 1, 45/38, ANZ Wellington. See part 1.2.4(b) Subsequent Legislation, above
[289] GM to Min THR, 13 May 1927, TO 1, 45/38, ANZ Wellington

because it interfered with the water for his stock.[291] It closed temporarily during the Second World War.[292] By 1946, additions were proposed even though the hatchery was in the centre of hydro activities at Kaitawa. The hydro works had not been considered a problem when the hatchery was built.[293] Kean, by then the Rotorua Conservator of Fish and Game, considered it could be moved if necessary but he wanted to enlarge it to cope with 600,000 ova and fry. The Waikaremoana fishing district had become very popular. Anglers were taking large numbers of fish annually and Kean wanted to increase the supply of fry to lakes and streams.[294] However the department decided in 1947 to dismantle it and remove hatchery operations for the lakes to Ngongotaha.[295]

2.5.2(c). Reports, Investigations, and Scientific Surveys

Rangers wrote regular reports, which were summarised in the Tourist Department's AJHR annual reports, on the fishery at Lakes Waikaremoana and Waikareiti. The ranger reports generally consisted of brief notes about the quantity and quality of trout, lake levels and weather conditions. In August 1922, for example, Ranger Cobeldick noted the extreme height of the lake which made spawning difficult because water covered the usual gravely spawning redds. The previous year, he said, the lake had been 14 feet below normal.[296] In June 1936, Ranger Frame noted that there were 'quite a number of fish all along the lake shore and some very nice fish are to be seen in places … [and] spawning along the shores at Waikareiti' He added that the weather had been 'very cold and changeable'.[297] The Tourist Department annual report in 1947 commented that Lake Waikaremoana had reached an abnormal low of 20 feet below normal level following two very dry summers. 'The low level has also adversely affected angling.'[298] But, on occasion, more indepth reports and scientific investigations were conducted by government officers into the trout species and their environments, often after lobbying by Wairoa angling clubs.

<u>1910s, Lake Ayson</u>

The first of these was in 1919–13 when Ayson, then Chief Inspector of Fisheries for the Marine Department, made recommendations for the organisation and administration of New

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[290] Walzl, p 274 citing O'Malley, Supporting Papers, Vol 3, p 706
[291] Memo to Min IA, 15 July 1937 and Heenan to Min IA, 25 January 1938, IA 1, 78/4, ANZ Wellington. See also Lands Department correspondence between 1930 and 1938, LS 1, 6/485, ANZ Wellington
[292] Heenan to Min IA, 30 July 1940, IA 1, 80/19; US IA to Min IA, 20 May 1943, IA 1, 78/4 Fish Hatchery, ANZ Wellington
[293] Kean to US IA, 2 March 1937, IA 1, 78/4 Fish Hatchery, ANZ Wellington
[294] Kean to US IA, 26 February 1946, IA 1, 78/4 Fish Hatchery, ANZ Wellington
[295] McNamara to US IA, 20 November 1947, IA 1, 78/4 Fish Hatchery, ANZ Wellington
[296] Cobeldick, 31 August 1922, TO 1, 45/38, ANZ Wellington
[297] Frame to Conservator, 30 June 1936, F W3129 IA 52/3 vol 1, ANZ Wellington
[298] 'Annual Report of the Department of Tourist and Health Resorts', AJHR, 1947, H-2, p 7

Zealand fisheries. Some of his recommendations, regarding ecological analysis by qualified biologists, were eventually to be effected in the lakes. Ayson argued that New Zealand had not given sufficient attention to the important fishing industry which was, he said, a most important food-supply for its people, a source of employment, and an industry capable of developing an export trade. With regard to trout, he commented on the anxiety of acclimatisation societies that trout had decreased and deteriorated.[299]

The lakes of the Rotorua district, Ayson considered, had been overstocked with rainbow trout 'for a good many years'. He argued that hundred of tons of the best-quality trout should have been taken out 'as a welcome addition to the food-supply of the people'. Such a thinning-out, he argued, would keep the lakes in a healthy condition.[300] These recommendations were carried out at Lake Rotorua, with good fish sent either smoked or fresh for sale to city markets, so that by 1918 the condition of Lake Rotorua trout had improved.[301] But it is not clear whether Ayson included the Waikaremoana lakes in lakes of the Rotorua district.

1920s, William Cobeldick

Some of Ayson's suggestions were carried out at Waikaremoana from about 1920 by Ranger William Cobeldick. Complaints were made in 1922 or 1923 by the Wairoa Rod and Gun Club to the Minister of THR about a perceived deterioration of the quality and quantity of trout in the lakes.[302] This led to a substantial report by Cobeldick that not only indicated his annual observations of trout behaviour and measurements of the lake environment but also made further recommendations for ongoing scientific studies. Cobeldick considered that the 'supposed deterioration of the trout fishing' should really be described as 'an apparent diminution of the number of trout visible or that should be visible'.[303] Cobeldick had taken specimen scales for age examination from a small number of both brown and rainbow trout and marked the fish with wire tags. From his observations and experiments, he believed that trout at Waikaremoana did not spawn until they were four or five years old, contrary to the general opinion that trout spawned each year from two years of age. He believed this was because the coldness of the waters retarded development compared to

[299] L F Ayson, 'Report on Fisheries of NZ with Recommendation for Organisation and Administration', AJHR, 1913, H-15B, p 10
[300] Ayson, 1913, p 9
[301] Galbreath, *Wildlife*, p 10
[302] Cobeldick, 27 September 1923, TO 1, 45/41, ANZ Wellington
[303] Cobeldick, 27 September 1923, p 3, TO 1, 45/41, vol 1, ANZ Wellington

trout development in the Rotorua thermal lakes that were at a lower altitude and consequently lower temperature.[304]

Cobeldick had observed that fry and fingerlings lived for one or two years in the lake streams where food was plentiful. In their second or third year the fish migrated to the lake waters where their food supplies of koura, kakahi, tou-tou, inanga and other forms that might, or might not, be plentiful according to breeding conditions. Therefore those trout seen in the lake comprised only a portion of the total trout.[305] He suggested increasing the supply of koura from Lake Rotorua and emphasised, too, the need for ongoing scientific surveys.[306] His recommendation for a new supply of koura may have been followed up as the general manager of the department certainly considered the introduction.[307]

Cobeldick also recommended recording, for future scientific reference, the annual growth of rainbow fry that he had released in the small lake on Rahui Island in Waikareiti in 1919. The lake was, he said, 'absolutely virgin water, and the fish will have to depend on the abundant insect life for their main sustenance'.[308] Whether he did so is unknown.

1950, P Dickinson

In 1946 the level of Lake Waikaremoana was lowered by five metres to help manage the hydro-electric power scheme.[309] By 1949, the year in which further discussions were held between Waikaremoana Maori and the Crown on compensation, low lake levels had impacted considerably on the lake's ecology. Part of the Waikaremoana Maori claim for compensation included the destruction of their fish-feeding grounds.[310] The Rotorua Conservator of Wildlife listed a number of impacts from the lowered levels:

- thousands of fresh-water shell fish decomposed particularly in the upper reaches;
- fish-feeding grounds then dry land;
- a greater proportion of pure mud on the lake bed with 'little or no vegetable growth to encourage aquatic life of any sort';
- the poor condition of the fish [a reference to trout].[311]

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[304] Cobeldick, 27 September 1923, p 2
[305] Cobeldick, 27 September 1923, pp 3, 2
[306] Cobeldick, 27 September 1923, pp 3, 2, 1
[307] GM THR to Min THR, 1 October 1923, TO 1, 45/41 vol 1, ANZ Wellington
[308] W Cobeldick in Hill to GM THR, 6 November 1919, TO 1 45/38, ANZ Wellington
[309] ECNZ 'Waikaremoana Power Scheme', p 101
[310] White, pp 157–158

The department's partial remedy to improve trout condition was to transfer two large consignments of smelt to Waikaremoana from Lake Rotoiti in 1948. The next year, the conservator remarked that 'reports of their success to date are encouraging.' But he recommended a comprehensive survey by the Marine Department.[312]

This was undertaken by an Assistant Fishery Officer, P Dickinson, in 1950. Dickinson's report concentrated on Lake Waikaremoana although he briefly visited Lake Waikareiti. After a brief history of the lake's origin and natural features, he discussed food, spawning areas, and the problems created by the hydro-electricity schemes.
On the question of food for trout, Dickinson found that aquatic plants, which form the basis of the lake ecosystem, were not plentiful. On the open surface waters, one species of plankton (Daphnia sp, a small crustacean) was present in large numbers. A few larval galaxids [species not given] were collected. No smelt were collected. He considered that natural spawning facilities for smelt were poor. 'It is doubtful if smelt would ever become established because of the absence of satisfactory spawning areas.'[313]

Dickinson commented on the 'considerable' loss of trout occurring down the intake pipes to Kaitawa hydro station. Screens, with vertical bars set at 1¾ inch gaps, and with 2¼ inch gaps at each side, were located in the pipes and had to be cleaned monthly to remove dead fish. Between 16 April and 13 September 1950, 920 whole fish plus smashed-fish pieces were recovered. He recommended the installation of an electric screen.[314]

He considered that, because of the nature of the lake, the fishery had never been very prolific but that numbers had been maintained by natural reproduction and fairly large liberations of fry. He suggested the latter practice continue because trout numbers had dropped. This was due to the destruction of feeding shallows caused by the lowered lake level and loss of fish down the intake to the hydro scheme.[315]

Annual releases of trout fry continued. The question of an improved fish screen will be discussed in the next section. In 1957, the Conservator of Wildlife in Rotorua, pointed out

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[311] Extract from the Memorandum received from the Conservator of Wildlife, Rotorua, 31 March 1949, M 1, 1/7/148, ANZ Wellington
[312] Conservator, 31 March 1949, M 1, 1/7/148, ANZ Wellington

[313] P Dickinson, 'Report on Lake Waikaremoana visited 5 to 10 September 1950', pp 3, 4, 6, quotation p 6, IA 1, W2578 78/37, ANZ Wellington
[314] Dickinson, September 1950, pp 5–7

that Dickinson's opinion on smelt reproduction was wrong because 'the lake is teeming with smelt and a large percentage of the fish taken have shown that their sole diet at the time has been these small fish.' The conservator commented that, in Lake Taupo, it had taken three years for smelt to become established; that too little was known about smelt; and less was known at the time of Dickinson's report. [316]

1970s, Peter Mylechreest and others

Extensive research began in the late 1960s again after lobbying from Wairoa angling clubs on the deterioration of the trout fishery.[317] In order to obtain more accurate information, Lake Waikaremoana and all streams flowing into it, except the Hopuruahine River, were declared experimental waters between October 1970 and June 1971.[318] An angler required a written permit that necessitated the keeping of details of fish taken in an Angler's Diary.[319] With information gathered from the diaries, and from their own investigations, the Wildlife Branch hoped to get information on the movements of fish around the lake and estimate the trout populations.[320] The detailed results of these surveys were given in 'Lake Waikaremoana Trout Fishery Investigation Report' and 'Experimental Waters 1970–71 Fishing Season – Permit Scheme'.[321] In 1973, Dr Vivienne Cassie of Auckland University began a study of phyto-plankton in the lake and regular water sampling was undertaken by rangers.[322]

In 1974, Dr Peter Mylechreest, a medical doctor in Canada who was working towards a Master's thesis in science, began a three-year research programme on Waikaremoana's plant communities and trout ecology. This programme was directed towards studying the effects of fluctuating water levels on the vertebrate and invertebrate fauna around the marginal reaches of the lakes. The research purpose was to try and determine a suitable regime for hydro lakes aimed at utilising their inherent power-generating capabilities to maximum effect with minimal damage to recreational fisheries. Failing this, it was to lessen

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[315] Dickinson, September 1950, p 6
[316] McNamara to Con Wildlife, 16 January 1957, IA W2578 78/37, ANZ Wellington
[317] Fairway to Min IA, 27 April 1970, AANS W3546 1, WIL 1/2/9, and correspondence in AAAC W3207, 58WIL 24/2/6, Fisheries Investigation 1970s, ANZ Wellington
[318] The Lake Waikaremoana Experimental Waters Regulations 1970, 21 May 1970, *New Zealand Gazette*, 1970, no 29, p 901
[319] Fairway to Min IA, 1 September 1969, AANS W3546 1, WIL 1/2/9, ANZ Wellington
[320] Burstall to Con WB, 27 May 1969, AANS W3546 1, WIL 1/2/9, ANZ Wellington
[321] 'Lake Waikaremoana Trout Fishery Investigation Report', June 1973; 'Experimental Waters 1970–71 Fishing Season – Permit Scheme', undated, AAAC W3207 58WIL 24/2/6, ANZ Wellington
[322] UNPB to NPA, Annual Report 1973–74, p 4, TO W1845, (47/25/10), ANZ Wellington

the effects of such fluctuations, coupled with suggestions for adjusting lake levels compatible with periods of highest angling use.[323]

Mylechreest concluded that hydro-electricity development at the lake had had considerable effects on its fauna and flora. These included:

- 'a disproportionately great loss of littoral area' as a result of the historical lowered lake levels;
- quantitative losses in the littoral invertebrate fauna due to the reduction in the total area of littoral;
- contemporary unnatural fluctuating lake levels because of higher lake levels in summer and lower in winter due to electricity demand. The natural levels were the reverse;
- further losses in littoral production due to the summer submergence of the weed-beds and reduced water transparency;
- because of the 'reversed' lake levels, a possible reduction in species diversity of the littoral fauna which 'New Zealand lakes with their low species diversity can ill afford to lose even a few species';
- a reduced carrying capacity of the lake for trout;
- rainbow trout were probably more adversely affected by the changes after hydro-electric development; brown trout appeared to have benefited more from the introduction of smelt.[324]

Mylechreest, who was to become a research scientist with Internal Affairs, recommended ongoing studies for a more detailed understanding of the ecology of the littoral invertebrates and native fish in view of the altered periodicity of lake level fluctuations. 'However, it is probably safe to assume that any measures to restore the seasonal periodicity back towards the natural situation would be desirable.' He suggested that hydro-electric power could be used during summer months and thermal power stations to meet winter power demands.[325]

Several of Mylechreest's recommendations for Lake Waikaremoana were carried out. Since 1977, the lake has been managed to the more natural pattern of generally rising levels in

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[323] Sec IA to NZED, 19 April 1974, AAAC W3207 58WIL 24/2/6, ANZ Wellington
[324] P Mylechreest, 'Some Effects of a unique Hydroelectric (sic) Development on the Littoral Benthic Community and Ecology of Trout in a Large New Zealand Lake', MA thesis, University of British Columbia, 1978, pp 97, 98, AAZU W3619, 09/11/68, ANZ Wellington. Interim reports are in AAAC W3207, 58WIL 24/2/6, ANZ Wellington
[325] Mylechreest, 'Some Effects', 1978, pp 98, 99; 'Warning on Lake Levels', *Daily Telegraph*, 20 October 1979, AAZU W3619, 09/11/68, ANZ Wellington

winter and falling in summer, according to the operating authority.[326] The lake levels, now operated by Genesis (and formerly ECNZ), normally fall within the band of 580.29 and 583.29 metres above sea level (Moturiki datum).[327] However, in 1983 what Mylechreest described as 'an episode of excessive drawdown' occurred, giving rise to criticism from Mylechreest and conservation groups like Friends of the Urewera.[328]

His recommendations for ongoing study have also been carried out. As a result, there have been modifications to his conclusions, as cited in the ECNZ report on the Waikaremoana Power Scheme. Studies in 1991 and between 1985 and 1996 concluded that littoral plant growth had not been significantly affected by short-term reduction in lake clarity. Further studies in the 1980s and 1990s concluded that there could be a significant loss of littoral plant productivity if the lake level falls below its minimum operating level for more than two months. The NZED appeared confident that, by prohibiting managed 'excursions into the low-level range' and by a monitoring programme, detrimental affects to the plant communities would be avoided.[329] The ECNZ acknowledged there had been in the past a loss of littoral area for aquatic plants and algae but stated that Eastern Region Fish and Game had agreed that this effect on the aquatic ecosystem could be appropriately mitigated through the enhancement of angling opportunities in other areas of the catchment.[330]

Studies of trout have also be carried out by the Eastern Region Fish and Game. The ECNZ report conclude that, although the data collected was described as 'fairly poor', under the present lake level management regime, there was no evidence of decline in the fishery, or that brown trout growth rates had been affected.[331]

2.5.2(d). Fish Barrier

In his 1950 report, Dickinson made recommendations for methods to prevent considerable numbers of trout from being destroyed in screens in the tunnel leading to Kaitawa power station. He noted that 920 whole fish plus pieces had been counted in five months in 1950. In 1956 and 1957, Wildlife officers, urged on by Wairoa anglers, began discussions on how to prevent the waste. Discussion initially focused on numbers destroyed. Records collected by the State Hydro Department showed that between 118 and 1071 fish were destroyed

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[326] ECNZ 'Waikaremoana Power Scheme', p 92
[327] ECNZ 'Waikaremoana Power Scheme', p 86
[328] Mylechreest, 29 October 1985; Dolman, Friends of the Urewera Assn, 25 October 198, AAZU W3619, 09/11/68, box 7, ANZ Wellington
[329] ECNZ 'Waikaremoana Power Scheme', pp 92–94
[330] ECNZ 'Waikaremoana Power Scheme', p 102

annually between 1950 and 1956.[332] But the Conservator of Wildlife in Rotorua believed that it was impossible to assess the numbers because so many were minced up that it was impossible even to count heads or tails.[333] Again urged by Wairoa and other fishing groups, discussions between Wildlife and Ministry of Works then took place on the type of barrier that could be erected. In 1958 the Conservator at Rotorua recommended that a snug-fitting barrier, with steel mesh of one-inch spacings, be attached to a steel grill that was proposed to be fitted to the outlet to stop logs from entering the outlet channel. He proposed that Hydro pay part, if not all, the cost as that body had been responsible for changing the features of the natural outlet.[334] The fish barrier request was then made to the State Hydro Electric Department, although the Hydro Design Section of Ministry of Works were responsible for plans and construction.[335] Work began in July 1958 and was completed in 1960.[336]

2.6. Conclusion

Claimants contend that Maori did not request trout to be introduced to Lakes Waikaremoana and Waikareiti and that therefore the Crown had no authority to do so. Claimants also contend that the Crown failed to provide Te Urewera Maori with a management role in the lakes' fishery; and that the Crown passed legislation to protect trout habitat but not that of indigenous fish. Written evidence in the 1890s conflicts with claimants' evidence today on the request or otherwise to introduce trout. But the Second Schedule to the Urewera District Native Reserve Act 1896 carried the implication that Tuhoe would, after instruction, release, manage, and own the trout fishery. The Act, however, allowed but did not require the Government to pass regulations effecting the intentions of the Second Schedule. The Government failed to pass the necessary regulations, thereby eliminating Maori from a role in the fishery management. Until recently, the lakes' habitats have been managed in the interests of trout and not indigenous fish.

Brown and rainbow trout were first introduced to New Zealand in the 1860s. In 1867, legislation was passed to protect introduced fish species, and to give statutory recognition to

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[331] ECNZ 'Waikaremoana Power Scheme', pp 94, 95
[332] 'Kaitawa Power Station: Record of fish taken from pipe line screens', attachment to McNamara to Con Wildlife, 16 January 1957, IA W2578, 78/37, ANZ Wellington; correspondence during 1958–59, M 1/7/108, ANZ Wellington
[333] McNamara to Con Wildlife, 16 January 1957, IA W2578, 78/37, ANZ Wellington
[334] Vercoe to Con Wildlife, 28 May 1958, and correspondence between Internal Affairs and State Hydro, from 9 August 1956, IA W2578, 78/37, ANZ Wellington
[335] Sec IA to GM State Hydro, 18 June 1958, IA W2578, 78/37, ANZ Wellington
[336] 'New Waikaremoana Works Screen Entrance of Tunnel', *Hawke's Bay Herald-Tribune*, 17 May 1960, AANU 7740, W5079/4 (21/30/5), ANZ Wellington

the acclimatisation societies to manage the fisheries. Trout fishing, as a recreational sport, was thus well established by the 1890s when the introduction of trout was mooted for Te Urewera.

In 1883, trout had been unsuccessfully released in Waikaremoana, which was presumed to have been in the district of the Hawke's Bay Acclimatisation Society until 1901. The first trout to survive there were released in September 1896 by F W Rutherford, the brother of the chairman of the Wellington Acclimatisation Society. Two Waikaremoana Maori assisted with the release and another, Arata, supplied equipment to transport the trout ova to the lake. A much larger released followed in December 1896. Trout may have been released into Waikareiti in 1897 but the actual date is unknown. Rainbow trout were first released into the small lake on Rahui Island in Waikareiti in 1919. Many subsequent releases followed the original liberations into Waikaremoana.

The 1896 release was the result of discussions between Seddon and Tuhoe between 1894 and 1896. Seddon understood Tuhoe to have asked for arrangements to be made to stock rivers with English fish as an additional food source for Tuhoe and an attraction for tourists. Today claimants dispute the request. But, as a result of the discussions, Seddon advised that he would ask the curator of the Masterton fish-hatchery, which was operated by the Wellington Acclimatisation Society, for trout to be supplied to Tuhoe. Seddon also advised that he would ask for Tuhoe to be given information on the most suitable places to release trout and for instructions on care of the fish. The implication from this letter, which became the Second Schedule to the Urewera District Native Reserve Act 1896, is that Tuhoe would release, manage, and own the trout fishery in their waterways. That did not eventuate. The Act required the Government to make regulations to that effect and this was not done. The introduction of trout to the lakes thus appears as much, if not more, about recreational sport for tourists than additional food resources for Waikaremoana Maori.

It was soon made clear to Waikaremoana Maori that the trout belonged to the Crown and that trout management was under Crown agencies. At least one Maori, Reneti Hawera, rejected this interpretation in writing. Other Maori exercised what they believed were their rights to the trout. They were accused by Wairoa fishermen of poaching, decimating the breeding grounds, the wholesale destruction of fish, and unsportsmanlike instincts.

To begin with, the fishery was managed by the acclimatisation societies, then by the departments of Tourist and Health Resorts and Internal Affairs. Today the fishery is

managed by the Eastern Region of Fish and Game New Zealand. The Fish and Game Council has a Memorandum of Understanding with the Department of Conservation who administers Te Urewera National Park. The statutory and regulatory regime, already in place, was applied to trout fishing at the lakes. This included the timing of the annual trout-fishing season, fishing tackle, numbers of trout permitted each day, and the fees payable for various types of licences. Honorary rangers were appointed to police regulations, as well as Crown officers.

The lakes contain a number of landlocked species of indigenous fish. They are toi toi or kokopu (common bully), koaro or maehe, and koeaea (common smelt) which was introduced in 1948 from Lake Rotoiti as trout food. There are questions over the presence of tuna (long-finned and short-finned eel) in Waikaremoana. While their presence has been reported, others dispute this. If they are present, their numbers are likely to be very low.

The management of the lakes' fishery concentrated on trout. Indigenous fish were seen in the role of trout-food. The main management practice in the past was the near-annual release of ova and fry, distributed until 1947 from the hatchery at Waikaremoana. During the nearly 50 years of the hatchery's existence, it was sited in different areas. Between 1926 and 1929, it was sited at Waimako Pa with the agreement and assistance of chief Mahaki. He was paid £5. The Department of Tourist and Health Resorts decided to remove the building in 1929, partly because of environmental factors and partly because its general manager refused a request from a group of ten Waimako Pa Maori for an annual rental or five free fishing licences. Another request in 1932 for 50 free licences, on behalf of Ngati Ruapani, was also declined. In light of licence concessions granted to Maori in other parts of the Rotorua Acclimatisation District, the refusal was against the spirit of Seddon's letter, another indication that the introduction of trout to Waikaremoana and Waikareiti was more for tourist sport than enhanced food supplies for Maori.

Other management practices and policies included the shooting of shags because they ate trout, and the production of a number of reports, investigations, and scientific surveys. These became more detailed and numerous after the lowering of Waikaremoana lake levels in 1946 by the New Zealand Electricity Department as part of their management of the hydro-electric schemes on the lake's outflow river. The surveys included those by P Dickinson in 1950 and Peter Mylechreest between 1974 and 1977. Dickinson urged the

construction of a fish barrier at the entrance to the lake's outflow for the hydro scheme to prevent the destruction of trout sucked into the outflow tunnel. This was installed by 1950.

After the removal of the hatchery from Waimako Pa in 1929 and the department's refusal of free trout-fishing licences about the same time, archival sources examined show little further involvement by Waikaremoana Maori with trout fishing. In 1957 the Tuhoe (Urewera) National Park Association submitted that fishing would be an added tourist attraction and source of revenue for Urewera National Park but advised that arrangements would have to be made for adequate supervision of fishing parties and for the restocking of streams.

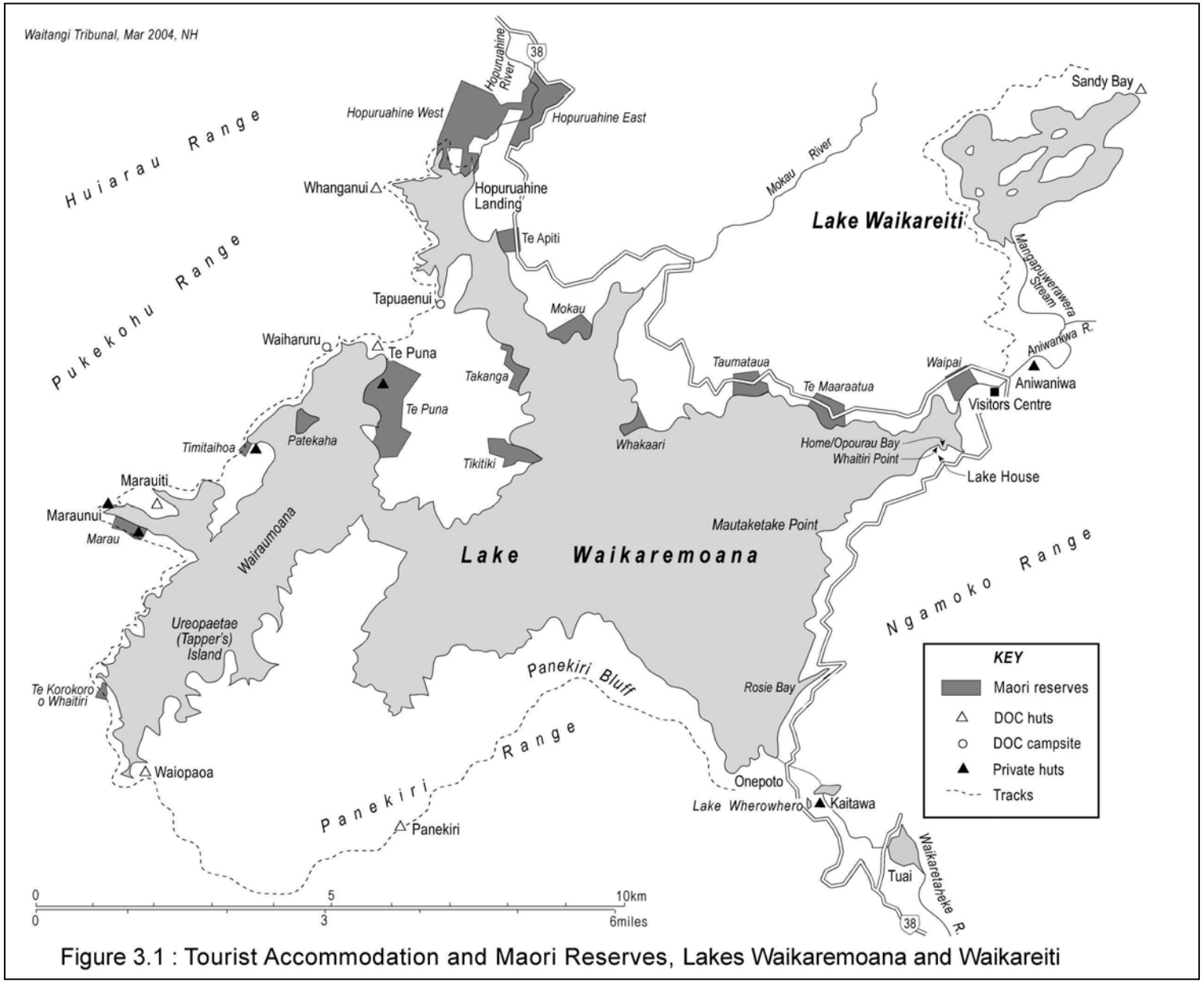

Figure 3.1 : Tourist Accommodation and Maori Reserves, Lakes Waikaremoana and Waikareiti

Chapter 3: Tourism at Lake Waikaremoana – Pollution of the Waters

3.1. Introduction

Increasing numbers of visitors to the lakes for trout fishing and other forms of recreation inevitably required the provision of accommodation. This increased the potential for pollution of the lakes. This chapter examines pollution in Lake Waikaremoana, caused by the release of sewage into the waters from different types of accommodation.

Effluent from septic tanks at Lake House and the nearby camping ground flowed into Lake Waikaremoana for some 50 years, especially during the peak tourist season in the summer months. Human waste from freedom campers and from those in permanent or semi-permanent huts and camps around the lake's edge may have despoiled the lake's margins and seeped into its waters.[337] Freedom camping may have contributed to the spread of giardia, which is discussed in the next chapter. In the 1970s, the sewage system, acknowledged by then as unhygienic and inadequate by Western scientific health standards, was upgraded. Because sewage has continued to seep into the lake, the sewage collection and disposal system is now being upgraded.

Effluent discharge concerns Waikaremoana Maori, not only for health but also for spiritual and cultural reasons. The sewage discharge was one of the reasons behind the occupation of Crown-leased land near the visitor facilities at Home Bay by Nga Tamariki o Te Kohu between 1 January and 6 March 1998. They and their supporters dismantled their campsite and withdrew from the lake bed as a result of the Government's establishment of an inquiry into their concerns. The solicitor, J K Guthrie, and the Maori Trustee, J E Paki, were appointed by the Ministers of Maori Affairs and of Conservation to undertake the inquiry. Their report was presented in August 1998.[338] Its findings will form part of the following discussion but they have not satisfied all Waikaremoana Maori, as the issue of disposal remains a concern with Nga Rauru o Nga Potiki.[339] Claimants have stated that the Crown

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[337] See Figure 3.1 for sites of tourist accommodation around Lake Waikaremoana

[338] J K Guthrie and J E Paki, 'Joint Ministerial Inquiry: Lake Waikaremoana. Report to the Minister of Maori Affairs, Hon. Tau Henare, [& to the] Minister of Conservation, Hon. Dr Nick Smith', 27 August 1998, [1998], p 3

[339] Interview with members of Nga Rauru O Nga Potiki, 11 November 2003

was responsible for pollution of the lake waters through mismanagement or poor control of visitors.[340]

3.2. The Collection and Disposal of Human Sewage

3.2.1. Lake House, to 1970s

In January 1903, the Department of Tourist and Health Resorts opened its first form of visitor accommodation at Lake Waikaremoana. This was Lake House built at Whaitiri headland on 80 acres of Crown reserve land.[341] The facility included the accommodation house itself, stables, cowsheds, grazing paddocks, a meat house, and toolshed.[342] Lake House was extended and had electricity installed in 1927.[343] Further extensions were proposed in 1929 and again in 1937 but seemingly not undertaken.[344] From 1957, Lake House came under the control of the Tourist Hotel Corporation.[345] The hotel ceased operations in 1972, in part because the sewage system was so outdated and unhygienic that the Health Department threatened to close it.[346]

Initially, Lake House had pan closets that were emptied at frequent intervals. In 1904, a Health Officer, Fred deLisle, recommended that water closets replace the pan closets and that all the drainage from them, and including slops from the kitchen and bedrooms, be passed through a septic tank. This was to be situated below the crown of the gully on the west side of Lake House. The effluent from the tank, he said, could discharge itself in the gully so that the roots of the trees and plants there could complete the purifying process begun in the septic tank. He also recommended increasing the capacity for water storage at

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[340] See 1.4.2., above, Urewera Statement of Issues 28.61 (dreived particularly from Wai 621: Wairoa-Waikaremoana Maori Trust Board; Wai 795: Tuhoe Potiki; Wai 937: Nga Rauru o Nga Potiki; Wai 1013: Dr Rose Pere on behalf of various Waikaremoana Hapu)

[341] s. 23 of the Second Schedule to the Urewera District Native Reserve Act 1896 empowered the Governor to compulsorily take land for accommodation houses or camping grounds, although the amount was limited to 400 acres unless the General Committee of Tuhoe agreed to an increase; Tony Walzl, 'Waikaremoana: Tourism, Conservation & Hydro-Electricity (1870–1970), report commissioned by the Waitangi Tribunal, October 2002, p 45

[342] Walzl, pp 76, 46; Rodney Gallen and Allan North, *Waikaremoana Wairau-Moana and Waikare-iti: A Concise History of the Lakes, the People, and the Land*, (n.p.: Te Urewera National Park Board, 1977), pp 37, 38. They note that many of the Lake House records were destroyed by fire.

[343] Walzl, p 246; Gallen and North, p 38

[344] Resident Engineer to District Engineer, 14 February 1929; Asst Engineer to District Engineer, 30 July 1937, W 1 24/571 pt 6, ANZ Wellington

[345] Memo for Cabinet Committee on Tourism, undated, Appendix 3, 1a, TO W1664, 63/6 vol 1 THC, ANZ Wellington; Gallen and North, p 38. The Department of Tourist and Health Resorts became the Tourist and Publicity Department in 1951. For ease of reference, I refer to it as the Tourist Department.

[346] Memo for Cabinet Committee on Tourism, undated, Appendix 2, 111, TO W1664, 63/6 vol 1 THC, ANZ Wellington

Lake House to prevent household water shortages and to enable the efficient flushing of the water closets.[347]

The water closets and septic tank were not installed apparently until 1921–22.[348] The tank was located '40 feet from the house on the front terrace' and the effluent pipe from it discharged into the bush about 80 feet from Lake House.[349] In 1924, the Public Works Department was required to repair part of the system as there was a 'terrible smell coming from the pipe'.[350] This may have been caused by newspaper blockage of the drains.[351]

In 1928, the septic tank emitted 'a very bad smell'. The Public Works Assistant Engineer inspected and cleaned out the tank which, he said, had had disinfectant emptied into it which destroyed the bacterial action of the tank. He recommended that the effluent pipe be extended so that its outfall was further away from Lake House.[352] The Acting Inspector for Tourist and Health Resorts recommended that a special report be obtained for the matter was urgent.[353] Since there was a proposal to enlarge Lake House, the Assistant Electrical Engineer, who inspected the sewage system, recommended that a new and larger septic tank be built on the north side of and about 300 feet from Lake House. His estimated cost was £130. He added that there was always a bad smell at the effluent pipe outfall that became 'very objectionable in hot weather or if the septic tank does not function properly'.[354] The sceptic tank was replaced.[355] The outfall was apparently extended so that the effluent then spread much nearer the lake's edge eventually discharging into the lake.[356]

3.2.2. Camping Ground, to 1970s

In the summer season of 1928–29, the Tourist and Health Resorts Department opened a camping ground in the vicinity of the hotel by the landing stage in Home/Opourau Bay.[357] It became known as the Jetty Camping Ground, now Lake Waikaremoana Motor Camp. Four huts were built in 1931.[358] It was enlarged in 1933 and further developed in 1935, 1937 and

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[347] de Lisle to Mason, 5 February 1904, TO 1 42 (1903/67), ANZ Wellington
[348] Gallen and North, p 38
[349] Asst Electrical Engineer to District Engineer, 29 May 1928, W 1 24/571 pt 4, ANZ Wellington
[350] Armstrong to Accountant, DPW, 10 March 1924, W 1 24/571 pt 1, ANZ Wellington
[351] Asst Engineer to District Engineer, 9 March 1928, W 1 24/571 pt 4, ANZ Wellington
[352] Ibid
[353] Acting Inspector THR to GM THR, 17 April 1928, TO 1 45/45, ANZ Wellington
[354] Asst Electrical Engineer to District Engineer, 29 May 1928, W 1 24/571 pt 4, ANZ Wellington
[355] GM THR to US PW, 7 June 1928, W 1 24/571 pt 4, ANZ Wellington
[356] Accountant to GM, 23 February 1939, TO 1 45/42/1, ANZ Wellington
[357] Acting Inspector THR to GM THR, 17 April 1928, TO 1 45/45, and 1928 correspondence, TO 1 45/47 pt 1, ANZ Wellington; Walzl, p 247
[358] Gallen and North, p 38

1940 by more huts, electric light, and a water supply.[359] These later developments appear to have been a few chains further toward Aniwaniwa from the main site.[360] A further site, which was mentioned in 1935, was used as emergency ground only.[361] Like Lake House, the camping ground came under the Tourist Hotel Corporation until 1977. It is now under the Department of Conservation.

In 1928–29, four Kemico lavatories, two each for women and men, were installed at the main site, as this model had proved satisfactory on the Milford Track.[362] The lavatories were portable, metal containers with wooden seats. Chemical powder and fluids mixed with water in the pan kept them sanitary.[363] They were inspected daily and washed out with hot water and disinfectant every other day.[364] The solids from the pans were buried in pits.[365]

However, by 1934, hygiene problems had arisen in the four camping sites. Whether the Kemico toilets were still in use at the main site is unknown but the other sites had closets built over pits. These became unhygienic in summer because of flies.[366] The Tourist Department asked the Director General of Health to make inquiries and recommendations.[367] Possible solutions, including a septic tank, chemical closets, and a better-constructed pit and pan closets, were discussed by both departments during 1934 and 1935. Costs were important, as these were depression years with restrictions on government expenditure. By October 1935, approval had been granted for the installation of a septic tank and conveniences, costing £266.[368] These were built; correspondence in 1944 refers to the existing septic tank.[369]

As numbers of campers grew prior to 1939, the provision of more conveniences became necessary.[370] But plans were held in abeyance during World War Two. In 1944, estimates were obtained from Public Works for erecting a new latrine with a septic tank and drainage,

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[359] Walzl, pp 249–50; Gallen and North, p 38; correspondence TD and PW, 3, 18 October 1935, W 1 24/571, ANZ Wellington
[360] Kean to Wilson, 19 August 1928 with map, TO 1 45/47 pt 1, ANZ Wellington
[361] Man Lake House to GM TD, 14 February 1935, TO 1 45/47 pt 1, ANZ Wellington
[362] GM THR to Kean, 17 October 1928, TO 1 45/47 pt 1, ANZ Wellington
[363] Advertisement Kemico Sanitary Lavatory, TO 1 45/47 pt 1, ANZ Wellington
[364] Man Lake House to GM THR, 30 January 1931, TO 1 45/47 pt 1, ANZ Wellington
[365] GM THR to Man Lake House, 14 January 1929, TO 1 45/47 pt 1, ANZ Wellington
[366] Man Lake House to GM TD, 15 May 1934, TO 1 45/47 pt 1, ANZ Wellington
[367] GM TD to DG Health, 21 May 1934, TO 1 45/47 pt 1, ANZ Wellington
[368] GM TD to Engineer-in-Chief and US PW, 3 October 1935, W I 24/571 pt 5 and other correspondence between TD, Health, PW, 1934–35, TO 1 45/47 pt 1; W 1, 24/571 pt 5, ANZ Wellington
[369] District Engineer to Permanent Head PW, 21 July 1944, TO 1 45/47 pt 1, ANZ Wellington
[370] GM TD to PW, 17 October 1938, W 1 24/571 pt 5, ANZ Wellington

and another drainage and septic tank system for the existing toilets. The new latrine was to consist of three water closets and a sink for women, and two water closets, urinal and a sink for men. The estimated cost was £396.[371] The latrine was evidently built by 1946 when the final cost was £565.17s. The additional expenditure included unexpected extra costs involved in excavation for the septic tank and drains in solid papa rock. It also included costs for an extended outfall pipe from the septic tank because the lake's level was lowered that year for the hydro-electricity scheme. This pipe extended into the water.[372]

An ablution block, providing showers, washhand basins, conveniences, sinks, washing tubs, and electric points, was proposed in 1950 after criticism of facilities from the Hawke's Bay Automobile Association.[373] Expenditure of £660 was approved.[374] Records do not show whether the work was carried out.

From the sources I have seen, I cannot determine whether the Crown could have managed the sewage systems at Lake House and Jetty Camping Ground by a means more preferable to Waikaremoana Maori. It may be possible to so determine if comparisons were made with other tourist accommodation in remote places.

3.2.3. Private Camps and Huts

From the 1920s, the departments of Tourism, Lands and Survey and later the Urewera National Park Board were concerned about the erection of huts and siting of permanent or semi-permanent camps on Crown land around Lake Waikaremoana. Their concerns had very little do to with toilet facilities. Competition between government and private interests, and the retention of scenic values were the main reasons.

Between 1929 and 1931, a controversy developed about other campsites and huts between private interests, the Automobile Association, and the Public Works Department on the one hand, and the Tourist Department on the other. An article in January 1929 in the *Wairoa Star* noted that there were campers at Rosie Bay, the Outlet [presumably the lip of the lake wall into the Waikaretaheke River], and on some of the lake's islands. A camp called

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[371] District Engineer to Permanent Head, 21 July 1944, TO 1 45/47 pt 1, ANZ Wellington
[372] US PW to GM TD, 9 October 1946, TO 1 45/47 [pt 2 – labelled by Copy staff] Waikaremoana Camping Sites, ANZ Wellington
[373] GM TD to Man Lake House, 5 May 1949, TO 1 45/47 Waikaremoana Camping Sites [pt 2 labelled by Copy Staff], ANZ Wellington
[374] GM to District Engineer, 22 September 1950, TO 1 45/47 vol 1, ANZ Wellington

Tapper's, on Maori-owned Ureopaetae or Tapper's Island, also had campers.[375] The article noted that a survey had recently been completed for a small side road, camping ground and park site at the top end of Rosie Bay, near the area granted to the Wairoa Rod and Gun Club.[376] Although the Rosie Bay campsite reference proved to be a mistake[377], two new campsites were provided by the Public Works Department in the hope that campers would be discouraged from camping indiscriminately along the road around the lake. Public Works suggested the Automobile Association might accept responsibility for them as the association had already established camping grounds in other parts of New Zealand. Toilet arrangements were not detailed.[378] The sites were former PW camps at Mokau and Hopuruahine. The Department of Lands and Survey apparently reserved them as motor camps at the instigation of the AA. Old chimneys were left where campers could light fires.[379]

The Manager of Lake House resented what was seen as competition since campers had to pay two shillings and six pence per day at Jetty Camp.[380] Besides the revenue loss, the manager pointed out the fire risk and the lack of sanitary arrangements that would be a menace to health.[381] In 1931, the Touring Manager of the Auckland AA said his organisation had received many complaints that the sanitary conveniences at the Jetty Camping Ground were inadequate.[382] But the Lake House Manager rebutted the complaints by saying that they referred to the AA's own camps at Mokau and Hopuruahine where there were no sanitary arrangements.[383] The Tourist Department erected notices that stated that camping on reserved land was prohibited and that authorised camping grounds were provided at Hopuruahine and Mokau with the main camping ground near Lake House where special facilities were available.[384] The notices were renewed in 1948.[385]

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[375] Sheffield to GM TD, 4 June 1931, TO 1 45/47 pt 1, ANZ Wellington. The island, Te Ureopaetai (sic), had not been included in negotiations in 1895 and was later acknowledged to be Maori land; Submission No 42, Tamariki o Te Kohu, Joint Ministerial Inquiry Lake Waikaremoana, 1998, [p, 11]; TP 3071, TPK Head Office, Wellington
[376] *Wairoa Star*, 14 January 1929 in TO 1 45/47 pt 1, ANZ Wellington. For the Wairoa Rod and Gun Club, see 2.3.2. above
[377] Extract from Kean, 19 January 1929, TO 1 45/47 pt 1, ANZ Wellington
[378] Furkett to GM Tourist Dept, 14 November 1930, TO 1 45/47 pt 1, ANZ Wellington
[379] Sheffield to GM TD, 30 January 1931, TO 1 45/47 pt 1, ANZ Wellington
[380] Wilson to Man Lake House, 14 January 1929, TO 1 45/47 pt 1, ANZ Wellington
[381] Sheffield to GM TD, 30 September 1930, TO 1 45/47 pt 1, ANZ Wellington
[382] Champtaloup to TD, 22 January 1931, TO 1 45/47 pt 1, ANZ Wellington
[383] Sheffield to GM TD, 30 January 1931, TO 1 45/47 pt 1, ANZ Wellington
[384] 'Notice. Camping Grounds', undated TO 1 45/47 pt 1, ANZ Wellington
[385] Conservator F&G to US IA, 9 April 1948, F W3129, box 351, IA 52/3 vol 1, ANZ Wellington

In addition to camping grounds, both the Tourist Department and Lands and Survey were disturbed by the erection of permanent or semi-permanent buildings around the Lake Waikaremoana shoreline. In 1926, the Wairoa and Gisborne Chambers of Commerce suggested a township in the area between Rosie Bay and Mautaketake Point to popularise the lake as a holiday destination.[386] The Tourist Department opposed it on competitive grounds.[387] The township proposals did not eventuate.

In 1930, Lands and Survey noted 12 buildings on Crown land campsites although at least one of these, Tapper Brothers, was included in the newspaper list given three paragraphs above.[388] It was ultimately found to be on Maori land.[389] Another of the 12 was also on Maori land, so that the department presumed 'no action can be taken in respect of it.'[390] The surveyor, R M Mowat, whose building was on Crown land asked to retain it until such time as he had finished a map of the lake shore, incorporating historic sites and Maori place names, which he was recording in his spare time with Chief Mahaki.[391]

Apart from any revenue loss, the departments were also concerned with aesthetics. Officials considered that unsightly shacks, damage to the bush, and the risk of fire were probabilities.[392] The Assistant Ranger, A Kean, wrote that if the situation continued, 'buildings will be springing up all round the Lake and the present beauty of the resort will be destroyed.'[393]

Owners were given notice to demolish their buildings but by 1937, four huts, including Mowat's, remained on Crown land.[394] An inspection by Lands Department officials in 1954 noted 19 huts and cottages in the vicinity of Lake Waikaremoana. Some of these were occupied by roadmen and possum trappers.[395] Another survey in 1968 showed that there were again four huts, as well as a building for the Wairoa Anglers' Club at Mokau landing, on Crown land.[396] Some were apparently removed by 1970.[397] Other huts, including a

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[386] Coates to Sec Wairoa CC, 17 June 1926; Sec Gisborne CC to Premier, 18 June 1926, LS 4/19 (closed 8/7/27), DOC HO Wellington
[387] GM THR to US LS, 22 September 1927, LS 4/19 (closed 30/9/38), DOC HO Wellington
[388] Asst US LS to GM TD, 9 September 1930, LS (closed 30/9/38), DOC HO Wellington
[389] CCL to US LS, 10 June 1935, LS 4/19 (closed 30/9/38), DOC HO Wellington
[390] Asst US LS to MG TD, 9 September 1930, LS (closed 30/9/38), DOC HO Wellington
[391] Mowat to GM TD, 7 November 1930, TO 1 45/42/1, ANZ Wellington
[392] GM TP to Min TP, 2 November 1931, TO 1 45/41 vol 1, ANZ Wellington
[393] Kean to GM TD, 18 March 1929, LS 4/19 (closed 30/9/38), DOC HO Wellington
[394] CCL to US LS, 18 June 1937, LS 4/19 (closed 30/9/38), DOC HO Wellington
[395] CCL to DG Lands, 7 July 1954, LS 4/19 (closed 16/4/57), DOC HO Wellington
[396] CS to SG, LS 13 December 1968, LS 4/19 (closed 17/10/72), DOC HO Wellington
[397] Min Lands to Howard, 21 August 1970, LS 4/19 (closed 16/12/70), DOC HO Wellington

building by the Youth Hostel Association, and a hunters' lodge, were built at Aniwaniwa. They were to be removed from 1974.[398] But the 1997 park map shows that six private huts, three of which are on Maori land, remain around Lake Waikaremoana's edge.[399] Records do not show what sort of toilet arrangements were in place at the private campsites and huts. They may have had long drops like the huts in Urewera National Park.

In the 1960s, the Urewera National Park Board asked occupiers to remove the private huts and camps. Occupiers were offered the lease of a section in the Onepoto subdivision, south of the lake and outside the national park and lake watershed.[400] Twice in the past subdivisions had been mooted for this land. In 1925, a Field Inspector for the Lands Department had suggested a small township on the Onepoto Reserve. This was 237 acres, section 1, block 1, Waiau, which had been leased to W A Neale in 1904 for 21 years but the lease had not been renewed.[401] The Department of Tourist and Heath Resorts had attempted to have the land vested in itself but Lands and Survey had disagreed and had retained it.[402] In the 1950s, the Gisborne Commissioner of Crown Lands again recommended the subdivision of the Onepoto Reserve, arguing that the department had a duty to meet public requirements for accommodation at the lake. But, as the Departments of Tourist and Publicity, Public Works, and State Hydro Electricity opposed it, the proposal was withdrawn.[403]

3.2.4. Camps on Maori Land

Tony Walzl has discussed the Tourist Department's efforts from 1926 to prevent private commercial interests from acquiring land from Maori owners of reserves on Lake Waikaremoana. In 1932, an Order in Council prohibited the alienation of the reserves under section 95 of the Native Purposes Act 1931 but departmental efforts continued to bring the Maori reserves under scenery preservation legislation and later within Te Urewera National Park. The department was also concerned to prevent the erection of huts and semi-permanent camps by individual Pakeha on the Maori reserves. Apart from competition for Lake House and the Jetty Camping Ground, the department's reasons again included the

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[398] B R Brown, 'Lake Waikaremoana: Sewage Disposal', 15 July 1974, p 1, ABKU W4404, PW 8/10/10, Marine, Works, Box 41, ANZ Wellington
[399] Parkmap, Urewera, (n.p: Department of Conservation, 1997) Edition 2
[400] Gallen and North, p 40; *Wairoa Star*, 28 May 1962, LS 4/19 (closed 9/1/63), DOC HO Wellington
[401] Field Inspector to CCL Gisborne, 14 October 1925; GM THR to US LS, 22 September 1927, LS 4/19 (closed 8/7/27), DOC HO Wellington
[402] GM THR to US LS, 22 September 1927; US LS to GM THR, 27 October 1927, LS 4/19 (closed 30/9/38), DOC HO Wellington
[403] 'Note for File', 21 May 1953, LS 4/19 (closed 9/10/53), DOC HO Wellington

danger of fire and destruction of forest and scenery.[404] But, as Brad Coombes has observed, such Crown actions 'confirm that Maori property rights were disregarded'.[405] In the mid-1950s, the department investigated Turi Carroll's offer to donate the reserve, Timi Taihoa, but found that the reserves were not available for disposal.[406]

In 1937, five Pakeha had huts on Maori reserve lands.[407] Thirty years later, when the Lands and Survey Department was again exercised by private huts in the national park, there were nine private huts on Maori land and a boatshed for an unnamed angling club. Lands Department officials found that no rights were registered against the titles, or orders creating rights made by the Maori Land Court. Officials concluded that, the camp and hut owners either had permission from the Maori owners, or were squatters.[408] There was also a houseboat moored at Rosie Bay, which had the approval of some, but not the majority of, Maori owners. The National Parks Authority suggested, as a reason for its removal, the likely effect of sewage on the fishery.[409]

Sanitation arrangements were rarely mentioned. In 1955, the Wairoa Anglers' Club was interested in erecting huts with a water supply and privies for Pakeha and Maori on national park land, possibly in return for unusable areas of the Maori reserves becoming national park.[410] A photograph of one of the huts shows the usual sort of household lavatory but disposal arrangements were not shown.[411]

3.2.5. Huts in Urewera National Park

In February 1962, the National Parks Authority approved the construction of huts at Sandy Bay, Lake Waikareiti; and at Waiopaoa, Marauiti, and Whanganui on the Great Walk track between Onepoto and Hopuruahine around the western side of Lake Waikaremoana. The Waikareiti hut, and part of the tramping track around Waikareiti, was completed by March 1963. The track between Onepoto and Hopuruahine was constructed between 1962 and

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[404] Walzl, pp 251–265, 385-390

[405] Brad Coombes, 'Preserving 'a great national playing area' – Conservation Conflicts and Contradictions in Te Urewera, 1954–2003', Prepared for Crown Forestry Rental Trust, September 2003, p 84. In subsequent references this will be Coombes (2)

[406] Lands Department correspondence between 26 July 1954 and 16 November 1956, LS 4/19 (closed 16/4/57), DOC HO Wellington

[407] CCL Gisborne to US LS, 18 June 1937, LS 4/19 (closed 30/9/38), DOC HO Wellington

[408] DG Lands to Min Lands, 10 March 1969; CS to SG LS, 13 December 1968, LS 4/19/1(sic), (closed 17/10/72), DOC HO Wellington

[409] Photograph 2 with DG Lands to Min Lands, 10 March 1969, LS 4/19/1(sic), (closed 17/10/72), DOC HO Wellington; Coombes (2), p 86 citing Sec NPA to Sec UNPB, 19 April 1968 and Sec NPA to Chair UNPB, 22 April 1970, UNP 30, DOC Gisborne

[410] Walzl, p 387 citing CCL Gisborne to DG Lands, 27 May 1955, LS 4/19 (Closed 16/4/57), DOC HO Wellington

[411] Photograph 8 with DG Lands to Min Lands, 10 March 1969, LS 4/19/1(sic), (closed 17/10/72), DOC HO Wellington

1972 by parties of schoolboys.[412] Waiopaoa and Marauiti huts were due for completion in the spring of 1963.[413] These huts had longdrop toilets.[414]

Today, in addition to the huts, there are also campsites at Waiopaoa, Korokoro, Maraunui (near Marauiti hut), Waiharuru, Tapuaenui, Hopuruahine, Mokau, and Aniwaniwa. They are administered by DOC.[415] Sewage from the Visitors' Centre and other buildings at Aniwaniwa is disposed of through septic tanks.[416]

3.3. Closure of Lake House and Development of Motor Camp, 1970s

Between 1969 and 1972, discussions took place between the Tourist Hotel Corporation, the Tourist Department, Lands and Survey as the controlling agency for Urewera National Park, and the Urewera National Park Board about the future provision of tourist accommodation at Lake Waikaremoana. Lake House no longer met Licensing Control Commission standards for accommodation, had a backlog of maintenance, and had few overseas visitors partly because of the poor condition of State Highway 38 between Murupara and Wairoa. In addition, and crucially, the Health Department had threatened to close the hotel because, in the summer of 1970–71, some raw sewage had gone into the lake when the system failed to cope with the large number of visitors. The motor camp had the same problem. The Tourist Department assessed the cost of the remedy, a pumping station to a soakage area, at $15,000.[417] The decision was made to close Lake House on 4 April 1972, and eventually to demolish the building and clear its site.[418] Although the National Parks Authority and the Urewera National Park Board had expressed the policy that the land become national park, the land remained under THC control until 1977.[419]

There was considerable public criticism in newspapers from local bodies in the East Coast area at the reduction in the amount of accommodation at the lake that the closure represented.[420] Newspaper articles amongst THC archives do not reveal any public criticism

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[412] Gallen and North, p 42
[413] NPA meeting 14 March 1963, LS 4/19 (closed 31/1/68), DOC HO Wellington
[414] Submissions No 61, East Coast Conservation Board Te Poari Atawhai o Te Rawhiti, Lake Waikaremoana Inquiry 1998, p 2, TP 3071, TPK Head Office, Wellington
[415] Parkmap, Urewera
[416] Information supplied by Glenn Mitchell, Area Manager DOC Aniwaniwa, 26 February 2004
[417] Memo for Cabinet Committee on Tourism, undated, Appendix 2 especially iii, TO W 1664 63/6 vol 1, ANZ Wellington; Ch UNPB to GM THC, 9 July 1971, LS 4/19 (closed 30/6/77), DOC HO Wellington. See also correspondence in TO W1664 63/6 vol 2, ANZ Wellington
[418] Inter-Office Memo GM THC, 13 March 1972, TO W1664 63/6 vol 2, ANZ Wellington
[419] Memo for Cabinet Committee on Tourism, undated, Appendix 5, TO W 1664 63/6 vol 1, ANZ Wellington; Gallen and North, p 38
[420] See newspaper articles in January and February 1972 from *Napier Daily Telegraph* and The *Dominion*, TO W1664 63/6 vol 2, ANZ Wellington

of the closure, or reasons for it, from Waikaremoana Maori. However, the THC intended to upgrade the facilities at the motor camp and, with the Urewera National Park Board, to investigate future accommodation requirements, possibly with the participation of private enterprise.[421] At a meeting on 18–19 July 1972 at Lake Waikaremoana both organisations agreed to a development programme that included new cabins, a new caravan site, and new motels. In addition, they agreed that the park board would contribute financially towards a road linking accommodation units, a new boat launching and trailer-parking area, and a joint sewage system. They proposed to complete the first group of new cabins by the summer of 1973–74 with the total development to be finished in 5 to 10 years' time.[422]

However Cabinet stepped in and declined to authorise the demolition of Lake House and upgrade the motor camp. Cabinet favoured private enterprise for the new developments and the retention of Lake House which could be managed by an organisation like the Youth Hostel Association.[423] The Cabinet decision was possibly because several alternative suggestions had been received.

One proposal for the Lake Waikaremoana area came from Rodney Gallen and John Rangihau, both members of the park board. They submitted that the Maori reserves could be leased and incorporated in the national park and, in exchange, the Maori owners would have the right to develop a holiday-conference complex be built on one of the Maori reserves.[424] Lands Department officials were interested in the idea but suggested the Lake House site as a better alternative.[425] The proposal did not proceed for several reasons. Maori ideas about the complex were still fluid. Some wanted facilities so that Maori could return for short stays, rather than a hotel complex. The conservation authorities – Lands Department and the park board – wanted to retain the wilderness perception of the national park and judged all the Maori reserves as unsuitable for development.[426] Other proposals for tourist facilities were from L. Summersby, who had local support in Gisborne, and from the Outward Bound Trust to use Lake House.[427]

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[421] Joint Ministerial statement, Mins Lands and Tourism, undated, LS 4/19 (closed 26/4/74), DOC HO Wellington
[422] 'Notes of discussion between Representatives of THC and Park Board at Waikaremoana 18/19 July 1972'; DG Lands to Min Lands, 20 July 1972, LS 4/19 (closed 26/4/74), DOC HO Wellington
[423] DG Lands to Min Lands, 8 September 1972, LS 4/19 (closed 26/4/74), DOC HO Wellington
[424] Gallen to MacIntyre, 25 January 1972, LS 4/19 (closed 17/10/72), DOC HO Wellington; Coombes (2), pp 57–59
[425] DG Lands to Min Lands, 4 February 1972, LS 4/19 (closed 17/10/72), DOC HO Wellington
[426] Robertson, 'Maori Reserves: Lake Waikaremoana', 28 March 1972, LS 4/19 (closed 17/10/72), DOC HO Wellington
[427] GM T&P, 10 August 1972; Past President Outward Bound to Min Tourism, 18 April 1972,

Park Board members were disappointed at the delay caused by Cabinet's rejection of the new development proposals. They wanted Lake House demolished, the site cleared, and all accommodation confined to the Home Bay area. They did not favour private enterprise but, if development was to be awarded to private interests, the park board wanted control of the land then under THC control. THC wanted the question of sewage and water supply to be the responsibility of the park board but the board saw such a provision as the responsibility of the THC.[428]

In 1975 the Visitors' Centre and Te Urewera National Park headquarters at Aniwaniwa was completed, after the park board had purchased and used a garage as a temporary accommodation from 1961.[429]

In all the inter-departmental disputes and ministerial discussions, the question of a hygienic sewage was temporarily lost. THC considered the motor camp septic tanks were 'quite efficient if de-sludged and cleaned out at reasonable intervals.'[430] The Hawke's Bay Association of Outward Bound could see 'no reason why one of the forms of treatment could not be within the means of the Trust. Afterall – the waste from the kitchen feeding 70 Outward Bound boys, is not going to be anything like that of the fastidious wealthy tourists.'[431] However, the continued use of septic tanks was vetoed by the Health Inspector of the Wairoa County Council because of the lack of seepage for the effluent due to the high water table.[432]

TO W1664 63/6 vol 2, ANZ Wellington
[428] Turley to Ch NPA, 27 October 1972, LS 4/19 (closed 26/4/74), DOC HO Wellington
[429] Gallen and North, p 42
[430] GM THC, Inter-Office Memo, 13 March 1972, TO W 1664 63/6 vol 2, ANZ Wellington
[431] President HB Outward Bound to Min Lands and Harrison, MP Hawke's Bay, 9 March 1972, TO W1664 63/6 vol 2, ANZ Wellington
[432] Min of Tourism, Memo for Cabinet Works Committee, 16 January 1975, paragraph 5, AAFD W4198 box 85 file 201/1/3, ANZ Wellington

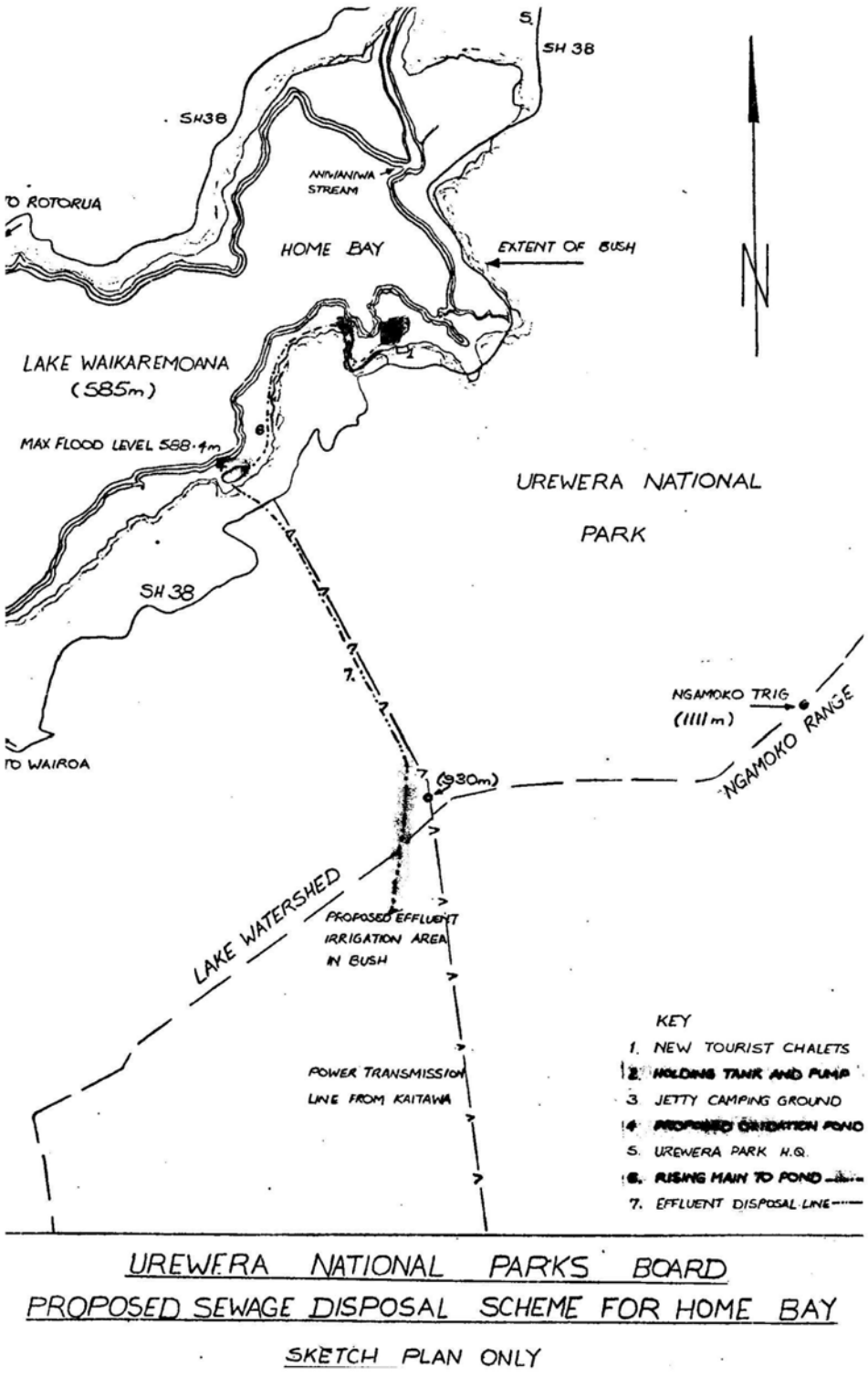

Figure 3.2 : Urewera National Park Board Proposed Sewage Disposal Scheme for Home Bay

3.4. Sewage Collection and Disposal Schemes, from 1974

3.4.1. Lake Waikaremoana Motor Camp

In 1974, two years after Cabinet had rejected the earlier proposal, the THC had plans prepared by architect John Scott, who was also architect to the Urewera National Park Board, to develop the motor camp in stages to a capacity of 200 visitors. The first stage was the construction of 10 cabins and an ablution block but, before these could be built, a new sewage scheme was required, along with roading from State Highway 38 to the camp. The existing two septic tanks were described as 'completely unsatisfactory as the effluent cannot be absorbed into the soil, and flows almost directly into the lake.'[433]

A firm of consulting engineers, Powell, Fenwick and Johnson, was engaged to prepare a plan for sewage reticulation which would be acceptable to all interested authorities. Several proposals eventuated. They included the collection of sewage from the new cabins and its transportation by tanker to a pumice bed on the THC farm with temporary irrigation into the lake until the population increased.[434] The *Environmental Impact Report* prepared by the park board and THC proposed to transport the effluent outside the lake catchment area in this temporary phase.[435] The second phase would be the construction of the pipeline, an oxidation pond, and the disposal system of irrigation to some suitable vegetated area.[436] This was the system eventually constructed.

When the THC applied for a right in 1974 to discharge domestic sewage and waste into Lake Waikaremoana in an emergency, the Nature Conservation Council opposed the application on the grounds that the effluent would disturb the ecological balance of the lake by the creation of weeds and algal blooms. As an alternative, the council suggested building a holding tank and discharging effluent through the bush.[437] The THC withdrew its application.[438]

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[433] *Environmental Impact Report: Development of Accommodation and Facilities at Home Bay, Lake Waikaremoana*, (n.p.: Urewera National Park Board, Tourist Hotel Corporation, October 1975), p 14, Also in AAUM W4043 ENV 8/62, ANZ Wellington
[434] B R Brown, 'Lake Waikaremoana: Sewage Disposal', 15 July 1974, p 4, ABKU W4404, PW 8/10/10, box 41, ANZ Wellington
[435] *Environmental Impact Report*, 1975, p 24
[436] Brown, p 3
[437] File Notes NNC, AAZU W3619 29/08/74, ANZ Wellington
[438] Com Works to Powell Senwick and Johnson, 25 July 1974, p 3, ABKU W4404 PW 8/10/10, box 41, ANZ Wellington

Further investigations were made which included a monthly survey carried out by P H W Mylechreest from November 1974 to July 1975. He concluded that sewage enrichment caused an increase in the production of plant-life in the lake, and changes in species' composition. The changes favoured species like the introduced exotic weed *Elodea canadenis* that would otherwise not be dominant. Changes in plant-life, he continued, affected the production and composition of animal communities in the lake, thereby creating an unfavourable habitat for bottom-dwelling native fauna. Mylechreest, whose researches into the trout-fishery were discussed in chapter two, considered that the impacts were likely to be undesirable in a trout-fishery and

> are unacceptable if conservation of the natural environment is to be considered. They are likely to persist, and even worsen, if nutrient enrichment continues to occur. If the aesthetic qualities of the clear waters of Lake Waikaremoana also become affected, then it will not only be the conservationists and fishermen who will be disturbed.[439]

Nevertheless, the Minister of Tourism recommended that Cabinet authorise the scheme to proceed, financed by an interest free advance from the National Development Loan Account under the 1974–75 and 1975–76 Works Programme.[440] Treasury did not support the proposal because it considered the scheme could not break even financially because of the high cost of the sewage scheme, new roading, and the operation of the facility.[441] The Lake Waikaremoana paper was withdrawn from the agenda of the Cabinet Works Committee meeting of 29 January 1975.[442]

A right was obtained to legalise existing discharges from the camp's septic tank and from the pumice filter into the lake until the permanent sewage treatment plant was functioning. The effectiveness of each stage of the proposal was to be monitored.[443]

The treatment plant, which was eventually constructed, was designed by the Ministry of Works and Development in 1977 and built during 1979–80 for the Department of Lands

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[439] P H C Mylechreest, Appendix F, 'Some Effects of Sewage Enrichment on the Bottom Fauna of Lake Waikaremoana' July 1975, in UNPB and THC, *Environmental Impact Report: Development of Accommodation and Facilities at Home Bay, Lake Waikaremoana*, (n.p.: Urewera National Park Board, Tourist Hotel Corporation, October 1975)
[440] Min Tourism to Cabinet Works Committee, 16 January 1975, AAFD ACC W4198, box 85, file 201/1/3, ANZ Wellington
[441] Sec Treasury to Min Treasury, 10 January 1975, AAFD ACC W4198, box 85, file 201/1/3, ANZ Wellington
[442] Cabinet Works Committee, 29 January 1975, AAFD ACC W4198, box 85, file 201/1/3, ANZ Wellington
[443] 'Urewera National Parks Board Proposed Sewage Disposal Scheme for Home Bay', undated, pp 8, 9, and 'Application by the Crown for a Right in Respect of Natural Water', undated, both in AAUM W4043 ENV 8/62, ANZ Wellington

and Survey.[444] It consists of a holding tank and pump in the camping ground with a rising main to carry the material through a buried pipe alongside an access road to an oxidation pond half-a-kilometre south-west along the lake edge from the camp. The oxidation pond allows for bacterial processes to convert wastes to a cellular material and simple end products like carbon dioxide, water, NH3 (ammonia) and PO4 (phosphate) over a period of 20 to 40 days. The process removes 99 per cent of the coliforms, that is, bacteria that indicate the possible presence of disease-producing organisms.

From the pond, effluent is pumped by a high-pressure pump to a dosing tank located outside the lake catchment. A siphon system in the dosing tank carries the effluent to irrigation nozzles on long pipelines. It is then sprayed onto forested ground west of the power transmission line from Kaitawa on the Ngamoko Range. The provision of several pipelines allows land to be irrigated and then rested. Should a power failure occur, storage is provided at the pump station, another system of pumping sewage to the oxidation pond is installed, and a tile drainage trench has been built to percolate any overflow before it reaches the lake. The system is operated by park board staff.[445]

The management plan of 1989 suggested that a leakage from the oxidation pond continued. It also noted the provision for effluent discharge via an existing pipe into the deep parts of the lake in emergencies.[446] There appears to be no further evidence on these points.

3.4.2. Huts and Freedom Campsites within the Lake Catchment Area

When huts were first built around the lake, long drop toilets were installed.[447] These were holes in the ground, which were filled in from time to time. Before 1992, freedom camping by trampers and boaties was widespread around the lake margins adjacent to the Lake Waikaremoana track. Problems were caused because of damage to vegetation, littering, and the deposition of toilet waste because toilet facilities were not provided. As Trainor Tait of Nga Rauru o Nga Potiki said:

> We lived on Te Puna and we've seen boats come in and you know what they're going on your land for because you see a toilet paper in his hand, all those kind of things. People don't see this, you try and talk to DOC about this and they think you … bark up trees or

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[444] Submission No 59, Department of Conservation Te Papa Atawhai, Lake Waikaremoana Inquiry, pp 22, 33, TP 3071, vol 3, TPK Head Office, Wellington
[445] 'Urewera National Parks [sic] Board Proposed Sewage Disposal Scheme for Home Bay', undated, map and pp 6, 9–11, AAUM W4043 ENV 8/62, ANZ Wellington. See Figure 3.2
[446] *Management Plan* 1989, p 14
[447] Submission No 61, East Coast Conservation Board Te Poari Atawhai o Te Rawhiti, Joint Ministerial Inquiry 1998, p 1, TP 3071, TPK Head Office, Wellington

> something. Those were the things we have seen. We lived there for nearly four years so we've actually seen them with our own eyes.[448]

By 1998, all camping along the Great Walk track within 500 metres of the track was restricted to five sites. These were provisioned with shelters, water supplies, toilet facilities and cleared areas for tents. Wardens are engaged to enforce these restrictions under Te Urewera National Park Bylaws 1981.[449]

Each hut and campsite has a sealed vault toilet that collects waste in a plastic vault. By 1998, DOC had closed all the long-drop toilets around Lake Waikaremoana and was successively implementing sealed vault toilets at other overnight sites near the lake and at Lake Waikareiti.[450] The sealed units are emptied periodically by vacuum pump into a specifically designed barge which carries the contents to the sewage treatment plant at Home Bay. Waste from the sealed vault toilets at Panekiri hut and at Lake Waikareiti is emptied into tanks that are transported by helicopter to the oxidation pond.[451] DOC has a Standard Operating Procedure that prevents the helicopter, with either full or empty tanks, from flying over the lake. The original SOP had applied only to a helicopter transporting full tanks but was revised when a strop broke allowing two empty tanks to fall into the lake. The tanks floated and were recovered. DOC says that no pollution occurred.[452]

3.5. Waikaremoana Maori and the Sewage Schemes

While Waikaremoana Maori may wish to provide their own explanations of their values, the protection of mauri has become, according to Gail Tipa and Laurel Teirney, one of the principle issues for contemporary freshwater management. Citing Mäori Marsden, they stated that, 'Maori traditionally believe that the forests, the waters, and all the life supported by them, together with natural phenomena such as mist, wind, and rocks, possess a mauri, or life force.'[453] Tipa and Teirney added, 'The decline in both water quantity and water quality has impacted on cultural values and, most importantly, cultural uses of the river, and

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[448] Trainor Tait, Interview with Nga Rauru o Nga Potiki, 11 November 2003
[449] East Coast Hawke's Bay Conservancy, *Te Urewera National Park Management Plan*, (Gisborne: Department of Conservation Te Papa Atawhai, 2003), Numbers 4–7, pp 90, 91
[450] Submission No 59, DOC, p 22
[451] Submission No 59, p 22
[452] Information from Glenn Mitchell, Area Manager DOC Aniwaniwa, 26 February 2004
[453] Gail Tipa and Laurel Teirney, *A Cultural Health Index for Streams and Waterways: Indicators for Recognising and Expressing Maori Values*, prepared for the Ministry for the Environment (Wellington: Ministry for the Environment, 2003), p 7 citing Mäori Marsden, 'God, Man and Universe' in *Te Ao Hurihuri*, edited by Michael King (Auckland: Reed Publishers, 1992)

threatens to put at risk the mauri of the resource, which is unable to protect itself against unnatural changes to the environment.'[454]

The mauri has been recognised by the Conservation Department from the time of the 1989 management plan for Te Urewera National Park when the cultural significance of indigenous vegetation was also acknowledged. 'There were also 'tipua', trees with special powers, and other landmarks which were identified with the mauri (spirit or life force) of the land and forest.'[455] After the department received a submission from the Tuhoe people on the draft management plan for 2003, mauri was further defined. 'Kaitiakitanga is the means by which the mauri (life force) of resources is restored, maintained and enhanced for present and future generations and for life itself.'[456]

But prior to, and during the development of the oxidation pond system, it is not known whether Maori values for the health of the lake were discussed with the representatives of the Tuhoe-Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards on the Urewera National Park Board. Brad Coombes stated that neither the Gisborne office of Lands and Survey nor the East Coast National Parks and Reserve Board were enthusiastic about public participation. 'Tangata whenua concerned about pollution from the Home Bay motorcamp for many years, but they did not have an opportunity to comment on facilities there.'[457]

In the Kaituna River claim to the Waitangi Tribunal, claimants explained that to mix water contaminated by human waste with water for gathering food was deeply objectionable on Maori spiritual grounds. They said that Maori custom requires water for food preparation to be kept strictly separate from water used for other purposes. If such mixing occurred, the water in that case would have to be declared tapu. Fishing and the collection of plants would

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[454] Tipa and Teirney, p 7. For cultural knowledge of water health, see, for example, Tipa and Teirney, pp 1–3; also Pattle Delamore Partners Ltd, 'Review of Lands Based Wastewater Treatment Options and their Potential for Groundwater Contamination', prepared for the Ministry for the Environment, June 1991, p 1

[455] *Management Plan* 1989, p 17

[456] 'Changes to the Te Urewera National Park Management Plan as Result of the Submissions and Hearings', undated, (b) 4.1.2.c, with the handwritten comment 'now implemented'; 'Submission on the Draft: Te Urewera National Park Management Plan', 7–8 September 2001, p 4; MTP 126, DOC Gisborne; *Management Plan* 2003, policy 4.1.2(c), p 37

[457] Coombes (2), p 368 citing meeting ECNPRB, 1 October 1982, BAHT 1542/1769a 8/137/10 pt 3, Department of Conservation, Bay of Plenty Conservancy, East Coast National Parks and Reserves Board, 1982–1983, ANZ Auckland

also be out of bounds.[458] The pollution of water by human waste can thus have severe effects on Maori spiritual, cultural, and economic life.

3.6. Joint Ministerial Inquiry Lake Waikaremoana, 1998

Sewage discharge into the lake was one of the significant issues that lay behind the protest by Nga Tamariki o Te Kohu in January and February 1998. The group, described as 'predominantly younger Maori', established a camp on the shores of Lake Waikaremoana near the visitor facilities at Home Bay. They announced that their occupation of land within the area leased by the Crown from 1971 was justified by alleged breaches of the lease by the Department of Conservation.[459]

At hui to prepare for submissions prior to the Joint Ministerial Inquiry on Lake Waikaremoana, speakers mentioned the sewage system. In 1983, said one speaker, John Rangihau wrote of his concerns about leaks from the oxidation pond. The speaker who provided this information thought that nothing had been done about the complaint.[460] Because of time, it has not been possible to trace Rangihau's letter.

Another speaker spoke of the sewage system breaking down on several occasions thereby allowing leaks into the lake.[461] However members of Friends of the Urewera denied knowledge of recent overflows although they stated that these had occurred regularly when the septic tank system was in operation.[462]

3.6.1. Joint Ministerial Inquiry Lake Waikaremoana: Submissions

In their submission, Nga Tamariki o Te Kohu provided both the overarching reason as well as detailed causes, for their occupation. 'Most importantly we have seen our mana as a people ignored and our special status as Kaitiaki of Lake Waikaremoana undermined in the name of upholding a lease arrangement where we the owners are told we have no say.' The detail of their submission stated:

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[458] Department of Justice, 'Kaituna: The Waitangi Tribunal and the Kaituna River Claim', in *The Waitangi Tribunal Claims: A Resource for Schools*, Set 1, ([Wellington]: Department of Justice, [1990])
[459] Joint Ministerial Inquiry, p 3
[460] Anaru Paine, hui for 1998 Joint Ministerial Lake Waikaremoana Inquiry, p 7, TP 3075 Lake Waikaremoana Inquiry – Hui Transcripts, TPK Head Office, Wellington
[461] Trainor Tait, hui for 1998 Inquiry, p 16
[462] Friends of the Urewera, hui for 1998 Inquiry, pp 21, 22

a) Oxidation Pond

We are concerned that the oxidation pond has been built too close to the lakes edge and erosion is occurring. If this is allowed to continue eventually the pond could collapse spilling its contents directly into the lake;

There are several large cracks around the lining of the pond. This could be an avenue for the seepage of sewage into the lake;

With ducks and other wildlife swimming in the pond, the potential to transfer diseases and parasites from the pond to the lake is great;

We recommend the inquiry team look into:

i) The laws concerning the development; planning and construction of the oxidation ponds and whether the Department of Conservation complied with these statutory obligations;

ii) The negligence of the Department of Conservation in approving the construction of the oxidation ponds so close to the lake and its environs and whether such actions are consistent with their obligations under the Treaty of Waitangi and the Conservation Act;

iii) The appropriateness of constructing and maintaining the oxidation ponds in its current state without reference to its ongoing impact on the spiritual and cultural sites in close proximity to the lake;

iv) who is responsible for the design and approval of the construction and ongoing maintenance of the oxidation pond;

v) whether the oxidation ponds comply with health and safety regulations and promote the values of sustainable development entrenched in the Resource Management Act;

vi) whether there are more appropriate strategies that could have or can be adopted by the Department of Conservation as part of their management plan;

vii) whether there have been appropriate consents obtained from the Regional Council and the District Council in terms of construction and maintenance of the oxidation ponds and whether such a development complies with the District and Regional Plan requirements.[463]

In another submission, Nga Tamariki o Te Kohu and Te Karanga o Waikaremoana submitted that:

5.5.1.5 ii) introduced micro-organisms are playing havoc with the natural eco-systems and scenic beauty that Crown have a statutory obligation to keep preserved in their natural state. The increased pollution does not seem to be a primary concern for DOC as they are only now introducing sealed vault toilets that if installed earlier may have reduced the pressure on the existing cracked, inefficient oxidation pond that has allowed leakage of raw sewage into the lake … iv) Raw sewage has been discharged into the lake, and more recently been sprayed into the surrounding native vegetation.[464]

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[463] Submission No 56, Nga Tamariki o Te Kohu, pp 4, 5, Lake Waikaremoana Inquiry 1998, TP 3071, TPK Head Office, Wellington

[464] Submission No 66, Te Karanga o Waikaremoana and Nga Tamariki o Te Kohu, clause 5.5.1.5 pp 20, 21 Lake Waikaremoana Inquiry 1998, TP 3071, TPK Head Office, Wellington

This submission was also concerned that the campground, sewage system, and landings for boats had been built on lake-bed land, a position that was not envisaged by the 1971 lease. The submitters stated that, 'All of these matters required ongoing consultation and participation with local Maori who have protested their concerns particularly to the spiritual transgressions that have occurred by the blind practices of DOC on these matters.'[465]

Another clause in this submission referred to Lake Waikaremoana Motorcamp's failure to comply with health and safety components of the Camping Ground Regulations 1985.[466] In 1995, the submission stated, an audit of the camp was undertaken by Rose Gemmell and the Health Inspector at Wairoa District Council to identify areas that needed attention. 'The report identified that there will be further costs associated with making the necessary improvements, some of which will be costly. Some of the remedial work is currently underway – especially the sewage system and water supply work.'[467]

Other submissions reiterated some of these points. Raewyn O'Neill stated that, 'The pumping of this human waste onto the forest floor[.] Is spiritually and culturally insensitive, it seeps back into the lake at the next shower or storm because of the very light soils that cover the papa rock layer.'[468]

Lisa Waiwai submitted that DOC management had guaranteed that the new method of toilet-waste disposal was fail-proof. But several reports had been received locally that the barge had leaked human waste into the lake. She said that DOC had verbally and unofficially confirmed one of those reports.[469]

Another group of submissions declared the 1971 lease agreement to be invalid and annulled. The authors submitted that, 'Spiritually Te Papa Atawhai and the Tuhoe Waikaremoana Maori Trust Board, in their ignorance have disregarded the sacredness of our papakainga

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[465] Submission No 66, Lake Waikaremoana Inquiry 1998, TP 3071, TPK Head Office, Wellington, clause 8.13, p 42

[466] The Camping Ground Regulations 1985 were introduced under section 120B of the Health Act 1956 and this section does not bind the Crown. The Crown is therefore able to provide more 'primitive' camping sites for users of remote areas, like national parks, without obtaining a Certificate of Exemption from the local authority which would otherwise be required; Ministry for the Environment, *Freedom Camping: The Problem of Human Waste Disposal*, ([Wellington]: Ministry for the Environment, January 1988), p 14

[467] Submission No 66, clause 8.17, p 43

[468] Submission No 51, Raewyn O'Neill, Lake Waikaremoana Inquiry Submissions vol 1, TP 3071 TPK Head Office, Wellington

[469] Submission No 54, Lisa Waiwai, Lake Waikaremoana Inquiry Submissions, TP 3071, TPK Head Office, Wellington

(Reserves) and worse, have actually pursued activities around the lake which have offended us greatly.' One of their issues was that overflows from septic tanks drain into the lake.[470]

Other submissions presented different views to the Inquiry team. The Trust Manager of the Tuhoe-Waikaremoana Maori Trust Board said that, in the light of information from the lessee, the Department of Conservation, he believed claims made by the protestors could not be sustained.

> With regard to the protestors complaints re [National Park Management], and in the light of information from the lessee DOC, I believe in the overall that the claims made by the protestors cannot be sustained and that the Inquirors should find that DOC is honouring its obligations under the lease.[471]

A representative of the East Coast Conservation Board Te Poari Atawhai o Te Rawhiti said that the board endorsed the actions taken by DOC to remove long drop toilets and other effluent disposal systems and replace them with sealed vault units. Board members believed that the impact of freedom campers on the shores of Lake Waikaremoana, which had occurred for over 60 years, was negligible.[472]

In its submission to the Inquiry, DOC denied or explained allegations from the submissions. These included: the proximity of the treatment plant to the lake; overflows into the lake from the oxidation pond; cracks in the lining allowing sewage to seep into the lake; transferral of sewage and disease by birds; and breakdowns in the plant would result in discharge to the lake.[473] The department's response was:

> 193 … The oxidation pond was sited for maximum efficiency in terms of evapotranspiration.[474] The Department has no evidence that it is sited too close to the lake.

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[470] Submission No 50, Poai Raymond Nelson and others, Lake Waikaremoana Inquiry 1998, TP 3071, TPK Head Office, Wellington

[471] Submission No 37 (Draft), T R Nikora on behalf of Tuhoe-Waikaremoana Maori Trust Board, p 10, Lake Waikaremoana Inquiry 1998, TP 3071, TPK Head Office, Wellington

[472] Submissions No 61, East Coast Conservation Board Te Poari Atawhai o Te Rawhiti, Lake Waikaremoana Inquiry 1998, p 2, TP 3071, TPK Head Office, Wellington

[473] Submission No 59, DOC, pp 33,34

[474] Pattle Delamore Partners define the word evapotranspiration as 'a term commonly used to describe the total amount of water vapour produced from a vegetated area of land through a combination of evaporation and transpiration'. In the design of land treatment sewage systems, relatively large amounts of water can be vapourized through this process but the rate is highly variable depending on the temperature, the amount of sunlight, the relative humidity of the air, and the wind speed. 'Land treatment systems that rely on evapotranspiration often have substantially less capacity in winter'; p 5

194 There is no overflow into the lake. When the water reaches a pre-determined level, pumps are activated automatically to take waste water from the pond to a series of irrigation sprinklers on the Ngamoko range. The water does not enter the lake.

195 The pond is constructed of an impervious clay layer with a concrete wave band designed to prevent erosion of the clay by wave action. The concrete does not need to be 'waterproof'. Nevertheless, cracks in the concrete have recently been repaired.

196 Oxidation ponds are usually left uncovered to permit evaporation. Birds can therefore freely access them. The Department has been advised that to cover the pond would significantly reduce its effectiveness by lowering evapotranspiration rates and aeration.

197 There is a second set of pumps connected to the system, as a failsafe, if the pumps break down. These failsafes are connected to the Department's radio system to send a warning signal to staff. There is also a separate flashing light on the building. In the event of a power failure there is a contingency plan in place, to obtain a back-up generator. The pumps are regularly maintained, and all four have been replaced within the last four years, and their electric motors reconditioned.

3.6.2. Joint Ministerial Inquiry Lake Waikaremoana: Findings

The Inquiry team, Paki and Guthrie, in their comment stated that:

> The use of an oxidation pond, with a forest based discharge area for treated effluent seemed to us to have been, on the evidence, an appropriate use of technology and capital in the late 1970s.
>
> … We are satisfied that the plant works efficiently and that contamination of nearby lake waters from the sewage treatment plant is not shown to be occurring.
>
> The significance for tangata whenua of the contamination of the waters of the Lake with sewage effluent is of paramount significance and the Department should continually be alert to ensuring that its system is working efficiently, that pollution is not occurring and that technology upgrades are committed to as soon as they can be justified in terms of both capital and the importance of the Lake to Maori.[475]

The Ministerial Inquiry report does not indicate whether the team made its own inquiries on the details of the siting, construction and operation of the oxidation pond and sewage management. The team appears to have accepted the Conservation Department's explanation. On the question of a cover for the pond, the team appears to have given preference to the department's position of productive efficiency over submissions on the allegations of possible transfer of disease and parasites by birds. In the report, there is no mention of an investigation into the allegations that sewage leaked into the lake from the barge.

3.7. Subsequent Leaks, DOC's Response, and an Upgraded System

Despite its denial of the possibility two years earlier, DOC discovered on 28 February 2000 a damp area between the oxidation pond wall and the pumping shed, and evidence of

effluent seepage to the lakeshore. From the following day, the department cleared away long grass and vegetation to get better access to any problem and excavated a well to collect any seepage and return that to the pond. The work was carried out under the advice of a sewage engineer.

As soon as the seepage was discovered, the department contacted the Chairman of the Waikaremoana Maori Committee, Aubrey Temara, Max Temara, and iwi representatives for the Ruatahuna Co-operative Conservation Management Team. All the work was done after what the department called 'full discussion' with members of the Waikaremoana Maori Committee. DOC provided daily transport to the site to view it and discuss likely solutions. The committee was involved in the taking of samples and has been informed of actions in relation to samples, results, and ongoing work to solve the problem.[476] Samples continue to be collected monthly, in the presence of hapu representatives, to ensure seepage does not reach the lake. The pond is dosed with fluoride to levels that are higher than the background level of fluoride in the lake so that any seepage would be obvious from the higher fluoride level. None has been detected.[477]

In our interviews, speakers from both Nga Rauru o Nga Potiki and the Wairoa-Waikaremoana Maori Trust Board spoke about spillages of sewage into the lake. Rangi Paku's version of the leakage differed from that of the department, described above. She said that a pipe, from the pond out into the lake, had been cut and that the leak had been denied by the department.[478] Other Nga Rauru o Nga Potiki speakers were concerned about the helicopter transportation of tanks, and about the dispersal of oxidation pond water residue on the Ngamoko Range because they were no longer able to collect pikopiko there. They do not want sewage treated at the lake but transported out of the lake area altogether.

Teariki Mei and Reay Paku of the Trust Board spoke of concerns that the oxidation pond could overflow. But they considered that the alternative suggested - transportation of the effluent by truck to a site outside the national park boundaries [a suggestion made in 1975] - would be impracticable. The amount of sewage would require more than one trip per day by

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[475] Joint Ministerial Inquiry, pp 12, 13
[476] 'Schedule Of Issues Suggested for Action by the Enquiry', circa 6 April 2000, MAO 020, DOC Gisborne
[477] Information supplied by Glenn Mitchell, Area Manager, DOC Aniwaniwa, 26 February 2004
[478] Mrs Rangi Paku; Interviews with Nga Rauru o Nga Potiki, 11 November 2003

a five or ten tonne truck along a narrow, winding, unsealed road. The cost, they indicated, would be considerable.[479]

Because of the leak, the existing sewage collection and disposal system is to be improved. Works include the replacement and re-siting of the oxidation pond; the upgrading of the reticulation and pumping equipment; and the piping of sewage from the Aniwaniwa septic tanks into the new oxidation pond. The total anticipated costs are $850,000. Finance has been approved in principle. Design and some construction work are being carried out this financial year [2003–04] but the remaining work will be done in the 2004–05 financial year. DOC officials have formed a joint management team with hapu representatives to manage to the project. Hapu representatives have specified their preferred site for the oxidation pond to which the department has agreed. This is about half a kilometre from the existing oxidation pond and, in the past, was the site of the farm for Lake House. Hapu representatives have also approved a Resource Consent application for discharge of the treated effluent to the forest beyond the lake catchment.[480]

3.8. Conclusion

The development of tourist accommodation and facilities by the Tourist Department at Lakes Waikaremoana and Waikareiti from the early twentieth century required systems to collect and dispose of sewage. For some 50 years, Lake House and the nearby camping ground at Home Bay (also called Opourau Bay) used septic tanks to begin the decontamination process by bacterial action. Initially the effluent was discharged into vegetation in a gully to complete the process. But in the early 1920s, increasing visitor numbers, especially in the peak summer holiday season, overloaded the system. This resulted in contamination at the outfall from the Lake House pipe, and the pipe's subsequent extension, so that partially treated sewage flowed into the lake for 50 years.

At the Jetty Camping Ground near Lake House, human wastes were buried at first. In the 1930s, a septic tank was installed with an effluent pipe to the lake. A number of huts and private campsites, some on the Maori lakeside reserves, were established around the lake. Sanitation arrangements are unknown but may have been inadequate. They possibly contributed to the spread of giardia which is discussed in the next chapter. The long drop was used in the tramping huts built by the Urewera National Park Board after Te Urewera

[479] Teariki Mei and Reay Paku of Wairoa-Waikaremoana Maori Trust Board, 11 November 2003
[480] Information supplied by Glenn Mitchell, Area Manager, DOC Aniwaniwa

National Park was gazetted in 1954. One hut was sited at Lake Waikareiti and the others at Lake Waikaremoana. While the Tourist and Lands Departments made every effort to have the private huts and campsites removed, it was more for aesthetic and commercial reasons, than for hygiene or Maori values relating to the contamination of fresh water.
By late 1960s, when Lake House was threatened by the Health Department with closure because of the effluent discharge, the Tourist Hotel Corporation, Te Urewera National Park Board, and Lands and Survey considered a number of proposals for upgrading tourist accommodation at Home/Opourau Bay. The THC decided to close Lake House and provide more motel and cabin accommodation at the camping ground but a completely safe sewage system was the first requirement.

In 1974–75, the Minister for Tourism sought approval for a two-phase system that initially would have continued the discharge of effluent into the lake. Treasury advised against it, not on hygienic but on financial grounds. In 1977 the present system was devised by the Ministry of Works and Development and constructed in 1979–80. It consists of a holding tank and pump at the motor camp to take the material through a buried pipe to the oxidation pond half a kilometre along the lakeshore. The pond allows for bacterial processes to convert wastes to cellular material and simple end products like carbon dioxide, water, ammonia, and phosphorus oxide over a period of between 20 and 40 days. From the pond, effluent is pumped by a high-pressure pump to a dosing tank on Ngamoko Range, out of the lake catchment. From the tank, the effluent is sprayed from long pipelines onto forested land. Several pipelines allow ground to be irrigated then rested. In the event of a power failure, storage facilities are provided at the pump station, and alternative system of pumping sewage to the pond is installed, and a tile drainage trench had been built to percolate any overflow before it reaches the lake. The system is operated by park board staff.

In the 1990s, the long drop toilets at the national park huts were replaced by sealed vault toilets. These are emptied periodically into a specifically designed barge that transports the contents to Home Bay for treatment. Waste from the huts at Panekiri and Lake Waikareiti, which are not accessible by the barge, is transported by helicopter to Home Bay.

For Maori spiritual and cultural values, the separation of water for food preparation and other purposes is essential, as is the preservation of the mauri through kaitiakitanga. Whether Crown authorities engaged in consultation with representatives of the Tuhoe-

Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards before the implementation of the sewage scheme is unknown.

One of the main reasons given by Nga Tamariki o Te Kohu for their occupation near Aniwaniwa between January and March 1998 was the discharge of sewage into the lake. Their concerns, expressed to the resulting Joint Ministerial Inquiry, entailed fears that the oxidation pond would leak and that its uncovered state was unhygienic. Some were grieved that they could no longer gather pikopiko in the area on Ngamoko range where effluent was discharged.

The Conservation Department, having by then replaced Lands and Survey as the statutory agent, denied the possibility of any overflow to the lake. This was accepted by the Ministerial Inquiry team although they advised the department to be continually alert because of the significance of the issue for Waikaremoana Maori.

The impossible occurred almost two years later when there was evidence of effluent seepage from the oxidation pond to the lakeshore. The department immediately consulted the Waikaremoana Maori Committee and effected repairs. Maori were involved in the decisions and monitoring. Today plans are underway for the replacement and re-siting of the oxidation pond; the upgrading of the reticulation and pumping system; and for the disposal of sewage from Aniwaniwa into the new pond.

Waikaremoana Maori continue to have concerns about possible leaks and overflows from the oxidation pond, given its proximity to the lake. Members of Nga Rauru o Nga Potiki would like sewage to be taken out of the lake area, possibly by truck, a proposal that was first made as a temporary measure in the 1970s. Members of the Wairoa-Waikaremoana Maori Trust Board, who were interviewed by researchers, consider this impractical and costly, given the amount of sewage and the narrow, windy, unsealed roads to the lake.

As discussed in this chapter, various claimants contend that the Crown has been responsible, through mismanagement and poor control, for pollution of Lake Waikaremoana. It is not possible to say whether more suitable methods could have been employed for the collection and disposal of sewage at Lake House, Jetty Camping Ground, and national park huts prior to the 1970s. Subsequently, the Department of Conservation was over-confident that the oxidation pond would not leak, and appears to have underestimated Waikaremoana Maori disquiet, until the seepage in 2000. Since then a consultative process has been established between departmental officials and Waikaremoana Maori hapu representatives.

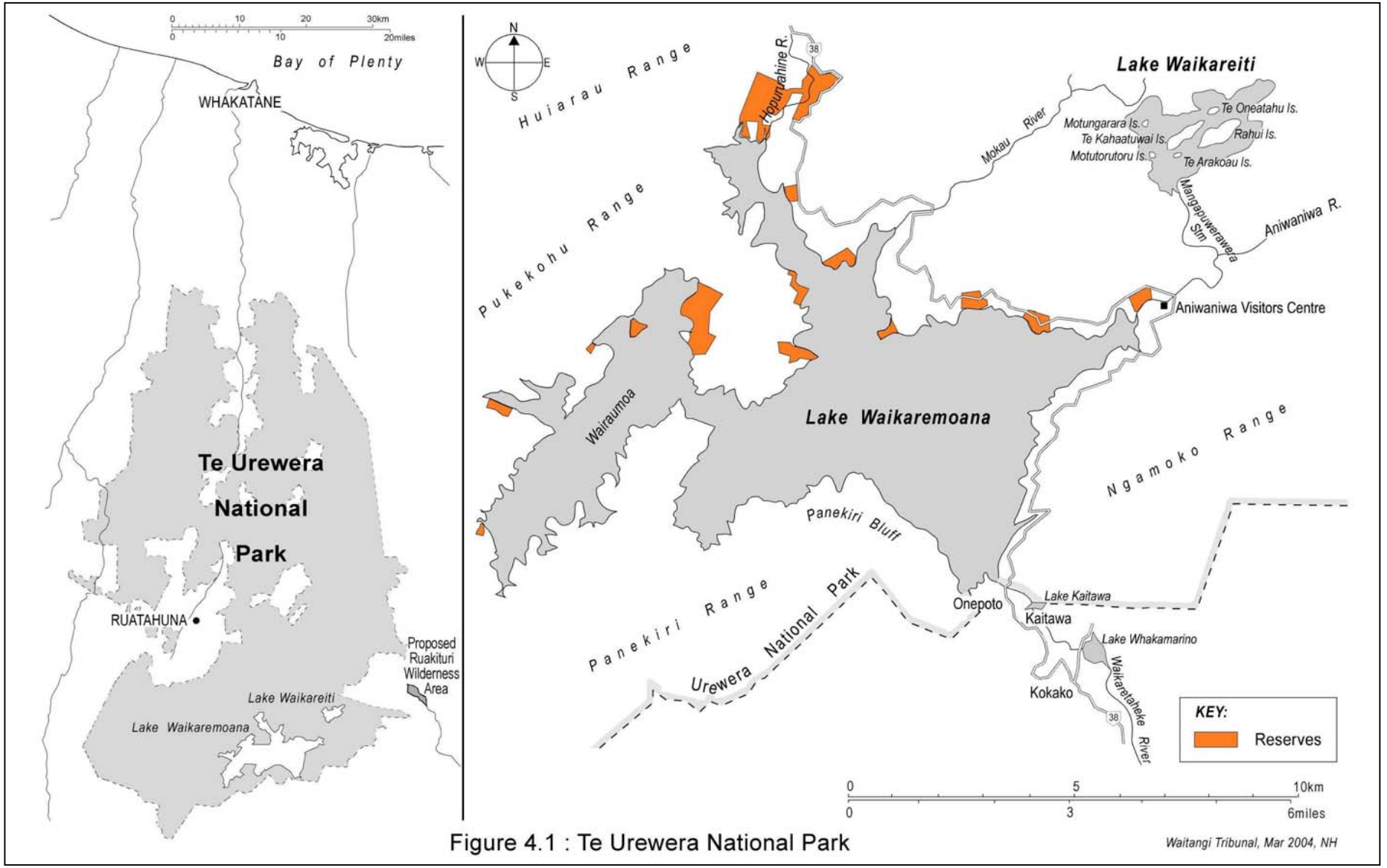

Figure 4.1 : Te Urewera National Park

Chapter 4: Crown Conservation Policy, a Parasite and an Exotic Weed

4.1. Introduction

Time and finance have precluded team researchers from personal examination of Lands and Survey and DOC files at Gisborne and Aniwaniwa. Consequently it has not been possible to completely cover topics 1 (b) (xi) and 1(c) in the 'directions covering commission'. These are respectively: 'Conservation authorities' (including Urewera National Park) policy and practices in relation to the lakes' and 'The level of consultation and ongoing involvement of Waikaremoana Maori in the management of Lakes Waikaremoana and Waikareiti.'

This chapter, therefore, addresses only conservation policy as delineated in management plans, and the issues of the protozoan parasite, *Giardia intestinalis*, and the exotic weed, *Lagarosiphon major*, which is now in Lake Waikaremoana. The latter two issues pertain respectively to the project briefs water pollution and boating and were raised in the 1998 Joint Ministerial Inquiry Lake Waikaremoana and are included in Waitangi Tribunal claims. The chapter begins with a brief resume of land status, statutes, and administration authorities that have applied to the lakes. This is summarised largely from research by Brad Coombes and Tony Walzl.

For over half the twentieth century Waikaremoana Maori had no role in management of the lakes. Since 1961, and the formation of Te Urewera National Park Board, the Crown has recognised the need for Waikaremoana Maori involvement in management.

The word 'conservation' has several definitions, including those of wise and of sustainable use, but I use the word in the sense of permanent preservation and protection. This is its meaning in the New Zealand Conservation Act 1987 under which the Department of Conservation administers national parks.[481]

4.2. Conservation: Controlling Legislation and Administration

4.2.1. Initial Legislation and Regimes

In the late nineteenth century, the lakes adjoined, or were included in, two types of reserves: forest and native game. Forest reserves, gazetted in 1891 and 1895, were designated to the

[481] New Zealand Conservation Act 1987, s.2(1)

south and east of Lake Waikaremoana.[482] Although the reservation of forests was partly to regulate timber supply, conservation soon became the overriding objective to prevent soil erosion, for climatic reasons, for the preservation of indigenous scenery, and for tourism.[483] The forest reserves, including the area of Lake House, its farm, and approximately half of the waters of Waikareiti, but not the waters of Waikaremoana, were vested in the Department of Tourist and Health Resorts (and its successors) in 1908 and 1909.[484] Coombes' map of the forest reserves, however, shows that very little of Waikareiti was included.[485]

In 1898, most of the forest reserves, the lakes, and a large portion of what was Maori land surrounding the remainder of the lakes were designated a reserve for imported game.[486]

In 1909, the lakes became part of the Rotorua Acclimatisation District because they were then trout fisheries. They were administered by the departments of Tourism and Internal Affairs until 1931 and then by Internal Affairs alone. Internal Affairs (later the Wildlife Service) remained the Crown agency in control of the fishery when the lakes were gazetted as part of Te Urewera National Park in 1954. When the Department of Conservation was established in 1987, the Service's functions were reallocated between Conservation and the Eastern Region of New Zealand Fish and Game. The department has a Memorandum of Understanding with Fish and Game New Zealand but can refuse Fish and Game requests in the interest of maintaining intrinsic values under the National Parks Act 1980 and other acts.[487]

From 1913, the Crown, through the Lands Department that was the controlling authority for scenery preservation legislation, made efforts to acquire the Waikaremoana block of Maori land to the west and north of Lake Waikaremoana. The Inspector of Scenic Reserves,

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[482] Brad Coombes, 'Making 'scenes of nature and sport' – Resource and Wildlife Management in Te Urewera, 1895–1954', report prepared for the Crown Forestry Rental Trust, May 2003, p 78, citing *New Zealand Gazette*, 10 December 1891, vol 91, p 1375 and 21 March 1895, vol 21, p 526. In subsequent references this is Coombes (1)

[483] Tony Walzl, 'Waikaremoana: Tourism, Conservation & Hydro-electricity, 1870–1970', report commissioned by the Waitangi Tribunal, October 2002, pp 49–60; Walzl gives 1892, not 1891, as the date

[484] Walzl, p 49 citing 7700 and 8629 acres in *New Zealand Gazette*, 1908, pp 850, 1046; and 600 acres in *New Zealand Gazette*, 1909, No 72, map of Waikaremoana Forestry Reserves 1892 and 1895, p 53. Walzl stated one-third of Waikareiti was included in the Crown award of Waipaoa
No. 2 block in 1889 and the remainder in the Crown award of Waipaoa No. 4 in 1903, pp 28, 29. Because this report focuses on environmental issues, it does not investigate the Crown's acquisition of the lakes.

[485] Coombes (1), Figure 1.1, p 79

[486] Coombes (1), pp 80–83, citing *New Zealand Gazette*, 23 June 1898, vol 46, p 1016

[487] See 2.2.2 chapter two above

Edward Phillips Turner, investigated, reported on the area, and recommended the compulsory acquisition of approximately 14,580 acres. This left 300 acres in Maori ownership. Protest, petitions, and their application to the Native Land Court for title to Lake Waikaremoana in September 1913 led to the lands remaining in Maori ownership until the passing of the Urewera Lands Act 1922.[488] This Act consolidated Crown and Maori land holdings. By 1925, the Crown owned most of the land along the western and northern shores of Lake Waikaremoana, apart from 13 Maori reserves.[489] The Crown-owned land was administered by Lands and Survey.

Thus, the waters of the lakes and their surrounding lands were administered by three government departments: Internal Affairs, Tourism, and Lands and Survey. As research for chapters two and three revealed, Waikaremoana Maori had no management role and very little involvement in Crown activities at the lakes.

4.2.2. Te Urewera National Park, from 1954

When the Urewera District Native Reserve was being considered in 1895–96, it is possible that national park status was intended for the area.[490] National park status for Te Urewera was broached in 1909 by Apirana Ngata as Member of Parliament for Eastern Maori. He suggested Urewera Maori, if properly approached, might consent to a national park reservation similar to Tongariro National Park.[491]

But, with the passing of the National Parks Act 1952, the idea of a national park conjoining the lakes with Urewera land was promoted by the Lands Department.[492] An Order in Council proclaiming Te Urewera National Park was signed on 28 July 1954. The national park included 4,950 acres of State Forest and 17,947 acres previously administered by Tourist and Publicity.[493] Additions were gazetted from time to time. A substantial area of 330,000 acres of Crown land was included in 1957.[494] The bed of Lake Waikaremoana was not included, nor the Maori-owned enclaves.[495] According to former park board members, Rodney Gallen and Allan North, the national park was officially gazetted in November

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[488] Walzl, pp 127–203
[489] Walzl, p 224
[490] Coombes, (1), p 59 citing Minutes of UNPB meeting, 11 December 1973, LS 4/4/2, DOC Gisbourne
[491] Walzl, p 91, citing Ngata speaking in the debate on the Urewera District Native Reserve Amendment Bill 1909
[492] Director State Forests to DG LS, 22 June 1953; NPA meeting 19 August 1953, LS 4/19 (closed 9/10/53), DOC HO Wellington; Rodney Gallen and Allan North, *Waikaremoana Wairau-Moana Waikare-Iti: A Concise History of the Lakes, the People and the Land*, (n.p: Te Urewera National Parks Board, 1977), p 39
[493] Lands in South Auckland and Gisborne Land Districts Declared to be a National Park, 28 July 1954, *New Zealand Gazette*, 1954, no 46, p 1211. See Figure 4.1
[494] Walzl, p 378; Adding Land to the Urewera National Park, 25 November 1957, *New Zealand Gazette*, 1957, no 89, p 2217

1961.[496] This *Gazette* notice established the first Urewera National Park Board under the National Parks Authority that had been created by the National Parks Act 1952.[497]

The year 1961 may have been significant because of Cabinet approval for purchase of the lake-bed, islands, and Maori-owned reserves, although this did not subsequently occur.[498]

The delay between proclamation and gazette may be related to negotiations between the Crown and Waikaremoana Maori for compensation for the sale or lease of Waikaremoana after title to the lake was awarded to Maori owners in 1947. Negotiations continued until the passing of the Lake Waikaremoana Act 1971 on 16 December 1971 under which the Crown was to lease the lake bed, islands, excluding Patekaha, and the dry land between the water's edge and the title boundary, for a period of 50 years with a perpetual right of renewal. The owners were represented at the signing of the deed of lease by a committee of ten. Rents are paid to the two Maori Trust Boards that existed at the time, renamed as the Tuhoe-Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards.[499]

Today, however, Tamaterangi Trainor Tait of Nga Rauru o Nga Potiki applies a different concept to the area of the lake bed lease.

> … the lake bed lease to me is the bed underneath the lake and as far as I'm concerned all the exposed lake bed is not the lake bed lease at all ... Because the water … didn't naturally go away it was taken away by them. So therefore they've done something that's totally out of character in generating land that's no longer theirs because I am still of the opinion that the lake bed lease is for the bed that the water's on.[500]

Control of Lake Waikaremoana by the Urewera National Park Board was not legalised until 1979 by an Order in Council.[501]

Park boards had authority to administer, manage, and control each national park subject to the general power and authority of the National Parks Authority.[502] The purpose of the 1952

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[495] Gallen and North, p 39
[496] Gallen and North, p 42
[497] Board Appointed to Have Control of Urewera National Park, 10 November 1961, *New Zealand Gazette*, 1961, no 73, p 1774; National Parks Act 1952, s 4–6, 8 (3) and (4)
[498] White, p 159
[499] White, pp 156–162
[500] Trainor Tait, Interview Nga Rauru o Nga Potiki, 11 November 2003
[501] The Urewera National Park Board Lake Waikaremoana Waters Control Order 1979, 5 March 1979, *New Zealand Gazette*, 1979, no 18, p 558; Brad Coombes, 'Preserving 'a great national playing area' – Conservation Conflicts and Contradictions in Te Urewera, 1954–2003', report prepared for the Crown Forestry Rental Trust, September 2003, p 87. In subsequent references this is Coombes (2)
[502] National Parks Act 1952, s 9 to 41

Act was both to preserve in perpetuity indigenous flora, fauna and landscapes, and to allow for human recreation and inspiration from that preservation. Indigenous flora, fauna, and areas were to be preserved as far as possible in their natural state.[503]

The National Parks Act 1980, which replaced the 1952 Act, continued these principles. It reintegrated the administration of scenic and other classifications of reserves with national parks and so the NPA and national parks boards became respectively the National Parks and Reserves Authority and national parks and reserves boards.[504]

Under the Conservation Act 1987, the Department of Lands and Survey was replaced by the Department of Conservation which was given the management of conservation lands and the administration of the National Parks Act 1980. Under the Conservation Law Reform Act 1990, the National Parks and Reserves Authority and the national parks and reserves boards were replaced respectively by the New Zealand Conservation Authority and regional conservation boards. Administration of national parks is therefore an integrated statutory structure whereby the Conservation Authority prepares statements of general policy and approves management plans; the conservation boards advise DOC on management planning and administration; and DOC is guided by the 1983 *General Policy for National Parks* and park management plans.

Te Urewera National Park now comes under the East Coast Hawke's Bay Conservancy of DOC and the East Coast Hawke's Bay Conservation Board.[505] Te Urewera National Park Visitors' Centre and Headquarters was opened 22 February 1976 and is located at Aniwaniwa.[506]

Coombes was critical of what he called DOC's 'cowering' behind the preservationist sentiments and the 'now antiquated provisions' of the National Parks Act 1980.[507] These have indeed been in place for nearly 25 years. In the past, national park acts have been reviewed and superseded, following evolving ecological theories and management practices, approximately every 30 years from the establishment of Tongariro National Park in 1894. New legislation would be required to modify the conservationist purpose of the

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[503] National Parks Act 1952, s 3, ss 1, 2
[504] National Parks Act 1980, s 4–39
[505] Figure 2.1 in Coombes (2), p 210, clearly illustrates these administrative changes. See also Coombes (2), pp 20–21, 164–259
[506] Gallen and North, p 42

National Parks Act 1980 and DOC's role under the Conservation Act 1987. In addition, Coombes' assessment demonstrated the problems that exist in reaching agreements for change that will satisfy all concerned parties on ownership and management issues. These include mana whenua conflicts, and Treaty of Waitangi claims. Meanwhile, Waikaremoana Maori and DOC are each between the rock of the conservationist purpose of current legislation and the hard place of today's legislative requirement to make operative Treaty principles.

4.2.3. Maori Representation in Management of the Lakes

Unlike the boards for Tongariro and Egmont National Parks, Waikaremoana Maori were not granted places as of right on Te Urewera National Park Board. But four years before the first national park board was appointed in 1961, the Tuhoe (Urewera) National Park Association recommended that some members of the board be local Maori. This association was formed at a meeting at Ruatahuna on 12 November 1957. At least one member of its committee, M Temara, had a Maori name and may have been on the East Coast National Parks and Reserves Board in the 1980s. The Association's secretary was Allan North, later a member of the park board, co-author of the history of the park, and contributor to the discussion of the history section of the first management plan.[508]

The Minister of Lands, in announcing plans for the first park board, recognised that it should include Maori representatives. There have been one, and sometimes two, Maori representatives. Both Tuhoe and Ngati Kahungunu have had board representatives.[509] Policy, outlined in management plans from 1989, requires DOC to consult with the owners of the bed of Lake Waikaremoana through the Trust Boards on any matters affecting their interest in and around the lake.[510]

Section 4 of the Conservation Act 1987 and a Court of Appeal judgement in 1995 required DOC to give effect to the principles of the Treaty of Waitangi in its management of national parks.[511] The latest *Te Urewera National Park Management Plan* stated that this responsibility applied to the administration of the Acts in the First Schedule of the

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[507] Coombes (2), p 249
[508] North to Ch NPA, undated, LS 4/19 (closed 12/8/60), DOC HO Wellington; Coombes (2), pp 382, 290
[509] Coombes (2), pp 164, 167–168
[510] *Management Plan* 1989, policy 2.8.5, p 63; *Management Plan* 2003, policy 5.2.2(f), p 50. The bed of the lake is defined in that of the natural lake prior to its lowering in 1946.
[511] Robert McLean and Trecia Smith, *The Crown and Flora and Fauna: Legislation, Policies, and Practices, 1983–98*, Waitangi Tribunal Publications, 2001, pp 414, 415

Conservation Act, including the National Parks Act 1980, 'to the extent that the principles of the Treaty are not inconsistent with the provisions of the Acts'. The management plan interpreted this obligation to include 'liaison and involvement with tangata whenua, including consultation.'[512] It is policy to develop and maintain an ongoing effective working relationship. 'This may include the development of principles, processes or protocols to enable iwi to participate in statutory and administrative processes relating to Te Urewera National Park.'[513]

4.2.3.(a). The Aniwaniwa Informal Agreement

An attempt has been made at co-management with the informal partnership initiated at Aniwaniwa between DOC staff and Waikaremoana Maori. Coombes has analysed the Aniwaniwa model. He identified its successes, including the level of trust developing between the parties, but also obstructions to success. These include finance, centralised operating procedures, and decisions on whether a formal or an informal co-management regime is appropriate.[514]

Glenn Mitchell, Area Manager of the Aniwaniwa Area, says that hapu from Ruatahuna and Waikaremoana provide representatives under the agreement. At present, the representatives from Waikaremoana are James Waiwai, Maria Waiwai, and Te Whanau Pani Turipa, although others come and go. Hapu representatives take part in bi-monthly project planning meetings and other permanent or one-off teams such as business planning and the new oxidation pond project.[515] The latter was discussed in chapter three of this report.

Issues of guardianship, conservation philosophy, management, and ownership may prevent all Waikaremoana hapu from participating in co-management of the lakes. In 1998, Lorna Taylor, on behalf of Nga Tamariki o Te Kohu, 'sought the return of the management and control of the land to the descendants of the original kaitiaki of Lake Waikaremoana'.[516] They also sought the cancellation of the 1971 lease and the termination of DOC's management contract because of 'the many failures of DOC and its management regime.' They argued that, from a long-continued relationship with their lands, they had developed the kinds of practices that ensure the preservation of these taonga.

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[512] *Management Plan* 2003, policy 3.2 (a), p 33
[513] *Management Plan* 2003, policy 4.1.2(a), p 36
[514] Coombes (2), pp 243–259
[515] Information supplied by Glenn Mitchell, Area Manager DOC Aniwaniwa, 26 February 2004
[516] Lorna Taylor submission, p 33, Lake Waikaremoana Inquiry hui transcripts, TP 3075, TPK HO Wellington

> It has become more and more frustrating for us therefore to see the eradication of these practices and values that underpin our customary rights and the obligations by the management philosophy and strategies that have been employed by the Department of Conservation and we have come to the conclusion that their role must cease.
>
> Our efforts to encourage the Department of Conservation to institute practices that are consistent with our customary rights have fallen on deaf ears …
>
> Most importantly, we have seen our mana as a people ignored and our special status of kaitiaki of Lake Waikaremoana undermined in the name of upholding a Lease arrangement where we the owners have no say.[517]

The Tuhoe-Waikaremoana Trust Board contested some of these arguments. In their submission to the 1998 Joint Ministerial Inquiry, the board's Trust Manager, T R Nikora, said the 1971 lease had been negotiated by the Waikaremoana Negotiating Committee of owners who were representative and very well-known leaders. The Tuhoe and Wairoa Maori Trust Boards had played no role in the negotiations, other than consenting to the intentions of the Lake Waikaremoana Act 1971. The board therefore believed the lease was executed by the owners before the trust boards received the lease to administer. Responding to points raised by Nga Tamariki o Te Kohu about the lease, sharing of control, and DOC's management, the board declared that the protestors had no legal standing to allege a breach of the lease as they were neither lessor nor lessee. The board's submission stated:

> (32) With regard to some sharing of control, Mr Tokawhakaea Temara is our current representative on the East Coast-Hawke's Bay Conservation Board and who accounts back to the Trust Board, and where all members thereof can then account back to their respective hapu. There has always [been] continuing good communications between the Trust Board and DOC in respect of which the Board has confidence in DOC's management. What needs to be remembered is that the real issue is policy and where people everywhere can participate in at times of review by sending to DOC well thought out and convincing submissions … (42) The Trust Boards as the registered proprietors of the land and Lessor thereof do not allege any breach of the lease by the Crown i.e. the Department of Conservation. Certainly there are matters that remain to be addressed to the Waitangi Tribunal in respect of Crown actions, inactions, policies etc; however they remain to be addressed to the appropriate forum, the Waitangi Tribunal.518

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[517] Lorna Taylor submission, pp 28–29, Lake Waikaremoana Inquiry hui transcripts, TP 3075, TPK HO Wellington

[518] T R Nikora on behalf of the Tuhoe-Waikaremoana Maori Trust Board, draft submission no 37 Lake Waikaremoana Inquiry 1998, p 3 (12. iii, v), p 8 (32), p 10 (42)

The 1998 Joint Ministerial Inquiry team recommended that 'the Department, tangata whenua and the Trust Boards meet and negotiate a formal management agreement for Lake Waikaremoana, that gives tangata whenua a more inclusive and transparent role in issues relating to the management of the leased area at Lake Waikaremoana than at present.'[519] No formal agreement was negotiated.

4.2.4. Conservation Management Objectives

4.2.4.(a). Wilderness Concept as an Overriding Objective

The 1952 National Parks Act introduced the concept of wilderness. Park Boards were given authority to set apart a wilderness area which was then to be 'kept and maintained in a state of nature', without buildings, roads or tracks, and where animals and vehicles were prohibited.[520] This concept was quickly applied to the forests surrounding Waikaremoana's foreshore and was one of the reasons why Lands and Survey and the Park Board were so intent on removing lakeside private huts and campsites and on restricting tourist facilities to a small, circumscribed area of the lake's circumference. But it involved considerable sleight of mind for conservation authorities since, as Geoff Park has stated, 'Redolent with ancestors, names and history, [Te Urewera] is far from the empty, un-peopled land that the word implies.'[521]

Nevertheless, the concept persisted. The national park's first management plan declared, 'There are no designated Wilderness Areas in Urewera National Park but the whole of the Urewera has always been regarded as wilderness and it is an object of management that it remain as such'. Consequently, the specific object of management was to, 'Ensure the ecological well-being and the preservation of the wilderness character of the Urewera National Park.'[522]

In the national park's second and third management plans of 1989 and 2003, the concept of wilderness was restricted to the proposed Ruakituri Wilderness Area in an area just north-east of Lake Waikareiti.[523] The central conservation objective then became the protection of

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[519] J K Guthrie and J E Paki, 'Joint Ministerial Inquiry: Lake Waikaremoana. Report to the Minister of Maori Affairs, Hon. Tau Henare, [& to the] Hon. Dr Nick Smith', 27 August 1998, [1998], p 1
[520] National Park Act 1952, s 34
[521] Geoff Park, *Effective Exclusion? An Exploratory Overview of Crown Actions and Maori Responses Concerning the Indigenous Flora and Fauna, 1912–1983*, Waitangi Tribunal Publications, 2001, p 331
[522] n.a., *Urewera National Park: Management Plan 1976*, (n.p: n.p, 1976), p 11; Coombes (2), pp 279–283
[523] Policy 2.2, p 58, Department of Conservation Rotorua, *Te Urewera National Park Management Plan 1989–1999*, (n.p: East Coast National Parks and Reserves Board, February 1989); East Coast Hawke's Bay

native plant and animal communities and, as far as possible, their preservation.[524] Under the 2003 management plan, this was expanded to include aspects of both nature and culture: scenery, ecological systems, and objects of archaeological and historical interest.[525]

4.2.4.(b). Lake Waikaremoana

None of the management plans headline Lake Waikaremoana but references are made to it throughout the documents. In the 1976 plan, the need for public facilities was recognised, as was the lake's importance as a trout fishery where 'boating for pleasure in terms of quiet exploration' was to be encouraged. High-speed boating, regattas, races and water-skiing were prohibited. All boats, when not in use, were to be removed from the waters.[526] On lake level fluctuations, it was park board policy to ensure adequate and close co-operation with the New Zealand Electricity Department to keep them to a minimum, and to seek compensation and/or remedial work if and when damage occurred.[527]

Under the 1989 management plan, no introduced species of fish were permitted into park waters where only indigenous fish were present.[528] The continued discharge of a small amount of sewage into the lake was a concern because it encouraged the expansion and increasing density of the exotic weed *Elodea* in the Home Bay area. The plan called for monitoring of lake fauna, flora, and water quality by the responsible agencies. These were the Hawke's Bay Catchment Board (soon to become the Hawke's Bay Regional Authority in October 1989) and Electricorp (formerly NZED). The policy was to prevent the discharge and to identify and repair leaks.[529] In relation to the use of the waters for hydro-electricity generation, the policy remained to minimise its effects on the ecology of the lake and lakeshore; and to oppose development that could result in impairment of park values or removal of areas from national park status.[530] Policies on the relationship between boating and the spread of exotic weeds are discussed below. Policies in the 2003 *Management Plan* reiterated the principles outlined above.[531]

Conservancy, *Te Urewera National Park Management Plan*, (Gisborne: Department of Conservation, 2003), pp 57–59

[524] *Management Plan* 1989, Objective One (a), p 53
[525] *Management Plan* 2003, 3.1 Management Objectives 3.1(a), p 32
[526] *Management Plan* 1976, pp 23, 31–32
[527] *Management Plan* 1976, p 36
[528] *Management Plan* 1989, policy 2.7.2, p 62
[529] *Management Plan* 1989, p 14, policy 2.8.4, p 62
[530] *Management Plan* 1989, policies 2.8.6. and 2.8.8., p 63
[531] *Management Plan* 2003, policies 5.2.1–2, pp 48–51

4.2.4.(c). Lake Waikareiti

From the early days of trout release, Lake Waikareiti was thought of and managed differently to Waikaremoana, as chapter two noted. Under national park status, policies for Lake Waikareiti continued to be stricter than for Waikaremoana. In the 1976 *Management Plan*, boating was more restricted. It was limited to a dingy owned by a fishing club, small boats for hire owned by the park board, and the park board's own boat. The objective was to keep the waters 'completely free of pollution'.[532]

This boating policy was continued in 1989, as the lake was one of the few in the North Island reputed to be free of exotic aquatic weeds. It therefore provided an important baseline for research on similar lakes. The habitat quality of the lake was ranked exceptional within the Urewera-Raukumara region.[533] As the islands in Waikareiti, apart from Rahui, were considered to be in a nearly pristine state, and Rahui itself was seen as interesting for its own lake, the Conservation Department policy was to seek specially protected area status for the islands: Motungarara, Motutorotoro, Te Arakoau, Te Oneatahu, Kahuatuwai, and Rahui. Section 12 of the National Parks Act 1980 allowed for the setting aside of such areas. Access to Rahui would be restricted to the existing landing and viewing platform while access to the other islands was to be restricted to those with permits for scientific research or for management purposes.[534]

By 2003, the department had decided not to seek a formal Order in Council for the islands but to protect them through the development of bylaws so that access could be managed in a manner consistent with the specially protected area provisions. But if this policy did not provide adequate protection, policy provided for the department to seek an Order in Council.[535]

4.2.5. Waikaremoana Maori and Management Plans

Consultancy processes for the three Te Urewera National Park management plans have been analysed by Coombes in chapter three of his second report.[536] He has shown that Waikaremoana Maori were in a position to contribute little to the formation of the first plan partly because of developmental planning, distribution and advertising practices. Conservation and recreational interest groups were well organised to make submissions to

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[532] *Management Plan* 1976, p 32
[533] *Management Plan* 1989, pp 15, 17, 37, policies 3.3.5, 3.4.3–4, p 68
[534] *Management Plan* 1989, p 37, policy 2.1, p 58
[535] National Park Act 1980, s 13; *Management Plan* 2003, objective and policy 5.3, pp 52, 53
[536] Coombes (2), pp 270–301

the public participation process. In addition, there appeared to be a feeling amongst park board members that Tuhoe were relicts of the past rather than participants in the present even though, at this time, there were both positive action and protests by radicalised Maori groups throughout New Zealand which led to the establishment of the Waitangi Tribunal in 1975.[537]

Not even the Tuhoe Maori Trust Board was included in the original distribution list seeking input into the first plan. Tuhoe must have discussed the development of the plan because they nominated T R Nikora, of Tuhoe and a surveyor and planning officer with Lands and Survey in Gisborne, to become a member of the planning committee. This nomination was equivocally received by the board, as was Nikora's draft for the history section of the management plan. The trust board appeared satisfied with Nikora's representation of tribal interests.[538]

Some of the procedural impediments, criticised by the Tuhoe-Waikaremoana Maori Trust Board, remained in the preparation for the second management plan.[539] Waikaremoana Maori made submissions but these were largely overwhelmed by those of conservationists and recreation groups. With regard to the lakes, in an echo of the Waimako Pa shareholders in 1929, a Tuhoe hui submitted that trout be recognised and accepted as traditional Tuhoe food to sustain the way of life. They argued that the restrictions of the Wildlife and Fisheries Acts were contrary to the principles of the Treaty of Waitangi.[540]

Conservation authorities amended procedural frameworks for the preparation of the third management plan. They recognised the need to involve a wide variety of Maori groupings including Nga Tamariki o Te Kohu whose lake occupation had procured an investigation of their concerns in the Joint Ministerial Inquiry of 1998. On the lakes, a Napier member of a Ngati Kahungunu group wanted consultation with Tuhoe, Kahungunu and Ruapani before any development and no petrol, oil, or electric water craft on the waters. Another Napier grouping requested, among other petitions, that there should be no trout or exotic fish species, and that sewage should be pumped away. A supplementary submission from Tuhoe opposed lakeshore and other forms of freedom camping because such activities could

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[537] Michael King, *The Penguin History of New Zealand*, (Auckland: Penguin, 2003), pp 481–484
[538] Coombes (2), pp 277–279, 289
[539] Coombes (2), pp 374–395
[540] Coombes (2), p 378 citing 'Tuhoe hunting and access rights. Notes on the deliberations of the tangata whenua of Ruatahuna (MTP 121)…'

fracture the integrity of wahi tapu, wahi pakanga (battle sites), and sites of significant historical importance to Tuhoe.[541]

4.3. The Parasite, *Giardia intestinalis*

4.3.1. Giardia as an Infectious Disease

Giardia was first discovered in 1681 by Antony van Leewenhock, the inventor of the microscope, and scientifically described in 1859. The species, *Giardia intestinalis*, infects humans, cats, dogs, and other animals. It is endemic worldwide. In an infected person or animal, cysts form in the intestine and are excreted. Infection can occur in several ways. It can move from person to person through hand to mouth transfer, and by contaminated food. Animals, such as possums, rats, mice, sheep, cows, hens, dogs, and cats, are sources of human infection. Infection can be passed on through drinking inadequately treated water or from streams as cysts can survive for several months in cold water. Human waste, through camping and tramping activities, and lack of toilets at roadside rest areas, are considered possible sources of infection and may contribute to the spread of giardiasis in New Zealand. Clinical manifestations of giardiasis include diarrhoea, nausea, lethargy, and weight loss.[542]

In New Zealand, giardia is said to have first been detected amongst servicemen returning from overseas in the 1940s, possibly in the Manawatu. However authorities acknowledge that it may have been already present. A scientist formerly with the Ecology Division of the Department of Scientific and Industrial Research, Bob Brockie, considered that it could have arrived with human and animals immigrants in the nineteenth century, or with the first Polynesian settlers much earlier, or that it could be an indigenous species.[543] By 1991, the Department of Health considered that there were between 3000 and 5000 cases of giardia annually. During 1990–91, the department provided funding for four projects that investigated aspects of giardia in New Zealand. These were carried out by the New Zealand Communicable Diseases Centre, Land Resources of Department of Scientific and Industrial Research, Works Consultancy Service and Massey University, whose research continues.[544]

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[541] Coombes (2), pp 395–431, especially 404, 413, 430

[542] E Arnpofo, C P Shaw, E G Fox (Department of Health), 'Giardia and Giardiasis in New Zealand', Paper presented to annual conference, 'For the Public Good', New Zealand Water Supply and Disposal Association, 14-16 August 1991, pp 6-29–6-32

[543] Submission of Department of Conservation, Lake Waikaremoana Joint Ministerial Inquiry, p 29, Submission no 59, TP 3071 vol 3, TPK HO Wellington citing *New Zealand Veterinary Journal*, 1992, vol 40, pp 24–27, and communications from Dr Tim Brown, Massey University and Dr Bob Brockie; Friends of the Urewera p 20, hui transcript Lake Waikaremoana Inquiry, TP 3075, TPK HO Wellington

[544] Massey University Protozoa Research Unit undertakes two types of research; molecular-based research and environmental monitoring: (http://imbs.massey.ac.nz/res/water.htm, 28 February 2004)

Based on the 1990–91 research, departmental officials acknowledged transmission of cysts between children was significant but they also said that many local body water treatment systems were inadequate for the removal of giardia cysts. They recommended the upgrading of facilities. As far as freedom camping was concerned, officials recommended the advice in a Department of Conservation fact sheet.[545]

Today, the Conservation Department advises that giardia 'is mainly spread as a result of poorly disposed toilet waste' and that, if people doubt water purity, they should boil water for at least three minutes before drinking it, chemically treat, or filter it.[546]

4.3.2. Maori Concerns

Claimants have alleged that poor control of tourism and recreational use of Waikaremoana lands and waters have led to the introduction of exotic waterweeds, algae, and parasites such as giardia.[547] The presence of giardia, with its links to the disposal of human wastes by freedom campers and trampers, and sewage seepage into Lake Waikaremoana from government holiday facilities, was also a cause of the 1998 lakeside occupation by Nga Tamariki o Te Kohu.[548] At hui with the Joint Ministerial Inquiry team, and in their submissions, many people expressed their concerns. Some were:

- Anaru Paine: 'In 1971 we never had [g]iardia in our Lake, as late as 1990 we had [g]iardia through the leaking sewage system.'
- Trainor Tait: '[A]s recent as 1993 one of our children had a drink out of the lake and that night we had to call upon one of the fishermen to take him back out because … he started vomiting … and we took it down to the pollution becoming more spread wide.'
- Lorna Taylor said that tests were done on lake waters from 1991 to 1993 but since the latter date, they had not had access to data and were unsure whether further tests were made and results recorded. She submitted verification of test results by the Massey University research unit and suggested 'regular tests should be taken as a natural responsibility of the management regime.'

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[545] Arnpofo et al, pp 6-32–6-34
[546] Department of Conservation, *New Zealand Environmental Care Code*, undated, (http://www.doc.govt.nz//Explore/NZ-Environmental-Care-Code.asp, 10 February 2004)
[547] See 1.4.2. above Urewera Statement of Claims 28.61
[548] Te Aroha Mei p 11; hui transcript from Lake Waikaremoana Inquiry, TP 3075, TPK HO Wellington

- Another speaker mentioned that John Rangihau [a Tuhoe member of the Urewera National Park Board] had investigated and submitted a paper on the appearance of giardia in the lake in the 1970s and that it had been removed.[549]
- A submission on behalf of Te Karanga O Waikaremoana Maori Committee and Nga Tamariki O Te Kohu pointed out that 'water quality has severely diminished to the state where officials are warning visitors to boil water before drinking it.'[550]

The Department of Conservation submission rejected allegations that it was responsible for the introduction of giardia to the lake. It cited steps taken to prevent contamination with human waste, and Brockie's report. It noted that giardia had been recorded once at Waikaremoana, at Okereru Stream in 1991 [which is just east of the oxidation pond] but that the Hawke's Bay Regional Council did not monitor waterways for giardia. Conservation department officials made the assumption that the organism might be present in Lake Waikaremoana and advised visitors accordingly with a fact sheet in huts and visitor centres.[551]

The Inquiry found that contamination of water-bodies with giardia appeared to be an 'inevitable consequence of the human occupation and use of New Zealand's back country, and the spread of mammalian pests over the last four or five decades or so.' [552]

Today, Glenn Mitchell has advised that giardia has been discussed by DOC and Waikaremoana Maori, under the Aniwaniwa informal agreement, and that hapu representatives accept that giardia is carried by animals and birds as well as humans. At the time of the 1998 Inquiry, he wrote, there was a misconception that humans were the sole cause of its existence and spread. Therefore, he continued, even if the spread of giardia by human campers could be prevented, animals and birds could continue to spread the micro-organism through their droppings.[553] Nevertheless, giardia continues to be an issue with some Waikaremoana Maori, as our interviews in November 2003 revealed. Members of Nga Rauru o Nga Potiki, in explaining that Waikaremoana was their lifeline, the source of

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[549] Anaru Paine p 7, Trainor Tait p 23, Lorna Taylor p 30, 'He Wahine', p 25, Lake Waikaremoana Inquiry hui transcripts, TP 3075, TPK HO Wellington

[550] Submission Te Karanga O Waikaremoana Maori and Nga Tamariki O Te Kohu, Submission No 66, Lake Waikaremoana Inquiry 1998, p 21, TP 3071, TPK HO Wellington

[551] Department of Conservation submission no 59 to 1998 Joint Ministerial Inquiry, p 29. Brockie's report was outlined in 4.3.1

[552] Joint Ministerial Inquiry, p 9

[553] Information supplied by Glenn Mitchell, Area Manager DOC Aniwaniwa, 26 February 2004

their water at Tuai and the Wairoa, resented the need to boil it, which they had not done in the past.[554]

4.4. The Exotic Weed, *Lagarosiphon major*

4.4.1. The Arrival of *Lagarosiphon major* in Lake Waikaremoana

Introduced submerged aquatic plant species can overwhelm and replace native plant communities of lakes with dense, surface-reaching beds that restrict light and water circulation, and reduce oxygen levels within the weed beds. They can hinder navigation, foul propellers, make swimming dangerous, interfere with and restrict angling, and block water intakes. They are suspected of reducing fish habitat, and are often considered unsightly. In contrast, native plant species 'have not generally proved troublesome' and are thought to provide cover for fish from predation by shags, trout, and eels.[555]

Lake Waikareiti is entirely free of introduced aquatic plants.[556] Lake Waikaremoana has contained introduced aquatic plants probably since the nineteenth century. Species like *Elodea canadensis* apparently first came to New Zealand with shipments of fish ova imported from Tasmania by the Canterbury Acclimatisation Society in 1868. Until 1998 at Waikaremoana, there were three species: *Elodea canadensis* (Canadian pondweed), *Potamogeton crispus* (curly pondweed), and *Ranunculus tricophyllus* (water buttercup).[557] *Elodea* is now the dominant introduced plant in most suitable habitats around the lake especially in Home Bay. Curly pondweed and water buttercup are well established.[558]

Lagarosiphon major is a more vigorous plant. It was probably first introduced for its ornamental value but was designated a noxious plant in 1982. In New Zealand it is represented by only one sex and therefore relies on the transfer of live, bud-bearing stem fragments for population growth and dispersal. The most likely method of plant transferral is through boats, boat trailers, and fishing equipment especially nets. Although waterfowl

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[554] Rangi Paku, Trainor Tait, Lorna Taylor; interviews 11 November 2003
[555] D K Rowe and E Graynoth, *Fish in New Zealand Lakes: Lake Managers' Handbook*, (Wellington: Ministry for the Environment, 2002), p 71; Brian Coffey, 'Preventive Weed Management Strategy for *Lagarosiphon Major* in Lake Waikaremoana', prepared for Electricity Corporation of New Zealand, August 1996, p 9
[556] *Management Plan* 2003, p 72
[557] Mark James, Mark Weatherhead, Rohan Wells, 'Macroinvertebrate and Macrophyte Communities in Lake Waikaremoana – Effects of Lake Level Fluctuations. Final Report', prepared for ECNZ by National Institute of Water & Atmospheric Research Ltd, February 1999, Executive Summary, p 6; DOC, Submission to the Lake Waikaremoana Inquiry, May 1998, p 20
[558] *Management Plan* 2003, pp 18, 23

can disperse aquatic plants that set seed, transferral of *Lagarosiphon major* by waterfowl has been discounted.[559]

By 1996 it was found in the hydro-electric scheme lakes, Whakamarino and Kaitawa, and its spread to Lake Ngawhakatutu was considered possible. In 1999 *Lagarosiphon major* was discovered in Rosie Bay, Lake Waikaremoana, presumably in the course of the annual check by divers for noxious aquatic weeds in the vicinities of boat ramps.[560] It may have been there for some time as undetected small stem fragments growing inconspicuously beneath the water surface. The stems subsequently fall down and give rise to many new vertical shoots from lateral buds that present a canopy at the water's surface.[561] When it was first discovered, the department employed divers to pluck all plants from the lake-bed and truck it away. This amounted to several tons. Public access by both road and water to Rosie Bay was cordoned off.[562]

As *Lagarosiphon major* is capable of displacing all other submerged plant communities, from approximately one to six metres in depth, the Conservation Department considers that it presents a threat to Waikaremoana and potentially to Waikareiti because of their valuable native aquatic communities.[563] Control measures are being implemented.[564]

At national level there is a Strategy for Managing Invasive Weeds. The department's website enumerates the various means by which fragments of weed can enter waterways. These include: boats, trailers, water skis, and fishing equipment including nets. Owners are asked to check and clean their equipment, and dispose of any weed fragments in the rubbish.[565]

At the local level at Waikaremoana, the department undertakes a number of measures to control and eradicate it. Monthly, divers comb the bed of the lake within Rosie Bay following an underwater grid system of string lines, and pull up all plants seen. Recently only two or three plants per month have been found for 10 to 12 hours of dive time. The department regularly inspects Waikaremoana's shore using a glass-bottom boat and an

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[559] Coffey, pp 5–10
[560] DOC Submission no 59 to 1998 Joint Ministerial Inquiry, p 20
[561] Coffey, p 10
[562] Information from Glenn Mitchell, Area Manager DOC Aniwaniwa, 26 February 2004
[563] *Management Plan* 2003, pp 18, 25
[564] *Management Plan* 2003, p 18

underwater camera. When suspicious-looking plants are seen through the boat, the camera is lowered, the film recorded on tape, and viewed on board the boat. The Global Positioning System location is automatically recorded. A diver is sent down to take a sample. Only one plant of *Lagarosiphon major* has been found. It was at Onepoto, opposite Rosie Bay, in 1999.[566]

The *Management Plan* also allows for the department to consider the future need for controls on boat use which could include the closure of some boat ramps to reduce the number of possible points of entry and the establishment of bylaws to prevent the use of boats on the lake.[567]

The department undertakes an education programme at the lake. Signs are in place at boat ramps and at Waikareiti to warn users to check their equipment. Notices in the motor camp kitchen, store and Aniwaniwa visitor centre provide information about the main weed threats.[568] The department is confident that they will be able to eradicate it, which would be, Mitchell said, the first time this has been achieved
in New Zealand and possibly the world.[569] The Eastern Region of Fish and Game New Zealand acknowledges that it, too, has a role to educate anglers to take adequate precautions to prevent the spread of *Lagarosiphon major*.[570]

4.4.2. Maori Concerns

While *Lagarosiphon major* was not discovered until 1999, concerns about the spread of uncontrollable noxious weeds were voiced at hui for the 1998 Joint Ministerial Inquiry. Riripeti Haley-Paine, who had been a conservation officer at Aniwaniwa, said that aquatic weed had become overwhelming in and around Lake Waikaremoana; that locals could recall a time when it did not exist; and that it was rampant in bays like Home Bay where boats were moored for long periods. She questioned whether kayaks should be allowed on Waikareiti 'so that weed can spoil it'.[571]

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[565] Department of Conservation, *Help Stop the Spread of Aquatic Weeds*, undated, (http://www.doc.govt.nz/Conservation/003~Weeds/01…, 5 February 2004)
[566] Information from Glenn Mitchell, Area Manager DOC Aniwaniwa, 26 February 2004
[567] *Management Plan* 2003, policy 7.1.2(h) and 7.1.2(i), p 72
[568] DOC submission no 59 to Joint Ministerial Inquiry 1998, p 20
[569] Information from Glenn Mitchell, DOC Aniwaniwa, 26 February 2004
[570] Eastern Region Fish and Game Management Plan, draft, undated, p 59, supplied by Rob Pitkethley, Eastern Region Fish and Game, Rotorua
[571] Riripeti Haley-Paine p 35; also Huriana Lawrence p 13, Lorna Taylor p 32, Lake Waikaremoana Inquiry hui transcripts, TP 3075, TPK HO Wellington

The Department of Conservation submitted that Canadian pondweed did not present a significant threat to native flora and fauna and, because of its widespread nature, it would not be practical to remove it.[572] The Joint Ministerial Inquiry team made no comment on aquatic weeds, other than to repeat the Conservation Department explanation of a reflective film often seen on the surface of Waikaremoana. The department acknowledged that the possibility of an oil slick could not be discounted [another Nga Tamariki o Te Kohu concern], but said the reflective film was the result of natural process reactions between water, iron leech from rocks and humic material of decomposing plants. The film did not indicate pollution.[573]

Teariki Mei, of the Wairoa-Waikaremoana Maori Trust Board, suggested at our interview that *Lagarosiphon major* was able to acclimatise itself in Rosie Bay because the bay is not as deep as the rest of the lake and the waters there get fairly warm. He thought that ducks were responsible for the transfer of the weed. Both he and Reay Paku considered that DOC's eradication methods were fairly successful and could be a trial area for the rest of the country. But Paku believed that unfortunately the weed was here to stay, given that boats and ducks come and go between lakes.[574] The weed has been discussed at Aniwaniwa informal agreement meetings. Mitchell described hapu as being 'happy with our efforts'.[575]

4.5. Conclusion

Chapter four examined the Crown's conservation policy, the introduction of giardia, and the introduction and control of exotic aquatic weeds, particularly, the invasive *Lagarosiphon major*.

For much of the twentieth century, aspects of the lakes have been managed by a variety of Crown agencies and statutes. The Departments of Tourist and Health Resorts and of Internal Affairs, and from the 1980s the Eastern Region of Fish and Game New Zealand have managed the trout fisheries. From 1922, the Department of Lands and Survey, the Urewera National Park Board, and then followed by the Department of Conservation and the East Coast Hawke's Bay Conservation Board have managed the conservationist aspects of the lakes' surrounding environments. Lake Waikaremoana, however, did not legally

[572] DOC submission no 59 to Joint Ministerial Inquiry 1998, p 20
[573] Joint Ministerial Inquiry, p 15
[574] Teariki Mei and Reay Paku; interviews 11 November 2003
[575] Information from Glenn Mitchell, 26 February 2004

come under the Urewera National Park Board until 1979, eight years after its lease by its owners to the Crown.

When Te Urewera National Park was gazetted in 1954, it was managed for many years under wilderness precepts of the National Parks Act 1952. Wilderness values continued to be an objective in the national park's first management plan of 1976. The importance of Waikaremoana's trout fishery was recognised. High-speed boating was prohibited. It was policy to work closely with the NZED to ensure lake levels were stabilised. During the 1980s, the conservation objective became the protection of native plant and animal communities under the National Parks Act 1980 that remains the prevailing national parks legislation. This concept underpinned policies in the second management plan of 1989. Under the latest management plan of 2003, the ecological objective was expanded to include the protection and preservation of objects of archaeological and historical interest.

Lake Waikareiti continues to be assessed differently to Waikaremoana in that its waters are free of exotic weeds and its islands are considered to be in a near-pristine state. The latter are a Specially Protected Area Zone. Therefore management plan policies for Waikareiti are strict. Boating is limited to departmental, non-motor craft kept at the lake to minimise risk of weed transfer. Within the lake, public access is permitted only to Rahui Island and restricted to the existing landing and viewing platform.

Apart from establishing the Department of Conservation and new management structures, the Conservation Act 1987 required DOC to give effect to the principles of the Treaty of Waitangi in its management of national parks. The *Management Plan* 2003 interprets this obligation to include 'liaison and involvement with tangata whenua, including consultation'[576], in an ongoing effective working relationship. This policy acknowledges a much greater role for Waikaremoana Maori than previously when Tuhoe and Ngati Kahungunu had one or two representatives on the Urewera National Park Board. In responding to the legislative requirements, the department and some Waikaremoana hapu have attempted co-management under the Aniwaniwa informal agreement. Hapu representatives take part in bi-monthly project planning meetings and in other permanent or one-off teams such as that dealing with the new oxidation pond. Because of issues of ownership, management, and guardianship, not all Waikaremoana Maori feel able to participate in this co-management agreement.

The parasite, *Giardia intestinalis*, is said to have first been detected amongst servicemen returning from overseas in the 1940s but it could have been in New Zealand for much longer. It is endemic worldwide and considered a possibility throughout New Zealand. It infects humans, animals, and birds when cysts form in the intestine and are excreted. Giardia can be transferred from person to person, by contaminated food, inadequately treated water, or poorly disposed human waste. It is also carried by birds and animals. Clinical manifestations of the disease include diarrhoea, nausea, lethargy, and weight loss.

The presence of giardia was one cause of the 1998 lakeside occupation by Nga Tamariki o Te Kohu. As discussed in this chapter, various claimants allege that the Department of Conservation was responsible for giardia's introduction to the Waikaremoana environment through poor control of tourism. The department rejects the allegation. The Area Manager, Glenn Mitchell, says that giardia has been discussed by the department and Waikaremoana hapu within the Aniwaniwa informal agreement and that hapu representatives accept that giardia is carried by animals and birds as well as humans. Therefore, even if the spread of the parasite by human campers could be prevented, birds and animals would continue to disperse it in their droppings.

Exotic submerged aquatic plant species can overwhelm and replace native plant communities, hinder navigation, foul propellers, interfere with angling and are suspected of reducing fish habitat. Several, such as Canadian pondweed, curly pondweed and water buttercup, are likely to have been in Lake Waikaremoana since the nineteenth century and are well established. However *Lagarosiphon major* is more invasive and was declared noxious in 1982. It is thought to spread by the transfer of live, bud-bearing stem fragments, perhaps on boats or fishing equipment, rather than by waterfowl. *Lagarosiphon major* was found in Rosie Bay at Lake Waikaremoana in 1999. It thus presents a threat to Waikaremoana and potentially to Waikareiti because of their valuable native aquatic communities.

The Department of Conservation at Aniwaniwa undertakes a number of measures to control and eradicate *Lagarosiphon major*. When it was first discovered, tons were cleared out and trucked away. Today, divers check Rosie Bay and pull out any plants found. Recently only two or three plants per month have been found. In addition, the department regularly checks the shoreline of Waikaremoana using a glass-bottomed boat, underwater camera, and a

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[576] *Management Plan* 2003, p 33

physical check of any suspicious plant. Signs, providing information about water weeds and the necessity for checking and cleaning boat and fishing equipment, have been placed at boat ramps and at Waikareiti. The Eastern Region of Fish and Game New Zealand also acknowledges that it has an educative role.

As discussed in this chapter, some claimants have alleged that poor control of tourism and recreational use of Waikaremoana lands and waters has led to the introduction of exotic waterweeds. However *Lagarosiphon major* has been discussed by Waikaremoana hapu at Aniwaniwa agreement meetings. The Department of Conservation considers that hapu are satisfied with departmental methods to eradicate it and that the department's success in controlling the spread of *Lagarosiphon major* is an indication of the department's concern, rather than of poor control.

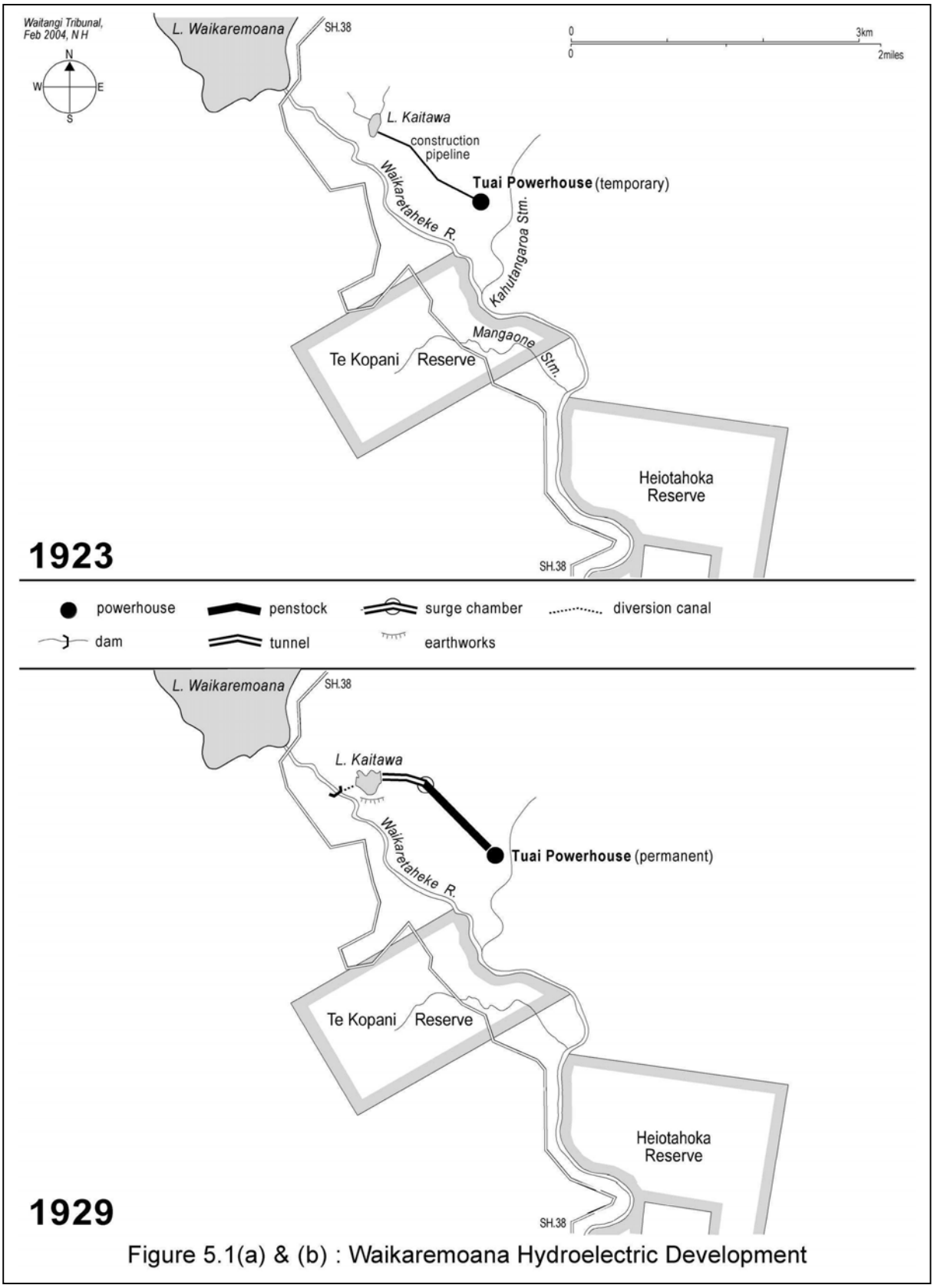

Figure 5.1(a) & (b) : Waikaremoana Hydroelectric Development

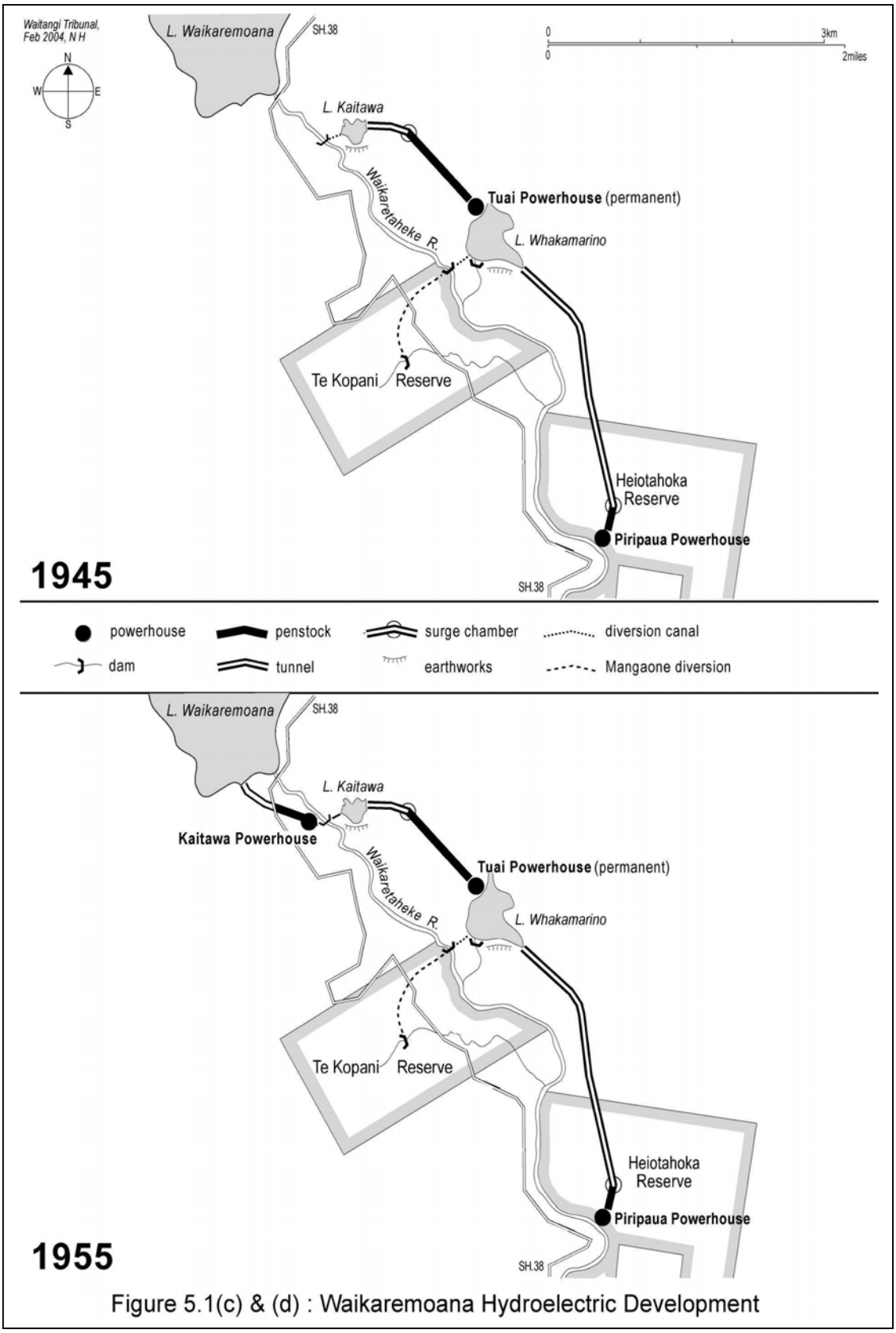

Figure 5.1(c) & (d) : Waikaremoana Hydroelectric Development

PART II

Chapter 5: Hydro-electric Development at Waikaremoana

5.1 Introduction

In the last block of chapters, the focus of investigation was the Crown's management of Lake Waikaremoana as a scenic and natural heritage resource. In this and the next two chapters, that focus shifts to the Crown's management of Lake Waikaremoana as a water resource, and more specifically, as a reservoir for the generation of hydro-electric power. This chapter is concerned with the evolution of hydro-electric development in the area, and its consequences for the lake and its vicinity, whereas the following chapter will consider the changes wrought on Lake Waikaremoana by the artificial modification and management of the lake level since it was lowered in 1946. The rationale for this division is that hydro-electric development, as will be seen, has had environmental impacts over a wide area, whereas the lowered lake levels affect only the lake itself; the changes in lake levels, moreover, have a fairly dynamic operational history to them, whereas many of the environmental impacts from the period of scheme development are, like their progenitors, set in concrete. While these two chapters will also discuss the impacts on Maori in a historic sense, the final chapter will examine the current management structures, in light of the Resource Management Act and devolution of power generation to utilities operating without direct Crown control, and the position of Maori within those management structures.

5.2. Lake Waikaremoana and the Upper Waikaretaheke River valley: Physical Setting and Hydrology

Lake Waikaremoana is the fourth largest lake in the North Island, behind Lakes Taupo, Rotorua, and Wairarapa. When at the top of its normal operating range, the lake has a surface area of approximately 53 sq. km, about three-quarters of which is taken up by the main body of the lake, while the remainder is taken up by its western arm, which is

named Wairaumoana.[577] Its normal operating range for hydro-electric generation lies between 580.29 and 583.29m above mean sea level, as measured against the Moturiki datum (defined by the Department of Survey and Land Information in 1990). This can be converted to the traditionally employed Kaitawa datum (New Zealand Electricity Department) by adding 27.51m, thus giving the often cited operating range of 607.80-610.80m (1994-2004 ft).[578] The Kaitawa datum, the use of which will be indicated by the abbreviation KD (as opposed to MD for the Moturiki datum) during the remainder of this chapter, seems to have been adopted by the New Zealand Electricity Department in 1916, when it adopted the elevation 2015ft (KD) as the height of the lake, in its pre-hydro-electric development state.[579] Nevertheless, the legally defined natural lake edge, as employed in the Lake Waikaremoana Act 1971, was at elevation 2020ft (KD), which equates to 588.19m above sea level (MD).[580]

Lake Waikaremoana is even more notable for its depth, in that it is the deepest lake in the North Island. Its steep submarine topography means that only 13 percent of the lakebed lies within 17m of the surface, and its lowest point is just 335m above mean sea level (or 248m below the surface at maximum operational level).[581] The depth of the lake means in turn that its water is remarkably free of sediment, and hence water clarity is very high. This was in fact one of the initial attractions of Lake Waikaremoana for hydro-electric development.[582]

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[577] Electricity Corporation of New Zealand Ltd. (ECNZ), 'Waikaremoana Power Scheme: Assessment of Effects on the Environment, 1998, p 47; J C Allan, W J Stephenson, A Taylor, & R M Kirk, 'Monitoring Shoreline Change and Development at Lake Waikaremoana for Shoreline Management : a report to the Electricity Corporation of New Zealand', 1999, p 4

[578] ECNZ, 'Waikaremoana Power Scheme', pp 33-34; Allan et al. , 'Monitoring Shoreline Change', p 2. Although the formal differential between the two datums is 27.51m, it should be noted that an informal differential of 90ft (or 27.3m) was sometimes used to make the conversion (see Urewera National Park Board, 'Submission to the Regional Water Board (Hawke's Bay Catchment District) re the setting of maximum and minimum water levels for Lakes Waikaremoana', 14 April 1980, Appendix A). Nature Conservation Council, Lake Waikaremoana (levels, sealing) (AAZU 3619, 09/11/68, Box 7, Archives NZ (ANZ), Wellington)

[579] D G Jeffery, Chief Surveyor, Gisborne, to the Surveyor-General, Wellington, 10 October 1967. Urewera National Park - General file (UNP 4/4 no. 239), DOC East Coast / Hawke's Bay Conservancy, Gisborne). During 1916, G P Anderson (Public Works Department) had collected survey data in relation to the lake outlet (G G Natusch, *Power from Waikaremoana: A History of Waikaremoana Hydro-Electric Power Development*, Gisborne, Te Rau Press Ltd. for Electricorp Production (Waikaremoana Power Stations), p 8).

[580] Lake Waikaremoana Act 1971, Schedule.

[581] Allan et al., 'Monitoring Shoreline Change', p 4; ECNZ, 'Waikaremoana Power Scheme', p 47

[582] G Nelson, cited in T Lambert, Wairoa Electric Power Board. Souvenir to mark the first stage in the Hydro-Electric Development of Lake Waikaremoana, Napier, 'Herald' Print, 1923, [p 9]

The lake's natural outlet is the Waikaretaheke River, which leaves the lake at its south-east corner, but as will be seen during the course of this chapter, hydro-electric development - in particular, lake lowering and the construction of siphons - has largely made this outlet redundant. Having said this, the flow in the outlet was intermittent prior to hydro-electric development, despite the large catchment of the lake (347 sq km^2), and the high precipitation in the region, which amounts to 2300mm per annum.[583] The reason for this intermittent flow - it carried water only 40-50 percent of the time[584] - was that water in the lake was able to drain through the earth barrier which lay across the top of the Waikaretaheke Valley, and re-enter the Waikaretaheke River downstream. The earth barrier is thought to have been created about 2200 years ago by two giant landslides; the material in the first seems to have lost its original structure, and hence upon coming to rest formed a compact mass, impervious to water, but the material involved in the second slip, which in part weighed down upon the material from the first, retained its structure, and thus formed a severely fractured mass through which water could pass.[585] It is estimated that when the lake was at its normal pre-hydro-electric development level, seepage through the barrier would have amounted to 15.5m^3/s. This compares with a historic average flow in the Waikaretaheke River downstream of the lake of 17m^3/s, and a minimum flow of 12.4m^3/s.[586] Since run-off and lake overflow at a time of minimum river flow were probably negligible, the latter instance gives an approximate minimum historic seepage rate.

Two other much smaller lakes in the Waikaretaheke Valley, namely Lake Kaitawa and Lake Whakamarino, also play an integral part in hydro-electric development in the district. As is shown in Figure 5.1 (a series of maps showing the chronological development of the various hydro-electric schemes at Waikaremoana), the first body of water to be used for hydro-electric generation in the region was Lake Kaitawa, which lies only about 1km from the outlet of Lake Waikaremoana. This small temporary scheme, which was initiated by the Wairoa Electric Power Board in 1920, and built on

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[583] M E Livingston, B J Biggs, & J S Gifford, *Inventory of New Zealand Lakes. Part 1: North Island*, Water and Soil Miscellaneous Publication 80, Wellington, Government Printer, 1986, p 148; ECNZ, 'Waikaremoana Power Scheme', p 42

[584] ECNZ, 'Waikaremoana Power Scheme', p 36.

[585] ECNZ, 'Waikaremoana Power Scheme', p 43; G P Anderson, 'Waikaremoana: the Problem of Lake Control', *Proceedings of the New Zealand Institution of Engineers* 34, 1948, pp 510-513.

their behalf by the Public Works Department - the powerhouse becoming operational in 1923 - exploited the fall between this lake and Whakamarino Flat, a further 1.3km down the valley.[587] For the purposes of the scheme, a rough timber and boulder dam maintained the level of the spring-fed lake at 1565ft (KD) (449.5m (MD)), and its area was just under 1ha. The turbines in the Board's powerhouse on the Flat, incidentally, had an elevation of 897ft (KD), thereby giving a total head of 668ft(204m).[588] The lake underwent a major change, however, with the completion of the Middle Waikaremoana (Tuai) Power Development in 1929 (see Figure 5.1(b)). In the course of this development, a weir was built across the Waikaretaheke River and a 250m long water race or canal (as it is variously described) was cut to allow its flow to be diverted into the lake. The lake level was also raised by 10ft, that is, to 1575ft (KD) (452.5m (MD)), a task that required the construction of a low earth dam on its south-west side. Lastly, a channel was formed in the new lakebed to allow access to the Tuai Power Scheme intake.[589] Further hydrological change, depicted in Figure 5.1 (c) & (d), resulted from the Upper Waikaremoana (Kaitawa) Power Development, and Lake Waikaremoana lakebed sealing programme, which were completed in 1948 and 1955 respectively. As a result of these two projects, the Waikaretaheke River ceased to carry much of the outflow from Lake Waikaremoana; it instead travelled through the system of tunnels and penstocks which fed water to the Kaitawa powerhouse, and only re-entered the Waikaretaheke River (via the powerhouse tailrace), at the point of the river's diversion into Lake Kaitawa. In the meantime, the weir was replaced by a dam (the Kaitawa Spillway Structure), fitted with gates which spilled flow surplus to that needed by Lake Kaitawa into the downstream riverbed, and the canal upgraded. Subsequently, a new weir was also built further upstream in the Waikaretaheke River; by measuring its flow, the new weir was able to gauge how much water was bypassing the Kaitawa

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[586] ECNZ, 'Waikaremoana Power Scheme', p 36; Anderson, 'Waikaremoana', p 508. Anderson gives the original historic flows as 600 cusecs for the average flow, and 73 percent of the average for the minumum.

[587] Natusch, pp 10-1. Measurements are taken from I R Robinson & R H Packwood, 'Lake Waikaremoana Power Development', *Proceedings of the New Zealand Institution of Engineers* 12, 1926, p 290A.

[588] ECNZ, 'Waikaremoana Power Scheme', p 53; Robinson & Packwood, pp 281-282 & 286.

[589] Robinson & Packwood, pp 280-281; T Lambert, East Coast Local Bodies' Waikaremoana Souvenir: to mark the official opening of Lake Waikaremoana Hydro-Electric Station by His Excellency the Governor-General,20th November, 1929, Napier, Dinwiddie, Walker & Co., 1929, pp 47 & 49; G P Anderson, 'The Waikaretaheke Weir', Proceedings of the New Zealand Institution of Engineers 18, 1932, pp 190-191 & 200-201; Natusch, pp 16-17. As the reference in Lambert indicates, the lake was raised in the 1920s, not in the 1930s, as suggested in ECNZ, 'Waikaremoana Power Scheme', p 53. Some sources give the raised height as 1576ft (KD) e.g. Natusch, map facing p 76.

powerhouse, in the same way that its immediate predecessor had been used to determine - through the gauging of the weir's overflow - how much water was bypassing the Tuai powerhouse.[590] The new weir has revealed that since sealing, the seepage through the lakebed of Waikaremoana into the Waikaretaheke River upstream of the diversion dam has only amounted to 4-6m^3/s; this compares with a maximum flow through the Kaitawa powerhouse of 36.5m^3/s.[591] Nowadays, the enlarged Lake Kaitawa covers an area of about 6ha, and has an operating range of between 450.1-453.5m (MD); the Waikaretaheke River, meanwhile, is usually dry below the Kaitawa Spillway Structure.[592]

Lake Whakamarino, which receives water from Kahutangaroa Stream, the Tuai (Middle Waikaremoana) Scheme powerhouse, and the diversion of the Waikaretaheke River, is an artificial lake that covers approximately 30ha of the old Whakamarino Flat.[593] Previously, this was the site of a natural lake, but it had been silted up by deposits from Kahutangaroa Stream, which flowed into the flat from its northern side.[594] Through the construction of an earth dam and spillway, the flat was flooded in 1942.[595] Lake

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[590] J E Martin, *People, Politics, and Power Stations: Electric Power Generation in New Zealand 1880-1990*, Wellington, Bridget Williams Books for Electricity Corporation of New Zealand, p 105; Natusch, p 45; Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ. Hawke's Bay Regional Council Officer's Report', [1998], p. 1 ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence (Hawkes Bay Regional Council, Napier); Anderson, 'The Waikaretaheke Weir', pp 190-191 & 200-201. Not all the Lake Waikaremoana outflow escaping the Kaitawa powerhouse is measured by this weir - as Anderson observes two of the lake-derived springs (namely Bush and Fairy Springs) empty into Lake Kaitawa, and one (Quarry Spring) discharges still further down the Waikaretaheke catchment. The new measuring weir, built just upstream from the Kaitawa powerhouse tailrace, dates from around 1955 (C W O Turner, 'Annual Report on Public Works by the Engineer-in-Chief', in 'Ministry of Works Statement' ('Associated Reports of Divisional Controlling Officers', AJHR, 1956, D-1, p 41).

[591] ECNZ, 'Waikaremoana Power Scheme', pp 21 & 36-37.

[592] Ibid; T Hickman, Environmental Manager, Genesis Power Ltd., to C McClellan, Hawke's Bay Regional Council, 5 May 1999, & T Waugh, Hawke's Bay Regional Council, to Genesis Power Ltd., 13 October 1999. ECNZ - Waikaremoana Power Scheme WP982001T &c. File 5 of 5 (Hawkes Bay Regional Council, Napier)

[593] ECNZ, 'Waikaremoana Power Scheme', pp 23 & 55. The modern powerhouse at Tuai lies at elevation 902ft (KD) (247.3m (MD) (Natusch, map facing p 76).

[594] Natusch, p 14. A small remnant lake is shown on a map in Robinson & Packwood, p290A. There was also a small stilling pond on the Whakamarino Flat where water exited the Tuai Scheme powerhouse, which was needed to maintain water in the turbine tubes (on the downstream side). This pond was enclosed by a small weir, which remains in place today, albeit submerged (Natusch, pp 14-15).

[595] Natusch, p 56. It has been reported that the dam needed to create the lake was built in 1940 (Natusch, p 15), but it is certain that flooding did not occur until 1942, as an official report of work in the 1941/2 year noted that the impending lakebed was being cleared of vegetation (W L Newnham, 'Annual Report on Public Works by the Engineer-in-Chief for the year ending 31st March 1942', in 'Public Works Department (Annual Report)', Appendix B. AJHR, 1942, D-1, p 12). Presumably some passage was left for water to flow around the dam works prior to 1942.

Whakamarino's major inflow comes from the Tuai powerhouse and tailrace (up to a maximum of 42m³/s), but as at Lake Kaitawa, the normal flow of the Waikaretaheke River (which was at least 1m³/s, and sometimes much more, along the adjacent stretch of the river) was diverted into the lake by way of a diversion dam and canal; between 1945 and 1998 the canal also received water (about 0.6m³/s) from Mangaone Stream, a southern tributary of the Waikaretaheke River, which was piped into the Waikaretaheke River just upstream from this second diversion dam. The mean natural inflow from Kahutangaroa Stream, meanwhile, is 0.75m³/s.[596] The new lake had a maximum elevation of 903ft (KD) (247.6m (MD), thus raising it 19ft (5.8m) above the average height of Whakamarino Flat. Today it has an operating range of 248.1-246.3m (MD).[597] It should also be noted that the new Lake Whakamarino is subject to silting up like its natural precursor; to this end, 80,000m³ of sediment were dredged from the lake in 1987-8.[598]

The last part of the Waikaretaheke River catchment used in hydro-electricity generation is the fall between Lake Whakamarino and Piripaua, which lies at elevation 530ft (KD) (134.0m (MD)).[599] Water can flow from the former to the latter by one of two routes: either down 4km of the Waikaretaheke River, or through the 3.2km of tunnel and penstocks associated with the Lower Waikaremoana (Piripaua) Power Development.[600] Generally this stretch of the Waikaretaheke River contains little water nowadays, with the typical flow at Piripaua being only 0.2m³/s, although the spillway at Lake Whakamarino, which allows water along the remainder of the old Kahutangaroa Stream bed and into the Waikaretaheke River, can release up to 52m³/s during periods of flooding, or when the Piripaua Scheme powerhouse is out of action. The maximum flow through the tunnel and penstocks to the powerhouse, meanwhile, is 49m³/s.[601]

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[596] ECNZ, 'Waikaremoana Power Scheme', pp 23 & 36-38; Natusch, p 38. The maximum recommended flow along the canal intake is 27m³/s; with flows higher than this, there is a danger of riverbed scour, and sediment deposition in the canal's siphon (ECNZ, 'Waikaremoana Power Scheme', p 23).

[597] G P Anderson & W A Bloodworth, 'Waikaremoana Lower Development', *Proceedings of the New Zealand Institution of Engineers* 30, 1944, p 194; ECNZ, 'Waikaremoana Power Scheme', p 23; Hickman to McClellan, 5 May 1999, & Waugh to Genesis Power Ltd., 13 October 1999. ECNZ - Waikaremoana Power Scheme WP982001T &c. File 5 of 5 (Hawkes Bay Regional Council, Napier)

[598] Natusch, p 39

[599] Ibid., map facing p 76. The Piripaua powerhouse elevation is at 532ft (KD) (134.2m (MD)).

[600] The measurements for the length of the course of the Waikaretaheke River, and of the combined length of tunnel and penstocks respectively, are taken from the following two sources: P S Hay, 'New Zealand Water Powers, etc. [Report on]'. AJHR, 1904, D-1A, follows p 38 (Map no. 9); Anderson & Bloodworth, p 193.

[601] ECNZ, 'Waikaremoana Power Scheme', pp 23, 26, 28 & 37.

5.3 Description of Present Hydro-electric Works in the Lake Waikaremoana District

The development of hydro-electric generation in the Lake Waikaremoana / upper Waikaretaheke River catchment has, as seen in Section 5.2, three components to it: the Upper Development which utilised the fall between Lake Waikaremoana and Lake Kaitawa, the Middle Development which utilised the fall between Lake Kaitawa and what was formerly Whakamarino Flat (and is now Lake Whakamarino), and the Lower Development which utilised the fall between Lake Whakamarino and the downstream course of the Waikaretaheke River. For the sake of abbreviation, these power developments are commonly known by the site of their associated powerhouses:

Kaitawa	=	Upper Waikaremoana Power Development
Tuai	=	Middle Waikaremoana Power Development
Piripaua	=	Lower Waikaremoana Power Development

All three schemes were built separately, but each was seen as a step towards completion of an overall development that was planned from the start. Indeed, serious investigation of the area's hydro-electric potential began in 1904, when it was ascertained that there was approximately 1420ft of fall in the space of 4 miles (6.4km) - this is not too dissimilar to the maximum fall of 1474ft (449m) today.[602] The next step was to determine how best to distribute this fall; costings of various schemes were put forward, and although the current three-step outcome was not the cheapest, it was thought close enough to be proceeded with, as being in three stages, it was the easiest to implement.[603] The first stage to be undertaken was the Tuai Scheme, which was built during the years 1926-9 (although, as mentioned above, a small, temporary power development at Tuai was completed for the Wairoa Electric Power Board by 1923).[604] This was followed by a hiatus in development, occasioned by the decrease in demand for electricity that accompanied the Great Depression. Once demand returned, however, the other two schemes were built in quick succession; the main periods of construction in the Piripaua and Kaitawa power schemes were 1938-43 and 1943-8 respectively. The final major

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[602] Hay, AJHR, 1904, D-1A, pp 6-7. The figure 1474ft is derived by taking the maximum operating level of Lake Waikaremoana - 2004ft (KD) - and subtracting from this the elevation of the Waikaretaheke River at the Piripaua powerhouse - 530ft (KD).
[603] Robinson & Packwood, pp 278-280
[604] Natusch, pp 10-11

phase of hydro-electric development, namely the sealing (as far as practicable) of the leaks in the lakebed of Lake Waikaremoana, was completed in 1955.[605] As demonstrated by Figure 5.1 (d), which shows the layout of the component power schemes, the resulting structures were both numerous and spread across a wide area within the Waikaretaheke valley.

Only the Kaitawa Power Scheme (Upper Development), and the associated lakebed sealing work, concerns Lake Waikaremoana. The disposition of works at the lake in shown in Figure 5.2. On the lake itself there are two main structures, the tunnel intake (which the water destined for the Kaitawa powerhouse enters) at Te Kowhai Bay, and the nearby siphons / spillway system, located where the Waikaretaheke River left the lake at Te Wharawhara Bay.[606] The tunnel intake structure consists of a U-shaped amphitheatre, the floor of which is at 1960 ft (KD) (569.9m (MD)), into which a series of steps have been excavated and concreted. From here water enters, via a short vertical shaft (akin to a bath plughole), a 10ft (3.05m) diameter tunnel.[607] Using this intake, it is possible to lower the lake level to as little as 1970ft (KD) (572.9m (MD)).[608] Since 1960 the mouth of the intake has also been protected by a 50mm mesh steel screen that was

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[605] Martin, pp 98, 102 & 105; T Walzl, 'Waikaremoana: Tourism, Conservation, & Hydro-electricity, 1870-1970', report commissioned by Waitangi Tribunal, October 2002 (Wai 894 record on inquiry, doc A73), p 308. Martin gives 1939 as the start date for Piripaua, but as noted in Walzl, construction of the surge chamber began in 1938.

[606] See map in R Gallen & A North, *A Souvenir Booklet of Waikare-moana, Wairau-moana, and Waikare-iti*, [Aniwaniwa,] Te Urewera National Park Board, 1977, p 50. Some other sources refer to the tunnel intake as being at Onepoto Bay (e.g. ECNZ, 'Waikaremoana Power Scheme', p 19), but as the map in Gallen and North indicates, this is the name of the bay adjacent to the intake site.

[607] N R Carter, 'Construction work at Waikaremoana Upper Power Development', *Proceedings of the New Zealand Institution of Engineers* 34, 1948, pp 177, 190 & 223-224

[608] *Gisborne Herald*, 26 January 1956, *Daily Telegraph* (Napier), 14 July 1958, & 15 July 1958. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington).

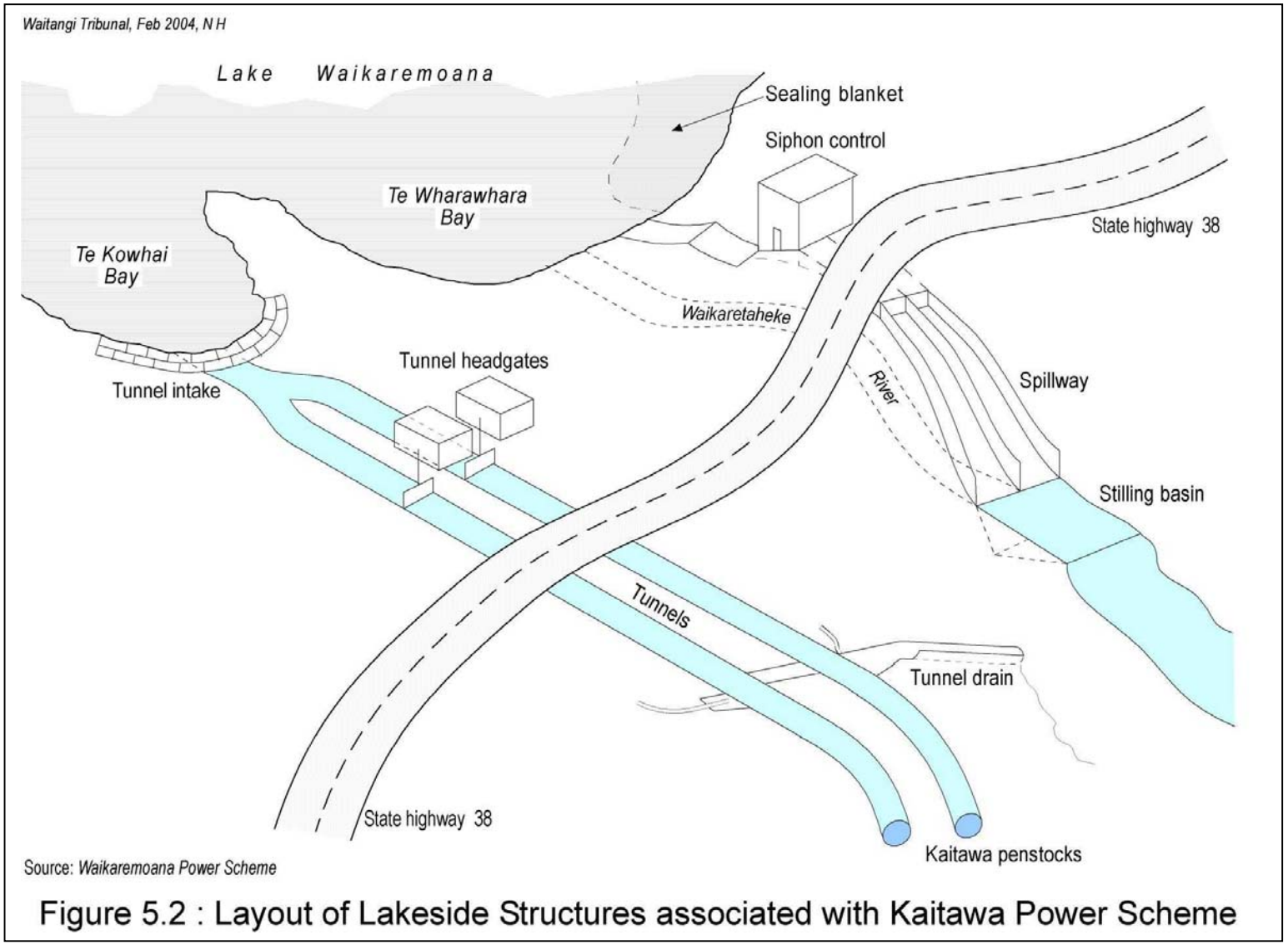

Figure 5.2 : Layout of Lakeside Structures associated with Kaitawa Power Scheme

added in order to prevent fish and other waterborne debris being carried into the tunnel.[609]

The existing siphons, which consist of two concrete conduits which extend underwater about 100m from the lakeshore, date from 1955.[610] These siphons, which are able to draw the lake level down to as low as 576.3m (MD) (1981ft (KD)),[611] replaced three 4ft (1.2m) diameter pipes which were first used as temporary siphons in early 1946.[612] The purpose of the original siphons was to draw water from Lake Waikaremoana and discharge it into Waikaretaheke River, so that there would be more water available for generating hydro-electricity in Lakes Kaitawa and Whakamarino; it may be recalled from Section 5.2, that both these two lakes had diversion canals associated with them, which captured water flowing in the Waikaretaheke River. The drawdown of Lake Waikaremoana was also advantageous for the construction of the Kaitawa Power Scheme, which carried on until 1948.[613] Now that the Kaitawa Scheme allows additional water to be taken for hydro-electricity generation directly, the present siphons serve more of a back-up role, in that they allow for Kaitawa to be bypassed if its component tunnels, penstocks or powerhouse are out of action for any reason, and they also allow water to be spilled from Lake Waikaremoana in case of abnormally high inflows. To this end they can accommodate flows of up to $34m^3/s$.[614] The crest of the present siphons is at 2006ft (KD) (583.9m (MD), or 9ft (2.7m) below the old outlet level, but as these can be stopped by gates in the control house, Lake Waikaremoana can still be filled to 2011ft (KD) (585.51m (MD), that is, 2.22m above the normal operating level, at which point water can flow through a spillway built atop the siphons. Even during

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[609] ECNZ, 'Waikaremoana Power Scheme', p 19; *Hawke's Bay Herald Tribune*, 17 May 1960. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington). See also Natusch, p 47.

[610] ECNZ, 'Waikaremoana Power Scheme', p 19; Electricity Corporation of New Zealand Ltd. (ECNZ) (Fuel Resources Group), 'Waikaremoana Consents Project - Lake Section Consents', Plan no. L826/3 (follows p. 5). ECNZ / Genesis - Lake Waikaremoana (2 files) (Hawke's Bay Regional Council, Napier); F Langbein, 'Annual Report on Public Works by the Engineer-in-Chief', in 'Ministry of Works Statement', Appendix C. AJHR, 1949, D-1, p 36; Turner, AJHR, 1956, D-1, p 41

[611] *Gisborne Herald*, 26 January 1956. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington)

[612] F T M Kissel, 'Annual Report of the General Manager for the year ended 31st March, 1946', in 'State Hydro-Electric Department Annual Report', Appendix A. AJHR, 1946, D-4, p 8; F T M Kissel, 'Annual Report of the General Manager for the year ended 31st March, 1947', in 'State Hydro-Electric Department Annual Report', Appendix A. AJHR, 1947, D-4, p 14. It should be noted that Natusch mistakenly gives the number of temporary siphons as four (Natusch, p 49).

[613] ECNZ, 'Waikaremoana Power Scheme', p 18

[614] Ibid., pp 19 & 21

Cyclone Bola, the severest test on the lake since the level was subject to regulation, the spillway did not have to be used, however.[615] Because of the potential of extreme flows to scour the bed of the Waikaretaheke River, it should be noted that at the point of discharge from the siphon tubes and spillway, there is firstly a stilling basin (which also entrains air in the siphon when it is not in use), and secondly a concrete apron, which acts as a shield on the river-bed.[616]

A third 'structure' associated with hydro-electric development at Lake Waikaremoana is the lake's 'sealing blanket', which was created between 1948 and 1955. This covers up the entrances to the former leaks in the lakebed, which were identified in Te Wharawhara Bay. In profile, the 'sealing blanket' is not unlike a chip-sealed road, in that it has a foundation composed of layers of graded fill, ranging from crushed rock at the bottom to clay at the surface, and finally a rough surface coating, made up of small rocks and gravel. The role of this coating is to protect the softer layers immediately underneath it from abrasion by wave action.[617] From the available documentation it has not been possible to determine the area covered by the 'sealing blanket', but a sketch map drawn in the late 1970s, when there were proposals to expand the sealing over more of Te Wharawhara Bay,[618] indicates that it was approximately 0.75ha.[619]

Downstream from Lake Waikaremoana, of course, there are a whole host of structures associated with the Kaitawa, Tuai and Piripaua Power Schemes, several of which were referred to in Section 5.2. To start with the Kaitawa Power Scheme, water enters the tunnel intake at Te Kowhai Bay, and then travels approximately 220m inland, at which point the single 10ft (3.05m) diameter concrete tunnel divides into two 8ft 3in (2.5m)

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[615] ECNZ, 'Waikaremoana Consents Project - Lake Section Consents', Plan no. L826/3 (follows p. 5). ECNZ / Genesis - Lake Waikaremoana (2 files) (Hawke's Bay Regional Council, Napier; Natusch, pp 49 & 67-68; ECNZ, 'Waikaremoana Power Scheme', p 21

[616] ECNZ, 'Waikaremoana Power Scheme', pp 19 & 21. See also Natusch, p 68.

[617] F Langbein, 'Annual Report on Public Works by the Engineer-in-Chief', in 'Ministry of Works Statement' ('Associated Reports of Divisional Controlling Officers'), AJHR, 1950, D-1, p 22

[618] Divers found previously undiscovered leaks in 1978, but as will be seen later in this chapter, no further sealing work was carried out, due to a number of cultural and environmental concerns. H J Freestone, R Jack & J Bowler, 'Lake Waikaremoana Hydrology, Pt. 2: Lake Waikaremoana Natural Levels Report', 1996, p 11; E Stokes, J W Milroy, & H Melbourne, *Te Urewera: Nga iwi, te whenua, te ngahere*, Hamilton, University of Waikato, 1986, p 216

[619] See copy of map in extract from P Mylechreest, 'Some effects of a unique hydro-electric development on the littoral benthic community and ecology of trout in a large New Zealand lake' (M Sc thesis in Zoology, University of British Columbia), p 12. Nature Conservation Council, Lake Waikaremoana (levels, sealing) (AAZU 3619, 09/11/68, Box 7, ANZ, Wellington)

diameter steel-lined tunnels.[620] In the course of constructing these tunnels, large amounts of 'grout' (a sand-cement mix) were injected into crevices in the natural earth barrier, in order to stop external water flow into the tunnels. Ultimately, however, this grouting also impeded water flow through the barrier, thus complementing the subsequently installed 'sealing blanket'.[621] Near the start of the two tunnels, meanwhile, are two headgate shafts, which allows the flow through the tunnels and penstocks to be stopped whenever this is necessary (such as for maintenance purposes). The shafts also used to be the site where debris was filtered out from the tunnel flow, until the decision was made to add screens to the intake itself.[622] The water travels a further 275m in these smaller tunnels, and then passes into two 7ft (2.1m) diameter steel penstocks, which take it the 670m to the Kaitawa powerhouse.[623] Provision was also made for water to be discharged from the penstocks directly into the river - whenever the Kaitawa powerhouse was out of action - through the use of disperser valves; this plan was abandoned, however, when in testing the water jets from the valves were found to overshoot the powerhouse tailrace, and this role has been taken over by the siphons in any case.[624] Having said this, the penstocks associated with each scheme retain a drain that allows them to be de-watered once inflow has been stopped.[625] The Kaitawa powerhouse contains two Francis-type turbines, which, since the recent refurbishment programme undertaken at the three powerhouses, have been together capable of generating 35 MW[626] - by way of comparison, in 1989 the eight dams on the Waikato River had power stations with a generating capacity ranging from 51 to 360 MW.[627]

The corresponding stretch of the Waikaretaheke River contains only one structure in addition to the combined siphons/spillway/stilling basin at the Lake Waikaremoana outlet. This is the present-day measuring weir, sited just upstream from the Kaitawa

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620 ECNZ, 'Waikaremoana Power Scheme', p 19; Carter, p 177.
621 Carter, p 198
622 ECNZ, 'Waikaremoana Power Scheme', pp 19-20; Natusch, p 47; Tracy Hickman, Environmental Manager, Genesis Power, pers. comm., 19 March 2004. In the final clearance of the headgate screens, the debris removed included an old tyre and a dead goat (*Hawke's Bay Herald Tribune*, 17 May 1960. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington)).
623 Carter, pp 174 & 177
624 Natusch, pp 46-47
625 ECNZ, 'Waikaremoana Power Scheme', p 30
626 Ibid, pp 21 & 31. The alignment of the turbines at Kaitawa is 'vertical', that is, spinning on a vertical axis.
627 *New Zealand Official Yearbook [1990]*, 94th ed., Wellington, Department of Statistics, 1990, p 489

powerhouse tailrace. This seems to be have been the third built on the river. It has been noted already that it replaced one which had the dual role of diverting water into Lake Kaitawa for the Tuai Power Scheme; prior to the Tuai Scheme, however, there was a measuring weir at the Lake Waikaremoana outlet, which, as seen in a photograph published in 1923, occupied the site of the modern siphons.[628]

As seen earlier, the point where the Kaitawa powerhouse tailrace joins the Waikaretaheke River is also the site for the Kaitawa Spillway Structure which diverts water into Lake Kaitawa, via a concrete canal approximately 250m in length. The lake itself, it may be recalled, also has associated earthworks, namely the low earth dam on its south-west side, and the 150m long formed channel that leads to the Tuai Power Scheme intake. From the intake, water travels approximately 240m in a 12ft (3.6m) diameter concrete-lined tunnel under Kaitawa Ridge, before emerging into a cylindrical surge chamber (30m diameter by 9m deep), the purpose of which is to keep the penstocks free from sudden changes of water pressure.[629] Beyond the surge chamber there are three 1100m long steel penstocks, of varying diameter; after starting out at 6ft6in (2.0m), they reduce in size to 6ft (1.8m) and finally to 5ft 6in (1.6m).[630] Two of the three penstocks were constructed in 1929, whereas the third was built in 1939, after it was decided to add a generator to the Tuai powerhouse.[631] In combination, the three Francis-type turbines in the Tuai powerhouse are capable of generating 58MW.[632]

From the Tuai powerhouse tailrace, water is discharged directly into Lake Whakamarino. As seen previously, the lake also receives water from the Waikaretaheke River, via diversion by a concrete dam at Tuai (the Waikaretaheke Diversion Structure). The Waikaretaheke Diversion Structure has two sets of gates: one for spilling surplus flow (like that of the Kaitawa Spillway Structure), and the other to give entry to a canal which takes water under the bed of the Waikaretaheke River, via an invert siphon. This

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628 It is not known when this first measuring weir was constructed. See T Lambert, *Wairoa Electric Power Board. Souvenir to mark the first stage in the Hydro-Electric Development of Lake Waikaremoana*, Napier, 'Herald' Print, 1923, [p 4]

629 Martin, p 98; Natusch, p 16 & map facing p 76; ECNZ, 'Waikaremoana Power Scheme', p 23. Sudden pressure changes can threaten the structural integrity of the penstocks. In 1982, for example, a faulty relief valve on Tuai's no. 3 penstock caused several sections to rupture, and put the penstock out of action for several months (Natusch, pp 24-25).

630 Martin, p 98; Natusch, map facing p 76

631 Martin, pp 99 & 102.

canal continues on the other side of the siphon, and after skirting around Tuai Village, it discharges its contents in the lake.[633] Previously, a feeder into this system was the Mangaone Diversion, which discharged water into the Waikaretaheke River just above the diversion dam at Tuai. Through a small weir, the normal flow in Mangaone Stream was diverted into a 3ft (0.9m) diameter concrete pipeline, and en route to the Waikaretaheke River, the pipeline collected further water from two minor watercourses - one being Waimako Stream, and the other unnamed.[634] Only when the flow was twice the normal rate, did water in Mangaone Stream carry on downstream over the weir.[635] As noted above, this diversion was discontinued in 1998, although Genesis Power are currently negotiating with local Maori over its possible reinstatement.[636]

The containment of water in Lake Whakamarino, meanwhile, relies on two earth dams. The major earth dam lies across the bed of the Kahutangaroa Stream, on the southern side of the lake, while its minor counterpart sits adjacent to the Piripaua Power Scheme tunnel intake.[637] In the main earth dam, there is a set of spillgates, through which excess water is discharged into the remaining length of Kahutangaroa Stream, and also a sluice gate, although the latter, which allowed the lake to be drained (into another fork of Kahutangaroa Stream), is no longer operational.[638] Incidentally, another structure, albeit one now submerged beneath Lake Whakamarino, is the old Tuai Scheme weir.[639] Within the Kahutangaroa Stream bed, below the spillgates, there is a V-shaped trough, fitted with teeth on the downstream side, which serves to protect the riverbed by breaking up the flow.[640]

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[632] ECNZ, 'Waikaremoana Power Scheme', p 23. The alignment of the turbines at Tuai is 'horizontal', that is, spinning on a horizontal axis.
[633] ECNZ, 'Waikaremoana Power Scheme', p 26; Anderson & Bloodworth, p 194; Natusch, map facing p 76.
[634] ECNZ, 'Waikaremoana Power Scheme', p 27; Natusch, p 39. The water from the minor streams was captured by tiny dams fitted with intake pipes (see ECNZ, 'Waikaremoana Power Scheme', p 38; Electricity Corporation of New Zealand Ltd. (ECNZ) (Fuel Resources Group), 'Waikaremoana Consents Project', [1996,] pp 13-14).
[635] Natusch, p 39. The flow needed to overtop the weir was 1.1m^3/s (ECNZ, 'Waikaremoana Power Scheme', p 38).
[636] Tracy Hickman, Environmental Manager, Genesis Power, pers. comm., 19 March 2004; Interview, Tamaterangi Trainor Tait, Nga Rauru o Nga Potiki, 11 November 2003.
[637] Anderson & Bloodworth, p 194; Natusch, p 38
[638] ECNZ, 'Waikaremoana Power Scheme', p 23; Tracy Hickman, Environmental Manager, Genesis Power, pers. comm., 19 March 2004. See also Natusch, map facing p 76.
[639] Natusch, p 15
[640] Anderson & Bloodworth, p 195

At this point, it is appropriate to mention two additional water features in the vicinity of Lake Whakamarino associated with the hydro-electric schemes. The first is a settling pond held behind a 'tailings dam', built in a small valley above Lake Whakamarino. This contains the 80,000m^3 of sediment that was dredged from the lakebed in 1987-8, and has sufficient volume to accommodate the material from two more dredgings. A drain in the dam allows for water to be discharged back into Lake Whakamarino.[641] The second water feature, which was associated with the electrical switchyard next to Tuai powerhouse, is the emergency cooling water supply reservoir. Like the Lake Whakamarino sluice gate, this is no longer used. Its purpose was to provide supplementary water to that taken from the tailrace or penstocks, which was used to cool the oil in the switchyard's electrical equipment via a process of heat exhange.[642]

The final group of hydraulic works in the district deliver water from Lake Whakamarino to the Piripaua powerhouse. At the south-eastern end of Lake Whakamarino is a gated intake to a 16ft (4.9m) diameter concrete lined tunnel.

Because of the lake weed problem, the intake is also protected by a screen, which is fitted with a self-cleaning device, which deposits intercepted debris on land nearby.[643] Once in the tunnel, the water then travels 2.9km to a tapered surge chamber (32m(top)-23m (bottom) in diameter and 10m deep). En route, however, it passes through two invert siphons, which take it under an area of swamp, and a small gully, respectively.[644] Like the other siphons, these contain drains for flushing out sediment, but in their case the long distance from the discharge point in the Waikaretaheke River - 340m in the case of the swamp siphon - makes the drains significant engineering works in their own right. From the surge chamber, the water is delivered, in two 370m long steel penstocks which are 7ft6in (2.3m) in diameter to the Piripaua powerhouse.[645] This, together with its tailrace, is built in a loop in the former bed of the Waikaretaheke River, the upstream end of which is blocked off by an embankment. The river itself now flows instead in a

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641 ECNZ, 'Waikaremoana Power Scheme', p 26

642 Water was diverted for this small reservoir from a tributary of Kahutangaroa Stream, but as it was normally full, most flowed out again via an outlet pipe to the same tributary. ECNZ, 'Waikaremoana Power Scheme', pp 28 & 133-134; Tracy Hickman, Environmental Manager, Genesis Power, pers. comm., 19 March 2004; Natusch, map facing p 76

643 Anderson & Bloodworth, p 193; ECNZ, 'Waikaremoana Power Scheme', p 28

644 Anderson & Bloodworth, p 193; Natusch, map facing p 76. The siphon under the swamp is the larger of the two.

parallel bypass channel.[646] With its two Francis-type turbines, the Piripaua powerhouse is capable of generating a total of 45MW, thereby giving a combined maximum for the three powerhouses of 138MW.[647] Together the Waikaremooana schemes provided 98.5% of the electricity sold by Eastland Energy (the local supply company for the Gisborne / East Coast region) during the mid-1990s.[648]

5.4 Environmental Impacts of Hydro-electric Development (with particular reference to impact on Maori)

In the first two parts of this chapter, it has been seen that hydro-electric development has resulted in numerous hydrological changes in the Waikaremoana district, together with the establishment of a large number of permanent engineering works. Although the environmental impacts of these collective modifications are not particularly wide-reaching in a spatial sense, within a local area they may still be significant.

This Section will be concerned with assessing the environmental impacts of the Waikaremoana hydro-electric schemes, and in particular their effect on the lives and activities on the Maori residents of the district. It should be pointed out, however, that the effects of lake level fluctuations will be primarily considered in Chapter Six. While the chief areal focus of this research project is the lakebed and shoreline of Lake Waikaremoana, with which only the Kaitawa Power Scheme and the lake sealing programme are concerned, as noted in Section 1.6, the interconnectedness between Lake Waikaremoana and the upper Waikaretaheke River valley as far as Waikaremoana Maori are concerned make it desirable to include the impacts of the earlier Tuai and Piripaua Power Schemes in the discussion.

5.4.1 Interference with Proprietary Rights: Beyond the Bed of Lake Waikaremoana

The first issue on which hydro-electric development has had some bearing is on occupation of land. This has been treated more fully in some other Waitangi Tribunal reports, such as Tony Walzl's 'Waikaremoana: Tourism, Conservation, and Hydro-electricity (1870-1970)' (WAI-894 #A73) and Elizabeth Cox's 'Lake Waikaremoana and

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645 ECNZ, 'Waikaremoana Power Scheme', pp 29 & 116-117; Anderson & Bloodworth, p 193
646 ECNZ, 'Waikaremoana Consents Project', pp 26-28.
647 ECNZ, 'Waikaremoana Power Scheme', p 28. The alignment of the turbines at Piripaua is 'vertical', that is, spinning on a vertical axis.

District Scoping Report' (WAI-894 #A8), but it is worth repeating some of the basic details here. Excepting those engineering works on the bed of Lake Waikaremoana, the area affected by hydro-electric development lies within the Taramarama and Tukurangi Blocks, as defined by the Maori Land Court in 1872. These two blocks, which occupy land on the north and south sides of the Waikaretaheke River respectively, above its confluence with the Waiau River, were purchased by the Crown in 1875.[649] In making the purchase, provision was made for 5500 acres of Ngati Kahungunu reserves within the two Blocks, and 2200 acres of reserves for Ngati Ruapani and 'the Ureweras' (Tuhoe). The latter was divided between Heiotahoka Reserve (1100 acres) in Taramarama Block, and the Whareama and Te Kopani Reserves (300 and 800 acres respectively) in the Tukurangi Block.[650]

In purchasing the two blocks, the Crown had secured ownership of almost all the land bordering on the southern and eastern edges of Lake Waikaremoana. At that time, however, Tuhoe resistance, in the form of the *Rohe Potae*, to allowing their lands to fall under the jurisdiction of the then Native Land Court, seemed to safeguard Maori ownership of the land to the immediate north and west of Lake Waikaremoana.[651] Eventually the Crown reluctantly recognised this position with its inclusion in Urewera District Native Reserve, which was created by Act of Parliament in 1896. This encompassed more than 650,000 acres.[652] Ultimately, however, most of this land on the periphery of Lake Waikaremoana was to be purchased by the Crown as well, and the hydro-electric potential of the district was, as Walzl relates, one of the reasons for its acquisition.

It may be recalled that the first serious Crown interest in generating power from Lake Waikaremoana dates from Hay's study of sites with hydro-electric generation potential in 1904. The previous year, Parliament had passed the Water Power Act 1903 that reserved the future development of hydro-electric resources to the Crown, although it

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[648] Ibid., p. 72

[649] Walzl, pp 16-17; E Cox, 'Lake Waikaremoana and District scoping report', report commissioned by Waitangi Tribunal, December 2001 (Wai 894 record of inquiry, doc A8), pp 27 & 29-30

[650] Walzl, pp 21-22; Cox, p 33. It should be noted that Cox gives the area of Heiotahoka Reserve as 1000 acres.

[651] Stokes et. al, pp 48 & 50-51; Walzl, p 17

[652] Stokes et. al., pp 51-55; Cox, p 39. As noted in Cox, the estimated acreage was initially 656,000 acres, but later surveys reduced this slightly to 651, 366 acres (Walzl, p 193).

could also delegate this authority to local bodies.[653] From 1907 onwards there was agitation for development at Lake Waikaremoana from groups in Hawke's Bay, such as the Napier Chamber of Commerce and the Waikaremoana Hydro-Electric League, but prior to the First World War it was perceived by the New Zealand Government to be too remote from centres of electricity demand for immediate action.[654] By 1913, calls were not being made solely for the requisite engineering works, however, but also for the acquisition of the forested land to the immediate north of Lake Waikaremoana, on the basis of watershed protection; these would complement the forestry reserves already established on the south side of the lake.[655] In line with what were widely held views, it was argued that a continual supply of water for electricity generation could not be guaranteed without in turn securing the future of the forests; the latter - and here the proponents of this argument concurred with scenery preservation lobbyists - was not something that ought to be entrusted to its Maori owners.[656]

The Crown's opportunity to purchase this area, in the form of the Waikaremoana Block, came in 1921, when the lake's Urewera-based owners opted for its inclusion in the Urewera Consolidation Scheme following a meeting at Ruatoki.[657] It should be noted that lakebed ownership, as determined by Urewera Commission rulings in 1903 and 1907, was split between Tuhoe, Ngati Ruapani and Ngati Kahungunu. With Tuhoe and Ngati Ruapani forming the majority of the list, the Crown evidently regarded this support from Urewera owners as sufficient mandate to proceed.[658] The Consolidation Scheme exchanged Maori land for a mixture of Crown land elsewhere and monetary compensation, and in the case of the Waikaremoana Block, its Tuhoe owners took up

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[653] Water Power Act 1903, SS 2(1) & 3. SS 2(1) reads as follows: "Subject to any rights lawfully held, the sole right to use water in lakes, falls, rivers, or streams for the purpose of generating electricity or other power shall vest in His Majesty".

[654] Natusch, pp 7-8. See also Walzl, pp 181-189

[655] Walzl, pp 53, 55-56 & 183

[656] For further commentary on the need to take the area to guarantee water supplies, see ibid, pp 193-5; for correspondence asserting the forest was endangered while in Maori ownership, and therefore should be taken on scenic grounds, see ibid, pp 128-131, 133, 136, 140-144, 153, & 156-158. A recent paper which examines the linkage made between forest preservation and water conservation concerns in New Zealand is J Beattie, 'Environmental Anxiety in New Zealand, 1840-1941: Climate Change, Soil Erosion, Sand Drift, Flooding and Forest Conservation', *Environment and History* 9(4), 2003, pp 379-392.

[657] Walzl, pp 194 & 220

[658] In 1903, the Urewera Commission awarded the title to a list of 729 Ngati Ruapani and Tuhoe owners. After Ngati Kahungunu appealed, a new list of 906 owners was produced in 1907, of which 117 were identified as Ngati Kahungunu. Cox, pp 40-41. Paul Harman, Counsel for Ngati Kahungunu,

lands further north, its Ngati Kahungunu owners accepted a cash settlement, and its Ngati Ruapani owners received a mixture of 607 acres of lakeside reserves, cash, and Crown-managed debentures.[659] As part of the negotiations, the above-mentioned Whareama Reserve was also acquired by the Crown.[660] It should be said that the owners' hand was somewhat forced in the negotiations, as they were aware that the Crown was otherwise likely to acquire the Waikaremoana Block under the terms of the Scenery Preservation Act.[661]

That the Crown was prepared to take the latter step does not necessarily indicate that scenery preservation was regarded as more important than watershed conservation though - it may instead indicate that these grounds for taking the land were easiest, in a legislative sense, to fulfil.[662] Indeed, as Walzl notes that "the correspondence on the acquisition of the Waikaremoana block reflects that the hydro-electricity implications of allowing deforestation bec[a]me of greater concern than those of scenery preservation".[663] To give but one example of this, when the value of Ngati Ruapani interests in the Block was being assessed, one of the Consolidation Commissioners, R. J. Knight, wrote in a letter to the Minister of Lands that the Crown should pay 6s. per acre for half of the 44,000 acres, whereas for the other half it would need to pay

> a price to be determined taking into account its special value as the feeding ground of Waikaremoana Lake which it is necessary to preserve to ensure a constant and regular supply of water for the Waikaretaheke River which flows from Waikaremoana Lake and

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has pointed out that Ngati Kahungunu were not consulted over the inclusion of the Waikaremoana Block within the Consolidation Scheme. Paul Harman, pers. comm., 19 March 2004.

659 Walzl., pp 199-200. Unfortunately for Ngati Ruapani, they were disadvantaged by the Crown's subsequent management (through the Native Trustee) of the debenture scheme. Apart from being a tardy payer, the interest rate was unilaterally lowered in 1933, and the duration of the scheme unilaterally extended, so that instead of lasting 10 years, as had been agreed upon, it was not paid out for 35 years (Ibid., pp 228 & 326).

660 Stokes et al., p 86.

661 See Walzl, pp 194-197 & 201

662 The Crown could take land for scenic purposes, once a recommendation to this effect had been made by the Scenery Preservation Board (see Scenery Preservation Act 1908, SS 6(2)). The Auckland Board had made such a recommendation in regard to the Waikaremoana Block in 1914, and a further recommendation was made in 1921 (Walzl, pp 145 & 194). Having formally reserved land for scenic purposes, it was then able to be taken under the Public Works Act. The same Act also allowed land to be taken for the purpose of 'utilising water for the generation or storage of electrical power', but the Waikaremoana Block contained no generation facilities, nor any sites for power scheme reservoirs (see Public Works Act 1908, SS 14(1) and 267(2)).

663 Walzl, pp 513-514

upon which the hydro-electric station will depend for its power.[664]

Interestingly, reports from the Ruatoki meeting indicate that the proposals for hydro-electric development received some support from local Maori. Apart from the promise of employment opportunities - certainly, politicians saw local Maori involvement as integral to solving the problem of the development's labour supply[665] - it may also have been felt that it was generally advantageous to have large-scale capital investment in what was a deprived area.[666] At the time, local Maori were, as a Mr. Harvey of the Hawke's Bay Motor Company observed, as "hard up as Church mice". [667]

When it came to building the Tuai and Piripaua Power Schemes, of course, the Crown alienation of most of the land in the upper Waikaretaheke River catchment, referred to at the beginning of this section (5.4.1), limited the extent of interference with Maori proprietary rights that could occur as a result of hydro-electric development. Nonetheless, both Te Kopani and Heiotahoka Reserves lost land to permanent works. The earliest use of Maori reserve land occurred during the time of the Wairoa Electric Power Board's temporary scheme at Tuai, when the Public Works Department constructed a road (together with a bridge across the Waikaretaheke River) which connected the existing Frasertown - (Waikaremoana) Lake House road with Tuai. Part of the road, which later served the Tuai Power scheme as well, went through Te Kopani Reserve. A letter from the local chief Mahaki Tapiki and others, dated 30 September 1929, states that "Compensation for land taken for the road has been effected in the form of providing our pahs Waimako and Kuha with electric current from the Power House"; as some affected owners lived elsewhere, the letter requested that reduced

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[664] R J Knight to the Minister of Lands, 19 September 1921, cited in ibid., p 200. Similarly, in August 1923, the Native Minister, J. G. Coates, expressed his appreciation of the owners' "exchanging out of the Waikaremoana Block, so as to leave to the Crown, for climatic and water conservation purposes, the bush all around the Waikaremoana Lake ..." (T Lambert, *The Story of Old Wairoa*, Auckland, Reed Books, 1998 [reprint of 1925 original], p 728).

[665] See comments by J V Brown, MP, in 'Waikaremoana Hydro-electric Scheme: Deputation to Prime Minister (Rt. Hon. W. F. Massey), and Minister of Public Works (Hon. Sir Wm. Fraser), Wellington, 12th March 1920)'. Waikaremoana Power Scheme: Minister's File (1918-20) (AADO 569 524c (59/1) vol. 2, ANZ, Wellington)

[666] Walzl, p 220

[667] See Crown Commissioner of Lands, Napier, to Under Secretary of Lands, 14 July 1920, cited in ibid., p 192

charges could be extended to them as well.[668] It is conceivable that this manner of compensation could have been suggested by the Wairoa Electric Power Board (or the County Council acting on its behalf), so that it might meet the legal requirement imposed on power boards that they supply electricity to at least 25 percent of householders within their territory. In this regard, it should be noted that in anticipation that it would be difficult to sign up as consumers many of the large number of Maori residing in the area, the prospective Board had requested a dispensation from this requirement, but it had been declined.[669] In a 1997 affidavit by Rodney Gallen he states that elders had told him free power to Kuha and Waimako continued until, in the late 1980s, the newly-formed State-Owned Enterprise, the Electricity Corporation of New Zealand (ECNZ), stopped it, citing a lack of any written agreement.[670] Evidently, this was not the first time the Crown has challenged the notion that 'free power' was to be supplied; in early 1932, for example, Judge Carr of the Native Land Court was writing to the Wairoa Electric Power Board explaining that the pa residents had been rendered temporarily unable to pay the electricity bill.[671]

The lack of promised roadside fencing, and the making of a quarry to supply road metal, were also referred to an earlier letter from Mahaki Tapiki and other local residents to the Native Affairs Minister, Sir Apirana Ngata (dated 8 July 1929). In response, the Public Works Department acknowledged that its then Minister, Joseph Coates, probably had agreed in 1923 to fence the powerhouse road, and that £300 had been allocated for the fencing, but the Department's subsequent actions are not recorded. There was some dispute, meanwhile, over where the said road metal had been used and hence how much had been used. Initially, the Department claimed to have taken metal, for which it had

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[668] M Tapiki et al. to W A Veitch, Minister of Public Works, 30 September 1929. Waikaremoana Power Scheme: Minister's File (1929-39) (AADO 569/526a (59/1, vol. 5), ANZ, Wellington). See also Walzl, pp 299-302. It is possible that this manner of compensation may have been suggested by the Wairoa Electric Power Board (or the County Council acting on its behalf), so that it might meet the legal requirement imposed on power boards that they supply electricity to at least 25 percent of householders within their territory. In this regard, it should be noted that in anticipation that it would be difficult to sign up as consumers many of the large number of Maori residing in the area, the prospective Board had requested a dispensation from this requirement, but it had been declined (Natusch, p 9). In the absence of further evidence, however, this explanation is only a speculative one.

[669] Natusch, p 9

[670] Affidavit of Rodney Gallen, 9 April 1997. J K Guthrie & J E Paki, 'Joint Ministerial Inquiry. Lake Waikaremoana, 27 August 1998', Appendix 3, no. 2

[671] As Judge Carr observed, payouts of the debentures to the pa residents had been stopped while financial governance was transferred from the Native Trustee to the Tairawhiti District Maori Land

paid a royalty, from only one quarry within Te Kopani Reserve, but a site visit confirmed that road metal had been taken from a second quarry. It appears, however, that the Department used the dispute over the quantity of road metal, and the small sum involved, as grounds for not making any payment. The letter of 8 July 1929 also requested compensation for clearance of trees and excavations pertaining to a Public Works Department workers' camp, but apart from the Departments' rejection of the idea that the vacated huts should be given to local Maori, there is again no record of subsequent developments.[672]

As early as January 1938, plans were afoot to take Heiotahoka Reserve land for the Piripaua Power Scheme, and by mid-1938 Public Works Department employees were engaged on the Reserve in such tasks as surveying, road-making and building huts for the workers' camp. Construction of hydraulic works on the Reserve had also begun by the end of the year, with a start having been made on the surge chamber.[673] Many of these actions were illegal, as the Public Works Act 1928 allowed only limited works, such as the erection of powerlines or the digging of tunnels, where land was not being taken; only the laying of electrical cables, meanwhile, could take place irrespective of owner consent.[674] In fairness to the Department, it should be said that the process of obtaining consent was confused by twelve owners of what was communally held land apparently giving permission for the work to go ahead, while many other co-owners objected to it.[675] Certainly, within the Public Works Department there was no doubt that sufficient consent had been gained; in its Annual Report to Parliament it stated that "work on this scheme was authorized in March, and permission to enter on the land was given in May, when work was commenced on clearing for a camp-site and forming of service roads".[676] Consideration of compensation to affected parties, meanwhile, was held up until 1941, when the Department at last formally took 40 acres of the Reserve,

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Board (H Carr to the Secretary, Wairoa Electric Power Board, 27 January 1932 (Maori Land Court, Gisborne, MLC 8/3/560).

672 Walzl, pp 299-302

673 Ibid., pp 302-308

674 Public Works Act 1928, SS 311(1) (d) & 312; Walzl, pp 307-308

675 Walzl, p 303

676 J Wood, 'Annual Report on Public Works by the Engineer-in-Chief ' (for the year 1st July 1937-30th June 1938) . 'Public Works Department' (Annual Report), Appendix B. AJHR, 1938, D-1, p 41.

comprising of 8 acres for roading purposes, and 32 acres for other works. At the same time, one acre of Te Kopani Reserve was taken.[677]

The compensation claim for loss of land, damage to cultivations, taking of wood etc. was finally settled by the Native Land Court in 1942. The Court ruled that in addition to the envisaged transfer of an old 'paper' road, which encompassed an area of 5 acres, the Department should pay £275 for the Heiotahoka Reserve land, plus £4 for one acre of Te Kopani Reserve land. It was also charged with keeping the Waikaretaheke River 'stock-proof' by way of fencing, in light of the reduced downstream riverflow once the Piripaua Scheme was operational.[678] The Court also examined the question of the workers' camp, which at the time was occupying 18 acres of Heioitahoka Reserve land, and a rental of £46 was awarded for the four years since 1938. The camp continued to be occupied until 1952, albeit on a reduced scale, after which the buildings were removed, as ordered by the Court. This said, a water reticulation system built for the camp was left in place, and used as payment for rent arrears.[679] It would appear that the successive Crown hydro-electric agencies undertook to maintain this system until it was damaged by Cyclone Bola in 1988.[680] It should be noted that the although the Heiotahoka Reserve owners received compensation, the loss of this land to hydro-electric works and the temporary works camp was particularly disadvantageous, for as aerial photographs of the time show, together they occupied much of one of the few areas available for cultivation.[681]

The last engineering works to be constructed within either Reserve was the Mangaone Diversion (and its associated pipeline), completed in 1945, in Te Kopani Reserve. By both burying the pipeline, and having its line closely follow that of the existing

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[677] Proclamation taking land for Road in Block IV, Waiau Survey District, 13 June 1941, & Proclamation taking land for the Development of Water Power (Waikaremoana Lower Development Scheme) in Blocks IV & III, Waiau Survey District, 13 June 1941, *New Zealand Gazette*, 1941, no. 52, pp 1858 & 1861. See also Walzl', pp 354-355. The acre taken from Te Kopani Reserve was in the no.1 partition (see inset map in Stokes et al., p 215), which suggests that it was for the loop of the canal which takes water from the Waikaretaheke Diversion Structure to the downstream siphon.

[678] The compensation was held in trust by the Tairawhiti District Maori Land Board. Walzl, pp 355-356.

[679] Ibid., pp 356-358; Cox, p 66. Anecdotal evidence suggests that some Maori residents may have been joined to the reticulated system prior to the camp's removal (Natusch, p 34).

[680] Interview, Huia Lmbert, Nga Rauru o Nga Potiki, 11 November 2003

[681] Walzl, p 420; Natusch, p 39. Whereas Walzl thought that this land had been taken permanently, maps showing the area taken for hydro-electric development (identified as the triangular area around the surge chamber in Natusch, map facing p 76) indicate that most of it was on the hill above, which suggests that the temporary work camp was probably the greater nuisance.

Frasertown-Waikaremoana Lake House and Tuai Powerhouse roads (so that most of its length lay in the existing road reserves), the Public Works Department had sought to minimise its impact on the Reserve land. In doing so, it seems that the Department managed to avoid taking any land under the Public Works Act.[682] Late in 1945, the Department also gained permission to build a water reticulation system based on a spring in Te Kopani Reserve. As compensation, the nearby Waimako Pa was also connected up, and ownership of the pipe network transferred to local Maori after six months.[683] The Department's

> Tuai work camp had needed a new water supply as effluent from the new Kaitawa camp leaked into Lake Kaitawa, and hence into the Tuai Scheme's penstocks, from which the Tuai camp had been drawing its supply.[684]

[682] See N Carter to the Registrar, Native Land Court, Gisborne, 1 September 1944 (and attached plan), S A Wiren to same, 6 October 1944, & N Carter to same, 10 November 1944 (Maori Land Court, Gisborne, MLC 8/3/116).
[683] Order of Judge Carr, Native Land Court, 31 July 1946 (in the matter of Te Kopani no.1 block), & order of Judge Carr, Native Land Court, 31 July 1946 (in the matter of Te Kopani no. 2 block). (Maori Land Court, Gisborne, Block Order file 240A).
[684] Natusch, p 42

5.4.2 Interference with Proprietary Rights: The Lakebed

Given the Crown's eagerness, in the period up to the 1920s, to obtain almost complete ownership of the Lake Waikaremoana watershed, it may seem surprising that it never sought - at least not until 1946 - to secure ownership of the lakebed itself. It is not necessary to discuss this question in any detail here, as again this has been dealt with in other Waitangi Tribunal reports. Nonetheless, it is important to note, in summary, the sequence of events surrounding the title.

In 1918, the Native Land Court awarded title to 22 lists of Tuhoe, Ngati Ruapani, and Ngati Kahungunu owners, after having held hearings between 1915 and 1918 into applications for title investigation that had been lodged in 1913 and 1914 respectively.[685] The involvement of the Native Land Court followed a Court of Appeal decision in 1912, in regard to the Rotorua lakes, which had allowed the former to investigate customary title to inland lakes.[686] Parliament had also been petitioned in 1912 about the ownership status of the lake, with the aim of the petitioners being to include it within the legal protection of the Urewera District Native Reserve.[687]

The Crown did not bother to make submissions during the Native Land Court's hearings, since it regarded the case as beyond the Court's jurisdiction, and although it appealed the decision almost immediately, Crown procrastination in the 1920s and Waikaremoana Maori poverty in the 1930s caused the appeal not to be heard until 1944.[688] In the interim, the Crown's hydro-electric development of the district proceeded without reference to the question of lakebed title, a situation that was aided by the fact that until the initiation of the Kaitawa Power Scheme in 1943, the Crown was using the water resource of Lake Waikaremoana, rather than building structures on the lakebed itself. The Crown's near indifference to the 1918 ruling seems to have resulted from its unshaken belief that the lake was "Crown land free from Native title".[689] Interestingly,

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[685] Cox, pp 54-55; Walzl', pp 164-167
[686] Walzl, pp 138-139
[687] The petition was from Hurae Puketapu and 84 others. Ibid., p 136
[688] Cox, pp 55-56; Walzl, pp 165-167, & 312-313. It should be noted that Cox states that the Crown took three weeks to appeal, whereas Walzl states it appealed the day after the judgement was announced.
[689] MA 8/3/484, Maori Land Court, Gisborne, cited in R Wiri, 'Te Wai Kaukau o nga matua Tipuna: Myths, Realities, and the Determination of Mana Whenua in the Waikaremoana District' (M A thesis, University of Auckland, 1994), p 320. Cox, 'Lake Waikaremoana scoping report', p 55. See also ibid., 55-56

the Crown probably could have had recourse to the Public Works Act 1908 which gave it the power to take land for the purpose of 'utilising water for the generation or storage of electrical power'[690] - that they did not do so is a further testament to their assumption of lakebed ownership.

When its appeal against the 'Native title' to the lakebed was finally heard in 1944, the Native Appellate Court found against the Crown. It was noted that the Crown had failed to offer any evidence to back up its claims of Crown title during the original case, and in light of the un-contradicted evidence produced by the Maori claimants as to their ownership of the lake, the Court ruled that the awarding of 'Native title' had been legitimate.[691] As a result of the decision, in 1946 the Crown started negotiations with its Maori owners over what compensation might be offered for future use of the lake, but the Crown negotiators did so without much conviction, as it was believed that the Crown might still appeal the decision - primarily in regard to the jurisdiction of the Native Courts - to the Supreme Court.[692] This right of appeal was allowed to lapse in 1954, but protracted negotiations continued through until 1969, during which time the Crown struggled to find a consistent negotiating position.[693] The deadlock was broken in 1969 when, following the Crown's undertaking of a special valuation of the legal lakebed, the owners suggested a 50-year lease to the Crown, with perpetual right of renewal, in return for annual rental; this arrangement was subsequently formalised in the Lake Waikaremoana Act 1971 (which will be referred to in Chapter Seven). It should be said, however, that no compensation was paid by the Crown for lake usage prior to this time.[694]

The first engineering structures to be built on or over the lakebed were the temporary siphons, which, as described previously, were installed in 1946. More serious modification began in 1947 with the commencement of excavations for the Kaitawa Scheme's intake channel. This, it may be recalled, was built in the form of a stepped U-shaped amphitheatre. Initially, excavation was carried on behind a coffer dam, with the hole being deepened around the mouth of the intake tunnel, and then extended outwards

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690 Public Works Act 1908, SS 267(2)
691 Cox, p 56. See also Walzl, pp 333-335 & 338-339
692 See Walzl, pp 339-353
693 Ibid., pp 434-439, 502-504, 506-508.
694 Ibid, pp 523-524; Cox, 'Lake Waikaremoana scoping report', p 56

towards the lake; at the same time, it should be remembered, the lake was receding, due to its being drawn down by the siphons. As the formed intake channel neared completion in 1948, more intensive blasting was employed to expedite the removal of the coffer dam, and rock that could not be dislodged by a dragline. The final length of the channel base was 350ft (110m), of which 150ft (45m) lay beyond the initial shoreline of the lake.[695]

While clearing of rock outcrops and other material from around the intake channel continued on a small scale for several years after 1948,[696] the focus of the work at Lake Waikaremoana shifted to constructing the 'sealing blanket'. Thanks to the efforts of a small team, including a diver, which had worked for the Public Works Department from Onepoto between 1929 and 1932, and further diver investigations once the Kaitawa Scheme was underway, the location of many leaks in Te Wharawhara Bay was already known,[697] and thus the first task carried out in 1948 was the removal of 460 cords of driftwood from the bed by a diver. This was followed by the filling of depressions in the local lakebed with spalls (crushed rock), and finally the gradual deposition of the graded 'sealing blanket'. Within the first year of 'sealing' work, 13,400m^3 of fill had been used in the 'blanket', while a further 3700m^3 of rubble had been dumped on outlying areas.[698]

Unfortunately, there seems to be little documentary evidence relating to this work, and more especially the manner in which it was laid down, other than the observation in Natusch that material was dumped from barges, or from specially constructed temporary jetties in the case of deeper 'leaks'.[699] Initially the Ministry of Works had hoped to

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[695] Carter, pp 223-227; Natusch, p 44

[696] See C W O Turner, 'Annual Report on Public Works by the Engineer-in-Chief', in 'Ministry of Works Statement' ('Associated Reports of Divisional Controlling Officers'), AJHR, 1953, D-1, p 22; C W O Turner, 'Annual Report on Public Works by the Engineer-in-Chief', in 'Ministry of Works Statement' ('Associated Reports of Divisional Controlling Officers'), AJHR, 1955, D-1, p 82; Turner, AJHR, 1956, D-1, p 41

[697] Natusch, pp 31-32 & 49. A map of known leaks appears in Anderson, 'Waikaremoana:', facing p 513; this may be compared with one produced in the late 1970s by Mylechreest (See extract from P Mylechreest, 'Some effects of a unique hydro-electric development on the littoral benthic community and ecology of trout in a large New Zealand lake' (MSc thesis in Zoology, University of British Columbia), p 12. Nature Conservation Council, Lake Waikaremoana (levels, sealing) (AAZU 3619, 09/11/68, Box 7, ANZ, Wellington)

[698] Langbein, AJHR, 1950, D-1, p 22

[699] Natusch, p 49. The only other note in this regard is that in 1954/5 some fill used near 'The Pinnacles' (discussed below) was dumped at the lakeshore and then bulldozed into the lake (Turner, AJHR, 1955, D-1, p 82).

complete the sealing within about three years, but as has been noted above it continued until 1955. This was because in certain sites, most notably in the vicinity of a rock outcrop known as 'The Pinnacles', holes kept forming in the 'sealing blanket'. It appears that a concerted effort was made during the 1953/4 year to stem the leaks, as 50, 000m^3 of material were used, mainly near 'The Pinnacles', but even so, a further 21, 000m^3 had to be added in the next two years before the leakage was finally stopped (as far as it was practicable).[700] In the meantime, the Ministry also completed the siphons and spillway, on which work had begun around 1952.[701] Regrettably, it has not been possible, owing to the lack of correspondence available for inspection, to comment on the degree to which lakebed ownership was taken heed of during the execution of these works; nevertheless, it may be indicative that in the Crown's early negotiations over the lakebed, as reviewed by Walzl, the first mention that there may be a problem with the new works on the lakebed seems to have been a Cabinet paper from Maori Affairs in 1954.[702] An examination of comments by Crown officials during the late 1950s suggests that the consensus was that as the engineering works occupied only a small area, and that on the margin of the lakebed, the infringement of title was too trivial to require any corrective action.[703]

Since the completion of the siphons and lakebed sealing in 1955, the only new structure of note placed on the lakebed for hydro-electric purposes has been the intake screen, which was installed in 1960. Nevertheless, since 1955 the electricity generation arms of the Crown have, quite apart from altering the lake levels, interfered with lakebed in other ways. The first two instances of this relate to the removal of wood from the lake, which was done firstly to prevent obstruction of the Kaitawa Scheme intake, and secondly to remove a hazard to navigation. Following claims to the wood by Maori in 1956, the District Electrical Engineer corresponded with the Chief Surveyor at Gisborne, who informed him that the wood was rightfully the property of the lake's Maori owners, and therefore it should not be moved beyond the high-water mark; the

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[700] Langbein, AJHR, 1950, D-1, p 22; C W O Turner, 'Annual Report on Public Works by the Engineer-in-Chief', in 'Ministry of Works Statement' ('Associated Reports of Divisional Controlling Officers'). AJHR, 1954, D-1, p 25; Turner, AJHR, 1955, D-1, p 82; Turner, AJHR, 1956, D-1, p 41

[701] Turner, AJHR, 1953, D-1, p 22; Turner, AJHR, 1954, D-1, p 25; Turner, AJHR, 1955, D-1, p 82; Turner, AJHR, 1956, D-1, p 41

[702] Walzl, pp 352-353

[703] Ibid., pp 397-403

owners, moreover, ought to be informed of these actions.[704] Six years later, the New Zealand Electricity Department came under pressure from boat-owners to replicate at Lake Waikaremoana a tree stump removal operation which had been successful in Lake Monowai. At the time, the low lake level meant that stumps from the lake's drowned forest (a relic from the time prior to the landslides which formed the lake barrier) had become a hazard to navigation, and several boats were holed on them.[705] The Department decided on a trial removal on stumps, which was undertaken when the lake level fell still lower, in 1964.[706] Forty-three stumps were selected; most of which were close to the boat launching areas at Home Bay and Mokau. These were blown up by navy divers using explosives. As boat owners considered it a failure, the blowing up of stumps was discontinued, and the Department raised the idea of volunteers chainsawing the stumps off at just above the then water level.[707] A meeting to discuss the issue was held, and attended by 'Elders of the local Maori Tribal Committee' (presumably the Tuhoe Maori Trust Board), members of the Urewera National Park Board, the Wairoa County Council, the Hawke's Bay Catchment Board, Wildlife Branch of Internal Affairs and interested recreational clubs. According to the recollection of a Mr. Dolman, then the local policeman, all of the groups represented gave their approval to the plan, and in

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[704] B Coombes, 'Preserving 'a great national playing area' - conservation conflicts and contradictions in Te Urewera, 1954-2003', report commissioned by Waitangi Tribunal, September 2003 (Wai 894 record of inquiry, doc A133), p 83. See also Natusch, p 47

[705] F S Beachman, Commissioner of Crown Lands (CCL), Hamilton, to D N R Webb, Director-General (DG), Lands and Survey Department (LS), 13 March 1962, Webb to A E Davenport, General Manager (GM), New Zealand Electricity Department (NZED), 15 March 1962 (LS 4/19 (file closed 9/1/1963), DOC Head Office, Wellington)

[706] Davenport, GM, NZED, to Webb, DG, LS, 1 November 1962 (LS 4/19 (file closed 9/1/1963), ANZ, Wellington); Beachman, CCL, Hamilton, to R J Maclachlan, DG, LS, 18 March 1963, & E B Mackenzie, GM, NZED, to Maclachlan, 14 April 1964 (LS 4/19 (file closed 31/1/1968), DOC Head Office, Wellington). It is interesting to note that a 1962 letter regarding stump removal refers to 'legal difficulties' being looked into, although whether this related to Maori ownership of the lakebed is unclear. A E Davenport, GM, NZED, to the DG, LS, 1 November 1962 (LS 4/19 (file closed 9/1/63), DOC Head Office, Wellington).

[707] L I Dolman, Chairman, Friends of the Urewera Association Inc., to the Chairman, Hawke's Bay Catchment Board, 25 October 1985, & Regional Water Board / Hawke's Bay Catchment Board, 'Report of the Meeting of the Special Tribunal Appointed by the Hawke's Bay Catchment Board ... on Monday 9th June 1980, ... and which reconvened on Wednesday 30th July 1980, to consider its recommendations', p 5. Nature Conservation Council: Lake Waikaremoana (levels, sealing) file (AAZU W3169, 09/11/68 box 7 ANZ, Wellington). It should be noted that Dolman gives the height at which the stumps were sawn off as being just above 1982ft (KD) (577m (MD)), whereas the Tribunal's Report states that the height was 1988ft (KD) (578.5m (MD)).

all 2500 stumps were sawn off during July and August 1964, prior to the lake level rising again.[708]

With the passage of the Lake Waikaremoana Act in 1971, it was agreed that the lakebed would be administered as if part of Urewera National Park,[709] although the lake level remained under the effective control of the New Zealand Electricity Department. It might be thought that this step was alone sufficient to prevent further hydro-electricity-inspired modifications to the lakebed, but in 1978, amidst nationwide concern about future energy supplies, the Ministry of Works proposed a second round of lake sealing, after divers investigating the sealing blanket found additional leaks just to the north of Te Wharawhara Bay. The newly discovered leaks were around 30m below the water level, which was beyond the limits of divers in the earlier investigations in the 1930s. It was calculated at the time that if sealing could stop two-thirds of the area's leakage, which was reckoned to be around 4.25m^3/s, this would annually save $650,000 worth of generation elsewhere;[710] subsequently, it should be noted, this figure was lowered to $250,000, on the basis of the electricity being produced from Maui gas rather than oil.[711] A number of farmers, who were concerned about a reduced supply of water to their properties,[712] objected to the Ministry's sealing plans,[713] as did the Urewera National Park Board and the Internal Affairs Department's Conservator of Wildlife. This ensured an assessment of environmental effects before any sealing could be proceeded with.[714]

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[708] L I Dolman, Chairman, Friends of the Urewera Association Inc., to the Chairman, Hawke's Bay Catchment Board, 25 October 1985. Nature Conservation Council: Lake Waikaremoana (levels, sealing) file (AAZU W3169, 09/11/68 box 7 ANZ, Wellington)

[709] Cox, p 57

[710] *Daily Telegraph* [Napier], 9 November 1978. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington); Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 2', p 11.

[711] *Gisborne Herald*, 2 May 1979. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington)

[712] For details of farmer objections see '780326 - Ministry of Works - Crown Water Rights Application'. Nature Conservation Council, Lake Waikaremoana (levels, sealing) (AAZU 3619, 09/11/68, Box 7, ANZ, Wellington)

[713] By mid-1979 the Ministry of Works had resolved that 'blanket sealing' would be the best option for sealing the leaks (J H H Galloway, Ministry of Works and Development Power Division, 'Proposal to reduce the natural leakage from Lake Waikaremoana', April 1979, enclosure to N C McLeod, Commissioner of Works to the Secretary, Nature Conservation Council, 13 June 1979. Nature Conservation Council, Lake Waikaremoana (levels, sealing) (AAZU 3619, 09/11/68, Box 7, ANZ, Wellington), although previously the use of 'plugs', made from cement-filled nylon bags had also been considered (*Daily Telegraph* [Napier], 9 November 1978, & 7 March 1979. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington)).

[714] *New Zealand Herald*, 19 & 22 January 1929. Ministry for the Environment, Natural Resources - Reserves - Parks - Urewera file (AAUM W4043 NR 2/1/C Box 208, ANZ, Wellington)

Both the National Park Board and the Conservator of Wildlife were particularly concerned that a reduction in lake leakage would worsen the unnatural periodicity of the lake levels (which will be considered at greater length in the next chapter), by allowing the Electricity Division[715] to hold back water in the summer for generation in winter; with the existing leakage, the lake level would slowly draw down on its own account during periods of dry weather. The Conservator of Wildlife also observed that remaining spring and stream flows in the upper Waikaretaheke River catchment would be further reduced.[716] In view of these objections, the Ministry of Works decided to withdraw its lake sealing application to the Hawke's Bay Regional Water Board for the time being, and to carry out tests to assess leakage instead.[717] These tests, in which salt and two chemical dyes were injected into the leaks so as to discover where the inflow emerged downstream, were undertaken in February and March 1980. While not wholly conclusive, the tests supported the Ministry's earlier contention that there was almost no throughflow to the farms from which objections had been received; the volume of water passing through the leaks, meanwhile, was found to be 4.5m^3/s.[718] Thereafter the focus of the Ministry of Works and Electricity Division seems to have shifted to the setting of lake level ranges (these, as will be seen in the next Chapter, were determined by a special tribunal of the Hawke's Bay Catchment Board, which held hearings in June 1980), as nothing more appears to have done about the sealing proposals until 1983. At this time, New Zealand Electricity put forward to the East Coast National Parks and Reserves Board its plan to seal a number of leaks, and in addition, to remove a number of rock outcrops overhanging the leaks, so that sealing could take plan.[719] Evidently,

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[715] In April 1978, the New Zealand Electricity Department became the Electricity Division in the new Ministry of Energy. *New Zealand Official Yearbook [1981]*, 86th ed., Wellington, Department of Statistics, 1981, p 504

[716] See, in relation to the Park Board's and the Conservator's objections, 'Urewera National Park Board. Minutes of a meeting held at Waikaremoana on 23 and 24 November 1979 (Extract from)', & P J Burstall, Conservator of Wildlife, Internal Affairs, to the Secretary, Hawke's Bay Catchment Board, 17 April 1980. Nature Conservation Council, Lake Waikaremoana (levels, sealing) (AAZU 3619, 09/11/68, Box 7, ANZ, Wellington). Newspaper reports indicate that the National Park Board were also worried about the taking of rock for fill from a 'natural' quarry at Onepoto (*New Zealand Herald*, 19 January 1929, & O Cox, 'Waikaremoana Lake Bottom Plugging' file note. Ministry for the Environment, Natural Resources - Reserves - Parks - Urewera file (AAUM W4043 NR 2/1/C Box 208, ANZ, Wellington)

[717] *Daily Telegraph* [Napier], 7 March 1979, & *Gisborne Herald*, 2 May 1979. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington)).

[718] *Wairoa Star*, 22 January 1980, & *New Zealand Herald*, 25 March 1980. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington).

[719] *Gisborne Herald*, 26 May 1983. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington)

however, this plan was never put into operation as a 1996 document reports that in the period since 1955, "no further significant sealing works" had been carried out.[720]

A recent important development in relation to use of the lakebed was the Supplementary Deed signed by ECNZ and the Tuhoe-Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards in 1988 (transferred to Genesis Power in 1999). The exact details are confidential, but broadly speaking, it requires an annual payment by Genesis to the two Trust Boards "in return for the grant of easements associated with intake structures for the Waikaremoana Power Scheme which rest on the bed of Lake Waikaremoana".[721]

5.4.3 Fluvial Impacts

As seen in Section 5.2, the engineering works associated with all three power schemes caused major changes in the hydrology of the upper Waikaretaheke River catchment. It should be remembered that the Tuai Scheme involved the diversion of the Waikaretaheke River at Kaitawa, and the raising of Lake Kaitawa, while the Piripaua Scheme saw the flooding of Whakamarino Flat to create Lake Whakamarino and the diversion of the Waikaretaheke River at Tuai, together with the Mangaone Diversion.

In terms of physical effects on the riverbed, these changes have had a fairly modest impact. Erosion rates within the watercourses seem unlikely to have altered much, as the greatest potential for bed disturbance and erosion will be in flood conditions.[722] In these instances, the spilling gates and weirs in the various barrier permit the excess flow to carry on downstream in an almost natural, uncontrolled fashion. Furthermore, throughout the history of development, efforts have been made to reduce the chances of erosion, through engineering works, such as protective aprons or stilling basins, or through the setting of limits on spillflow discharges - the decision to mothball the disperser valves on the Kaitawa penstocks after their commissioning tests, because the

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[720] Freestone et al.,'Lake Waikaremoana Hydrology, Pt. 2', p 11.
[721] Tracy Hickman, Environmental Manager, Genesis Power, pers. comm., 19 March 2004. The area covered by the easement is shown in 'Waikaremoana Power Scheme: Land Interests' (map). 'Statement of Evidence of Peter Canvin [Doc D]', Exhibit PAC 21. ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence (Hawke's Bay Regional Council, Napier)
[722] ECNZ, 'Waikaremoana Power Scheme', pp 112-113.

water jets they were releasing extended beyond the tailrace, is a case in point.[723] A more noticeable effect is associated with the reduction in normal flow (especially that immediately below the two diversion structures). When discharges back into the river system are at a minimum, sediment can accumulate, and if this is followed by a major spillflow, it can be entrained and flushed out in a short period of time. Having said this, the entrainment of sediment is not a particularly serious issue because of the extremely low sediment levels to start with in Lake Waikaremoana. In addition, Lakes Kaitawa and Whakamarino act as settling ponds, thereby capturing some of the sediment that would naturally have flowed downstream.[724]

The stop-start nature of spillflows can also have an influence on flows (and hence flow-related characteristics, such as water temperature) in the Waiau and Wairoa Rivers, which water from the Waikaretaheke River enters downstream. This impact is only temporary though, and is less noticeable in the Wairoa River because its average flow, of almost $80m^3/s$, is more than 50 percent larger than the maximum spillflow from Kaitawa.[725] It is also worth remembering that the water abstracted from the Waikaretaheke River is subsequently returned to it rather than being transferred to another catchment, or used up in some other manner (such as irrigation or urban water supply), so that the aggregate flow of water (but not sediment) continuing into the lower catchments is the same as it would have been without hydro-electric development.

When it comes to considering instream flora and fauna, the reduced normal flows in the watercourses with hydro-electric works are of greater significance. Less flow means less wetted stream area, and hence less in-stream habitat. Comparison with nearby streams in their natural state nevertheless shows that the composition of in-stream biota in the affected and unaffected watercourses is fairly similar, with the only notable change observed in studies being the abundant growth of macrophytes (large plants) below Lake Whakamarino.[726] Spillflows, meanwhile, tend to act like floods in flushing out

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[723] See also, by way of example, comments in regard to the spillgates and sluice gate of Lake Whakamarino in Anderson & Bloodworth, p 195
[724] ECNZ, 'Waikaremoana Power Scheme', pp 108, 113-114 & 136
[725] Ibid., pp 135-137
[726] Ibid., pp 119

much of the in-stream biota, but clearly the communities recover quickly (given the lack of difference between the natural and controlled watercourses).[727]

Of more interest to this study, since it involves Lake Waikaremoana as well, is the ability of fish and eels to migrate through the upper Waikaretaheke River catchment. In this respect, the effects of hydro-electric development have been mixed. Below the Piripaua powerhouse, the reduced flows had aided the migration of some native fish, such as inanga (*Galaxias maculatus*) and the common bully (*Gobiomorphus cotidianus*) up the Waikaretaheke River. Of the eight native fish and two eel species found in the Waikaretaheke River, however, only the koaro (*Galaxias brevipinnis*) and long-finned eel (*Anguilla dieffenbachii*), can overcome the Mangapapa Falls, which lie around 12km downstream from Piripaua. These two species therefore come into direct confrontation with the watercourse structures used in the power scheme, which deny access to Lake Waikaremoana.[728] In addition, a 1950 report by P. Dickinson, a fisheries officer, relates that an electrified eel barrier had been installed at Piripaua, which its operator claimed to be "100 percent effective".[729]

Quite how far koaro and long-finned eels might have migrated in the absence of hydro-electric development is something of a mystery. Although a population of koaro remains in Lake Waikaremoana, few koaro venture into the upper Waikaretaheke River catchment today. This is thought to owe not so much to the hydro-electric works, but rather to the lack of modern-day forest cover. The removal of such cover has occurred primarily through agricultural development in the region, and in particular uncontrolled grazing by goats.[730] In the case of long-finned eels, it appears there may have been a population in Lake Waikaremoana prior to the arrival of Pakeha in the 19th century, but their numbers must have been fairly low. As one local resident, Wiremu (Bill) Wahanui, recalled, "the old Maoris always said there were no eels in Waikaremoana". Wahanui went on to observe that when dive operations at Onepoto were carried out plenty were found, but they were 12 to 18 metres below the lake surface.[731] In the circumstances, the

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[727] Ibid., pp 119-121
[728] Ibid., pp 61 & 124-125
[729] P Dickinson, 'Report on Lake Waikaremoana (Visited 5th to 10th September 1950)' (IA 1, W2578, 78/37 (ANZ, Wellington)), [file vol. 4 , p 1968]
[730] ECNZ, 'Waikaremoana Power Scheme', pp 58, 61, 65 & 125
[731] Natusch, p 55

'no eels' observations may have referred not to an absence of eels, but rather to a population that was not being harvested, for reasons of scarcity and/or tapu status (described in Section 2.2.2). In his 1950 report, Dickinson remarked that it seemed "certain that eels had access to the lake from the Waikaretaheke River", and that they could have found their way "into the lake either through seepage cracks in the bed or over the outlet when it was overflowing".[732] Similarly, in the 1970s, the fisheries scientist R. M. McDowall concluded that eels (together with hardy fish species) could have made it into the lake through the Onepoto outlet.[733] A major waterfall below Kaitawa was probably the limiting factor to the number of elvers reaching the lake, though interviews with claimants indicate that elvers were climbing this.[734] It is also possible that Maori supplemented elver numbers in Lake Waikaremoana by moving them from the Waikaretaheke River by hand; in the account of his visit in the 1890s, Elsdon Best wrote that "some natives say that eels are also to be found, but that they have been introduced in late times from the Waikaretaheke River".[735] In contrast, in a 1996 study, no eels were found to be present in the catchment beyond the diversion dam at Kaitawa. Since this time, a capture and release programme has helped boost numbers in three areas of known eel habitat, which were selected by local hapu, namely the upper reaches of Mangaone Stream, the Waikaretaheke River above the Tuai road bridge (and the Tuai diversion dam), and Kahutangaroa stream.[736]

The various hydro-electric structures have also been hazardous to lake fish, and blocked downstream passage. This consideration also affects fish introduced to the Lake Waikaremoana, such as brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), and native smelt (*Retropinna retropinna*).[737] Prior to the screen being placed on the Kaitawa Power Scheme intake, for example, large numbers of fish from Lake Waikaremoana were sucked in and subsequently destroyed at the headgate screens; a count reported by Dickinson found at least 920 fish had perished in this way in a nine

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[732] Dickinson, 'Report on Lake Waikaremoana' (IA 1 W2578, 78/37 (ANZ, Wellington)), [file vol. 4 , p 1968]
[733] Gallen & North, pp 60-61
[734] ECNZ, 'Waikaremoana Power Scheme', p 52; Interview, Te Ariki Mei, 11 November 2003.
[735] E Best, *Waikaremoana. The Sea of Rippling Waters*, Wellington, Government Printer, 1897, p 17
[736] ECNZ, 'Waikaremoana Power Scheme', pp 61-62 & 125
[737] See ibid., pp 52 & 56

month period.[738] Similarly, trout are often stranded in the surge chamber of the Tuai Scheme, though arrangements have now been made with Eastern Fish and Game Council to rescue fish whenever the surge chamber is drained.[739] The Tuai diversion dam also poses a problem for eels trying to reach the sea (which is more significant now that elvers are being released above it), since the river is diverted into Lake Whakamarino, from which the main outflow is through the Piripaua Scheme intake. In the late 1990s an eel management plan was being devised in order to determine the best means (that is, catch & release, or an eel passageway on the Lake Whakamarino dam) to circumvent this problem.[740]

Mention should also be made that the creation of Lake Whakamarino also impacted on mahinga kai for Waikaretaheke valley residents. Maria Waiwai, for example, recorded in 1986 that the swampy areas of the old Whakamarino Flat were an area where eel spearing took place.[741] The interviewed claimants also referred to the loss of eeling resources. Alternatively, as Genesis have pointed out, Lake Whakamarino provides an excellent home for fish, which is "heavily used by locals".[742]

5.4.4 Water Quality

Water quality, as demonstrated by tests conducted in the mid-1990s, is still high throughout the upper Waikaretaheke River catchment.[743] Accordingly, maintaining that standard is of considerable importance. Hydro-electric development, however, poses some risk to water quality, in particular through the danger that the cooling oil from the generators in the three powerhouses and the outdoor switchyard may somehow leak into the water to which it transfers heat. In order to reduce the chance of contamination, water with which oil may come into contact passes through oil interceptor systems. Elevated levels of trace metals are found in the discharges from these interceptor systems, and two from Tuai have been found to have increased petroleum hydrocarbon

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[738] Dickinson, 'Report on Lake Waikaremoana' (IA 1 W2578, 78/37 (ANZ, Wellington)), [file vol. 4 , p 1968]
[739] ECNZ, 'Waikaremoana Power Scheme', p 122
[740] Ibid., pp 126-128

[741] P Chester, Waikaremona Power Development dredging of Lake Whakamarino archaelogical site survey, Wellington, New Zeakand Historic Places Trust, p. 3
[742] Interview, Huia Lambert and Rangi Paku, Nga Rauru o Nga Potiki, 11 November 2003
Tracy Hickman, Environmental Manager, Genesis Power, pers. comm., 19 March 2004.

levels, but once mixed with water below the powerhouses, the concentrations are thought to be too low to have any negative effect on aquatic life.[744] Similarly, water discharged from the 'tailings dam' into Lake Whakamarino is reported to have higher concentrations of enterococci and plant nutrients, and slightly higher levels of iron, than the water in the lake. Again, however, after mixing the concentrations are probably too low to have any adverse effect.[745]

During the course of hydro-electric development, there have also been a number of discrete discharges of extraneous substances into the catchment's waters. It is not known how many accidental discharges there have been, but it is known, as seen above in relation to the taking of water from Te Kopani Reserve, that a sewage leakage into Lake Kaitawa in the mid-1940s was sufficient to cause an outbreak of dysentery. Presumably some contamination has also occurred in instances when machinery has fallen into the lakes, but compared to the impacts of engineering works the effects would obviously be minimal.[746] Investigations into lakebed leakage has also seen a number of intentional discharges into Lake Waikaremoana, and the spring waters emanating from the barrier, in the form of chemical tracers injected in the leak openings. It is not known what dyes were employed in the 1980 investigation, though it is known that salt was used at this time.[747] In the previous investigations in 1916 and during the early 1930s, salt was also used, as was aniline and potassium permanganate dyes at some point. Little information is available on the dyes, although salt concentrations in the spring waters were recorded to be just above 20 parts per million. As the normal concentration was around 15 parts per million, it seems very unlikely that the increased concentrations, which lasted a few hours at most,[748] would have harmed the biota in the spring-fed streams.

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743 ECNZ, 'Waikaremoana Power Scheme', pp 48, 53, 55, & 58
744 Ibid., pp 115-116
745 Ibid., pp 110-111
746 See Natusch, pp 42 & 49
747 *Gisborne Herald*, 2 May 1979, *Wairoa Star*, 22 January 1980, & *New Zealand Herald*, 25 March 1980. Tuai Station newspaper clipping book (AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington)
748 See Anderson, 'Waikaremoana', pp 518-521; Natusch, pp 8 & 31-32. Anderson nevertheless notes that 40lbs of potassium permanagate were employed, and that it must have reacted with organic matter in the barrier (it is an oxidising agent) as no colour was detected downstream.

5.4.5. Disturbance of Waahitapu

In several instances, construction of hydro-electric works has impinged on sensitive sites. The first such occasion was the accidental exhumation of the grave (the location of which was then unknown) of the rangatira Tuai during excavations for staff houses during the Tuai Power Scheme. It is reported that local Maori took his body away for re-burial elsewhere.[749] Seemingly relations between the Public Works Department and the resident Maori population were fairly positive at this time, as with the latter's consent, the generators at Tuai powerhouse were given the names Ruapani and Pukehore - thereby setting a precedent for the naming of all the generators subsequently added to the three powerhouses.[750] This may have been an attempt to give some recognition for the giving up by Maori of most of the Waikaremoana Block.[751] It is nevertheless interesting to note that one newspaper report detailing the opening of the Tuai powerhouse in 1929, remarked that were "many old tales and legends of the lake and the spirit of the lake, and the consequences that will follow upon the Pakeha's interference with the outlet waters". It went on to note, however, that this apprehension had not been so evident on opening day.[752]

Given the greater spread of environmental impacts in the latter period of hydro-electric development, it is not surprising that sensitive sites have come under greater threat. Rodney Gallen, for example, has recorded that but for the intervention of the Minister of Works the rock formation Nga Hoe a Kupe would have been blown up during lakebed sealing.[753] According to Te Ariki Mei, one of the interviewed claimants, some burial sites were also disturbed during excavations for the Kaitawa scheme intake.[754] Other sensitive sites to have been damaged are tihi near Whakamarino, which have had

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[749] Natusch, p 20

[750] *Evening Post*, 20 November 1929. Waikaremoana Power Scheme: Minister's File (1929-39) (AADO 569/526a (59/1, vol. 5), ANZ, Wellington); ECNZ, 'Waikaremoana Power Scheme: ', p 161. The full list of generators names is: (Tuai) G1 - Ruapani, G2 - Pukehore, G3 - Tuhoe Potiki, Auxiliaries - Haumapuhia, Hinewaho; (Piripaua) G4 - Tamate Pakua, G5 - Kahungunu; (Kaitawa) G6 - Tane Mahuta, G7 - Ranginui.

[751] See, for an example of the appreciation of power development advocates, Lambert, *The Story of Old Wairoa*, Auckland, Reed Books, 1998 [reprint of 1925 original], pp 727-728

[752] At the opening, a formal Maori welcome was led by Mah[a]ki Tapiki and Waip[atu] Winitana. *Evening Post*, 20 November 1929. Waikaremoana Power Scheme: Minister's File (1929-39) (AADO 569/526a (59/1, vol. 5), ANZ, Wellington).

[753] Cox, p 65

[754] Interview, Te Ariki Mei, 11 November 2003

power-pylons erected on them.[755] On a more spiritual level, the covering up of the representation of the taniwha Haumapuhia by a landslide near Kaitawa just prior to the diversion of the Waikaretaheke River was seen as a inauspicious sign by local Maori, and Stokes, Milroy and Melbourne reported that the belief that the lake and its river should not be interfered with was further reinforced one of the divers involved in the 1970s leakage investigations died after seeing the waka Hinewaho and the taonga it contained.[756] Incidentally, dive operations in the 1930s found another source of recent controversy, namely the whaleboats used by the Armed Constabulary on the lake during the New Zealand Wars. A proposal to raise one of the whaleboats in 1980 was opposed on the grounds that it would revive unhappy memories for local Maori, and finally abandoned after archaeologists argued that the retrieval would damage it too severely.[757]

5.5. Conclusion

This chapter has shown that hydro-electric development undertaken by various Crown agencies between 1920 and 1955 significantly altered the natural flow of water from Lake Waikaremoana down through the upper Waikaretaheke River valley. The initial project, in the form of the Tuai temporary power station, was small in scale and localised in impact, but with the completion in turn of the permanent Tuai, Piripaua and Kaitawa Power Schemes, what amounted to an 'artificial' river, running parallel to the Waikaretaheke River between Lake Waikaremoana and Piripaua, was created. Accordingly, whenever electricity was being generated, or alternately when water held back for subsequent generation, the flow in the Waikaretaheke River dwindled to a fraction of what it had been previously. While the Waikaretaheke lost water, elsewhere, in contrast, two tiny lakes were artificially raised, thereby turning them into sizeable new storage reservoirs, that is, Lakes Kaitawa and Whakamarino. The last act of this hydro-electric development was the formation of a 'sealing blanket' over leaks in the bed of Lake Waikaremoana near Onepoto. This move to minimise the escape of water through the lake's natural earth barrier was the culmination of the Crown's determination that no opportunity for generating electricity should be lost..

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[755] Chester, p 8

[756] Gallen & North, p 5; Stokes et al, p 216. In the circumstances, it is surprising that no Maori individuals or organisations seem to have lodged formal objections (see Section 7.3)

[757] Natusch, p 32; Coombes, 'Preserving 'a great national playing area' ', p 145

Until the 1940s, little of the development involved Lake Waikaremoana directly. Even so, Waikaremoana Maori were particularly affected by hydro-electric development, as there was a concentration of Maori communities in reserves in the Waikaretaheke River valley. Prior to hydro-electric development, many had resided in the Waikaremoana Block, but the Crown had acquired this in the 1920s for watershed preservation, which was thought by the Crown to be necessary if Lake Waikaremoana was to be a future hydro-electric reservoir. Ironically, therefore some local Maori found that the needs of hydro-electric development followed them around the district. The two Maori reserves most notably affected were Te Kopani and Heiotahoka, as both lost land under Public Works Acts to the hydro-electric schemes. Although compensation was eventually provided, the Maori owners often had to go to great lengths, including legal actions, to get it. Where compensation has been in the form of infrastructure and services, the Crown's ongoing responsibility for these has also been a matter of dispute. Conversely, although structures (the Kaitawa scheme intake, the siphons / spillway, and the 'sealing blanket') were all constructed on the bed of Lake Waikaremoana, the Crown never took steps to establish title to the areas concerned, as it believed it owned the lake, despite court rulings in 1918 and 1944 which suggested that it did not. Having completed the schemes, the Crown largely ignored this lack of title, and the situation was only addressing in 1988 when it is reported a confidential agreement between ECNZ and the lake's legal owners - the Tuhoe-Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards - gave the Crown-owned generator easements to allow the hydro-electric works to operate. They had already done so, however, for four decades, without either compensation or consultation.

As described in the chapter, the Waikaremoana hydro-electric schemes also had a number of environmental impacts, aside from loss of property rights, which in turn affected Maori interaction with that environment. The blocking off of the Waikaretaheke River by hydro-electric structures removed any opportunity for eel stocks in Lake Waikaremoana and the upper reaches of the Waikaretaheke River to be replenished naturally, and in addition Waikaremoana Maori lost access to traditional mahinga kai, when wetland areas were inundated by the raising of Lakes Kaitawa and Whakamarino. Having said this, investigations into the effects of reduced flows have suggested that there will be increased fish and eel penetration into lower reaches of the Waikaretaheke River, and Genesis have argued that Lakes Kaitawa and Whakamarino

provide enhanced opportunities for recreational fishing. From time to time, construction works also damaged culturally and spiritually sensitive sites. In addition, of course, the level of Lake Waikaremoana was lowered by around five metres, but this, and its impacts, are the subject of the next chapter.

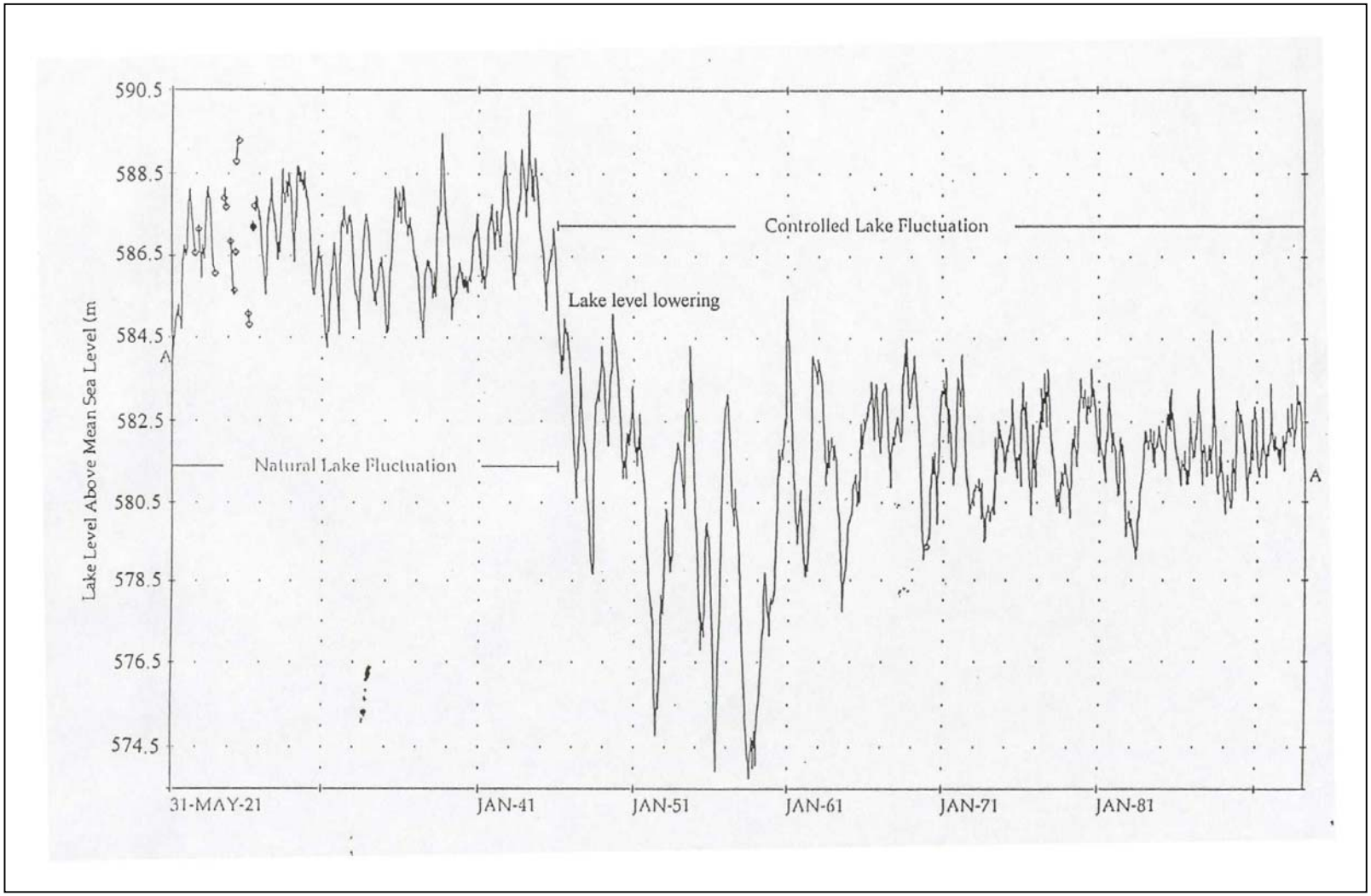

Figure 6.1: Fluctuations in the Level of Lake Waikaremoana, 1921 – 1994 (Elevations as for Moturiki Datum)

(Source: ECNZ, 'Waikaremoana Power Scheme: Assessment of Effects on the Environment'. 1998, p 3

Chapter 6: Lake Level Management at Waikaremoana

6.1. Introduction

The manipulation of the level of Lake Waikaremoana since 1946 with a view to increasing its potential for electricity generation has been a central feature of Crown activities at the lake. Certainly, amongst all the changes brought about by hydro-electric development, its effects have been the most visible, and thus have drawn the most public comment. More importantly, however, it has been an aspect of Crown management where the Crown's use of Lake Waikaremoana as a water resource has clashed with, and to a certain extent has overridden, the Crown's use of the lake as a scenic resource.

Even before the impacts of the artificial management are considered, it is important to appreciate the degree to which lake levels were changed. To this end, this chapter commences with an account of the natural lake level regime before 1946. It next proceeds to describe the evolution of plans to lower the lake prior to 1946, and examines their rationale, and then moves on to examine how levels have changed, and why, since 1946. This post-1946 analysis will be split into two parts, the first covering the period up until about 1970, when the lake level was subject to no regulation (other than the limits of the engineering structures to lower or raise it), and the second covering the post-1970 years when the lake level has been managed according to increasingly formalised set ranges. Finally, the focus of the chapter will move on to impacts of the altered lake level regime, and what effects these impacts have had on the local Maori population.

It is well to remember, as was observed at the start of Chapter 5, that elevations at Lake Waikaremoana have been defined according to two datum sets, the Kaitawa Datum (again abbreviated here as KD) and the Moturiki Datum (again abbreviated as MD), with the corresponding elevation of the latter being obtainable by subtracting 27.51m from the former. In order to prevent the text becoming overwhelmed by elevation conversions, when heights have been quoted only the datum matching that in the source has normally been used. To aid readers, however, diagrams giving the elevation in both datums of 'milestone' heights, such as the pre-1946 observed minimum, will be interspersed throughout this chapter.

6.2. Fluctuations in the Natural (pre-1946) Lake Level

The level of Lake Waikaremoana has been measured almost without a break since October 1926, and regular recording of levels dates back to June 1921.[758] Even before that time, details of historical minima and maxima were kept. The minimum level ever observed is 2001ft (609.9m) (KD), which the lake dropped to in 1915,[759] while between 1921 and the lowering of the lake in 1946, the minimum level was 2006ft (611.4m) (KD).[760] The highest ever level recorded, before or since 1946, has been the 2026ft (617.5m) (KD) measured in March 1944, although Anderson notes in his 1948 paper on leakage from the lake that according to the late chief Mahaki Tapiki, the lake level had risen in the past to as much as 2038ft (621.1m) (KD).[761]

Using the data for the years before lake lowering for which the lake level record is complete, namely 1927-1945 inclusive, it may be calculated that the mean annual lake height was 2015ft (614.3m) (KD).[762] This coincides exactly with the height ascribed to the lake in surveys in 1896,[763] which, as seen in Section 5.1, was subsequently adopted as the 'official' elevation by the New Zealand Electricity Department. Interestingly, the crest of the lake outlet was also at this height[764] - the semi-porous lake barrier, it should be remembered, meant that the lake surface did not have to be higher than the outlet for outflow to continue. The annual range, meanwhile, was fairly consistent with all but 6 of 24 observed ranges between 1922 and 1945 being between 2.0m and 3.5m; the remaining six were split evenly above and below this range, with the smallest being 1.48m (in 1934) and the largest 4.01m (in 1938). The mean yearly maximum height for this period was 2020ft (615.6m) (KD) - a figure which was subsequently employed when determining the boundary of the lakebed in land title negotiations - while the mean yearly minimum height was 2011ft (613.0m) (KD).[765] Unfortunately, there appear to be no earlier records of annual ranges, although it worth noting that when P S Hay investigated the hydro-electric potential of Lake

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[758] H J Freestone, R Jack, & J Bowler, 'Lake Waikaremoana Hydrology, Pt. 2: Lake Waikaremoana Natural Levels Report', [1996], Appendix A

[759] F T M Kissel, 'Waikaremoana Power Scheme' (enclosure to Kissel to E Parry, Chief Electrical Engineer, 3 December 1917), p 3, AADO 569 524b 59/1(vol. 1), ANZ, Wellington; L Birks, Chief Electrical Engineer, to Messrs. Hay & Vickerman, 7 May 1921, AADO 569 525a 59/1(vol. 3), ANZ, Wellington. See also G P Anderson, 'Waikaremoana : The Problem of Lake Control', *Proceedings of the New Zealand Institution of Engineers* 34, 1948, p 508

[760] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 2', pp 32-33.

[761] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', p 12, & 'Pt. 2', Appendix A; Anderson, 'Waikaremoana', p 508

[762] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 2', Appendix A

[763] The first topographical surveys in the Urewera region were undertaken in 1896, while by 1897 this had appeared in the height of a Lands and Survey Department map of Lake Waikaremoana.
S P Smith, Surveyor-General, 'Department of Lands and Survey (Annual Report on)', AJHR, 1896, C-1, p xi; E Best, *Waikaremoana. The Sea of Rippling Waters*, (Wellington: Government Printer, 1897), map in endpaper ('Plan of Waikaremoana', photo-lithographed at Head Office, Department of Lands & Survey, May 1897)

[764] Anderson, 'Waikaremoana: The Problem of Lake Control', p 508

[765] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', pp 10 & 12

Waikaremoana in 1904, he described 'the space between the low- and high-water levels of the lake' as being '12ft in height.'[766]

Level (ft)	Kaitawa Datum (m)	Moturiki Datum (m)	Comment
2038	621.2	593.7	Historic maximum according to Chief Mahaki Tapiki
2026	617.5	590.0	Observed Maximum (recorded in 1944)
2020	615.7	588.2	Mean Annual Maximum (1921-45)
2017	614.8	587.3	Monthly average for October (1921-45)
2015	614.2	586.7	Annual Mean (1921-45)
2013	613.6	586.1	Monthly mean for April (1921-45)
2011	612.9	585.4	Mean Annual Minimum (1921-45)
2006	611.4	583.9	Observed Minimum (1921-45)
2001	609.9	582.4	Observed Minimum (1915) prior to routine measurement

From day to day, of course, the lake level rose or fell in a manner largely determined by the amount of precipitation that had been falling in its catchment area. Indeed, the lake has been known to rise by up to 1.07m in 24 hours and by 2.66m over the course of a week.[767] Consequently, the seasonality of rainfall led in turn to a distinct seasonal variation in the lake height. Rainfall data from Lake Waikaremoana for the years 1921-50 (which is almost contemporaneous with the period under discussion) shows that of the average of around 1950mm recorded per annum, 40 percent fell in the four months of May-August inclusive, while at the other end of the spectrum, only 28 percent fell in the months September-December inclusive.[768] By way of comparison, an examination of mean monthly lake levels from the years 1921 to 1945 inclusive, which are depicted in Figure 6.2 below, shows that the lake tended to be at its highest in October, when the mean level was 2017ft (614.9m) (KD), while it tended to be at its lowest in April, when the mean level was 2013ft (613.7m)

[766] P S Hay, 'New Zealand Water Powers, etc. [Report on]', AJHR, 1904, D1-A, p 6

[767] Electricity Corporation of New Zealand Ltd. (ECNZ),'Waikaremoana Power Scheme: Assessment of Effects on the Environment', [1998], p 88

[768] *New Zealand Official Yearbook [1966]*, 71st ed., Wellington, Department of Statistics, 1966, p 17

(KD).[769] Clearly, recharge of the lake continued for 2-3 months after the heavy winter rains, as the initial falls would have been stored up in vegetation, soils, and the various ponds and lakes in its catchment, but from October onwards the dry spring and summer months allowed to lake level to drop steadily. As will be seen below, this natural pattern of high levels at the start of spring, and low levels in autumn, was to be reversed when the lake began to be managed with electricity generation in mind.

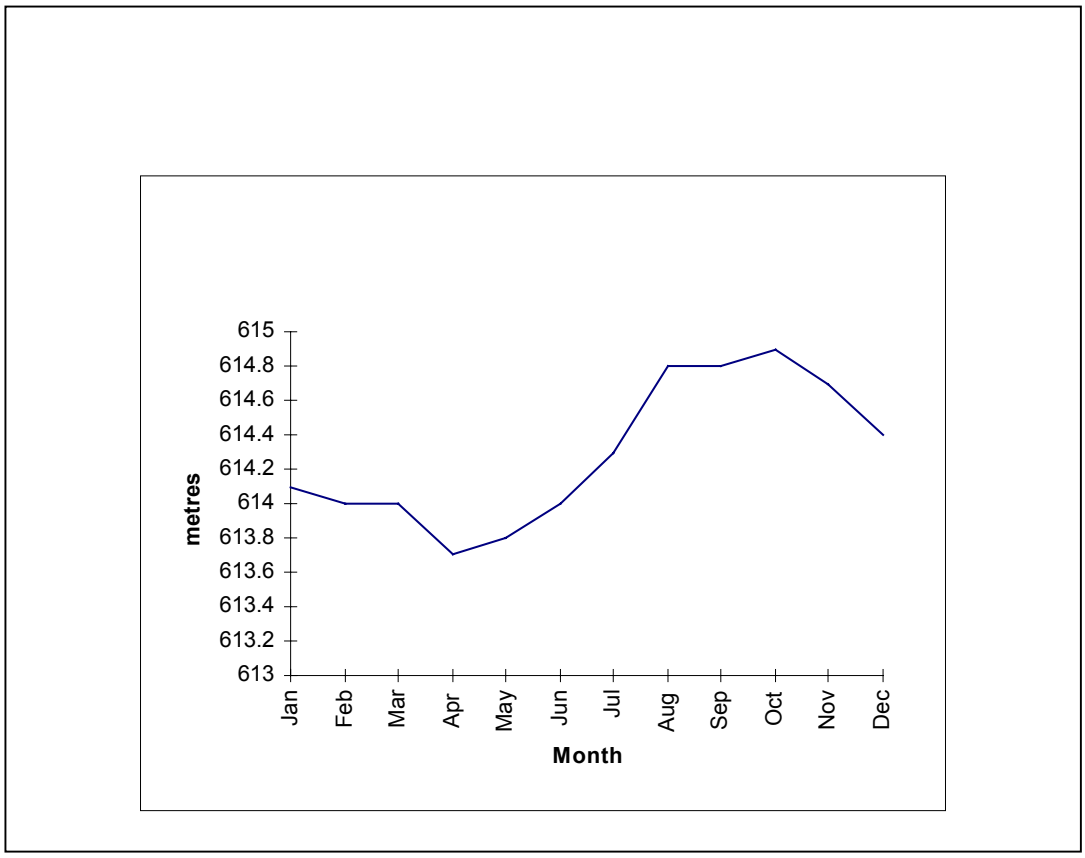

Figure 6.2 Mean monthly lake levels at Lake Waikaremoana between 1921 and 1945 inclusive (Kaitawa Datum) (Source: Calculated from data in Freestone et al., *Lake Waikaremoana Hydrology*)

6.3. The Evolution of Plans to Lower the Lake

The idea of lowering Lake Waikaremoana first seems to have been seriously considered in 1917, when Frederick Kissel noted that if a tunnel could be driven through the lake barrier at 70 to 80 feet below the surface, 'this could be used to temporarily lower the level of the lake and so enable the present shattered lake rim to be made watertight'. Thereafter, the same tunnel could be employed to take water through the barrier under pressure, to a

[769] Calculated on the basis of all available data in Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 2', Appendix A. The most comprehensive record is that for October, where data exists for 24 out of 25 years,

powerhouse downstream - *a la* the Kaitawa Power Scheme.[770] Until the completion of the Tuai Power Scheme in 1929, however, there was little to be gained from trying to control the outflow from the lake, and thus there does not seem to any further mention of the idea until the latter date. At that time, the *Poverty Bay Herald* remarked on the desirability of sealing the leaks so that the large winter inflow could be retained during the summer months, when the lake was receding. This, it informed its readers, could be done once the lake was lowered:

> It has been suggested that the level of the lake be lowered by 50ft for this purpose. Needless to say this will be a huge undertaking, but it is maintained that it will have to be done before the completed scheme [that is, the combined Kaitawa, Tuai and Piripaua Schemes] will attain the desired success. The means to be adopted in the lowering of the lake have yet to be decided upon, while it also appears indefinite when it is expected to make a move in this undertaking.[771]

The question of how the lake should be lowered was to be a key feature in the report of Professor Hornell, a Swedish expert on hydro-electric construction, who was invited to inspect Lake Waikaremoana and its development potential in 1930.[772] Hornell advised that the lake ought to be lowered by drainage through a tunnel at least 100ft below the surface, in order not just to seal the leaks, which he believed might extend that far down into the lake, but also to maintain the stability of the lake barrier. Nevertheless, he also indicated that once the tunnel and leak seals were in place, it might be possible to 'restore the level to its present height, or to parts of this height, thereby, of course, taking into consideration also the advisability of utilising the lake as a more efficient storage basin'.[773] The safety rationale for lake lowering was dismissed, however, by the two geologists, Marshall and Ongley, who had spent the most time studying the barrier. Both pointed to the comparatively unchanged nature of lake features, such as shoreline heights, and the lack of sediment issuing from the barrier springs, as evidence that the lake level and the barrier had changed little since the lake had first formed; the lack of dislocation suffered by the barrier as a result of the Napier earthquake in early 1931 further reinforced these views.[774] In the wake

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while the least comprehensive is that February where data exists for 20 of 25 years

[770] Kissel, 'Waikaremoana Power Scheme' (enclosure to Kissel to Parry, Chief Electrical Engineer, 3 December 1917), p 10, AADO 569 524b 59/1(vol. 1), ANZ, Wellington

[771] *Poverty Bay Herald*, 22 February 1929, AADO 569 525b 59/1(vol. 4), ANZ, Wellington

[772] W B Taverner, Minister of Public Works, to P G Hornell, 23 August 1930 (enclosure to Taverner to G W Forbes, Prime Minister, 1 August 1931), AADO 569 525c 59/1, ANZ, Wellington. See also G G Natusch, *Power from Waikaremoana: A History of Waikaremoana Hydro-Electric Power Development,*(Gisborne: Te Rau Press Ltd for Electricorp Production (Waikaremoana Power Stations), 1992), p 26

[773] P G Hornell & P N Werner, 'Re Waikaremoana Power Development', 15 June 1931, pp 33-5, AADO 569 526c 59/1, ANZ, Wellington

[774] See J Henderson, P Marshall & M Ongley to F W Furkert, 10 September 1931, & Ongley to Furkert, 11 September 1931 (enclosures to Furkert, Engineer-in-Chief, to W B Taverner, Minister for Public Works, 11 September 1931), and P G Hornell & P N Werner, 'Lake Waikaremoana: Comments upon the Enginner-in-

of Hornell's report, and Marshall and Ongley's comments thereon, F W Furkert, the Public Works Department's Engineer-in-Chief, concluded that whereas in terms of the depth of the tunnel, the 'Department's officers had in their mind something in the order of 60 ft., undoubtedly 100 ft. would be better'.[775] Most of the large leaks which had been found by the leakage investigation team at the time were within about 60ft of the surface,[776] and as Furkert reasoned a tunnel 100ft below the surface would allow 40ft for fluctuations in lake level once the outflow was completely regulated; in this case, Furkert assumed an extreme range of 30ft, and added 10ft to account for the lake area being smaller once lowered. Interestingly, Furkert was concerned that there would be 'grave criticism of the vandalism of the Public Works Department by a large section of the public' once the lake level had been reduced by 50ft or more, since it would no longer be 'bush clad right down to the water', and a 'band of varying width of bare rock round the sides and lower end of the Lake, and unsightly mud-flats in the upper arms' would be thereby exposed. However, Furkert countered this by declaring that

> nature soon restores the ravages of man, particularly in a damp climate, and not many years would elapse before all this bare ground would be clad with vegetation and the beauty of the Lake restored to something very similar to what it is at present.[777]

As noted in Section 5.2, the onset of the Great Depression slowed the growth in electricity demand to the point where there was no pressing need to complete hydro-electric development at Lake Waikaremoana; accordingly, for the time being progress on the proposed tunnel did not extend beyond the excavation of test tunnel drives and exploratory shafts near the lake edge between August 1935 and January 1936.[778] Given that the exploratory shaft from which the drives were extended only reached about 50ft below the lake surface, it seems that the idea of the deeper tunnel must have been rejected by 1935, despite Furkert's recommendation of it in 1931. Unfortunately, the documentation that has been examined gives no clues as to why the plans for the tunnel at a lesser depth remained unchanged; possibly this occurred after exploratory boring near the lakeshore in 1932.[779]

Chief's letter of 19th Sept., and enclosures', 23 December 1931. Waikaremoana Power Scheme: Minister's file (P G Hornell) AADO 569 525c 59/1, ANZ, Wellington. Marshall and Ongley both published articles relating to the geological origin of Lake Waikaremoana (see P Marshall,''The origin of Lake Waikaremoana', *Transactions and Proceedings of the New Zealand Institute* 57, 1926, pp 237-44'; M Ongley, 'Waikaremoana', *New Zealand Journal of Science and Technology,* 14 (3), 1932, pp 173-84).

[775] Furkert to Taverner, Minister for Public Works, 9 September 1931, AADO 569 526c 59/1, ANZ, Wellington

[776] Natusch, p 31

[777] Furkert to Taverner, 9 September 1931, AADO 569 526c 59/1, ANZ, Wellington

[778] Natusch, p 32

[779] J Martin (ed.), *People, Politics and Power Stations: Electric Power Generation in New Zealand 1880-1980*, (Wellington: Bridget Williams Books and Electricity Corporation of New Zealand, 1991), p 103; Natusch, p 32

Following the cessation of tunnelling operations, the engineers of the Auckland contractors Gilberd put forward the idea that siphons could be used in the meantime to draw water out of Lake Waikaremoana.[780] Previously, Professor Hornell had ruled out both pumps and siphons as means of lowering the lake, since they had a limited depth of suction, but this was in the context of his plans to lower it by 100ft.[781] Evidently, the use of pumps was considered in 1937, when the prospect of new shortfalls in electricity supply made filling Lake Kaitawa, and thus increasing generation from the Tuai Power Scheme, an attractive proposition, but ultimately this idea was again rejected.[782] Even so, it is significant that drawdown of the lake was now being proposed on the basis of increasing short-term generation, rather than the plugging of lake leakage.

The construction of the tunnel was finally assured once approval for the Kaitawa Power Scheme was given in 1941, although actual excavation did not start until December 1943.[783] Some six months earlier, the Minister of Internal Affairs, W E Parry, had expressed regret that 'the lowering of the lake level of Waikaremoana by some forty or fifty feet (which I think will be inevitable) will rob it of its rich and unique scenic beauty'. In contrast to Furkert's sentiments twelve years earlier, Parry believed that the marine growth around the edge of the lake, would 'take years and years' to again accumulate, if it ever did, 'owing to the variation of the lake levels', and consequently fish populations in the lake would be seriously injured by it. Parry was nevertheless resigned to the fact that New Zealand's future demands for hydro-electric power would take precedence over tourism and fishery concerns, and he merely stated his concerns in the hope that better planning for hydro-electric development would save other scenic lakes in the future.[784] Although Parry does not say so, obviously immediate utilitarian concerns such as electricity generation would have been even more to the fore in this wartime situation.

As it turned out, the tunnel was not the first means of lowering the lake though. In the midst of a severe electricity shortage - indeed, 20 percent cuts in supply were imposed in the North Island from March to August 1946[785] - the decision was made to build the three temporary siphons, which began drawing water from the lake in March 1946. Evidently, the extra water through the Tuai and Piripaua powerhouses was insufficient, as two of the siphons had been extended by early 1947.[786] Finally, with the completion of the tunnel

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[780] Natusch, p 49
[781] Hornell & Werner, 'Re Waikaremoana Power Development', 15 June 1931, pp 29-30, AADO 569 526c 59/1, ANZ, Wellington
[782] Natusch, p 32
[783] Ibid., p 26; W L Newnham, 'Annual Report on Public Works by the Engineer-in-Chief ', in 'Public Works Statement', Appendix B, AJHR, 1944, D-3
[784] W E Parry to P Fraser, Prime Minister, 21 June 1943, TO 1 45/10/1, ANZ, Wellington
[785] Martin, p 129
[786] F T M Kissel, 'Annual Report of the General Manager for the year ended 31st March, 1946', in 'State

intake in early 1948, the State Hydro-electric Department gained the ability to lower the lake level to 1970ft (600.5m) (KD),[787] that is, 45ft (13.7m) below the previous mean lake height, and 31ft (9.4m) below the previously observed minimum.

6.4. Lake Level Management without Regulation

The initial drawdown of Lake Waikaremoana, which began in March 1946, was a fairly gradual process. Even though it began with the lake below average level - the mean for January 1946 of 2012ft (613.2m) (KD) was a full 3ft (0.9m) below the January average for the previous 25 years - the minimum during 1946 of 2002.5ft (610.4m) (KD) was still above the natural minima recorded in 1915.[788] The range for the year of around 3.2m was also within the natural limit, so perhaps the most noticeable sign of the drawdown was the lack of rise in the lake level during the winter months.[789] With the extension of two of the siphons to a greater depth in 1947, however, the degree of lowering became much more marked, with the minimum for that year being only 1995ft (608.0m) (KD). A comparison of actual lake levels with a simulated 'natural' record, based on the combination of lake level and outflow data, indicates that the average lake height over the whole of 1947 was just over 5m less than it would have been normally.[790] Not surprisingly, this drop off in the lake created concerns amongst Tourist and Health Resorts Department officials, and consequently in late 1947 they contacted Frederick Kissel, General Manager of the State Hydro-Electric Department, asking him what was planned for the lake in future. Kissel's reply would not have given them much solace, as he stated that it was impossible to accurately forecast the future lake level, although it would certainly be lower than it had been naturally, and the managed range of levels would be greater than the natural range. In the short-term, he anticipated that the level would be held at around 2000ft (609.6m) (KD) to aid construction, but once this was largely complete, the lake would be allowed to fill again. The purpose of this extra storage was to plug the expected gap in supply that would develop in the early 1950s; consequently, Kissel warned, the lake was likely to be drawn down using the tunnel to the engineering limit of 1970ft (600.5m) (KD) during this

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Hydro-Electric Department Annual Report', Appendix A, AJHR, 1946, D-4, p 8; Kissel, 'Annual Report of the General Manager for the year ended 31st March, 1947', in 'State Hydro-Electric Department Annual Report', Appendix A., AJHR, 1947, D-4, p 14.

[787] F Langbein, 'Annual Report on Public Works by the Engineer-in-Chief', in 'Ministry of Works Statement', Appendix C, AJHR, 1948, D-1, p 38; *Gisborne Herald*, 26 January 1956, *Daily Telegraph* (Napier), 14 July 1958 & 15 July 1958, AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington

[788] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', p 12, & 'Pt. 2', Appendix A

[789] Ibid, 'Pt. 1', p 12, & 'Pt. 2', Appendix A

[790] Ibid., 'Pt. 1', pp 4-5 & 12, & 'Pt. 2', Appendix A

period.[791]

Level (ft)	Kaitawa Datum (m)	Moturiki Datum (m)	Comment
2011	612.9	585.4	Peak of December Flooding, 1960
2010	612.6	585.1	Annual Maximum in 1949
2007	611.7	584.2	Annual Maximum in 1954
2003	610.5	583.0	Annual Maximum in 1956
2002.5	610.4	582.9	Annual Maximum in 1946
2000.5	609.7	582.2	Annual Maximum in 1975
2000	609.6	582.1	Kissel's average operating level, proposed 1947
1994 - 2004	607.8 – 610.8	580.3 – 583.3	NZED's agreed operating range, proposed 1970
1990	606.5	579.0	Dry winter minimum, recorded in 1969
1976	602.3	574.8	Annual Minimum in 1951
1973	601.4	573.9	Annual Minimum in 1955
1972.6	601.2	573.7	Annual Minimum in 1958
1970	600.5	573.0	Sill Level: Kaitawa Intake

Over the next few years, the variations in lake levels closely followed the sequence outlined by Kissel. There was no further net drawdown of the lake between 1948 and 1950, and indeed in 1949 the lake level briefly rose to 2010ft (612.6m) (KD).[792] In mid-1951, however, the rapid abstraction of lake water Kissel has foreshadowed began, and over the course of a year the surface dropped by more than 9m, to 1976ft (602.3m) (KD).[793] At this point the State Hydro-Electric Department relented, and with power from the long awaited Maraetai (completed in 1953) about to come on stream, the lake was left to refill for the next two years, so that at the close of winter in 1954, its level stood at 2007ft (611.8m).[794] Accordingly, in August 1954 the *Wairoa Star* commented that the lake had 'recently recovered its full beauty with a restoration of its waters'.[795] This was not to be the last time the lake level was subject to wild fluctuations though. As an examination of Figures 6.2 and 6.4, graphs of lake levels between 1932-41, 1952-61, and 1966-75 illustrates, the changes in lake level were far greater in scale in the 1950s than they were in either the preceding and following decades (or for that matter, in the decades since). The reason why the fluctuations in level were so pronounced is made clear in a *Gisborne Herald* article in January 1956,

[791] Kissel noted power supply problems would become acute in the period leading up to Maraetai's completion. F T M Kissel to the General Manager, Department of Tourist and Health Resorts, 5 November 1947, AADO 569 526b (59/1), vol. 6), ANZ, Wellington

[792] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', p 12, & 'Pt. 2', Appendix A

[793] Ibid.

[794] Martin, pp 133 & 135; Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', p 12, & 'Pt. 2', Appendix A

[795] *Wairoa Star*, 9 August 1954, AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington

which noted that ‘a guiding principle in the maintenance of power supplies in the North Island is that Waikaremoana can be reduced in order to save draw-off from Lake Taupo’. This preservation of generating capacity within the Waikato River power network by the State Hydro-Electric Department was based on the fact that it generated much more electricity than the three Waikaremoana schemes, and hence was more indispensable. Furthermore, the higher rainfall and faster inflow to Lake Waikaremoana allowed it to recover its level more quickly than Lake Taupo. As it happened, the *Gisborne Herald* article had been written in response to a major drawdown of the Lake Waikaremoana during a dry summer, and there were fears

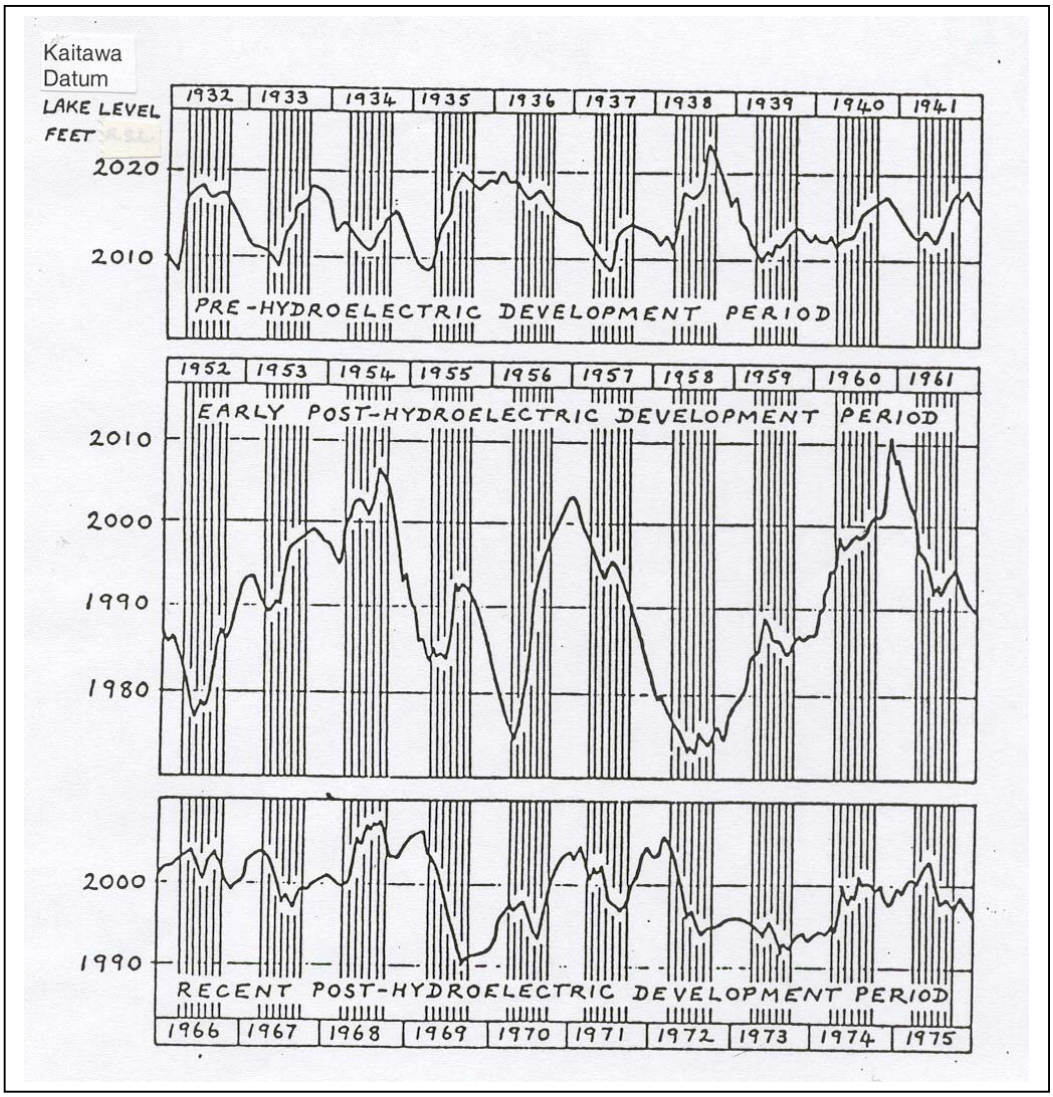

Figure 6.3 A Comparison of Lake Levels at Waikaremoana before and after Hydro-electric Development (Source:

that the lake might drop below the 1970ft (600.5m) (KD) intake tunnel shaft, thereby

closing down the three power schemes, and leading to 'a general and severe restriction on the use of power throughout the North Island'.[796] Ultimately, this scenario was avoided, but only just, the lake level reaching a new minimum of 1973ft (601.4m) (KD).[797]

The completion of Whakamaru power station on the Waikato River and an extremely wet winter allowed the crisis to pass,[798] and furthermore an opportunity for the level of Lake Waikaremoana to be built up again with extraordinary rapidity. A rise of more than 9m in 8 months saw its level reach 2003ft (610.5m) (KD) before the end of 1956.[799] By the start of 1958, however, a new electricity supply crisis, prompted by a fresh North Island drought,[800] resulted in the lake being drawn down again. Reporting on this development in April 1958, the *New Zealand Herald* noted how 'a brown and ugly band of barren foreshore about 40ft high now fringes Lake Waikaremoana', before grimly pronouncing that 'Waikaremoana is not a dying lake, but it is a very sick one'.[801] There was to be no immediate relief for the lake, as it remained close to the minimum generating level for the remainder of the year; in the process, the lowest ever surface height of 1972.6ft (601.26m) (KD) (equivalent to 573.75m (MD)), was recorded on 18 July.[802]

Not surprisingly, the ongoing condition of the lake attracted both anxious and adverse comment, and several newspapers published graphic images of the lake in its newly reduced state.[803] One of the most ardent critics of the lake's management was the biologist Dr J. T. Salmon. At a 1959 tourism convention in Christchurch, Salmon complained that Lake Waikaremoana had gone from being a place where forest reached the water's edge, to one where forest and lake were separated by 50ft, acres of exposed mud flats grew weeds, and bare tree stumps from the pre-lake forest poked above its surface. He then stated that when water was first siphoned off the lake in the 1940s to stave off electricity shortages, there had been assurances 'that once the crisis was over the lake would be refilled again to its original level', but instead the lake was now permanently lowered by 20ft.[804] As subsequent events have shown, Salmon was correct about the permanent lowering, although his 20ft claim was

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[796] *Gisborne Herald*, 26 January 1956, AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington
[797] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', p 12
[798] Martin, p 136
[799] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', p 12, & 'Pt. 2', Appendix A
[800] Martin, p 137
[801] *New Zealand Herald*, 28 April 1958, AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington
[802] See Addendum to A E Turley, Chairman, Urewera National Park Board to the Chairman, National Parks Authority, 20 September 1968, LS 4/19 (file closed 16/12/1970), DOC HO Wellington
[803] Photographs of Lake Waikaremoana appeared in the *Weekly News* [Auckland], 9 July 1958, *Daily Telegraph* [Napier], 15 July 1958, *Auckland Star*, 19 July 1958, *Gisborne Herald*, 24 January 1959, and *Evening Post*, 12 February 1959. See also articles in the *Gisborne Herald,* 8 July 1958, *Daily Telegraph* [Napier], 14 July 1958, and B Teague to the Editor, *Dominion* [Wellington], 17 February 1959, AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington
[804] J T Salmon, address to 1959 Travel Convention, Christchurch, cited in R J Noonan, *By Design: A brief history of the Public Works Department / Ministry of Works 1870-1970*, (Wellington: Ministry of Works, 1975), p 247

excessive.

Never again would the lake go nearly as low as this. With the commissioning of both Meremere and Atiamuri power stations in late 1958 the power crisis ended and thus the lake was left to be refilled by the winter rains of 1959 and 1960.[805] When further heavy rain led to flooding in December 1960, the lake level topped out at 2011ft (613.0m) (KD) - thereby giving an annual range for that year of 7.6m.[806] Although there were further drawdowns of the lake in 1962 and 1964 they were on a much lesser scale, with the lowest recorded lake level during either year being 1985.5ft (605.2m) (KD).[807] Then in 1965 the danger of further, more drastic lowerings of the lake was largely eliminated by the completion of not only the Cook Strait power cable, but also the massive Benmore power scheme in the South Island.[808]

6.5. Lake Level Management with Regulation

With the new flexibility in the electrical supply network provided by a truly national grid, the significance of the three Waikaremoana power stations for generation became much less. By 1970, their share of nationwide generating capacity had dropped to 3.5 percent.[809] This allowed the New Zealand Electricity Department to keep the lake level fairly stable from 1965 onwards. In the decade between 1966 and 1975, for example, the annual range only exceeded 3.9m in 1969, and even then it was 5.1m.[810] The lowest point the lake dipped to over the course of the ten years was 1990ft (606.6m) (KD) in 1969, when the winter had been unusually dry, while the maximum height recorded over the same period was 2008ft (612.0m) (KD) in 1968.[811]

The path towards regulating lake levels began, meanwhile, in 1968. Given the controversy created when the lake was extremely low in 1958, it is supremely ironic that the initial trigger for the regulation process was the lake being too high. In early August 1968, the Urewera National Park Board reported that the edge of the access road to the Mokau camping area was being washed away, and the same fate had already befallen part of the caravan camping park at the Jetty motor camp. Consequently, it had decided to 'make representations to the New Zealand Electricity Department concerning the present unusually high level of the lake and the need to control undue fluctuation in the lake level in

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[805] Martin, p 138
[806] See Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', p 13, & 'Pt. 2', Appendix A, and photographs (& captions) in Natusch, p 47
[807] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', p 13, & 'Pt. 2', Appendix A
[808] Martin, pp 181-182; C Ward, 'Operational Hydrology of Lake Waikaremoana', Gisborne, Department of Conservation, [1997], p 5
[809] Ward, 'Operational Hydrology of Lake Waikaremoana', p 7
[810] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', p 13
[811] Ibid; *Gisborne Herald,* 10 September 1969, AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington

the future'; in particular, it asked if the Department could restrict the lake to a range between 1996ft (608.4m) (KD) and 2004ft (610.8m) (KD).[812] Initially, the Department were reluctant to relinquish any of the available storage range (that is, between 1970ft (KD) and 2006ft (KD)), as it argued the loss of generation capacity upon the restriction of the lake level was the equivalent of up to $1.75m worth of thermal power station output.[813] A more conciliatory approach was evident by late 1969, however, as the Department acknowledged that since 1963 its practice had been to try to keep the lake level between 1994ft (607.8m) (KD) and 2004ft (610.8m) (KD).[814] In light of this, it seemed sensible to adopt this slight wider range, and an agreement to this effect was achieved at a meeting of the New Zealand Electricity Department, Urewera National Park Board, and Nature Conservation Council, in March 1970. In addition to setting these limits of 1994-2004ft (KD) (or alternatively 580.25-583.29m (MD)), what became known as the 'Gentleman's Agreement' included a provision that if the lake level exceeded 2006ft (KD) (583.89m (MD)), discharge would be mandatory.[815]

Although the annual ranges were now similar to what they had been prior to 1946, the fluctuations in lake levels still did not be resemble the pre-1946 natural pattern. As the fisheries scientist Dr Peter Mylechreest described in 1979, in the wake of his studies of trout ecology in the lake, an average of levels over the years 1966 to 1975 exhibited what he termed 'reversed seasonal periodicity'. Instead of the lake filling in the winter when inflows were high, and dropping in summer when inflows were low, the New Zealand Electricity Department was lowering the lake in winter by concentrating their generating at that time, and then raising the lake by curtailing its outflow in the summer, when demand for electricity was low.[816] As can be seen in Figure 6.4, this meant that the lake was highest in May, when the mean lake level was 2000.5ft (609.8m) (KD), and lowest in August, when the mean lake level was 1997ft (608.8m)(KD).[817]

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[812] See A E Turley, Chairman, UNP Board, to the Chairman, National Parks Authority, 20 September 1968, and R J MacLachlan, DG, LS, to the GM, NZED, 4 October 1968, LS 4/19 (file closed 16/12/1970), DOC HO Wellington

[813] E B Mackenzie, GM, NZED, to the DG, LS, 19 June 1969, AAZU 3619, 09/11/68, Box 7, ANZ, Wellington

[814] 'Extract from minutes of a meeting of the Urewera National Park Board held at Waikaremoana on 13 November 1969', AAZU 3619, 09/11/68, Box 7, ANZ, Wellington

[815] 'ECNZ, Waikaremoana Power Scheme', p 33

[816] P H W Mylechreest, 'Hydroelectric - Induced Changes in Lake Waikaremoana', *Wildlife, a review* 10, 1979, pp 46-7

[817] Calculated from Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 2', Appendix A

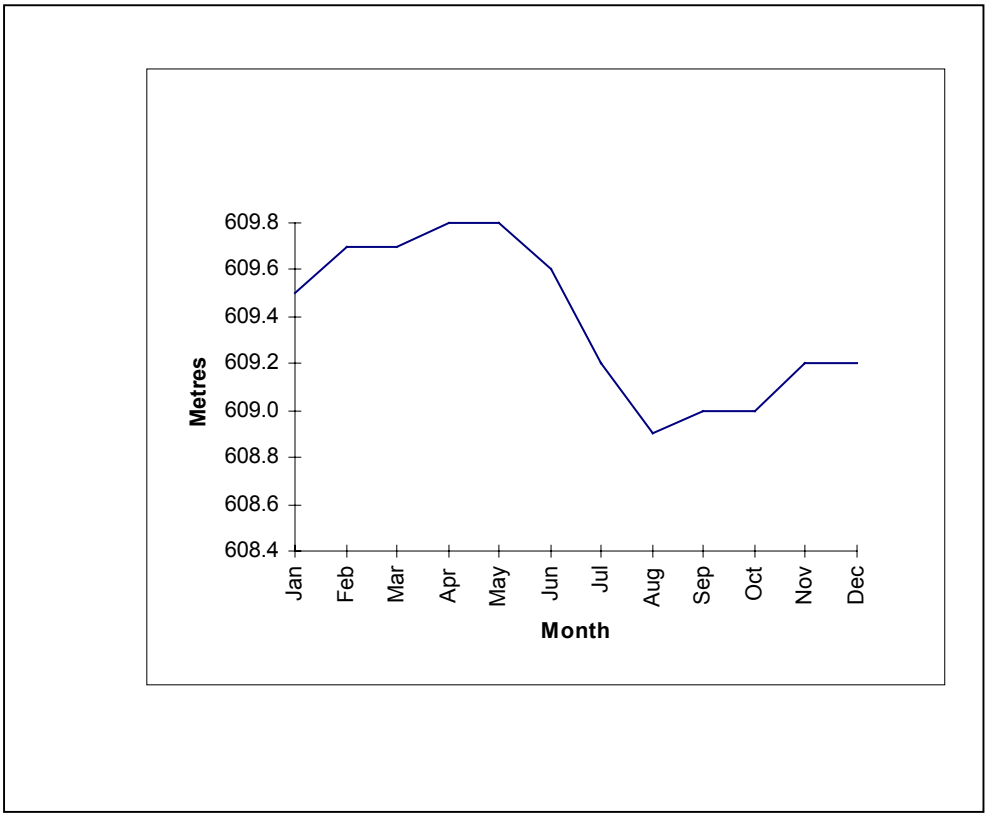

Figure 6.4 Mean monthly lake levels at Lake Waikaremoana between 1966 and 1975 inclusive (Kaitawa Datum) (Source: Calculated from data in Freestone et al., *Lake Waikaremoana Hydrology)*

Mylechreest had raised the issue at the time because of the then proposals to carry out further sealing work on the lakebed (described in Chapter 5), which he felt would exacerbate the 'reversed seasonal periodicity'.[818] However, at a meeting of the Urewera National Park Board in November 1979, Electricity Division staff assured those present (including Mylechreest) that less summer storage was likely to take place in the future.[819] This new approach, facilitated by the completion of the Pukaki high dam in the South Island (which provided summer storage elsewhere in the network), and the impending completion of the giant Huntly thermal power station north of Hamilton, promised to address the concerns about the unnatural lake level regime.[820] The same officials also stated that the lake would continue to be managed within the limits set by the 'Gentleman's Agreement'. Nevertheless, the Urewera National Park Board thought it was time a more formal arrangement was made, and thus recommended it be put before the Hawke's Bay Regional Water Board.[821] The Regional Water Board was able to regulate the levels of Lake

[818] Mylechreest, p 50
[819] 'Urewera National Park Board. Minutes of a meeting held at Waikaremoana on 23 and 24 November 1979 (Extract from)', AAZU 3619, 09/11/68, Box 7, ANZ, Wellington
[820] Ward 'Operational Hydrology of Lake Waikaremoana', pp 5-6. See also Martin, pp 193, 195, 250 & 253
[821] 'Urewera National Park Board. Minutes of a meeting ... on 23 and 24 November 1979 (Extract from)',

Waikaremoana using the powers vested in it by Subsections 14 (3) (o) and 20 (5) (d) of the Water and Soil Conservation Act 1967.[822]

The tribunal charged with setting the lake levels sat in June 1980, but first received submissions from New Zealand Electricity, the Urewera National Park Board, Nature Conservation Council, Gisborne Anglers' Club, and the Wildlife Division of Internal Affairs' Rotorua Conservator, and the Central North Island Wildlife Conservancy Council (Wairoa-Gisborne ward).[823] The Tuhoe Waikaremoana Maori Trust Board, it should be said, felt it did not have the time and resources for its own submission, and so asked that the National Park Board's submission stand for it as well.[824] In brief, all the parties were reasonably happy with the current 1994-2004ft (607.8-610.8m) (KD) operating range, though the Rotorua Conservator and Gisborne Anglers' Club both called for the range to be dropped to 2000ft (609.6m) (KD) during the summer months, and the National Park Board requested the maximum generation be commenced well before the 2004ft (610.8m) (KD) limit be reached. The Nature Conservation Council also called for a return to natural periodicity in lake levels, but did not advocate particular summer-specific limits.[825] New Zealand Electricity, however, complained that the proposed limits through summer would not allow it to have the lake full by early winter and still generate through autumn.[826] After considering these submissions and the evidence presented at its hearings in June, the tribunal opted to maintain the normal operating band of 10ft (3m), but to lower it in absolute terms to 1992-2002ft (607.2m-610.2m) (KD); it seems that the tribunal had been mindful of the risk from erosion to tourist facilities at Home Bay, which the Catchment Board's own staff reported as being increased when the lake was above 2002ft (610.2m) (KD). The former mandatory discharge point dropped correspondingly to 2004ft (610.8m) (KD), while below the 1992ft (607.2m) and 1990ft (606.6m) (KD) respectively, the new regime allowed generation only when, firstly, there was a recognised national shortage of energy, and secondly, when that shortage became extreme.[827] These recommendations were

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AAZU 3619, 09/11/68, Box 7, ANZ, Wellington

[822] Regional Water Board / Hawke's Bay Catchment Board, 'Report of the Meeting of the Special Tribunal Appointed by the Hawke's Bay Catchment Board ... on Monday 9th June 1980, ... and which reconvened on Wednesday 30th July 1980, ... to consider its recommendations', p 1, AAZU W3169, 09/11/68 box 7, ANZ, Wellington

[823] Ibid.

[824] T Nikora, Secretary, Tuhoe-Waikaremoana Maori Trust Board, to the Secretary, UNP Board, 21 May 1980, AAZU 3619, 09/11/68, Box 7, ANZ, Wellington

[825] See E Wilcox, President of the Gisborne Anglers' Club, to the Secretary, Hawke's Bay Regional Water Board, 17 April 1980; P J Burstall, Conservator of Wildlife, Rotorua, Department of Internal Affairs, to same, 17 April 1980; UNP Board, 'Submission to the Regional Water Board (Hawke's Bay Catchment District) re the setting of maximum and minimum water levels for Lakes Waikaremoana', 14 April 1980, and K A Hoskin, Secretary, Nature Conservation Council, to the Secretary, Hawke's Bay Catchment Board/Regional Water Board, 28 May 1980, AAZU 3619, 09/11/68, Box 7, ANZ, Wellington

[826] R K Smith, District Manager, New Zealand Electricity, to the Secretary, Hawke's Bay Catchment Board/Regional Water Board, 3 June 1980, AAZU 3619, 09/11/68, Box 7, ANZ, Wellington

[827] Hawke's Bay Catchment Board, 'The Setting of Maximum and Minumum Lake Levels. Lake

subsequently ratified by the National Water and Soil Conservation Authority in November 1980.[828]

Lake level records for the 1980s and early 1990s suggest that in recent years the height of the lake has remained relatively stable. In the years 1981 to 1993, the annual range only exceeded 3m in two years, and that was in 1983, when the lake dropped to 1990ft (606.6m) (KD) after one of the driest summers on record, and in 1988 when the rainfall associated with Cyclone Bola pushed the lake up to 2008.5ft (612.2m) (KD).[829] In general, therefore, the annual range is now smaller than the natural one. The lake, as the New Zealand Electricity staff indicated in 1980, no longer exhibits 'reversed natural periodicity' either, although at the same time the seasonal variation has not been entirely natural. In the decade from 1984 to 1993 inclusive, the highest lake level tended to be in October, which is similar to the lake's natural record up to 1946, but the lowest lake level tended to be in July.[830] For the purposes of comparison, the mean annual height for the years 1981 to 1993 (1998.4ft (609.1m)) (KD) is less meaningful,[831] as in the first five-year review of the lake level rules established in 1980, it was decided that the new range was too low, and hence it was raised again. As the Wildlife Service pointed out in their 1985 submission, the new regime of 1981 to 1985 seemed to have been associated with more erratic lake levels, while the Friends of the Urewera Association were concerned that the lower range had exacerbated the effects of the 1983 drought, and thus put boats at risk of being holed on the stumps of the ancient drowned forest for the first time since 1964. Both the Lands and Survey Department and Wildlife Service also complained that the lowering of the operating range had undermined the stabilisation in the shoreline that had been brought about by a fairly constant lake level policy since the 1960s.[832] In fact, the only submitter not specifying a wish to return to the higher operating range was the Electricity Division - and even its position was fairly neutral, as its main concern was to maintain the 10ft (3m) width of the current operating range, and the 2ft (0.6m) buffer zones.[833] It will be seen from Figure 6.5, which compares

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Waikaremoana', 9 June 1980 and Regional Water Board/Hawke's Bay Catchment Board, 'Report of the Meeting of the Special Tribunal Appointed by the Hawke's Bay Catchment Board ... on Monday 9th June 1980, ... and which reconvened on Wednesday 30th July 1980, ... to consider its recommendations', p 7, AAZU W3169, 09/11/68 box 7, ANZ, Wellington

[828] See A W Gibson, Director of Water and Soil Conservation Council, to the Secretary, Nature Conservation Council, 21 November 1980, AAZU W3169, 09/11/68 box 7, ANZ, Wellington

[829] Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 1', p 13; *Evening Post*, 24 March 1983, AANU 7740 W 5079/4 (21/30/5), ANZ, Wellington; Natusch, pp 66-68

[830] The average lake elevations in these two months were 2000ft (609.6m) (KD) and 1998.6ft (609.2m) (KD) respectively. Calculated using Freestone et al., 'Lake Waikaremoana Hydrology, Pt. 2' Appendix A.

[831] Ibid

[832] See Wildlife Service, Department of Internal Affairs, 'Lake Waikaremoana - Review of Maximum and Minimum Levels', 30 October 1985 [, pp 11 & 32]; L I Dolman, Chairman, Friends of the Urewera Association Inc., to the Chairman, Hawke's Bay Catchment Board, 25 October 1985 and 'Submission by Department of Lands and Survey, Gisborne, on review of maximum and minimum levels for Lake Waikaremoana', 4 November 1985, AAZU W3169, 09/11/68 box 7, ANZ, Wellington

[833] Hawke's Bay Catchment Board, 'Lake Waikaremoana - Review of Maximum and Minimum Levels', April

side-by-side the three regimes of 1970 (the 'Gentleman's Agreement'), 1980, and 1986, that the Hawke's Bay Catchment Board decided to retain the 1980 protocols, but raised all the elevations at which these came into effect by 2ft (0.6m). Consequently, the normal operating range returned to what it had been under the 'Gentleman's Agreement', that is, 1994-2004ft (607.8-610.8m) (KD), or alternatively, 580.29-583.29m (MD).[834] The reversion in regimes was subsequently ratified by the National Water and Soil Conservation Authority in October 1986.[835]

As it turned out, no further rule reviews were undertaken under the terms of the Water and Soil Conservation Act 1967, as it was to be superseded by the Resource Management Act 1991. As a result the 1986 rules did not come up for review until 1998. The 1998 review will be dealt with in Chapter 7, and so does not need to be discussed here, although it should be said that the existing operating range (which in the Moturiki Datum was 580.29-583.29m) remained unchanged.

1986, and J Ram, District Manager, Electricity Division, Ministry of Energy, to the Secretary, Hawke's Bay Catchment and Regional Water Board, 6 March 1986, AAZU W3169, 09/11/68 box 7, ANZ, Wellington

[834] See Hawke's Bay Catchment Board, 'Lake Waikaremoana: setting of maximum and minimum lake levels' (enclosure to P K Simons, General Manager, Hawke's Bay Catchment Board and Regional Water Board, to the Secretary, Nature Conservation Council, 7 May 1986), and P K Simons, Hawke's Bay Catchment Board and Regional Water Board, to the Secretary, Nature Conservation Council, 26 May 1986, AAZU W3169, 09/11/68 box 7, ANZ, Wellington

[835] D G Knowles, Secretary, National Water and Soil Conservation Authority, to the Chairman, Hawke's Bay Catchment Board and Regional Water Board, 9 October 1986, AAZU W3169, 09/11/68 box 7, ANZ, Wellington

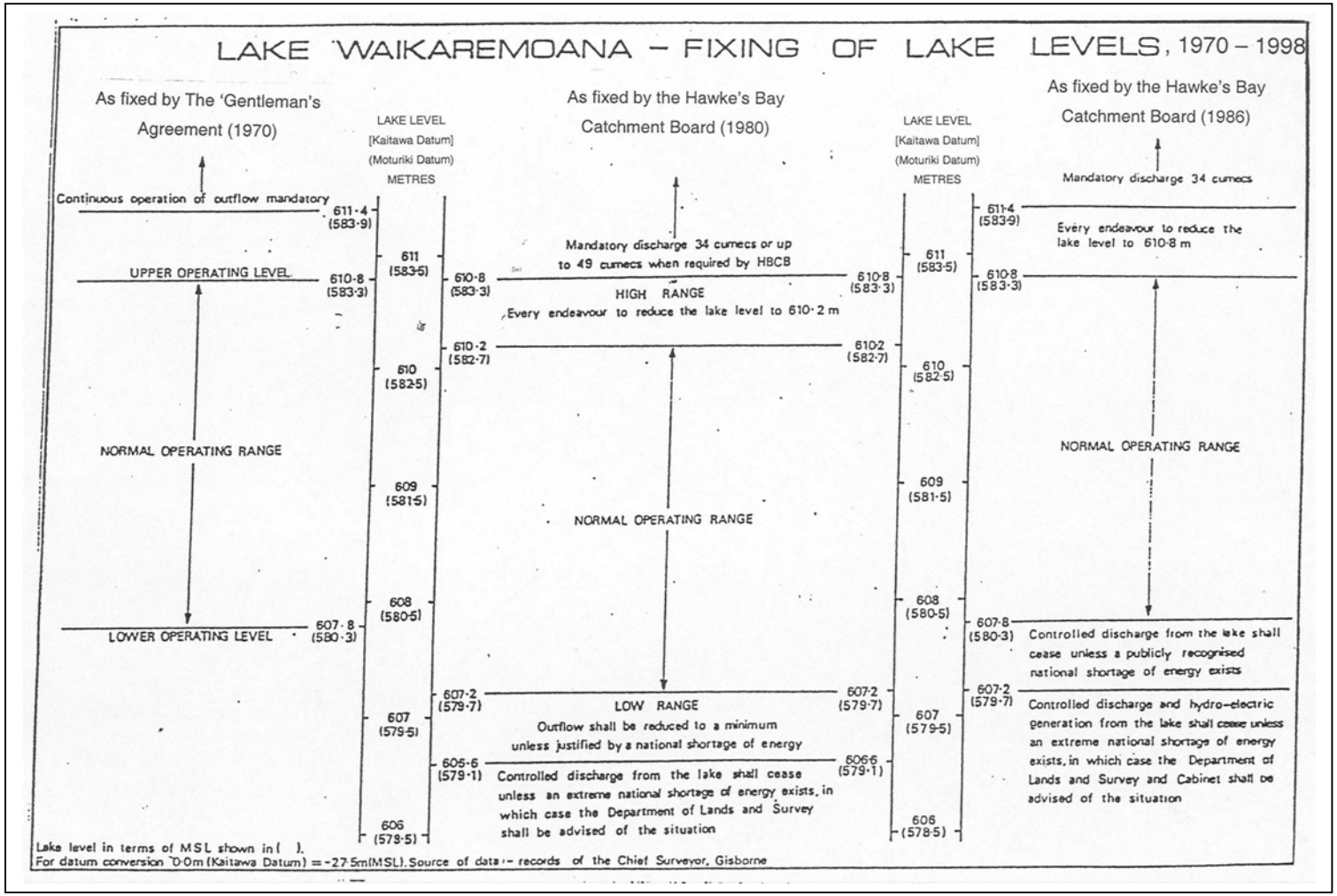

Figure 6.5 Lake Level Regimes, 1970 - 199

6.6. Environmental Impacts of Lake Level Management

Thus far, this chapter has been concerned with the manner in which the level of Lake Waikaremoana was managed for the purposes of electricity generation. It is only natural that with such an abrupt change as its lowering by an average of 5m, and by up to 13m at times, relative to the mean elevation in its unmodified past, this management has had a bearing on other parts of the lake ecosystem. In the remainder of this chapter, the impacts of managed lake level changes on shoreline erosion and water clarity, on aquatic biota, and finally on shoreline vegetation will be reviewed in turn. Where these impacts have in turn impinged on Maori interaction with the lake, this too will be discussed. Aesthetic considerations will not, however, be examined, as these are more in keeping with the lake's use as a scenic resource.

6.6.1. Shoreline Erosion and Water Clarity

One of the principal environmental concerns arising out of the lowering of Lake Waikaremoana since 1946 has been increased erosion around the shoreline, especially in areas where there are mudstone shore platforms (or 'benches' as they are sometimes known). Erosion of unconsolidated alluvium deposited by stream deltas has also been pronounced.[836] The total length of shoreline of Lake Waikaremoana is 93km, which is divided between 46.5km of structurally stable sandstone cliffs and slopes, 39km of mudstone 'benches', and 7.5km of beach-like features (sandy, cobble, and boulder beaches, and turf-covered shores)[837] In terms of their distribution around the lake, the chief areas of erosion-prone shoreline occur around the southern fringe of Wairaumoana (the lake's western arm), on the southern shore to the west of Panekiri Bluff, along the eastern shore between the Aniwaniwa Stream mouth and Mautaketake Point, and at the head of the Whanganui Inlet.[838] From a tourism viewpoint, the most serious erosion has been that of the alluvial fan deposits at Home Bay (which lies on the Aniwaniwa Stream delta), and at Mokau Landing (at the head of Mokau Inlet).[839]

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[836] ECNZ, 'Waikaremoana Power Scheme', pp 48-50; C Ward, 'Physical and Ecological Processes on the Shoreline of Lake Waikaremoana: effects of lake level management' [Draft report to the Waikaremoana Working Party], [1997], pp 3-4. The term 'benches' has been used to distinguish these purely erosional features from the beaches which have developed in sediments which were already unconsolidated (see J C Allan, W J Stephenson, A Taylor, & R M Kirk, 'Monitoring Shoreline Change and Development at Lake Waikaremoana', [1999], p 9).

[837] Allan et al., 'Monitoring Shoreline Change', p 5

[838] J R Waugh & H J Freestone, 'Lake Waikaremoana Sediment Review Study (Issue 1: April 1995)', Figure 2.1, follows p 5

[839] See R Reinen-Hamill and P A Roan (Tonkin & Taylor Ltd.), 'ECNZ Lake Waikaremoana Shoreline Erosion Control Options: Contract No. FRGH1020' (Draft), 1996, pp 3-5

In an 1992 MSc thesis on shore erosion and sedimentation in the lake, Matthews reported that before lowering the average down-wearing rate for mudstone platforms was only 0.5-1.6mm per year.[840] The rate for those platforms exposed since 1946, in contrast, he assessed to be between 7 and 11mm per year. As the methods employed by Matthews have sometimes proved unreliable, and the number of erosion measurements involved was small,[841] further investigations have been carried out by teams of researchers led by Professor Bob Kirk. Although rates of on average 6mm per year, based on losses of mudstone from under sandstone cap-stones, were first proposed,[842] the latest detailed measurements of profile change over time have indicated that typical surface lowering rates for mudstone benches are 9-11mm a year (which is within the range given by Matthews). Two sandstone shore profiles, in contrast, have consistently exhibited losses of less than 1mm per year.[843]

It has been reported by Mylechreest and Matthews that mudstone erosion accelerated following lake level rises, as weathered mudstone is then able to be removed by wave action.[844] Nevertheless, the research teams led by Kirk have concluded that the creation of freshly weathered mudstone surfaces is largely dependent on sub-aerial wetting and drying cycles, related to precipitation events. The role of the lake waves therefore is to wash away the weathered debris, rather than to initiate the weathering.[845] Having said this, frequent fluctuations in lake levels may add to the number of wetting and drying cycles.[846] It is expected that mudstone erosion rates will decline to something closer to pre-1946 rates, as the platform profile changes to a form more in equilibrium with the lowered lake level.[847] Understandably, the significant increase in shoreline erosion since 1946 has been of concern to local Maori. As Trainor Tait has noted, it was in fact one of issues behind the protest occupation (which will be discussed further in Chapter 7) at the lake in 1998.[848] Another of the current Waikaremoana claimants who raised shoreline erosion as an issue when interviewed was Reay Paku (Wai 621), a former member of the Urewera National Park Board.[849]

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[840] J C Allan, W J Stephenson, R M Kirk and A Taylor, 'Lacustrine Shore Platforms at Lake Waikaremoana, North Island, New Zealand', *Earth Surface Processes and Landforms* 27, 2002, p 213
[841] Allan et al., 'Monitoring Shoreline Change', p 12
[842] Allan et al., 'Lacustrine Shore Platforms', pp 213-216
[843] A Taylor, M B Single and R M Kirk, 'Annual Monitoring - Lake Waikaremoana Shoreline Monitoring Network, April 2003', [2003], pp 36-37
[844] E Christmas, W Chisholm, M James and C Howard-Williams, 'Review of the Effects of Lake Level Fluctuations on the Ecology of Lake Waikaremoana', [1995], p 12; Allan et al., 'Monitoring Shoreline Change', p 11. It should be noted that Allan et al. mistakenly cites Mylechreest's 1979 paper in the Internal Affairs Wildlife Service journal *Wildlife, a review*, rather than his 1978 MSc thesis
[845] Allan et al., 'Lacustrine Shore Platforms', p 217
[846] E Christmas et al., p 12
[847] ECNZ, 'Waikaremoana Power Scheme', pp 49 & 91
[848] Interview, Trainor Tait, Nga Rauru o Nga Potiki, 11 November 2003
[849] Interview, Reay Paku, Wairoa-Waikaremoana Trust Board, 11 November 2003

A related issue to shoreline erosion is water clarity. Given that the increase in erosion rates since 1946 might negatively affect water clarity - Mylechreest, for example, reported some discolouration of the lake when its surface level was high[850] - the Department of Scientific and Industrial Research was commissioned, at the suggestion of the Hawke's Bay Catchment Board, to undertake water clarity studies beginning in 1988.[851] At the time, it was thought that the main cause of 'cloudiness' was 'erosion of the fine clay soils around the lake edge'.[852] On the basis of light attenuation measurements it was calculated that the two main contributors were suspended inorganic particles, and yellow staining picked up from organic matter, which were responsible for 37 percent and 32 percent of light loss respectively.

Although there were occasions where plumes were formed from sediment stripped from the shore, generally light attenuation was greater near stream mouths, which suggests that these provide most of the inorganic sediment involved in light loss.[853] Conversely, mineralogical analysis of lakefloor sediments by Matthews indicates that over the whole history of lake (that is, since it was first formed), most sediment has eroded from the shore.[854] The reduced clarity when lake levels are high, meanwhile, was seen to be a natural consequence of high inflows - during flooding, the amount of yellow staining and entrained sediment entering the lake via the inbound streams are likely to be greatest.[855] At present it is thought that sediment entering the lake is unlikely to negatively affect water clarity, or biota in the lake.[856]

6.6.2. Aquatic Biota

The artificial changes in lake level in Lake Waikaremoana have affected aquatic biota in a number of ways. The first of these is a loss of biological productivity due to the change in lake area, and more specifically, the area of the lake's littoral zone - that is, the nearshore zone where light penetrates to the lake floor and where wave processes take place. This extends to a depth of about 16m, and currently comprises about 15 percent of the area of the lake.[857] The significance of this zone lies in the fact that it is here that macroinvertebrates

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[850] Christmas et al., p 10
[851] C Howard-Williams, W F Vincent, A-M Schwartz, V Reid and L Hrstich, 'Lake Levels and Primary Production', Taupo Research Laboratory File Report no. 128 (confidential), Taupo, DSIR Marine and Freshwater, 1991, p 4.
[852] Electricity Corporation of New Zealand Ltd. (Electricorp Production North Island Hydro Group), *Lake Waikaremoana –'Sea of Rippling Waters': Waves, Water Clarity and Plant Growth*, [1989?], p 1
[853] Howard-Williams et al., pp 8-10 & 13-14
[854] Waugh & Freestone, pp 7-8
[855] Christmas et al., p 10
[856] Part of the reason that sediment has so little effect on water clarity is that stream water often enters the lake as underflow, that is the cold stream water flows along the lake bottom. Waugh & Freestone, pp 8-9 & 13
[857] 'ECNZ, Waikaremoana Power Scheme', pp 50-51

(insects, molluscs, and oligochaete worms) provide the link between primary productivity, in the form of plant matter, and the fish and bird populations of the lake.[858] Given the steep topography in the catchment, the surface area of the lake only decreased slightly when it was lowered by about 5m after 1946 - it is, it should be remembered, more than 240m deep. Accordingly, its limnetic zone, that, is the area of open water beyond the littoral zone on the lake edge, decreased in area by only 4 percent. The littoral zone, on the other hand, was reduced in area by approximately 17 percent. The reason for the disproportionate loss in area of the littoral zone is that this zone tends, with its beaches, stream deltas, and shore platforms, to be fairly shallow close to shore. Further out, once the point is reached where wave action has no effect, the gradient tends to be much steeper. Lowering the lake, therefore, exposed a large part of the nearshore shallows, and replaced it with the steep edge of the offshore shelf.[859] Over time, as the shore profile develops in response to the change in lake level, the area of the littoral zone should expand again.

The second manner in which lake biota has been affected is by the reversed seasonal periodicity of the lake level that were observed by Mylechreest in the 1960s and 1970s. In particular, Mylechreest was concerned about the potential impact on macroinvertebrates, which tend to migrate upwards during the winter months.[860] Since the issue was first raised, investigations by Howard-Williams and others have shown that unnaturally high summer lake levels could decrease summertime productivity in the littoral zone by up to 18 percent on account of less light penetration. However, this would be compensated for by the increase in winter productivity when the lake was lower, so that effectively the amount of primary productivity was unchanged, although the timing of the cessation in productivity in the deepest part of the littoral zone shifts by about a month.[861] With respect to macroinvertebrates, a study in the late-1990s found that the vertical distribution varied markedly between years with a similar lake level history, which suggests that the impact of reversed seasonal periodicity would have been relatively minor (since other factors, such as water temperature fluctuations, clearly influence the distribution as well).[862] In any case, it should be remembered that since the 1980s the lake has been managed so that its seasonal variations in level are more akin to the natural pattern, so any negative effects of reversed seasonal periodicity are likely to be in the past.

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[858] Christmas et al., p 5
[859] Mylechreest, 'Hydroelectric - Induced Changes in Lake Waikaremoana', *Wildlife, a review,* 10, 1979, p 46
[860] Ibid., pp 46-50
[861] Christmas et al., p 16; 'ECNZ, Waikaremoana Power Scheme', pp 92-93. In either case, the period with no productivity from the bottom of the littoral zone runs from about April to October (Howard-Williams et al., Appendix 1)
[862] M James, M Weatherhead and R Wells, 'Macroinvertebrate and Macrophyte Communities in Lake Waikaremoana - Effects of Lake Level Fluctuations, Final report', NIWA Client Report: CHC 99/2, [1999], pp 26 & 30

Two other impacts are worthy of note. Firstly, it should be remembered that there has been some stranding of aquatic life whenever the lake level fell sharply. Following the drawdown of the late 1940s, for example, the Conservator of Wildlife for Rotorua noted that in the upper reaches of the lake thousands of freshwater shellfish could be found in a decomposing condition.[863] If the lake is abnormally low, the upper littoral plant community can be damaged by desiccation, freezing, and wave action; its chances of recovery depend not upon the frequency of such levels, but rather their duration, with about two months being assessed as the survivable limit.[864] Secondly, lake level fluctuations affected access to spawning grounds of introduced trout and bullies. Abrupt lowering would have been immediately hazardous to both, while more generally falling levels in summer (the 'natural' situation) probably reduced spawning success for bullies and rainbow trout, since they spawn at the end of spring, and falling levels in winter ('reversed seasonal periodicity') would have harmed the chances of brown trout, which tend to spawn in May.[865] After the permanent lowering in 1950, it was reported that some spawning areas had been cut off, but they had been replaced by others.[866] In a related vein, Mylechreest raised concerns about New Zealand scaup chicks being denied the chance to aquatic insects on the lake floor by sudden rises in lake level. However, subsequent investigations have concluded that a range of factors such as mammalian predation, quantity and quality of littoral food, and the availability of shelter determine New Zealand scaup populations, and the lake level regime is not especially significant.[867]

In practice, these past adverse effects of lake level management on aquatic biota seem likely to have had a less significant impact than other aspects of Crown management, such as the relocation of resident Maori from around the lake into the upper Waikaretaheke Valley, the introduction of trout on a large scale, and the denial of fishing licenses, in terms of hindering Maori use of the lake as a food source.[868] This has not stopped local Maori representatives from raising the issue, however. In 1959, for example, Turi Carroll (part of a deputation which travelled to Wellington to discuss compensation for Crown use of the lakebed) informed the Prime Minister, Walter Nash, together with his Lands and Maori Affairs Ministers (C F Skinner & E T Tirakatene-Sullivan respectively) that ‘the lake had deteriorated from a fishing point of view

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[863] Conservator of Wildlife for Rotorua, 31 October 1949, cited in T Walzl, ‘Waikaremoana: Tourism, Conservation, & Hydro-electricity, 1870-1970’, report commissioned by Waitangi Tribunal, October 2002, p 361

[864] ‘ECNZ, Waikaremoana Power Scheme’, p 93

[865] Christmas et al., p 22; Walzl, p 490

[866] P Dickinson, ‘Report on Lake Waikaremoana (visited 5th to 10th September 1950)’, IA 1 W2578, 78/37, [file vol. 4 , p 1969], ANZ Wellington

[867] ‘ECNZ, Waikaremoana Power Scheme, pp 97-98

[868] With respect to the use of Lake Waikaremoana for fishing prior to hydro-electric development, see Walzl, p 336

because the Electricity Dept's operations had reduced the level by a good 15ft and this had deprived the fish of quite a lot of food'; another member of the deputation, Dick McGregor, reinforced the point, noting that the drawdown had 'exposed the shores where the marine growth was and exposed the vegetation'.[869] Carroll was to raise the issue again in another deputation two years later.[870] Interestingly, in recent interviews with Wai 621 and Wai 937 claimants, lake level changes were linked more to shoreline erosion issues than to impacts on lake biota,[871] which suggests that the aquatic habitat has, like the lake levels, been able to return to a more natural condition, or at least a more stable one, in the last twenty years.

6.6.3. Shoreline vegetation

The last of the main physical impacts of lake lowering was the change in shoreline vegetation. In brief, the lowering in the lake after 1946 enabled primary successions in the vegetation to take place around the margin of the lake, since the 5m high band exposed was without terrestrial vegetation or soil cover.[872] Generally, the form of the new succession has varied according to the nature of the shore, and the height above the new lake surface. Manuka and kanuka shrubland (merging into beech and kanuka forest at the top of the band) is the main vegetation type on the stranded shore platforms, while on cliffs and exposed headlands, where there is vegetation, it tends to be open shrubland at the base, together with low scrub and low forest at the top. On the unconsolidated sedimentary fans, meanwhile, the main form of vegetation is introduced grasses and herbs. From an ecological perspective, the introduced grass and herb vegetation is the least desirable, as whereas the other vegetation types are eventually expected to be overtaken by the natural beech and podocarp forest, it tends to resist woody plant invasion.[873] Moreover, these areas of unconsolidated sediments have, in part because their low profile makes them more susceptible to inundation, been prone to be invaded by weeds. In the late 1950s, as Dr. J T Salmon observed, the problem was ragwort, thistles and blackberry, but now the most notable weeds are *Hieracium pilosella* and Spanish heath.[874] Apart from the negative botanical and aesthetic impact, the spread of such weeds has also had an adverse effect on resource use by local Maori - Trainor Tait noted that areas where fern was harvested for kai

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[869] 'Deputation to the Minister of Maori Affairs (the Rt. Hon. W Nash, C H.), the Minister of Lands (Hon. C. F. Skinner), and Hon. E T Tirakatene-Sullivan (Minister of Forests) in Maori Affairs Committee Room on Wednesday, 19 August 1959', LS 4/19/1 (file closed 27/5/1968),
[p 925], DOC H O, Wellington; Walzl, pp 410-411
[870] Walzl, p 489
[871] See, for example, Interview, Trainor Tait, Nga Rauru o Nga Potiki, 11 November 2003
[872] Ward, 'Physical and Ecological Processes' [Draft], p 17; W B Shaw, M O Kimberley, C D Bishop, 'Lake Waikaremoana Shoreline Vegetation Pt. 2: Vegetation Survey, Data Analysis and Results', [1998], p 63
[873] Shaw et al., pp 63-64; 'ECNZ, Waikaremoana Power Scheme', pp 45-47 & 103-104
[874] Salmon, address to 1959 Travel Convention, Christchurch, cited in Noonan, p 247; Ward, 'Physical and Ecological Processes' [Draft report], p 18

are now overgrown with blackberry, and thus the said harvesting no longer takes place there.[875]

A further serious impact is the fact that the changed shoreline vegetation have provided an excellent habitat for mustelids, which have put at risk kiwi - a species for which local Maori are particularly interested in the welfare of, as illustrated by the complaints made in relation to kiwi by protestors prior to the Lake Waikaremoana Joint Ministerial Inquiry in 1998.[876] As the Department of Conservation noted in their submission to the Lake Waikaremoana Joint Ministerial Inquiry (see Section 7.4.3), 'the threat from ferrets is present because lowering the lake in 1946 created a new land surface around the lake margin, with the type of vegetation that supports mouse, rat and rabbit populations'. Ferrets have not just been feeding upon the latter animals, but also upon adult kiwi (and presumably other native birds as well).[877] In the circumstances, it is appropriate that part of the $1 million dollars which is being donated by Genesis Power for conservation projects in the Lake Waikaremoana area is going to the Puketukutuku Peninsula Kiwi Restoration Project.[878]

6.7. Conclusion

The lowering of Lake Waikaremoana, as has been detailed in this chapter, occurred late in the course of hydro-electric development in the Waikaremoana region, with what became a permanent drawdown being undertaken over the years 1946-8. Plans were afoot to lower the lake, however, as early as the 1910s. Although there have been fluctuations in the level since that time, the lowering of the crest of the outlet to the Waikaretaheke River to accommodate the siphons / spillway has meant the lake cannot rise to the pre-1946 level, which averaged 2015ft (KD). Between the late 1940s and early 1960s, the all-consuming demands of electricity generation meant that Lake Waikaremoana was subjected to rises and falls of up to nine metres in a year, which was three times the average pre-1946 annual range. After the Cook Strait power cable created a national grid in 1965, the role of the Waikaremoana power stations became less and less significant as generation capacity was

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[875] Interview, Trainor Tait, Nga Rauru o Nga Potiki, 11 November 2003. Genesis, it should be noted, reports that it spends 'thousands of dollars a year' on controlling blackberry. Tracey Hickman, Environmental Manager, Genesis Power, pers. comm., 19 March 2004

[876] B Coombes, 'Preserving 'a great national playing area' – Conservation Conflicts and Contradictions in Te Urewera, 1954-2003', report commissioned by Waitangi Tribunal, September 2003, p 240. In subsequent references this will be Coombes (2)

[877] Department of Conservation, 'Submission to the Lake Waikaremoana Inquiry', 18 May 1998, pp 15-16, TP 3071 vol 3, TPK Head Office, Wellington

[878] Genesis Power, *Genesis Power Annual Report03: A Question of Responsibility* (http: //www.ecomsystems.net.nz/genesispower/publications/anreports/2003/pdfs/sec11.pdf), 19 March 2004; Coombe (2), pp 241-242

built up in other parts of the country. Accordingly, since that time, lake levels have been able to be managed in a way that is more sensitive to both the built and the natural environment. The concept of a 3m wide normal operating range was first introduced by the informal 'Gentleman's Agreement' (made between the New Zealand Electricity Department, the Urewera National Park Board, and the Nature Conservation Council) in 1970, and in formal regulatory reviews in 1980, 1986 and 1998 this has been retained, although the prescribed actions once the lake level is outside the range (mandatory discharge, or alternatively, no discharge) have been introduced in the later regulatory reviews. Today, the normal operating range of 580.29-583.29m (MD), which is the same as that chosen in the 'Gentleman's Agreement' in 1970, means that the level of the lake is, on average, five metres lower than it was before 1946.

The lowering of Lake Waikaremoana has had a number of impacts, although some are residual from the initial lowering and should slowly decrease over time, so long as the lake level continues to be fairly stable. Increased shoreline erosion in some sites is in this category, as the newly exposed shore profile will take time to be re-established in accordance with the change in location of weathering by wind and rain, and wave action. The impacts on aquatic biota, meanwhile, are likely to have been more significant in the past, since the frequent major fluctuations in lake level prior to the mid-1960s would have led to the shallowest marine life being stranded above the lake level for various periods, although at the same time, current populations of aquatic biota are likely to be smaller than pre-1946 levels due to the reduction in the area of littoral (nearshore) habitat. Previously, concerns have also been expressed about reversed seasonal periodicity (caused by the various hydro-electricity generating agencies drawing down the lake in winter, and then raising it in summer by stopping discharge) but contemporary information suggests the effects are limited. The exposure of new shoreline after 1946 has also provided an opportunity for more grassy and weedy vegetation, though as with coastal erosion, this will probably return to a more natural condition (that is, forest) over time. Waikaremoana Maori have pointed to shoreline erosion, and the reduced condition of the fishery, as issues of concern, although from a practical viewpoint, the most serious impact for Maori is probably the increase in grassy and weedy vegetation. As well as weeds invading traditional cultivations and food harvesting sites, the grassy vegetation supports mustelids, such as ferrets, which prey upon native birds, including kiwi.

Chapter 7: Environmental Governance

7.1. Introduction

Since 1946, when the Crown first began taking water from Lake Waikaremoana for the purposes of electricity generation, several agencies have been responsible, both singly and collectively, for the lake's management at different points in time. This Chapter seeks to explore how the roles of these agencies in relation to lake management have changed, and also the degree to which they have excluded or included the area's iwi from management. The latter, it must be remembered, do not simply enjoy tangata whenua status, but own the lake as well. In the course of this exploration of governance, the various policies of managing agencies, as well as the basis for their authority over the lake, will also be considered.

In general, the Chapter focuses on the influence each managing agency has had on the lake level regime, since this most directly relates to its use for hydro-electricity generation, but management of some activities which occurred in or on the lake, such as tree stump removal, and boat navigation, has also been mentioned where appropriate. In addition, three pivotal issues which related to the governance of the lake in the 1990s, namely the Crown's proposal to sell the Waikaremoana power stations, the obtaining of resource consents for the Waikaremoana power schemes by the Electricity Corporation of New Zealand Ltd. (ECNZ), and the Lake Waikaremoana Joint Ministerial Inquiry, which was chiefly concerned with the Department of Conservation's management record, have been examined in detail. Finally, the Chapter concludes with a discussion of some of the ongoing issues in lake management at present.

7.2 The Lake under Single-purpose Management (for Electricity Generation), 1946-1970

The exertion of Crown control over the edge and bed of Lake Waikaremoana for the purposes of electricity generation began, as has been seen in Chapters Five and Six, in the mid-1940s with the construction of the Kaitawa Power Scheme tunnel intake, and the lowering of the lake from 1946 by temporary siphons. This followed the earlier Crown involvement in hydro-electric development in the adjacent Waikaretaheke Valley, described in Chapter 5, and the Crown's interventions in acclimatisation, tourism and conservation, described in Chapters 2, 3 and 4.

Until the Public Works Department's restructuring in early 1946, when it was broken into the Ministry of Works (which took over construction) and the State Hydro-Electric Department (which took over generation),[879] it had almost sole responsibility for the hydro-electric development in the upper Waikaretaheke Valley. It may be recalled that provisions in the Public Works Act 1928 allowed the Crown to erect works necessary for the utilisation of water-power, and to impound or divert water, and raise or lower water bodies as required. Moreover, after 1939 regulations gave the Electricity Controller, or after 1946, the General Manager of the State Hydro-Electric Department, absolute control, within naturally imposed limits, over the amount of electricity being generated.[880] As a result, the only discussions with other parties which the Crown generally had to enter into, when undertaking hydro-electric development and power generation, was over compensation for affected land - as seen in Chapter 5, the Crown belatedly compensated local Maori after taking parts of Te Kopani and Heiotahoka Reserves for hydro-electric developments at Tuai and Piripaua. The Kaitawa Power Scheme, on the other hand, was built without any thought of recompense, for although it required construction of engineering works on the lakebed, the Crown at the time still held out hope of overturning the 'native title' to the bed of Lake Waikaremoana (despite this having been confirmed by two courts). Similarly, when in 1946 the lake began to be drawn down to supply water to the Tuai and Piripaua powerhouses, the new State Hydro-Electric Department does not seem to have consulted with anyone else, as its prevailing objective was to maximise generation at a time when demand exceeded supply. As the then Minister of Internal Affairs, W. E. Parry, noted in a 1943 letter (referred to in Chapter 6), ‘to advance claims of the scenic and fishing interests of the two lakes [Waikaremoana and Taupo] ... against those of hydro-electric power for the development of the country ... would be as unfair as it would be futile’.[881]

In theory at least, a more inclusive approach to lake level management might have been taken from 1954, as in this year the Crown finally conceded that the lakebed was under Maori title. This change seems to have been regarded by the State Hydro-Electric Department (and by its successor, the New Zealand Electricity Department) as only of peripheral importance though. In September 1958 (two months after the lake level had been drawn down to an all-time low), for example, the Department's General Manager, A. E.

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[879] J Martin (ed.), *People, Politics and Power Stations: Electric Power Generation in New Zealand 1880-1980*, (Wellington: Bridget Williams Books and Electricity Corporation of New Zealand, 1991), p 291

[880] See the Electrical Emergency Regulations 1939, ss. 3 (1)(a) & 3 (1)(j); The Electricity Control Regulations 1948, s. 4 (1)

[881] W E Parry to P Fraser, Prime Minister, 21 June 1943, TO 1 45/10/1, ANZ Wellington

Davenport, declared that the 'value of the use of the lake water ... for hydro-electric purposes' was still 'a matter for speculation', and that while 'the level of the lake has from time to time been drawn down lower than under natural conditions' this had 'not seriously prejudiced the Maori owners so far as is known'. Accordingly, he judged that their claims were likely to have only 'a nuisance value'.[882] The then Commissioner of Works, F. M. Hanson, joined Davenport in concluding that local iwi had not suffered from the management of the lake (and even if they had, it was too late to do anything about it):

> There is no evidence whatever that the construction or use of the public work for the control of the level of the lake have resulted in injurious affection or damage to the land of the Maori owners (in this case the owners of the bed of the Lake). As far as I am aware, no claims have ever been made and [as] the works have been operating for several years it is most unlikely that no claims would have been made if there had been injurious affection. ... Furthermore, it is some years since the work was carried out and it appears that all claims are now Statute barred by the effluxion of time.[883]

Hanson may have been correct in one sense, in that it seems Waikaremoana iwi had never raised objections with Government officials specifically about the construction of hydro-electric works being carried out on the lakebed. In part, this may have reflected the fact that hydro-electric construction was one of the few sources of employment for local Maori at the time.[884] Lake levels, however, had been an issue with iwi since 1949, as is evident in A.T. Carroll's request in that year that the Crown investigate the consequent loss of fishing grounds, and it appears thereafter that their representatives complained more generally about the Crown's exploitation of the water in the lake, rather than the structures on the lake edge.[885] It is worth recalling (from Chapter 5) that iwi did gain at least one concession as a result of their lakebed ownership, namely the calling for a halt to driftwood removal by State Hydro-Electric Department staff in 1956.

Another potential restraining force on the State Hydro-Electric Department's actions, even if its role was only that of a watchdog, was the National Parks Authority. The National Park's establishment also occurred in 1954. Despite the obvious significance of Lake Waikaremoana for tourism, the National Parks Authority seems initially to have had little interest in the lake's management. From a legal standpoint, this was perhaps proper, as the Park boundary was, because of the surface drawdown, not even on the lake edge anymore.

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[882] A E Davenport, GM, State Hydro-Electric Department, to the Commissioner of Works, 1 September 1958, cited in T Walzl, 'Waikaremoana: Tourism, Conservation, & Hydro-electricity, 1870-1970', report commissioned by Waitangi Tribunal, October 2002, p 402

[883] F M Hanson, Commissioner of Works, to the Director General of Lands and Survey, 15 April 1958, cited in Walzl, p 397

[884] Interview, Des Renata, 10 November 2003. See also Interview, Reay Paku, 11 November 2003.

Moreover, the Authority may have wanted to downplay its interest in the lake in order to reduce the National Parks contribution that might be made to a Crown purchase offer. As the Director-General of Lands explained in 1958:

> Certainly from added scenic views the lake is of value to the Park but apart from this [it] is not an integral part of the Park. Any restrictions governing the Park area do not effect the lake nor do they conflict with the lake's use. Consequently it is of no great concern whether the lake forms part of the Park or not.[886]

When the National Parks Authority did begin to actively call for changes in lake management, it was not so much the ecological wellbeing of the lake, or the rights of its Maori owners that caused concern, but rather the safety of navigation on the lake - boat-owners had been complaining that their craft were being holed on the submerged stumps of the lake's drowned prehistoric forest. Having said this, it was quite clear that the New Zealand Electricity Department would have the last word on the matter. At a National Parks Authority meeting in March 1961, the idea that the Authority might approach the Electricity Department to keep the lake level stable was critiqued by Mr Entrican of the New Zealand Forest Service, who remarked that he doubted 'whether such a move would be of any great value' as 'if power was short the water would be used irrespective of its level'.[887] The Electricity Department, as was seen in Chapter 5, did agree to a trial removal of tree stumps, but this action had to wait until 1964, when generating requirements had lowered the lake to an appropriate level. As it happened, the trial removal proved to be a failure, and hence a second plan to saw off the stumps near the waterline was adopted after being put to a public meeting, to which 'Elders of the local Maori Tribal Committee' were amongst those invited. In this instance, therefore, iwi were consulted before an action modifying the lakebed took place, but it appears from the later recollection of L. I. Dolman, the local police officer at the time, that their ownership of the bed was not seen as giving them a special interest in the matter.[888]

After the mid-1960s, the lake level issue began to be resolved, as the New Zealand Electricity Department was in a position where it was content to keep the level fairly stable.

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[885] Walzl, pp 347 & 391
[886] Director General of Lands to the Comissioner of Works, 18 June 1958, cited in Walzl, p 398
[887] 'Extract from Minutes of NPA. Meeting 11 March 1961' (appended to 'Brief Notes of Deputations met by the National Parks Authority while in the Urewera National Park'), LS 4/19 (file closed 12/8/60), [p 606], DOC H O, Wellington
[888] L I Dolman, Chairman, Friends of the Urewera Association Inc., to the Chairman, Hawke's Bay Catchment Board, 25 October 1985, AAZU W3619, 09/11/68 box 7, ANZ, Wellington

Meanwhile, the Urewera National Park Board, which had been established in 1962,[889] began pushing for the lakebed to be purchased and incorporated within the Park. Initially, the concern was over the Board's ability to regulate boating and its associated structures (jetties, boat-ramps etc.) on the lake, but by the late 1960s its lack of authority was further embarrassed as semi-permanent housing started appearing on the exposed lake edge. Finally, the Crown received a legal opinion that it did not own the lake's waters, which meant that members of the public using the lake (for boating, fishing etc.) were, strictly speaking, trespassers.[890] Because the lake's Maori owners had been moved away from the lake by the Crown's land alienations in the past, they were not well placed to monitor goings-on at the lake either, and as a result some unscrupulous individuals were taking advantage of what was something of a administrative vacuum.[891] In light of this, the owners were prepared to give greater consideration to Crown attempts to take over administration of the lake, provided they received fair recompense, and hence although a new offer by the Crown to purchase the lake in September 1969 was rejected outright, they appointed a negotiating committee with the object of securing a satisfactory lease arrangement. Eventually a lease (subsequently validated by the Lake Waikaremoana Act 1971) was signed in August 1971, in which ownership was vested in the Tuhoe-Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards, and the Crown agreed, on payment of an annuity to the said Boards, to administer the lakebed as if it was part of the National Park.[892]

In the meantime, two other developments occurred which were of significance to the taking of water from the lake by the New Zealand Electricity Department. The first was the department's reporting of the various dammings, diversions and discharges involved in the Waikaremoana hydro-electric schemes to the Hawke's Bay Catchment Board. The purpose of this was to register these as existing uses under the new Water and Soil Conservation Act 1967.[893] The second was the setting of informal limits on the lake level range by way of the

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[889] B Coombes, ''Preserving 'a great national playing area' - Conservation Conflicts and Contradictions in Te Urewera, 1954-2003', report commissioned by Waitangi Tribunal, September 2003, p 263. In subsequent references this will be Coombes (2)
[890] Coombes (2), pp 54-6 & 84-7; Walzl, pp 506-7
[891] As Rodney Gallen records, one trespasser even put up a sign stating 'Maori land, Park Rangers keep out', Affidavit of Rodney Gallen, 9 April 1997. [J K Guthrie & J E Paki,], 'Joint Ministerial Inquiry: Lake Waikaremoana. Report to Minister of Maori Affairs, Hon. Tau Henare, [&] Minister of Conservation, Hon Dr Nick Smith, 27 August 1998', Appendix 3, no. 2, Treaty Principles: Lake Waikaremoana Inquiry vol. 2, TP 3070, TPK Head Office, Wellington
[892] 'Lake Waikaremoana: background paper prepared by Te Puni Kokiri', 8 May 1998, pp 5-10. Treaty Principles: Lake Waikaremoana Inquiry vol. 2, TP 3070, TPK Head Office, Wellington
[893] J R Nixon, District Electrical Engineer, NZED, to the Secretary, Hawke's Bay Catchment Board, 30 April 1969, very old original Lake Waikaremoana consents and maps, Hawke's Bay Regional Council), Napier,

'Gentleman's Agreement' between the Electricity Department, the Urewera National Park Board and the Nature Conservation Council in 1970. As was seen in Chapter 6, discussions between the Park Board and the Electricity Department had initially been prompted by lakeside flooding in 1968, but it seems likely that the Park Board's hand was strengthened by the increasing certainty that the lake was about to be incorporated within the Park (from an administrative viewpoint). This would bring into play the National Parks Act 1952, which included the provision that 'they [National Parks] shall be preserved as far as possible in their natural state'.[894] Since severe fluctuations in lake level, like those of the 1950s, were not in keeping with the lake's 'natural state', it would be the Park Board's duty to try to curtail them.

7.3 Dual Management: the National Park and the Electricity Department, 1970-1991

With the 'Gentleman's Agreement' in place, and the Urewera National Park Board administering the lake on a day-to-day basis, there was little cause for change in the governance of Lake Waikaremoana during the early to mid-1970s. About the only development of note was the preparation of the first Urewera National Park Management Plan in 1976. In relation to the 'generation of hydro-electric power', the Plan stated that provided it did not 'cause permanent ecological or physical damage' it might be 'in the greater public interest[,] despite the conflict with national park objectives'. The Park Board's policy was thus to 'ensure adequate and close co-operation with the N.Z. Electricity Department in order to keep fluctuations in lake levels to a minimum and to seek suitable compensation and/or remedial work if and when damage to the resource or public facilities occurs'.[895] The other significant policy in regard to Lake Waikaremoana was that on boating, in which the Park Board noted that the large potential lake level range (601-613m) made building facilities difficult, and also that it needed to be given controlling authority over the lake before it could impose by-laws.[896] These by-laws were prepared the following year, and gazetted in 1979; further by-laws specifically for Lakes Waikaremoana and Waikareiti were, incidentally, issued in 1983.[897]

Water & Soil Conservation Act 1967, s. 21(2)
[894] National Parks Act 1952, ss. 3 (2)(a)
[895] Urewera National Park Board, *Urewera National Park Management Plan 1976, (*Hamilton: Urewera National Park Board, 1976), pp 35-6
[896] Ibid., p 32
[897] Coombes (2), p 87; Department of Conservation, *Te Urewera National Park Management Plan 1989-1999*, (Rotorua: Department of Conservation for the East Coast National Parks and Reserves Board, 1989), p 45

In 1978, the status quo in terms of the relationship between the Park Board and the Electricity Department was disturbed, however, by the determination of the latter to extend the sealing of the lakebed that had finished in 1955. As this involved an additional stopping of water, over and above those which were registered by the Department as being 'existing uses' in 1969, the proposal needed approval from the Hawke's Bay Catchment Board and Regional Water Board. The actual application, it should be pointed out, came from the Ministry of Works, as the sealing work fell within its hydro-electric construction responsibilities. It may be recalled from Chapter 5 that both the Urewera National Park Board and Rotorua's Conservator of Wildlife were concerned that the further sealing would exacerbate reverse seasonal periodicity and hence lodged objections to the proposal, as did seven other parties. Unfortunately, the correspondence that has been examined during this research includes the names of only seven of the nine objectors (most of whom appear to have been downstream property owners), but in that list there do not appear to be any iwi representatives.[898] This is despite the fact that Stokes, Milroy and Melbourne reported strong Maori opposition to the proposal in their 1986 report on Maori in the Urewera region.[899]

Although the lake sealing proposals were first put on hold, and finally abandoned, they prompted, as was noted in Chapter 6, the Urewera National Park Board to seek formal hearings into the level of Lake Waikaremoana as was allowed by the Water and Soil Conservation Act 1967. These hearings, conducted by a special tribunal of the Hawke's Bay Catchment Board and Regional Water Board in June 1980, have been discussed in some detail in Chapter 6, and so it is not necessary to retell the events here. Nevertheless, it is interesting to note that only six submissions were received, but they were all from organisations, included amongst which were the two main players in lake management, New Zealand Electricity (now a division of the Ministry of Energy) and the Urewera National Park Board.[900]

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[898] The seven known objectors (of nine) were K B Ross & four others (Ohuka) , E J A Alford (Ohuka), Makiri Station (nth. of Gisborne), K E Foot (Kokako) , Messrs. Dods, Stevens, Aitken & Taylor (Tuai), the Urewera National Park Board and the Conservator of Wildlife, Internal Affairs, Rotorua. (780326 - Ministry of Works - Crown Water Rights Application, AAZU 3619, 09/11/68, Box 7, ANZ Wellington); *New Zealand Herald*, 22 January 1929, AAUM W4043 NR 2/1/C Box 208, ANZ Wellington

[899] E Stokes, J W Milroy and H Melbourne, *Te Urewera: nga iwi, te whenua, te ngahere*, (Hamilton: University of Waikato, 1986), p 216

[900] The full list of submitters was New Zealand Electricity, the Urewera National Park Board, Nature Conservation Council, Gisborne Anglers' Club, the Wildlife Division of Internal Affairs' Rotorua Conservator and the Central North Island Wildlife Conservancy Council (Wairoa-Gisborne ward), Regional Water Board/Hawke's Bay Catchment Board, 'Report of the Meeting of the Special Tribunal Appointed by the Hawke's Bay Catchment Board ... on Monday 9th June 1980, ... and which reconvened on Wednesday 30th July 1980, ... to consider its recommendations', p 1, AAZU W3619, 09/11/68 box 7 ANZ Wellington

These hearings represent the first occasion when Maori ownership of the Lake was recognised by the Hawke's Bay Catchment Board and Maori opinion was specifically sought. As the tribunal noted in its report, submissions had been invited from T Nikora, representing the Tuhoe-Waikaremoana Maori Trust Board, R Paku, representing the Wairoa-Waikaremoana Maori Trust Board, and Sam Rerehe from Waimako Pa, but all three 'indicated verbally that with respect to lake levels, the interests of their respective groups would be served by the statutory interests of the Urewera National Park Board'.[901] Paku and Nikora were both Park Board members, hence their confidence that the Park Board's submission would take on board concerns of local iwi.[902] Having said this, the inclusion of local Maori perspectives in the Park Board's decision-making processes was very much reliant on the initiative of Paku and Nikora, as the Park Board did not send its annual reports to the Tuhoe-Waikaremoana Maori Trust Board until 1976 or to the Wairoa-Waikaremoana Maori Trust Board until 1980.[903]

As seen in Chapter 6, the Catchment Board tribunal's recommendations, which included the lowering of the operating range by 2ft (0.6m), and a requirement that discharge be stopped below the range except when there was a national energy shortage, were subsequently confirmed by the National Water and Soil Conservation Authority, and set for review after five years. Before this review took place, however, an important change occurred in the management of the National Park (and hence the lake as well).

As a result of the National Parks Act 1980, the Urewera National Park Board was abolished in 1981, and the job of determining park policy was taken over by the East Coast National Parks and Reserves Board, which managed an area including the whole of Hawke's Bay and Gisborne, together with eastern parts of the Bay of Plenty.[904] Only four members of the Urewera National Park Board were appointed to its East Coast successor, and although the inclusion on the National Parks and Reserves Board of Reay Paku and Mack Temara provided some link with Ngati Kahungunu and Tuhoe respectively in the Urewera region, the degree of connectedness between the Urewera National Park and policy-makers was decreased. As Brad Coombes has noted, whereas 57 of 72 Urewera National Park meetings were held within what the Waitangi Tribunal has defined as the 'Urewera inquiry district' -

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[901] 'Report of the Meeting of the Special Tribunal' , AAZU W3619, 09/11/68 box 7 ANZ Wellington, p 3
[902] Coombes (2), pp 165 & 168. It should be noted that Coombes gives Nikora's initials as T R rather than T B
[903] Ibid., pp 186-7
[904] The southern boundary in Hawke's Bay was near Dannevirke, while the western boundary in the Bay of Plenty was at Kaituna. Ibid., pp 208 & 210

most of these being held at the Park Headquarters at Aniwaniwa - only 3 of out 35 East Coast National Parks and Reserves Board meetings between 1981 and 1989 were held in the same area.[905]

In the review of lake levels conducted by the Hawke's Bay Catchment Board in May 1986, some nine submissions were received (or three more than in the 1980 review).[906] Apart from those of New Zealand Electricity, and the East Coast National Parks and Reserves Board, the most notable submission was probably that prepared by Dr Peter Mylechreest for the Wildlife Service's Rotorua Conservator, which extended to more than 30 pages. As was detailed in Chapter 6, almost all the submissions called for the operating range to be raised back to the pre-1980 agreement, while retaining the discharge controls at each end of the range, and so not surprisingly the Hawke's Bay Catchment Board obliged in its recommendations, which were ratified by the National Water and Soil Conservation Authority later in the year. Mylechreest's concerns over reversed seasonal periodicity also gained a small concession, in that New Zealand Electricity were asked to undertake a feasibility study into the economic ramifications of managing lake levels in a more natural way.[907] This was reported by I. M. Johnstone in the following year, who found that the cost of imitating a natural regime was excessive,[908] and so no further action seems to have been taken in this regard. It is interesting to note that none of the submissions came from Waikaremoana iwi or their representatives; possibly they may have voiced their opinions via the East Coast National Parks and Reserves Board submission, but even if they did - unfortunately no correspondence has been seen on this issue - the dilution of Urewera governance in the new enlarged body probably meant that Waikaremoana iwi had less input into the 1986 lake level determinations than they had in 1980.

Soon after this review took place, the management of Lake Waikaremoana was to be further modified by the wave of state sector reform embarked upon by the Fourth Labour Government. In 1987 the job of running the three Waikaremoana powerhouses, and hence

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[905] Ibid., pp 218-9
[906] The full list of submitters was New Zealand Electricity, the East Coast National Parks and Reserves Board, Nature Conservation Council, Gisborne Anglers' Club, Lake Waikaremoana Boating Assn., the Wildlife Service of Internal Affairs' Rotorua Conservator, Central North Island Wildlife Conservancy Council (Wairoa-Gisborne ward), Friends of the Urewera National Park Association Inc., and the Department of Lands and Survey. (Hawke's Bay Catchment Board, 'Lake Waikaremoana - Review of Maximum and Minimum levels', n/d, AAZU W3619, 09/11/68 ANZ Wellington)
[907] Hawke's Bay Catchment Board, 'Lake Waikaremoana: Setting of Maximum and Minimum Levels', 7 May 1986, AAZU W3619, 09/11/68 ANZ Wellington
[908] C Ward, 'Operational Hydrology of Lake Waikaremoana', (Gisborne: Department of Conservation, [1997]), p 15

managing the level of Lake Waikaremoana, was transferred from New Zealand Electricity to its new corporate counterpart, Electricorp Production. The latter company was part of a new tripartite organisation, the Electricity Corporation of New Zealand (otherwise known as ECNZ), which had been created in accordance with the State Owned Enterprises Act 1986. By the end of 1987, the Crown monopoly on hydro-electric generation was also no more, this having been removed by way of Sections 3(k) and 3(l) of the Electricity Amendment Act 1987.[909]

At the same time, the National Park's contribution to Lake Waikaremoana's management was also being transformed by the passage of the Conservation Act 1987. A notable feature of the Conservation Act 1987 was its 4th section, which stated that the 'Act shall be so interpreted and administered as to give effect to the principles of the Treaty of Waitangi'. Now the principles of kiatiakitanga (guardianship) by Maori, which had been ignored in previous legislation relating to the preservation of New Zealand's natural heritage, was at last recognised as having value in the conservation management process. Having said this, the remaining clauses in the Act dealing with conservation practice were taken largely from existing legislation, so that the Maori initiatives were not really brought into the fold of conservation management practice until Kaupapa Atawhai staff, whose job it was to liaise between the Department of Conservation and iwi, were attached to the various conservancies in the early 1990s.[910]

The Conservation Act also caused day-to-day administration of the Urewera National Park to pass from the Lands and Survey Department, which had been responsible for Crown lands in general, to the new Department of Conservation.[911] As it happened, the East Coast National Parks and Reserves Board was undertaking a review of the Urewera National Park management plan at the time of the Conservation Act - the new plan in final form emerged in 1989 - and the Treaty of Waitangi clause consequently increased the provisions in the plan for consultation with Maori about park management, although few changes in other parts of the plan resulted from submissions by Maori groups or individuals.[912]
In relation to hydro-electricity generation, meanwhile, the 1989 Plan commented that the Department of Conservation would negotiate with

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[909] R P Boast, 'The Crown and Te Urewera in the 20th Century: A Study of Government Policy', report commissioned by Waitangi Tribunal, December 2002, pp 299-300
[910] R McLean & T Smith, *The Crown and Flora and Fauna: Legislation, Policies and Practices, 1983-98*, Waitangi Tribunal Publications, 2001, pp 323-7 & 368-70
[911] Coombes (2), pp 208 & 222

> the appropriate catchment authority, the Ministry of Energy and Electricorp, to seek an operating regime for Lake Waikaremoana that will minimise the effects of hydro-electric power generation on the ecology of the lake and lakeshore, shoreline stability, the interests of the Maori people and the use of the lake for boating and other public uses.

This provision was a slight advance on that in the 1976 plan, in that the National Park 'manager' was now seeking to minimise the effects of fluctuations, rather than the fluctuations themselves, and there was now a clearer statement of what was meant to be protected. The only other statement of note in the 'Park Waters and Hydro-electric Power Generation' section (aside from general comments, such as that the Park Board would oppose developments injurious to the Park) was the provision that 'the owners of the bed of Lake Waikaremoana will be consulted through their Trust Boards on any matters affecting their interest in and around the lake'.[913]

Yet more changes in governance followed in the early 1990s. The East Coast National Parks and Reserves Board, which had replaced the Urewera National Park Board only a decade earlier, was swept away by the Conservation Law Reform Act 1990, which established in its place the East Coast Conservancy.[914] Of still greater moment, however, was the passage of the Resource Management Act 1991. In the first place, the impending replacement of the Water and Soil Conservation Act meant that the next review of the lake level regime by the Hawke's Bay Catchment Board, which was supposed to be undertaken in late 1990,[915] never took place. Indeed, the Resource Management Act 'restarted the clock' as far as the review process went, since existing use conditions were allowed to remain in force for up to ten years after the Act was passed.[916] In the event, ECNZ did not apply for new resource consents to the Hawke's Bay Regional Council (into which the Hawke's Bay Catchment Board had been subsumed) until 1998. Secondly, the Resource Management Act placed a new burden on the applicant to demonstrate that environmental effects were either avoided or mitigated. As will be discussed later, ECNZ began commissioning reports and consulting the community in preparation for the Waikaremoana hydro-electric schemes

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[912] Ibid., pp 228-9 & 374-95
[913] Department of Conservation, *Te Urewera National Park Management Plan 1989-1999*, p 63
[914] McLean and Smith, pp 346-7; Coombes (2), pp 224-7
[915] Hawke's Bay Catchment Board, 'Lake Waikaremoana: Setting of Maximum and Minimum Levels', 7 May 1986, AAZU W3619, 09/11/68, ANZ Wellington
[916] Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ - Hawke's Bay Regional Council Officer's Report', [1998], p 1, ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence, Hawke's Bay Regional Council, Napier

consents at least three years before the hearings took place. Finally, the Resource Management Act was significant for Maori participation in environmental decision-making, since it reinforced the need for the principles of the Treaty of Waitangi to be respected, and introduced kaitiakitanga as something that must be taken into account, and it also obliged applicants to notify and consult with Maori organisations and individuals.[917]

7.4 Governance Issues at Lake Waikaremoana, 1991-1998

The application for resource consents by ECNZ in 1998 was but one of three key developments related to the management of the Lake Waikaremoana environment in the 1990s. The two others, which were to some degree contemporaneous with the resource consent process, were the lakeside occupation by Maori protesting about Crown management (and the Ministerial Inquiry that the protest prompted), and the proposed sale of the three Waikaremoana hydro-electric schemes. Although the three issues were interwoven, they will be considered separately here for the sake of simplicity.

7.4.1. The Proposed Sale of the Waikaremoana Power Schemes

Following on from the Labour Government's creation of ECNZ, and the removal in 1987 of the Crown monopoly over electricity generation, the National Government which replaced it decided to take electricity deregulation a step further by setting up a 'free market' in electricity. To this end, legislation was passed in 1992 which turned the former electricity supply authorities into companies, an Electricity Market Company (EMCO) was created in 1993 with the object of creating an electricity trading system, and Transpower (the part of ECNZ responsible for the transmission lines) became an independent State Owned Enterprise in 1994.[918]

With these preparations complete, the National Government announced plans for reform of the electricity sector in mid-1995, which entailed the break up of Electricorp Production into competing generating companies, and the sale of 'non-core' generating assets. As part of this planning process, the Ministers of Finance and State-Owned Enterprises contacted iwi and pan-Maori groups with the object of setting out the proposal for a new State Owned Enterprise, and identifying any Treaty issues that might arise. At the time, the ramifications for future Treaty of Waitangi settlements were not as serious as they might have been, as in

[917] McLean and Smith, pp 208-13
[918] Boast, p 300

most cases power stations would simply be shifting between Crown-owned entities, but this was not true of the Waikaremoana power schemes, which had been earmarked for sale.[919]
The Waikaremoana iwi were well aware of the implications of the State Owned Enterprise Act and the proposal to sell the Waikaremoana power stations. The Tuhoe-Waikaremoana Moari Trust Board, through their solicitor East Brewster, wrote to the Minister of Finance, W F Birch, on 31 July 1995, informing him that a claim had been lodged with the Waitangi Tribunal (Wai-333) over the Crown's use of Lake Waikaremoana for electricity generation without sanction from its Maori owners, and further noting that the 'return of the power stations to the [Tuhoe-Waikaremoana Maori] Trust Board and the Wairoa-Waikaremoana Maori Trust Board' was 'an obvious solution to compensation for past and future use of the lake'. The letter also pointed out that the Crown was fully aware that it did 'not have a legal right to have its structures on the bed of Lake Waikaremoana', and argued that although the Department of Survey and Land Information had commenced negotiating for easements over these structures in 1993, this had only been a token gesture. It was acknowledged that Section 27 of the State Owned Enterprises Act allowed memorials to be placed on the ownership title for Crown assets which might be used in future Treaty settlements, but the Trust Board was firstly sceptical about whether such powers would be used in regard to the power stations, and secondly concerned that private owners would seek short-term profit over long-term sustainability if they became aware that the stations were going to be subject to a Crown buy-back.[920]

A similar call for a stop to be put on any sale was made by Rose Pere, Chairperson of the Tuai-based Haumapuhia Waikaremoana Authority (one of several organisations associated with the Ruapani hapu, Ngati Hinekura and Whanau Pani),[921] in a letter to the local MP, and former Minister of Maori Affairs, Koro Wetere. Pere observed that the Authority was against 'outside investors privatising anything that we believe should be under our jurisdiction, at least until everything has been properly accounted for between the Crown as one Waitangi Treaty Partner, and ourselves as representing the Maori Partner'.[922]

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[919] T Baldwin, Officials Committee on Energy Policy, 'Wholesale Electricity Market Reform - Progress Report', 28 August 1995 and N Love, 'Policy Preparation and Timetable relating to the Sale of ECNZ's Small Hydro Stations', 25 January 1996, ECNZ: Sale of small hydro-stations, vol. 1, June 95-96, NR 7642, TPK Head Office, Wellington
[920] D Ambler, East Brewster, to W F Birch, Minister of Finance, 31 July 1995, ECNZ: Sale of small hydro-stations, vol. 1, June 95-96, NR 7642, TPK Head Office, Wellington
[921] Te Puni Kokiri/Ministry of Maori Development, 'Profile: Tuhoe Waikaremoana Trust Board', 14 January 1998, p 4, Lake Waikaremoana Occupation, TP 3074, TPK Head Office, Wellington
[922] R R Pere, Chairperson, Haumapuhia Waikaremoana Authority, to K Wetere, 7 July 1995, ECNZ: Sale of

Soon afterwards, the National Government began to put its reform program into practice, with Contact Energy being established as a rival State-owned generating company to Electricorp Production in February 1996. When the general election in 1996 forced National to rely on a coalition with New Zealand First, this reform program was suspended, but after the coalition ended in 1998, the National Government proceeded to privatise Contact Energy, and to split Electricorp Production into three State-owned generators, namely Genesis Power, Meridian Energy, and Mighty River Power.[923]

In the meantime, the Crown had continued to consult with Waikaremoana Maori about the proposed sale of the Waikaremoana power stations. As noted in a 1998 Te Puni Kokiri document, the sale process allowed 'only two eligible parties to bid for the power stations, power companies, and Maori within the region of the power station'.[924] Unfortunately, negotiations soon became muddled by the contest over mandate between the two Trust Boards, and local iwi- and hapu-organisations (as noted above, these generally had a strong Ngati Ruapani association). At the risk of oversimplifying matters, it is reported that the Trust Boards, who had formed one commercial consortium, favoured an immediate start to the sale process, whereas Ngati Ruapani, which had formed a rival consortium, preferred that Treaty claims should be settled first.[925] It appears that the discord created had not engendered much confidence between the various parties and the Crown, as both the Wairoa-Waikaremoana Maori Trust Board and Te Okoro Joe Runga (acting for the Tareha Taraia Trust) raised objections over the sales process in claims to the Waitangi Tribunal (Wai-621 and Wai-687 respectively).[926] In the circumstances, it is perhaps fortunate that the sale of the Waikaremoana stations did not proceed. When Labour returned to power after the 1999 election, they decided to withdraw the Waikaremoana power stations from sale, and in April 2000 they were formally transferred to Genesis Power. Incidentally, this had previously been suggested as a means of boosting Genesis Power's generating capacity.[927]

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small hydro-stations, vol. 1, June 95-96, NR 7642, TPK Head Office, Wellington

[923] Boast, p 300

[924] K Ngarimu, Economic Development Branch, Te Puni Kokiri, to J Paki, 23 March 1998, Treaty Principles: Lake Waikaremoana Inquiry, vol 1, TP 3070, TPK Head Office, Wellington

[925] K Ngarimu to J Paki, 23 March 1998, TP 3070, TPK Head Office, Wellington. With respect to the contest over mandate, see also Robert Waiwai, Chairman, Waikaremoana Maori Komiti, to the Secretary, Tuhoe Waikaremoana Trust Board, 21 May 1996, Legal - Lake Waikaremoana,
LE 6050, TPK Head Office, Wellington

[926] E Cox, 'Lake Waikaremoana and District Scoping Report', report commissioned by Waitangi Tribunal, December 2001, p 6

[927] D Smith, 'Update to second printing', in G G Natusch, *Power from Waikaremoana: A History of Waikaremoana Hydro-Electric Power Development*, 2nd ed., (Gisborne: Te Rau Press Ltd. for Genesis Power (Waikaremoana Power Stations), 2001), p 3

7.4.2. Resource Consents for the Hydro-electric Power Schemes

The Resource Management Act 1991 had important implications for Waikaremoana Maori and for ECNZ. ECNZ was required to obtain resource consents from the Hawke's Bay Regional Council and Waikaremoana Maori were entitled to participate in the resource consents process. ECNZ began the process in 1993 by applying for a consent for a new streamflow recorder in Mangaone Stream.[928] It is not clear why ECNZ embarked on the application process for the existing schemes when they did, given that the current arrangements were allowed to carry on until 2001. The National Goverment's hopes of selling the power stations may well have made ECNZ keener to bring the process to a more expeditious completion in the years 1996-8, since power schemes with ongoing consents would probably fetch a higher price that those without. By November 1998 some 41 consents had been granted to ECNZ by the Hawke's Bay Regional Council.

There were two main aspects to the preparations made by ECNZ before it applied for the various hydro-electric scheme consents, both of which were required by the Resource Management Act. The first was engaging in consultation with affected parties and local Maori, and this commenced with a meeting with the Wairoa District Council and Hawke's Bay Regional Council in October 1994 to outline its plan for how this would proceed. The following month ECNZ met with the Tuhoe-Waikaremoana Trust Board, the majority owner of the bed of Lake Waikaremoana, and in February 1995 it began discussions with the newly formed Haumapuhia Waikaremoana Authority.[929] Full-scale consultation, meanwhile, began with the establishment of the Waikaremoana Working Party, the make-up of which was decided following a public meeting in Wairoa in April 1995. The Working Party consisted of representatives of ECNZ, the Department of Conservation, Hawke's Bay Regional Council, Wairoa District Council, Wairoa-Waikaremoana Trust Board, Haumapuhia Waikaremoana Authority, Eastern Fish and Game Council, Hawke's Bay Canoe Club, Royal Forest and Bird Protection Society, and Federated Farmers.[930] Minutes

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[928] This was probably the first test, in relation to the Waikaremoana power schemes, of the new consultation obligations imposed by the Resource Management Act. See, for instance, I M Johnstone, Hydro Resources Manager, ECNZ, to the Chairman, Panekiri Tribal Trust, 5 May 1993, ECNZ - Mangaone Stream, Tuai, Hawke's Bay Regional Council, Napier

[929] 'Statement of Evidence of Peter Anthony Canvin [Document D]', [1998], pp 2 & 6-7, ECNZ - Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier

[930] Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ - Hawke's Bay Regional Council Officer's Report', p 11, ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Office''s Report, Submitters' Evidence, Hawke's Bay Regional Council, Napier; Electricity Corporation of New Zealand Ltd. (ECNZ), 'Waikaremoana Power Scheme: Assessment of Effects on the Environment', 1998, p 162. It should be noted that the Royal Forest and Bird Protection Society representatives joined the Working Party in 1997.

of the Working Party meetings, of which there were 16 between May 1995 and February 1998, were in addition sent to more than 120 parties thought to have an interest in the Waikaremoana power schemes.

The working party process was an important opportunity for Waikaremoana Maori and ECNZ to contribute face to face and seek solutions to environmental problems. For ECNZ, the Working Party performed two important roles: firstly, it provided an interface with and information source for the wider community, and secondly, it helped to identify potential adverse effects of the power schemes' operation, and hence to direct the research commissioned by ECNZ prior to the hearings.[931] Over the same period, ECNZ representatives also held a small number of issue specific meetings with various groups. The Maori organisations involved in such meetings were: the Tuhoe-Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards, the Haumpauhia

[931] 'Statement of Evidence of Peter Canvin [doc D]', p 4, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier; Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ - Hawke's Bay Regional Council Officer's Report', pp 11-2, ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence, Hawke's Bay Regional Council, Napier

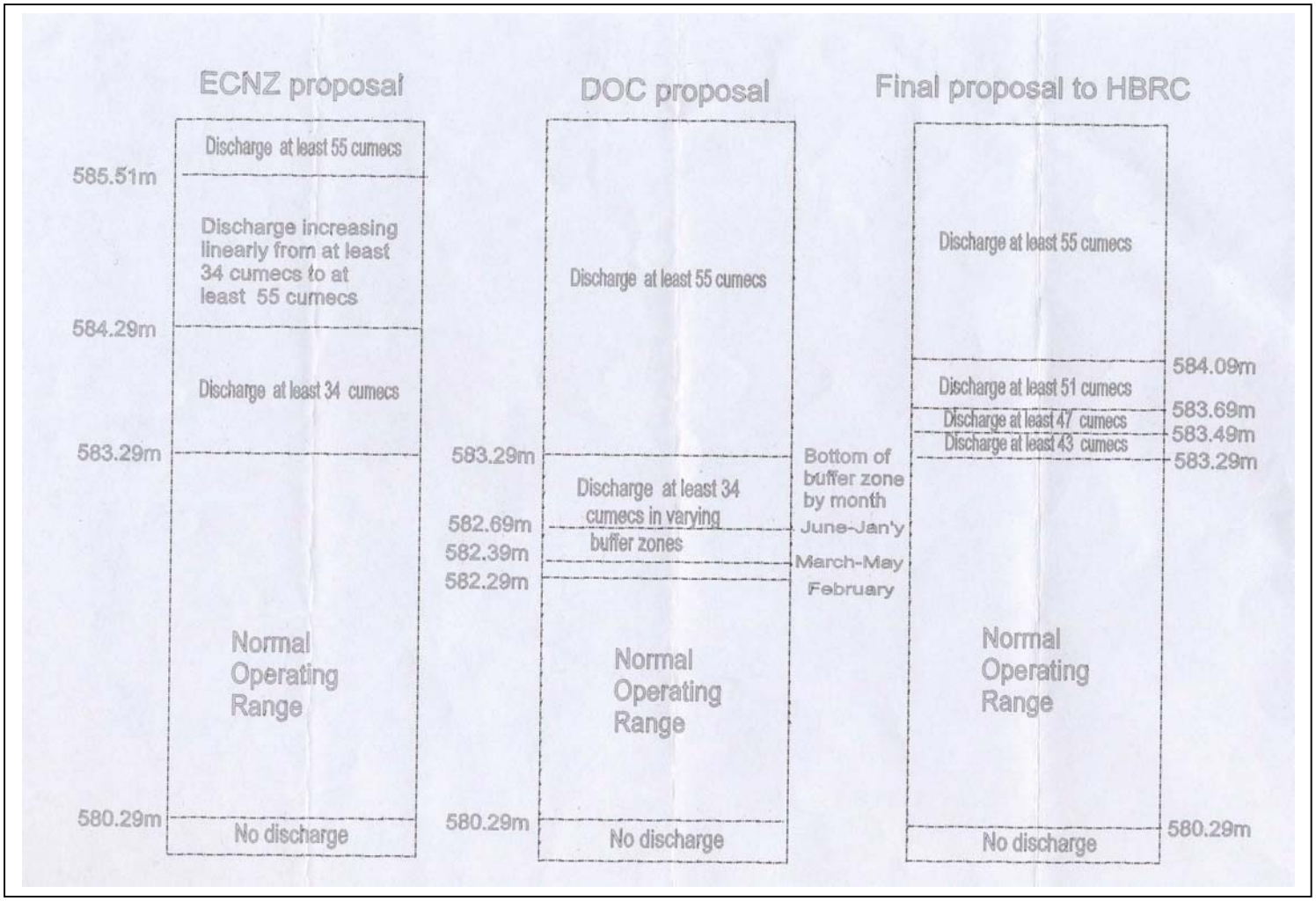

Figure 7.1 Lake Waikaremoana and the 1998 Resource Consents: Proposed and Final Lake Level Regime

Waikaremoana Authority, Panekiri Tribal Trust Board, Waikaremoana Maori Committee, and Hapu O Haenga Paretipua/ Te Kapuamatotoro (represented by Huriana Lawrence).[932]

The second aspect of preparations undertaken by ECNZ prior to their applying for consents was the commissioning of a number of research reports, with the aim of quantifying possible effects, and discerning by what means they might be avoided, remedied, or mitigated. With the aid of reviews of external literature on the Lake Waikaremoana,[933] a scoping report of the various impacts of the scheme,[934] and input from the Working Party, a number of adverse and potential adverse effects were identified;[935] these effects, such as increased erosion of the Lake Waikaremoana shoreline, decreased nearshore lake habitat, and impeded fish movement in the Waikaretaheke River, have been discussed at length in Chapters Five and Six. All told, at least 34 reports had been produced by the time the consents were applied for, most of which were written by external consultants,[936] such as the NIWA scientists Dr Mark James and Dr Jacques Boubeé (who wrote reports on Lake Waikaremoana's invertebrate fauna and eel populations in the Waikaretaheke River respectively).[937] At the time of the hearings, further expert witnesses, such as Professor R. M. Kirk, who described shoreline erosion processes, also gave evidence.[938]

Upon receipt of such reports, it was possible the Working Party to propose a number of monitoring and mitigation measures. According to ECNZ's Project Manager, the only issue on which no consensus could be reached by the Working Party was over the management of the level of Lake Waikaremoana.[939] In brief, there were two alternative regimes put forward, one by ECNZ and the other by Dr Chris Ward, a Department of Conservation staff member based at Gisborne. The two proposed regimes are shown side-by-side in Figure 7.1.

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[932] 'Statement of Evidence of Peter Canvin [doc D]', pp 6-10, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier
[933] E Christmas, W Chisholm, M James and C Howard-Williams, 'Review of the Effects of Lake Level Fluctuations on the Ecology of Lake Waikaremoana', [1995]
[934] E Christmas, W Chisholm and J McQuaid-Cook, 'Lake Waikaremoana Power Scheme: Report on the Scoping of Environmental Effects [Draft]', [1996]
[935] See HBRC, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ - Hawke's Bay Regional Council Officer's Report', pp 16-20, ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence, Hawke's Bay Regional Council, Napier
[936] Ibid., pp 37-9
[937] Ibid., pp 31, 43, & 37-8. See also 'Statement of Evidence of Mark Richard James [Document K]', p 1, and 'Statement of Evidence of Jacques Boubeé [Document G]', p 1, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier
[938] 'Statement of Evidence of Professor Robert M. Kirk [Document H]', pp 1-13. ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier
[939] See 'Statement of Evidence of Peter Canvin [doc D]', pp 4-6, ECNZ -Waikaremoana Power Scheme

As can be seen from the diagram, there was agreement that no discharge should take place when the lake was at the bottom of its operating range, but Ward wanted to reduce the chance of the lake ever getting above the top of the operating range by introducing a 'buffer zone' below it, in which ECNZ would be forced to discharge water from the lake. This, Ward argued, would minimise the extent of lake level rise when flooding occurred, and would hence limit the amount of increased erosion and damage to shoreline fauna.[940] ECNZ countered Ward's argument though by asserting that while it reduced generating flexibility and hence had an economic cost, there was not much environmental benefit. In short, the reports that ECNZ had suggested that the resulting nett fall in lake level might, by once again upsetting the post-1960s equilibrium that shoreline profiles and vegetation were gradually adapting to, have consequences not unlike those which followed the 5m lowering in 1946, that is, a new cycle of shoreline erosion, albeit obviously on a much lesser scale. In addition, it was observed that the narrower range was likely to increase the risk of 'excursions' below the bottom of the operating range, which unlike high lake levels, could not be corrected artificially (by spilling).[941]

By April 1998 ECNZ were in a position to apply to the Hawke's Bay Regional Council for the 45 consents necessary for the operation of the Waikaremoana power schemes in their existing form. Several schedules, which included various monitoring programmes for adverse effects, such as erosion of the shoreline of Lake Waikaremoana, and the eel passage management plan, accompanied these applications. Submissions for or against the applications, meanwhile, closed in June.[942] In total, submissions were received from eight organisations and three individuals, although three of these were subseqently withdrawn.[943]

WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier

[940] It should be noted that the Works proposal that Ward was comparing his regime proposal differed from that put forward in ECNZ's application. Ward, 'Operational Hydrology of Lake Waikaremoana', pp vii, 1, 16-7 & 33

[941] ECNZ, 'Waikaremoana Power Scheme', pp 88-97

[942] See P Canvin, Project Manager, Waikaremoana Resource Consents, to J Takuta-Moses, Secretary, Waikaremoana Maori Committee, 17 June 1998, 'Statement of Evidence of Peter Canvin [doc D]', Exhibit PAC 5, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier. The title page of the volume 'Waikaremoana Power Scheme', which accompanied the application, is dated April 1998

[943] Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ - Hawke's Bay Regional Council Officer's Report', pp 13-4, ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence; 'Statement of Evidence of Peter Canvin [doc D]', pp 17-9, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, both Hawke's Bay Regional Council, Napier. Although it is evident that the Te Moana O Waikaremoana Corporate Trust was acting on behalf of some Maori interested in the area, the nature of this interest, and its relationship with other representative Maori organisations, is not clear from the correspondence seen (See I Westbury to T Waugh, Hawke's Bay Regional Council, 17 June 1998, Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ - Hawke's Bay Regional Council Officer's Report', Appendix 1: Submissions, pp 103-4, ECNZ - Waikaremoana Power Scheme

Vern Winitana (representing Ngati Raupani iwi, and co-sponsored by the Trustees of Te Kopani & Heiotahoka Reserves), and Wayne Taylor, from Napier, presented Maori perspectives. Those remaining consisted of the Department of Conservation, the Eastern Fish and Game Council, the Royal Forest and Bird Protection Society, Transit NZ, the Hawke's Bay Canoe Club and the NZ Recreational Canoe Association; the submission of last two, it should be noted, only related to support for periodic recreational discharges.[944]

Although the Department of Conservation failed to get acceptance for a lake regime with a 'buffer' zone, as proposed in their submission,[945] they were successful in getting ECNZ to increase the proposed mandatory discharge rate, in the event of the lake level being above the normal operating range.[946] Similarly, ECNZ were persuaded by the Department that the shoreline erosion monitoring suggested should be undertaken annually. This, together with some other instances of relief relating to the avoidance of contamination of the Waikaretaheke River by oil or lead, and to the facilitation of fish passage, were, together with a ECNZ pledge to support projects of the Department around Lake Waikaremoana, sufficient to gain the Department's support for ECNZ's applications.[947] Other changes to the applications were also made in response to the Royal Forest and Bird and Transit NZ submissions, the principal ones being an agreement to monitor impacts on eels of minimum flows by the Tuai diversion dam (the 'Waikaretaheke Diversion Structure'), and similarly to monitor erosion from discharges in the Waikaretaheke River.[948]

WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence, Hawke's Bay Regional Council, Napier. Three applications (from Kerry Simpson (Kaitawa), David Renouf (Hastings), and the Taupo-based Te Moana O Waikaremoana Corporate Trust, represented by Isabella Westbury) were withdrawn subsequently after discussions between ECNZ and the submitters

[944] Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ - Hawke's Bay Regional Council Officer's Report', pp 10-1 & 14, ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence, Hawke's Bay Regional Council, Napier; 'Statement of Evidence of Peter Canvin [doc D]', pp 11 & 13-4, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier.

[945] See Submission from the Minister of Conservation, Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ - Hawke's Bay Regional Council Officer's Report', Appendix 1: Submissions, pp 59-62, ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence, Hawke's Bay Regional Council, Napier

[946] 'Statement of Evidence of Peter Canvin [doc D]', p 14, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier. Cf. ECNZ, 'Waikaremoana Power Scheme', p 35

[947] P Williamson, Department of Conservation, Gisborne, to C McClellan, Hawke's Bay Regional Council, 4 September 1998 and P Canvin to P Williamson, 3 September 1998, 'Statement of Evidence of Peter Canvin [doc D]', Exhibit PAC 10, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier

[948] 'Statement of Evidence of Peter Canvin [doc D]', pp 25-7, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier

Vern Winitana and Wayne Taylor raised a range of Maori concerns, some addressing the legality of the ECNZ position and others the practicalities of kaitiakitanga and resource management.[949] To begin with, Winitana noted that the lakebed hydro-electric works had never been legalised - a point that could also be raised relative to the Mangaone Diversion - and hence he argued that no resource consents should be granted until the settlement of the Wai-144 Treaty claim he had lodged for the Panekiri Tribal Trust. Winitana went on to raise issues to do with the extent of consultation with Raupani landowners (notwithstanding the discussions with the Haumapuhia Waikaremoana Authority), and then addressed a number of very specific environmental issues including the lake level regime at Waikaremoana, the control of lake weeds, minimum flows and eel and fish passage in the affected watercourses, and impacts on water supply downstream from the Mangaone Diversion, and at Lake Whakamarino.[950] Taylor's main concern, was that tangata whenua should have more say in assessing the consents, and that the 'true' tangata whenua had not been consulted.[951] In August 1998 ECNZ obtained a legal opinion on the matters raised by Winitana and, on the basis that it did not own the Mangaone Diversion dam, withdrew four of the related consents.[952]

The Hawke's Bay Regional Council eventually heard the application for the consents on 28 September 1998, and released its decisions on 13 November 1998, which were to grant all 41 of the consents applied for. In justifying these decisions, the Council noted that its

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[949] It is evident that no changes were made to ECNZ's consent applications as a result of Winitana's and Taylor's submissions (but for the withdrawal of consent applications relating to the Mangaone Diversion). The issues discussed by ECNZ and Taylor and by ECNZ and Winitana (together with Ken Lambert, on behalf of the Trustees of Te Kopani and Heiotahoka Reserves) are detailed in 'Statement of Evidence of Peter Canvin [doc D]', pp 19-25, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier

[950] See Submission from Vernon Winitana and Trustees of Te Kopani and Heiotahoka Land Blocks, Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ - Hawke's Bay Regional Council Officer's Report', Appendix 1: Submissions, pp 11-22, ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence, Hawke's Bay Regional Council, Napier

[951] See Submission from Wayne Taylor, Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ - Hawke's Bay Regional Council Officer's Report', Appendix 1: Submissions, p 23, ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence, Hawke's Bay Regional Council, Napier; 'Statement of Evidence of Peter Canvin [doc D]', pp 19-22, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier

[952] Hawke's Bay Regional Council, 'Resource Consent Applications: Waikaremoana Power Scheme ECNZ, Hawke's Bay Regional Council Officer's Report', pp 5-6, ECNZ - Waikaremoana Power Scheme WP982001T &c. File 1 - Hearing, Officer's Report, Submitters' Evidence, Hawke's Bay Regional Council, Napier; 'Statement of Evidence of Peter Canvin [doc D]', p 23, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 - Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier. It should be noted that the Hawke's Bay Regional Council Officer's Report erred in stating August 1988 instead of August 1998. See also P Canvin to B Graeme, Royal Forest & Bird Protection Society, 8 September 1998, 'Statement of Evidence of Peter Canvin [doc D]', Exhibit PAC 25, ECNZ -Waikaremoana Power Scheme WP982001T &c: File 2 -

Regional Policy Statement specifically recognised 'the need to provide an adequate supply and distribution of energy to meet the requirements of people and communities'.[953] Having said this, the consents were subject to numerous conditions - in relation to the level of Lake Waikaremoana, for example, ECNZ were required to 'adopt procedures in order to avoid reverse seasonal periodicity', to record the level every 30 minutes and provide this data to the Hawke's Bay Regional Council, and provide detailed reports on any 'excursions', and to undertake surveys on terrestrial shoreline vegetation and shoreline morphology and report on these annually to the Regional Council, Department of Conservation (Gisborne office), Eastern Fish and Game Council, and the Tuhoe-Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards.[954] Generally, the consents were subject to the possibility of review in 2004, but in addition the Council decided that an inspection of compliance should be undertaken every two years.[955] In its overall decision, the Council also commented on the Treaty settlement and consultative issues raised by Taylor and Winitana's submissions. With respect to the former, it made it clear that it could not take Treaty claims into account, while as for the latter, the Council noted that its Regulatory Committee were 'satisfied that adequate consultation had taken place with the appropriate Iwi parties', and that in its own decision-making it had paid 'adequate regard' to 'Kaitiakitanga and the principles of the Treaty of Waitangi'.[956]

7.4.3. The Lake Waikaremoana Joint Ministerial Inquiry

The Joint Ministerial Inquiry in 1998, introduced in Chapter 3, addressed a wide range of issues including very specific matters to do with lake pollution by sewage (the subject of Section 3.6) and wider concerns about authority and governance. Governance issues, in particular the roles of the Department of Conservation and Te Urewera National Park, are the focus of attention in this section.

ECNZ was not the only arm of the Crown to have its role in the management of Lake Waikaremoana scrutinised in 1998, as at the start of January in that year, about 30 members of the group Nga Tamariki o te Kohu ('The Children of the Mist') raised a protest against

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Hearing Applicant's Evidence, Hawke's Bay Regional Council, Napier

[953] Hawke's Bay Regional Council, 'Decisions on Resource Consent Applications for the Waikaremoana Power Scheme ECNZ', Preamble (dated 13 November 1998), ECNZ - Spare Decisions, Hawke's Bay, Regional Council, Napier

[954] Ibid., Consent No. WP982030M (Application ID: 6)

[955] See 'ECNZ -Consents Monitoring Requirements'[manuscript], ECNZ - Spare Decisions, Hawke's Bay Regional Council, Napier

[956] Hawke's Bay Regional Council, 'Decisions on Resource Consent Applications for the Waikaremoana Power Scheme ECNZ', Preamble (dated 13 November 1998), ECNZ - Spare Decisions, Hawke's Bay, Regional Council, Napier

the conduct of the Department of Conservation by establishing a camp near the existing visitor facilities at Home Bay.[957] From the perspective of the Department of Conservation the camp was unauthorised. For the protestors, the occupation was a symbolic actioning of Clause 4 of the Deed of Lease of 21 August 1971, which stated than 'whenever the Lessee shall make breach in the performance or observance of any of the covenants, conditions, or agreements herein on the part of the Lessee ... it shall be lawful for the Lessor forthwith and without making any demand or giving any notice whatsoever to re-enter upon and take possession of the demised land or any part thereof'.[958]

In essence, the protestors were concerned about two main issues. Firstly, they questioned the legitimacy of the vesting in the 1971 lease of the lakebed ownership with the Tuhoe-Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards. In their view, those individuals who had been granted title through the Native Appellate Court rulings of the 1940s remained the true owners, and hence the true lessors of the lake.[959] This question is of course beyond the scope of this Waitangi Tribunal research, but it is important to be aware of it, as it was at the root of much of the contest over who had the right to negotiate with the Crown over Treaty issues (such as the sale of the Waikaremoana power stations), and who ought to be consulted over ECNZ's resource consents. The second issue, which is within the scope of this research, was whether or not the Department of Conservation had met the conditions placed upon it by the 1971 lease with respect to looking after the Lake Waikaremoana environment. To quote Clause 2, the Lessee (then the Urewera Park Board) agreed to 'administer control and maintain the said land [the lakebed] in accordance with the powers and provisions of the National Parks Act 1952'.[960] According to the protestors, the Department of Conservation had repeatedly failed in this task, thereby justifying the occupation by former 'owners' (or a group thereof).

Following two months of stormy political debate over the actions of the protestors, a peaceful resolution was achieved in early March when the respective Ministers of Conservation and Maori Affairs, Nick Smith and Tau Henare, offered to hold a Joint Ministerial Inquiry into their allegations regarding the Department of Conservation's

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[957] J K Guthrie and J Paki, 'Joint Ministerial Inquiry: Lake Waikaremoana. Report to the Minister of Maori Affairs, Hon. Tau Henare, [& to the] Minister of Conservation, Hon. Dr Nick Smith., 27 August 1998, Wellington, Ministry of Maori Affairs', 1998, p 3

[958] Ibid., Appendix 2, No. 1 (Deed of Lease 1B/887, Gisborne Registry)

[959] A Sykes, Rangitauira & Co., 'Submission for and on behalf on Te Karanga o Waikaremoana and Nga Tamariki o te Kohu', pp 2 & 5, Lake Waikaremoana Inquiry Submissions , TP 3071, TPK Head Office, Wellington; Guthrie & Paki, pp 1 & 3-5

management. In return, the protestors agreed to withdraw from their occupation site.[961] The eventual terms of reference for the Inquiry, which was to be headed by former member of the Conservation Authority, James Guthrie, and the Maori Trustee, John Paki,[962] were as follows:

1. Identify the detail of the complainants relating to compliance with the 1971 lease;
2. Identify any concerns of local communities associated with the lake regarding the management of the Department of Conservation of the leased area and catchment area;
3. Inquire into whether the Department of Conservation has honoured the Crown's obligations under the terms of the 1971 lease, in respect of the requirements to manage the area in accordance with the National Parks Act; and
4. Identify what processes exist to resolve the issues which might arise from terms 1-3 above.[963]

During April and May the two Commissioners received about 70 written submissions, as well as hearing about 20 verbal submissions at Waimako marae, and at the offices of the Wairoa-Waikaremoana Trust Board in Wairoa. In the submissions by or in support of Nga Tamariki o te Kohu, the Commissioners identified 22 complaints against the Department of Conservation.[964] The Department then responded to these complaints in turn, as well as outlining what it described as 'a record of effective consultation with Tangata Whenua and of involving them in management planning and review'; this entailed consultation with the Waikaremoana Maori Committee and Ruatahuna Tribal Committee on day-to-day management issues, and additional consultation with the two Trust Boards when permanent modifications were planned, such as the erection of lakeside structures.[965] The Trust Boards themselves, meanwhile, objected to the idea of the Inquiry, and asked why none of the

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[960] Guthrie and Paki, Appendix 2, No. 1 (Deed of Lease 1B/887, Gisborne Registry)
[961] Ibid., p 3. Two protestor actions that were particularly contentious were the unauthorised erection of a building, for which purpose materials had been taken from Crown property in Tuai, see *Daily Post*, 20 January 1998. T R Nikora, 'Joint Ministerial Inquiry - Waikaremoana: Submission on Behalf of the Tuhoe-Waikaremoana Trust Board', Appendix A5, Lake Waikaremoana Inquiry Submissions, TP 3071, TPK Head Office, Wellington
[962] T Henare, Minister of Maori Affairs, to A Temara, Tuhoe-Waikaremoana Trust Board, 26 March 1998, T R Nikora, 'Joint Ministerial Inquiry - Waikaremoana: Submission on Behalf of the Tuhoe-Waikaremoana Trust Board', Appendix A1, Lake Waikaremoana Inquiry Submissions,
TP 3071, TPK Head Office, Wellington
[963] Guthrie and Paki, p 6
[964] Ibid., pp 7-15, 25-6, and Appendix 1: list of submitters
[965] Department of Conservation, 'Submission to the Lake Waikaremoana Inquiry', 18 May 1998, pp 14 & 38, Lake Waikaremoana Inquiry Submissions, vol 3, TP 3071, TPK Head Office, Wellington. See also pp 26-37

protestors have ever bothered to raise complaints with them.[966] In reviewing the 22 complaints, the Commissioners found that many related to matters outside the Department's jurisdiction, and in others they accepted the Department's assurances that the complaints were based on misconceptions - in relation to pollution from 1080, for instance, the Department stated than none had been used in the Waikaremoana catchment. In only one case was the Department found to have failed in its duties, that is, in inadvertently allowing logging operators by a neighbouring landowner to encroach upon the National Park.[967] The Commissioners did nevertheless make several suggestions as to how management of the lake under the terms of the lease might be improved. In regard to the lake in particular, they recommended that 'the Electricity Corporation take steps to avoid, mitigate, or remedy erosion that is erosion that is occurring particularly at Mokau Landing and Home Bay', and, in response to two of the protestors' complaints, they also called upon the Department of Conservation to 'ensure that the water quality at the Home Bay camp be tested regularly by the Wairoa District Council, and [that] results be made available to tangata whenua', and likewise to 'ensure that the sewage system [at Home Bay] is working efficiently', and that it 'commit to technological upgrade to the sewage system when justified'. Finally, the more general recommendation was made that 'the Department, tangata whenua, and the Trust Boards agree to meet and negotiate a formal management agreement for Lake Waikaremoana, that gives tangata whenua a more inclusive and transparent role in issues relating to the management of the leased area at Lake Waikaremoana than at present'.[968]

7.5 Developments since 1998

In terms of lake management, the main change since 1998 has been the production of a third Te Urewera National Park Management Plan. This was completed in 2003. The 2003 Management Plan is indicative of the fact that the Department has begun moving in the direction suggested by the Joint Ministerial Inquiry, that is, in paying more attention to the views of Waikaremoana iwi on Park, and hence lake management. As Coombes has noted, the East Coast Hawke's Bay Conservancy 'advanced significantly approaches to liaison with tangata whenua'.[969] Certainly, the 2003 plan is a step forward in this regard from the 1989 plan, where the Department of Conservation recognised the rights of local iwi in an

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for the Department's response to each complaint

[966] T R Nikora, 'Joint Ministerial Inquiry - Waikaremoana: Submission on Behalf of the Tuhoe-Waikaremoana Trust Board', pp 2, 4 and 6, Lake Waikaremoana Inquiry Submissions, TP 3071, TPK Head Office, Wellington; N Love, 'Waikaremoana Occupation: Issues Analysis', 23 January 1998, Treaty Principles: Lake Waikaremoana Inquiry vol. 1, TP 3070, TPK Head Office, Wellington

[967] Guthrie and Paki, pp 7-15

[968] Ibid., pp 19-20

[969] Coombes (2), p 431

almost entirely prescriptive way.[970] Nevertheless, the new willingness to consult with Maori does not, as Coombes has pointed out, equate with co-management[971] - amongst the examples cited where local Maori were heard, but their submissions overruled, was jet-boat use on Lake Waikaremoana. Their contention that jet-boats would spread lake weeds to the lake was ignored, Coombes argues, not just because of insufficient scientific proof, but also because of the large number of submissions from jet-boat users.[972]

Instead of negotiating a formal agreement with 'tangata whenua' as required by the Joint Ministerial Inquiry, the Department of Conservation has been content to rely on informal co-management arrangements made by Aniwaniwa field staff and Waikaremoana and Ruatahuna hapu representatives. As detailed in Section 4.2.3 of this report, this has become known as the Aniwaniwa model. Several factors, such as the contest between local Maori groups for tangata whenua status, the lack of resourcing for co-management in the Department of Conservation's budget, and the concentration by many of the parties concerned on other contemporary issues (such as preparation of Treaty claims), have prevented any progress from informal to formal agreements.[973]

At present, therefore, there is still a good deal of disquiet about the Department's management performance in regard to Lake Waikaremoana. Apart from the jet-boat issue, interviews with some claimants also highlighted concern about the spread of the noxious lake weed *Lagarosiphon* to Rosie Bay (this occurred in 1999),[974] and continuing difficulties in preventing sewage leakage from the Home Bay oxidation pond. Erosion around the shoreline was also referred to, but this is an ongoing issue that the Department can help to mitigate, but not prevent.[975]

When compared with the Te Urewera National Park Management 1989-1999, it is very evident that there has been a strengthening of the Department of Conservation's influence over hydro-electric generation developments. Whereas in 1989, the Department described itself as simply being able to negotiate with ECNZ over such matters, the 2003 plan

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[970] The section 'Relationship with Local Communities' in the 1989 plan included no provision for consultation with iwi, although it did say Maori resource use needed to be considered. Department of Conservation, *Te Urewera National Park Management Plan 1989-1999*, (Rotorua: Department of Conservation for the East Coast National Parks and Reserves Board, 1989), p 32

[971] Coombes (2), pp 395-396 & 431

[972] About half of the individual submissions were generic submissions from jet-boat users. Ibid., pp 415 & 431

[973] See Coombes (2), p 258

[974] Department of Conservation, East Coast Hawke's Bay Conservancy, *Te Urewera National Park Management Plan*, (Gisborne: Department of Conservation, 2003), p 18

followed up the statement that 'the administration of taking, use, damming or diversion of water in the park is undertaken by the regional councils under the Resource Management Act 1991' with the comment that 'in addition permission is required from the Department'.[976] At the same time, the Department has also tried to extend its interest in the lake to the Waikaretaheke River, even though this is outside the Park boundary, through Policy 5.2.2 (d), which is 'to advocate that fish passage is provided for wherever water bodies flowing to and within the park are affected by artificial barriers that may restrict or prevent indigenous fish passage'.[977]

Comparatively, the management record of ECNZ, and its local successor, Genesis Power, has been fairly uneventful since 1998. Genesis, of course, inherited the resource consents obtained in 1998, and although some variations have been made subsequently, they have mostly been minor in nature - the latest, for example, was to temporarily lower Lake Whakamarino to allow repairs to the dam structures.[978] In regard to the Mangaone Diversion, the diversion was stopped after 1998, and the diversion dam removed, although it has been reported that Genesis are negotiating with local iwi in an attempt to have it reinstated. Another Genesis initiative has been bringing in experts to discuss ongoing changes in the lake (such as shoreline erosion) with iwi every six months or so.[979] It should also be remembered that co-management to some extent also occurs through the eel management plan and transfer programme, which was referred to in Section 5.4.3. This programme, which started in the mid-1990s, is still in existence, although now all elvers captured at Piripaua are released at one site, that is, into Kahutangaroa Stream above Lake Whakamarino.[980]

In terms of consent compliance, ECNZ and Genesis have generally met the standards set by the Hawke's Bay Regional Council though one requirement which has troubled them was maintaining the minimum flow below the diversion dam at Tuai (the 'Waikaretaheke'

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[975] Interviews, Reay Paku and Te Ariki Mei, 11 November 2003, and Trainor Tait, 11 November 2003
[976] Department of Conservation, East Coast Hawke's Bay Conservancy, *Te Urewera National Park Management Plan*, p 48. Cf. Department of Conservation, *Te Urewera National Park Management Plan 1989-1999*, p 63
[977] Department of Conservation, *Te Urewera National Park Management Plan*, [2003,]p 49
[978] Genesis Power, 'A Report Accompanying an Application to Change a Resource Consent under section 127 of the Resource Management Act 1991', [2003], p 3, ECNZ - L. Waikaremoana WP982420M - Dam: Lake Whakamarino/Kahutangaroa Stm, Hawke's Bay Regional Council, Napier
[979] Interview, Trainor Tait by G Cant and R Hodge, at Tuai, on 11 November 2003
[980] E Bowman, J Boubee and M Tipuna, 'Waikaremoana Power Scheme - Monitoring of the Elver Catch and Transfer Programme 2002/3', [2003], p iv and 8, Genesis Power Ltd - Lake Waikaremoana WP 982030M [Monitoring Reports], Hawke's Bay Regional Council, Napier

Diversion Structure'). [981] Alongside this it is noted that some local Maori, in particular Trainor Tait of Nga Rauru o Nga Potiki, are suspicious about Genesis' motives in bringing in outside expertise for environmental monitoring.[982] As regards Lake Waikaremoana, Genesis have adopted a cautious approach in terms of the operating range - indeed, they were criticised by Government during the 2002 energy crisis for insufficient storage - and accordingly there have been no excursions outside the range since a high precipitation event caused it to be overtopped in late 2001.[983] With respect to seasonal periodicity, an examination of the lake level record between 1999 and 2003 indicates less consistency, however.[984]

7.6 Conclusion

In the course of this chapter, it has been seen that a number of different agencies were involved in managing Lake Waikaremoana after 1946, when the Crown first began manipulating the lake levels. The first two were the State Hydro-Electric Department, and its successor, the New Zealand Electricity Department. Both effectively had exclusive authority over the lake, and operated without reference to either the lake's Maori owners, or the neighbouring Urewera National Park. From the early 1960s, the new Urewera National Park Board began to comment on lake management, and in 1964 wider consultation, involving local Maori representatives (as an 'interested group'), took place over the issue of tree stump removal, but still the New Zealand Electricity Department retained ultimate authority.

A more co-operative approach began to be taken from 1970, with the 'Gentleman's Agreement' of that year (in which the New Zealand Electricity Department, Urewera National Park Board, and Nature Conservation Council agreed upon a lake level regime) being followed in 1971 by the Lake Waikaremoana Act which transferred administration from the lake's Maori owners to the Urewera National Park Board, in return for an annual rental paid by the Crown. The Maori owners had taken this action because they were not in

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[981] See D Lal, Hawke's Bay Regional Council, to R Bate, Genesis Power, 24 May 2000, Genesis - Lake Waikaremoana - Compliance Reports, Hawke's Bay Regional Council, Napier; M Scarsbrook and E Bowman, 'Effects of Changes to Minimum Flows on Macroinvertebrate Community Composition of Waikaretaheke River: Final Annual Report', [2003], p iv, Genesis Power Ltd - Lake Waikaremoana WP982030M [Monitoring Reports], Hawke's Bay Regional Council, Napier

[982] Interview and personal communication, 11 November 2003

[983] Jim May, Environment Officer, Hawke's Bay Regional Council, pers. comm., 11 February 2004. The lake level almost reached the top of the range in late 2002; at no time since 1999 has it been near the bottom of the range (see W B Shaw, C M Bycroft, S Hall and M O Kimnberley (Wildland Consultants), 'Lake Waikaremoana Shoreline Vegetation Monitoring - 2003 Progress Report', [2003], pp 23-5 & 36)

[984] Shaw et al, p 36

a position to police the lake themselves. From 1980, the Hawke's Bay Catchment Board (and later the Hawke's Bay Regional Council) also took up a role in lake administration, as arbiter of the lake level regime. The hearings in 1980 were the first occasion when local Maori opinion was sought out, but those representatives who were asked chose to rely on the National Park Board to defend their interests.

The State sector reform after 1984, meanwhile, resulted in a number of changes in terms of Lake Waikaremoana administration. The Department of Conservation took over running the lake lease, and the State's electricity generation arm became the State-Owned Enterprise ECNZ. In addition, the passage of the Conservation Act 1987 and Resource Management Act 1991 facilitated greater Maori participation in land and water management decision-making. These changes had significant repercussions in the Waikaremoana area in the 1990s. As ECNZ moved towards a commercial model, plans to sell the Waikaremoana power stations were set in motion in the mid-1990s. This caused consternation amongst Maori groups worried about what this might meant for Treaty settlements, and future Maori participation in lake management. Eventually, rival consortiums involving joint-bids between Maori representatives and outside commercial firms were put together, but a change of Government ended the sale process in 1999. Instead, the stations were given to a State-owned ECNZ offshoot, Genesis Power. Secondly, the first lake level review under the Resource Management Act took place in 1998. An unprecented level of consultation occurred between Maori representatives and ECNZ prior to the consents applications being lodged, so that few Maori organisations raised objections, although those that did still questioned whether the rights of the area's Maori landowners were being given sufficient consideration. Thirdly, a Joint Ministerial Inquiry into Department of Conservation management of Lake Waikaremoana took place in 1998, after protests by the group Nga Tamariki o Te Kohu. The Inquiry largely absolved the Department of the specific complaints made against it, but nevertheless called upon it to make greater efforts to include tangata whenua in its management. The latest Te Urewera National Park Management Plan (2003) indicates that this should occur, but in practice co-management between Department staff and local Maori is still restricted to informal arrangements. In conclusion, therefore, the voice of Waikaremoana Maori is now being heard, but they remain very much junior partners when it comes to decision-making.

Chapter 8: Conclusion

This report has examined the impact of Crown actions, or lack of action, on the environments of Lakes Waikaremoana and Waikareiti. It has also considered the impact on the customary use and management of their natural resources by Waikaremoana Maori.

The report opened with an Introduction in chapter one written by Garth Cant. This set the scene by describing natural features; identifying the principal claimant groups and positioning them in historical and contemporary terms; and delineating the general and specific grievances brought to the Waitangi Tribunal by each of the claimants. It also covered the mandate of the commission and the organisation of research and writing tasks.

The report is divided into two parts representing the two main prongs of Crown involvement in the Waikaremoana area. The first, written by Robin Hodge, comprises chapters two, three, and four. These examine, respectively, the introduction of trout and management of the fishery; the polluting impact of tourism in relation to sewage; and conservation policy, giardia, and introduced aquatic 'weeds'. Although they are discrete topics, they are nevertheless intertwined. The introduction of trout was partly an incentive for tourism while the conservation of natural flora, fauna, and scenery under Te Urewera National Park status also had tourist objectives.

Part two, comprising chapters five, six, and seven, was written by Vaughan Wood. It looks at hydro-electric power development and the impacts of this on Lake Waikaremoana and the Waikaretaheke River valley. Both Wood and Hodge contributed to the Conclusion in chapter eight which was compiled by Hodge.

Chapter two examined the fisheries of Lakes Waikaremoana and Waikareiti. It began with an account of indigenous fish and Waikaremoana Maori use of them prior to the introduction of trout from 1896. Evidence is limited, and sometimes conflicting, both about fish stocks themselves and their use by Waikaremoana Maori. The most important species appear to be the koaro, which they call maehe, and the eel. Although maehe have developed into a lake-locked species, eels require a passage to sea to breed in the Pacific Ocean and to allow their young to return to the lake. Some fish biologists doubt whether young eels could have climbed the waterfall below Kaitawa power station. Therefore they think Waikaremoana Maori may have placed eels in the lake. These could then have grown to the large eels of legend. Other biologists think fish could have come and gone through cracks in

the lake-bed leading to Waikaretaheke River but that passage was prevented when the cracks were sealed as part of the hydro-electricity scheme.

Today eel numbers are likely to be low. Maehe remain in the lake. Other indigenous fish are the common bully, toi toi, kokopu and the common smelt, koeaea. The latter were introduced from Lake Rotoiti in 1948 as additional food for trout. Indigenous fish are described as secretive as they prefer a sheltered habitat and are often nocturnal.

Lake Waikareiti contains maehe. Waikaremoana Maori netted considerable quantities of maehe but their use of eels is less certain. One report is of an eel fishery at Waikaremoana in the past but another states that no one ate eels from the lake for spiritual reasons.

The Northern Hemisphere species of brown and rainbow trout were introduced into New Zealand waterways from 1867. Trout were to provide opportunities for recreational fishing for Pakeha settlers who considered that indigenous fish lacked the 'fighting' qualities of trout and salmon. Acclimatisation societies were given statutory authority to introduce, protect, and manage exotic fish and game in New Zealand under the Animals Protection Act 1867. In the same year, the Salmon and Trout Act was passed. This established the basic regulatory framework for game fish protection and management. The act applied to rivers but, in 1884, was amended to include lakes. In 1902 an amendment act provided for the issuing of licences and for the acclimatisation societies to receive the revenue from licence sales. Subsequent legislation refined trout fishery management but the basic provisions remained. Regulations, which promulgated such matters as the open season, fishing equipment, licence fee, and fish size, were published annually. At both lakes today, trout can be fished throughout the year, except for springs, streams and their tributaries which flow into Lake Waikareiti. A variety of licences can be purchased.

Trout were released successfully in Lakes Waikaremoana and Waikareiti as part of Crown-Tuhoe negotiations on Te Urewera between 1894 and 1896. In response to what he called Tuhoe's request for trout as an additional food source and tourist attraction, the Premier, Richard Seddon, agreed to ask the Wellington Acclimatisation Society to supply them from its hatchery at Masterton. Today, however, as discussed in chapter 2, some Waikaremoana claimants dispute the statement that their ancestors asked for trout.

In September 1896, F W Rutherford, brother of the society's chairman, transported a small shipment of brown and rainbow trout fry to Lake Waikaremoana. With assistance from local Maori, Arata and two unidentified boatmen, Rutherford deposited the fish in at least eight streams flowing into the lake. In December 1896, a much larger consignment of fry were released. The date of the original release into Lake Waikareiti has been given as 1918 but may have been earlier.

Lake Waikaremoana has not been stocked since 1998 and Lake Waikareiti since at least 1966. Waikaremoana contains both brown and rainbow trout but Waikareiti only rainbow. In 1919 rainbow trout were released into the lake on Rahui Island in Lake Waikareiti. As has been stated, Waikaremoana Maori were involved with the initial release of both brown and rainbow trout species in September 1896 but this was more by chance than prior arrangement. They do not appear to have been involved with the substantial release in December that year nor with subsequent releases in the following decades.

As part of his agreement, Seddon wrote, 'I will also ask to be furnished with full directions to be furnished to you so that you may know which are the most suitable places in which to place the fish in the rivers and lakes of your country, and how to look after them.' His letter was reproduced as the Second Schedule to the Urewera District Native Reserve Act 1896. The statute, therefore, has the clear implication that Tuhoe would release trout, and manage and own the trout fishery. The act, however, allowed but did not require the Government to pass regulations effecting the intentions of the Second Schedule. The Government failed to pass the necessary regulations, thereby eliminating Waikaremoana Maori from a role in the fishery management. The introduced fish quickly became more a recreational sport for tourists rather than an additional free source of food for Waikaremoana Maori.

The lakes' fishery has seen many changes of administrative control. Lakes Waikaremoana and Waikareiti are presumed originally to have come within the district of the Hawke's Bay Acclimatisation Society, then that of the Wairoa Acclimatisation Society. From 1908, the lakes were in the Rotorua Acclimatisation District which was administered by the Tourist and Health Resorts Department from 1908. From 1913, that department and the Department of Internal Affairs divided administration of the fishery until 1931 when Internal Affairs gained sole control. In 1987, its Wildlife Service functions were allocated between the Department of Conservation and the Eastern Region of Fish and Game New Zealand. The department and the Fish and Game Council have a Memorandum of Understanding as a framework for a continuing professional relationship. Because the lakes are part of Urewera

National Park, the department can refuse Fish and Game requests in the interest of maintaining intrinsic values.

Fishery management at the lakes has included the destruction of black shags which predate trout; the establishment of a hatchery at Waikaremoana to allow more flexibility in the timing of the release of trout fry; the erection of a fish barrier to prevent trout from being destroyed in the intake tunnel to the hydro-electric scheme; and regular reports by rangers and inspectors for the Tourist Department and Internal Affairs. Occasionally more extensive scientific investigations and reports were made, often after lobbying by the Wairoa angling clubs. Two of the most important were by P Dickinson in 1950 and Peter Mylechreest in 1977. Dickinson, a fishery officer, investigated conditions after the level of Waikaremoana was lowered in 1946 for the hydro scheme. Mylechreest, a scientist, studied conditions for three years after hydro management had had further detrimental effects on the fishery.

The chief, Mahaki, assisted with the fish hatchery between 1926 and 1929 when it was operating on land at Waimako Pa and was paid £5 by the Tourist Department. However, when the department was asked by other Maori there to either grant five free fishing licences or pay an annual rental of £10 as 'a matter of fairness' for water use, the department refused. It removed the hatchery to the government reserve. The department's refusal, in light of free licences for Arawa and the acknowledged poverty amongst Waikaremoana Maori, appears unjust and against the spirit of legislative intent.

Since then Waikaremoana Maori appear to have had little involvement with the trout fishery at Lakes Waikaremoana and Waikareiti but both the Department of Conservation and the New Zealand Fish and Game Council have obligations to the Treaty of Waitangi under section 4 of the Conservation Act 1987. The department is required to interpret and administer the Act, and to administer the National Parks Act 1980 and other Acts in the First Schedule, so as to give effect to the principles of the Treaty. The council is required to interpret the Conservation Act and the Wildlife Act 1953 so as to give effect to those principles but no evidence has been found to reveal how this is effected.

Some Waikaremoana claimants contend that Maori did not request trout to be introduced to the lakes and that therefore the Crown had no authority to do so. Written evidence in the 1890s conflicts with such evidence from contemporary claimants' on the request or otherwise to introduce trout. Claimants also contend that the Crown failed to provide Te

Urewera Maori with a management role in the fishery; and that the Crown passed legislation to protect trout habitat but not that of indigenous fish. Evidence has shown that Waikaremoana Maori were excluded from a management role in the fishery at Lakes Waikaremoana and Waikareiti and that, until recently, the lakes' habitats have been managed in the interests of trout and not indigenous fish.

Chapter three examined the issue of pollution of the waters of Lake Waikaremoana, caused by the release of sewage collected and disposed of from different types of accommodation at the lake. For nearly 50 years, effluent from septic tanks flowed into the lake, especially in the peak tourist season of the summer months. Human waste from freedom campers, and from permanent and semi-permanent huts and camps around the lake may have seeped into the lake, and may have contributed to the spread of giardia.

Various Waikaremoana claimants allege that the Crown was responsible for pollution, caused by mismanagement and poor control. It has not been possible to judge whether the Crown should, or could, have provided more adequate systems at the time prior to the 1970s. The collection and disposal system was upgraded in 1979 but sewage has continued to seep into the lake. Although the Department of Conservation now has systems in place to involve Waikaremoana Maori whenever problems occur, Maori disquiet remains. However, the department has formed a joint management team with hapu representatives to manage the replacement and upgrading of the system. Hapu specified their preferred site for the new oxidation pond, about half a kilometre from the present pond on the old farm site. The department agreed to this site and have approved a Resource Consent application.

The chapter began with an account of the sewage arrangements for Lake House which was built for the Department of Tourist and Health Resorts in 1903 on Whaitiri headland. Pan closets, which were emptied frequently, were used initially. Water closets and a septic tank were installed in 1921–22. Partially treated effluent was at first discharged through a pipe onto vegetation in a gully. But in the late 1920s or 1930s the pipe was extended so that effluent spread nearer the lake's edge and eventually directly into the lake. This continued until Lake House was closed in 1972 after the sewage system failed to cope with visitors in the summer of 1970–71. At this time raw sewage went into the lake, and the Health Department threatened to close the hotel.

In the late 1920s, the department opened the Jetty Camping Ground in the vicinity of the hotel at Home Bay. Over the years it was expanded and is now Lake Waikaremoana Motor Camp administered by the Department of Conservation. The camping ground began with Kemico toilets but in the 1930s a septic tank was installed. Its outfall pipe, too, extended to the lake.

Other private camps and huts were established either as permanent or semi-permanent dwellings around the lake on both Crown and Maori land. Their toilet facilities are unknown but they may have had long drops like the huts built in the 1960s after the establishment of Te Urewera National Park in 1954. Both the Tourist and Lands Departments made every effort to have private huts removed but this was more for aesthetic and commercial reasons than for hygiene or Maori values relating to the contamination of the lake's waters.

In the years 1979 and 1980, the septic tanks were replaced with the system that remains today. This consists of a holding tank and pump at the motor camp to take the material through a buried pipe to the oxidation pond half a kilometre along the lake shore. The pond allows for bacterial processes to convert wastes to cellular material and simple end products like carbon dioxide, water, ammonia and phosphate over a period of between 20 and 40 days. From the pond, effluent is pumped by a high pressure pump to a dosing tank on Ngamoko Range, out of the lake catchment. From the tank, the effluent is sprayed from long pipelines onto forested land. Several pipelines allow ground to be irrigated then rested. In the event of a power failure, storage facilities are provided at the pump station, and alternative system of pumping sewage to the pond is installed, and a tile drainage trench had been built to percolate any overflow before it reaches the lake.

In the 1990s, the long drop toilets at the national park huts were replaced by sealed vault toilets. These are emptied periodically into a specifically designed barge which transports the contents to Home Bay for treatment. Waste from the huts at Panekiri and at Lake Waikareiti, which are not accessible by the barge, is transported in tanks by helicopter to Home Bay. The installations have not been entirely troublefree. Seepage into the lake has occurred from the oxidation pond, which has led to the proposed improvements. Two empty tanks dropped into the lake, seemingly without causing pollution, when the strop to the helicopter broke.

For Maori spiritual and cultural values, the separation of water for food preparation from water for other purposes like the disposal of human waste is essential, as is the preservation of the mauri through kaitiakitanga. One of the main reasons given by Nga Tamariki o Te Kohu for their occupation of Crown-leased land near the Aniwaniwa Visitors' Centre between January and March 1998 was the discharge of sewage into the lake. Their concerns, expressed to the resulting Joint Ministerial Inquiry, included fears that the oxidation pond would leak and that its uncovered state was unhygienic.

The Conservation Department, having by then replaced Lands and Survey as the statutory agent, denied the possibility of any overflow to the lake. This was accepted by the Ministerial Inquiry team although they advised the department to be vigilant because of the significance of the issue for Waikaremoana Maori. When the seepage occurred, the department immediately consulted the Waikaremoana Maori Committee and effected repairs. Maori were involved in the decisions and monitoring. But Waikaremoana Maori remain concerned about possible leaks and overflows from the oxidation pond, given its proximity to the lake.

Chapter four examined the Crown's conservation policy; the introduction of the parasite, *Giardia intestinalis*; and the introduction and control of the aquatic weed, *Lagarosiphon major*, which is now in Lake Waikaremoana. For much of the twentieth century, conservation and other aspects of the lakes have been managed under a variety of Crown agencies and statutes. The fishery management of lake waters was discussed in chapter two. Crown interest in the aspect of conservation of the lakes' surrounding environment - indigenous flora, fauna and scenery - began in 1913 when the Inspector of Scenic Reserves recommended the preservation of 14,580 acres of the Waikaremoana block. The passing of the Urewera Lands Act 1922 allowed the Crown to gain control of most of the land along the western and northern shores of Lake Waikaremoana, apart from 13 Maori reserves. The Crown-owned land was administered by the Department of Lands and Survey. The Crown already owned land on the southern and eastern shores of Lake Waikaremoana, including Lake Waikareiti. Formal conservation policies were instituted with the gazetting of Te Urewera National Park in 1954. The national park was derived from lands administered by State Forests, Tourist and Publicity, and Lands and Survey. It included Lake Waikareiti, but not Lake Waikaremoana nor the Maori reserves. Control of Lake Waikaremoana was not legalised until 1979. This occurred after the 1971 lease to the Crown by Maori owners of the lake bed, islands excluding Patekaha, and the dry land between the water's edge and the

title boundary. As chapter 4 demonstrates some claimants allege that the lease should be for only the lake bed underneath the water.

Te Urewera National Park was administered under the National Parks Act 1952 by Lands and Survey and, from 1961, by the Urewera National Park Board. Despite the precedents of Tongariro and Egmont National Parks, Waikaremoana Maori were not granted places as of right on the board but both Tuhoe and Ngati Kahungunu had board representatives. The 1952 Act was succeeded by the National Parks Act 1980 which remains as a controlling statute. The purpose of both national park Acts is conservationist, in the sense of permanent preservation and protection. This is its meaning in the Conservation Act 1987 under which the Department of Conservation now administers national parks.[985]

After the passing of the Conservation Act 1987, the Department of Conservation replaced Lands and Survey as the administering agency. Following the Conservation Law Reform Act 1990, Te Urewera National Park Board was replaced by the East Coast Hawke's Bay Conservation Board. This has Maori members. Section 4 of the Conservation Act 1987 required the Conservation Department to give effect to the principles of the Treaty of Waitangi in its management of national parks. *Te Urewera National Park Management Plan* 2003, which is the latest of three management plans, stated that this responsibility applied to the administration of the Acts in the First Schedule of the Conservation Act, including the National Parks Act 1980, 'to the extent that the principles of the Treaty are not inconsistent with the provisions of the Acts'. In order to allow partnership by iwi in management, new legislation would be required, both to amend the department's role as the sole conservationist agency, and perhaps to modify the conservationist intent of the National Parks Act.

In the Aniwaniwa Area of Te Urewera National Park, section 4 requirements have seen the development of an informal partnership called the Aniwaniwa agreement. This is an attempt at co-management between department staff and Waikaremoana hapu representatives. The latter take part in bi-monthly project planning meetings and other permanent and one-off teams such as business planning and the new oxidation pond project. But, because of issues of ownership, management, and guardianship, not all Waikaremoana Maori feel able to participate.

Until the 1980s, Te Urewera National Park, with a disregard for reality, was managed according to the concept of wilderness which had been introduced in the National Parks Act 1952. The concept included keeping and maintaining areas in a state of nature without buildings, roads or tracks. The park's first management plan in 1976 declared, 'There are no designated Wilderness Areas in Urewera National Park but the whole of the Urewera has always been regarded as wilderness and it is an object of management that it remain as such'. By 1989, when the second management plan was published, the wilderness construct was applied to only one area of the park. The main conservation objective was then the protection of native plant and animal communities. When the third management plan was published in 2003, ecological protection of the natural world was extended to objects of archaeological and historical interest.

Management plans for Lake Waikaremoana have attempted to minimise disturbances to physical characteristics. High-speed boating has been prohibited from 1976. Cooperation has been sought from the New Zealand Electricity Department and its successors, in relation to the hydro-electricity scheme, to minimise effects on the lake ecology and foreshore.

Lake Waikareiti continues to be assessed differently to Lake Waikaremoana because it is considered to be in a near-pristine state. This particularly applies to five of its six islands, all of which are designated a Specially Protected Area Zone. The sixth, Rahui Island, is considered interesting because it contains its own lake. The waters of Lake Waikareiti are free from introduced aquatic weeds. Therefore management policies are strict. Boating is limited to departmental, non-motor craft. Within the lake, public access is limited to Rahui Island and then restricted to a landing stage and viewing platform.

Analysis by Brad Coombes has shown that Waikaremoana Maori were in a position to contribute little to the formation of the 1976 management plan. For the management plans of 1989 and 2003, they made specific recommendations on trout, sewage disposal, and lakeshore freedom camping that have not eventuated. But their general recommendation relating to consultation has been fulfilled by the Aniwaniwa agreement.

The parasite, *Giardia intestinalis*, is said to have first been detected amongst servicemen returning from overseas in the 1940s but it could have been in New Zealand for much

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[985] New Zealand Conservation Act 1987, s. 2(1)

longer. It is endemic world-wide. It infects humans, animals, and birds when cysts form in the intestine and are excreted. Cysts can survive for several months in cold water. Giardia can be transferred from person to person, by contaminated food, inadequately treated water, and poorly disposed human waste. It is also spread by animals and birds. Clinical manifestations of the disease include diarrhoea, nausea, lethargy, and weight loss.

The presence of giardia was one cause in the 1998 lakeside occupation by Nga Tamariki o Te Kohu. Various Waikaremoana claimants allege that the Department of Conservation was responsible for giardia's introduction to the Waikaremoana environment through poor control of tourism. Included under this general heading are toilet facilities in private huts and camps, unthinking waste disposal by freedom campers and trampers, and by sewage effluent flow into Lake Waikaremoana. The department rejects the allegation. The Area Manager, Glenn Mitchell, said that giardia has been discussed by the department and Waikaremoana hapu within the Aniwaniwa agreement and that hapu representatives now accept that giardia is carried by animals and birds as well as humans. Therefore, he added, even if the spread of the parasite by human campers could be prevented, birds and animals would continue to disperse it in their droppings.

Water quality is not monitored for giardia because the parasite is considered to be present in almost all water bodies. The department advises people who doubt water purity to boil water for at least three minutes, filter, or treat it chemically.

Introduced submerged aquatic plant species can overwhelm and replace native plant communities, hinder navigation, foul propellers, interfere with angling and are suspected of reducing fish habitat. In contrast, native aquatic plant species are less troublesome and are thought to provide cover for fish from predation by shags, trout, and eels.

Introduced species probably arrived in New Zealand with shipments of fish ova imported from Tasmania in the 1860s. Several, such as *Elodea canadensis* (Canadian pondweed), *Potamogeton crispus* (curly pondweed) and *Ranunculus tricophyllus* (water buttercup), are likely to have been in Lake Waikaremoana since the nineteenth century and are well established. However *Lagarosiphon major* is more invasive and was declared noxious in 1982. It is thought to spread by the transfer of live, bud-bearing stem fragments, perhaps on boats or fishing equipment, rather than by waterfowl. The stems fall to the bottom and give rise to many new vertical shoots that present a canopy at the water's surface.

Lagarosiphon major was found in 1996 in the hydro-electric scheme lakes, Whakamarino and Kaitawa. It was found in Rosie Bay at Lake Waikaremoana in 1999, although it may have been undetected beneath the surface for some time. It is capable of displacing all other submerged plant communities and thus presents a threat to Lake Waikaremoana, and potentially to Lake Waikareiti, because of their valuable native aquatic communities.

The Department of Conservation at Aniwaniwa undertakes a number of measures to control and eradicate *Lagarosiphon major*. When it was first discovered, tons were cleared out and trucked away. Today, divers check along underwater gridlines in Rosie Bay and pull out any plants found. Recently only two or three plants per month have been found for 10 to 12 hours of dive time. In addition, the department regularly checks the shoreline of Lake Waikaremoana using a glass-bottomed boat, underwater camera, and a physical check of any suspicious plant. The Global Positioning System location is automatically recorded. Only one plant has been found at Onepoto, opposite Rosie Bay, in 1999.

Signs, that provide information about water weed threats and advice on the necessity for checking and cleaning boat and fishing equipment have been placed at boat ramps and at Lake Waikareiti. The Eastern Region of Fish and Game New Zealand also acknowledges that it has an educative role.

Some claimants have alleged that poor control of tourism and recreational use of Waikaremoana lands and waters has led to the introduction of exotic waterweeds. However *Lagarosiphon major* has been discussed by Waikaremoana hapu at Aniwaniwa agreement meetings. Departmental officials considered that hapu are satisfied with their methods of controlling it and are confident that they will be able to eradicate it.

Chapter five examined the impact of hydro-electric development in the area adjacent to Lake Waikaremoana between 1920 and 1955. There was, over a period of four decades, a massive concentration of construction activity in the upper Waikaretaheke Valley adjacent to and downstream from the natural debris dam that created Lake Waikaremoana.[986] This locality, small compared to either Lake Waikaremoana or its catchment area, has been particularly important to local Maori.

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[986] See Figure 1.2

A number of reasons for its importance can be noted. Firstly, in ecological and mahinga kai terms, the small shallow lakes, wetlands, rivers and streams in this locality were highly productive compared to the larger and much deeper Lake Waikaremoana and the more elevated and deeper Lake Waikareiti. Secondly, in terms of the life cycles of eels and other indigenous fish that migrate to and from the sea, this was the pathway between Lake Waikaremoana and the sea.

Thirdly, and most important in the context of colonial history, this is the area where wars, confiscations and land negotiations resulted in the relocation of larger numbers of Tuhoe and Ruapani and smaller numbers of Ngati Kahungunu. The Maori Reserves at Te Kopani, Heiotahoka, Tarapatiki and Terara, all adjacent to the Waikaretaheke River, were especially significant in this context. Maori were concentrated here in the nineteenth century as a result of events explored in depth in the historical reports to the Tribunal. These same areas were the locale for the large-scale construction works that took place in the twentieth century.

The impacts of construction work on the local environment of Lake Kaitawa, the Whakamarino wetlands, the Waikaretaheke River and the Mangaone Stream were immediate, as were the impacts on homes and cultivations adjacent to these same features and on the Whakamarino Flat. The social impacts of the loss of these customary resources were, in part, delayed as many local Maori were able to gain employment and cash incomes from construction work. Eventually, when construction was completed and employment ceased, they were faced with the choice of moving elsewhere for employment or remaining in the valley with a greatly reduced subsistence base.

Construction work began on a small scale in 1921 with the temporary scheme at Tuai, designed to provide power for Wairoa and for the larger construction projects to follow. The environmental impacts of the scheme itself were small compared with those of the later schemes but it was facilitated by the construction of a road through Te Kopani Reserve. The land for the road, and a metal quarry, was taken under the Public Works Act. Negotiations about compensation for land and royalties for metal were protracted, agreements made were not carefully recorded, and there was a lengthy delay before the road was fenced. Community life was much disrupted as a result.

Large-scale hydro-electric development began with the Tuai scheme (also known as Middle Waikaremoana) built between 1926 and 1929. The Waikaretaheke River and Lake Kaitawa were both substantially modified by the construction of a weir across the river and a 250 metre canal which diverted the flow into an enlarged Lake Kaitawa. The negative impacts were greatest in the case of the upper Waikaretaheke River. The bed became dry for most of each year, habitat was lost and the migration path for eels and other species was interrupted. The lake was raised and enlarged. The evidence is not specific but the assumption can be made that changes in the lake ecology were less of a problem for Maori than loss of access to mahinga kai in the lake.

Work on this first phase was completed in 1929 with the commissioning of the Tuai power station. Attention then shifted to hydro schemes elsewhere in New Zealand and work at Waikaremoana did not resume until 1938 when the Piripaua or Lower Waikaremoana Power Development was commenced. A large earth dam was created on the lower edge of the Whakamarino Flat, and the Mangaone Stream and the Kahutangaroa River were diverted, along with the outflow from the Tuai power station, to form a 30 hectare lake on what was formerly wetland and ancient lake bed. The new lake, like the ancient lake, is subject to silting especially from the Kahutangaroa River. In 1987-88, some 34 years after Lake Whakamarino was formed, the Electricity Division dredged some 80,000 cubic metres of sediment out of the lake and deposited it in a nearby valley, behind a smaller earth dam. The Piripaua power station was built near the bed of the Waikaretaheke River and commissioned in 1943.

The temporary impacts of hydro construction between 1938 and 1943 were substantial from the perspective of the Maori communities. Portions of the Heiotahoka Reserve were taken under the Public Works Act to allow for the construction of penstocks and power house and there was large-scale disruption during construction. One further acre from Te Kopani Reserve, and 40 acres from Heiotahoka Reserve (8 acres for roading and 32 for general purposes), were taken under the Public Works Act at this stage. The Crown was again tardy in its efforts to apply the Act and lax in its demarcation of the land to be used for construction purposes and worker housing.[987] The long term impacts of this second phase of hydro construction were threefold: there was a loss of habitat, both wetland and dryland, at

[987] Tony Walzl, 'Waikaremoana: Tourism, Conservation & Hydro-electricity', report commissioned by the Waitangi Tribunal, October 2002, pp 307-308

Whakamarino; secondly the lower reaches of the Mangaone Stream were diverted and the stream bed became dry; thirdly the next stretch of the Waikaretaheke River, between the diversion to Lake Whakamarino and Piripaua, alternated between being dry and being used as a short term discharge channel. In all cases there was loss of habitat and mahinga kai and further disruption of the migration paths for in-stream fish.

As construction was completed on the Lower Waikaremoana Power Development the focus of attention and the construction work force moved to the Upper Waikaremoana Development adjacent to Lake Waikaremoana. Between 1943 and 1948, tunnels were built through the debris dam at Te Kowhai Bay, and siphons and slipway were built over the lip of the dam at Te Wharawhara Bay. This made it possible to draw down the level of the lake and use the water in a new power station built at Kaitawa. There was considerable construction activity between Onepoto, on the shore of Lake Waikaremoana, and Kaitawa. The impacts of construction activity on the Maori communities resident on the Te Kopani Reserve were less than those experienced during earlier phases of work since they were not immediately adjacent to the construction sites and the construction housing was already in position. The long- term environmental impacts on Lake Waikaremoana are the subject of chapter six. The works below the debris dam intensified the environmental impacts on the already depleted ecology of the Waikaretaheke River but the impacts were smaller this time because the damage had been done during the previous two construction phases.

Large-scale construction work in the Waikaretaheke Valley was completed with the commissioning of the Kaitawa Power Scheme in 1948. The larger construction force was dispersed, but there was one remaining task to be done before the cluster of Waikaremoana schemes was complete in engineering terms. Between 1948 and 1955, the focus of work shifted to sealing the leaks in the natural debris dam by constructing a sealing blanket. Well in excess of 80,000 cubic metres of rocks, stones, and clay were applied to the sealed area of the bed over an eight year period. This complemented the sand and cement injected into caverns in the debris dam during construction of the Kaitawa Power Scheme tunnel. The result was a substantial reduction in seepage through the dam: from an average of 15 cubic metres per second prior to sealing to less than 6 cubic metres per second after sealing. The difference was substantial in terms of the operating efficiency of the power generating complex. The ecological impacts, above and below the debris dam, were also substantial. Those to do with lake levels and the seasonality of lake levels for Lake Waikaremoana are

the subject of chapter six. The impact on the hydrology of the Waikaretaheke valley below the debris dam was also substantial. From 1955 onwards the largest proportion of the water moving between Lake Waikaremoana and Piripaua was carried by the canals and the penstocks.

The combined impact or all these changes has been a deterioration of the composition of in-stream biota in the Waikaretaheke valley. Added to this are problems experienced from time to time when extraneous substances are released and find their way into the remaining watercourses. As a result of these multiple impacts the quality and quantity of flora and fauna, in stream and out of stream, has diminished. By 1996, for example, no eels were present beyond the diversion dam at Kaitawa. The results of a capture and release programme, organised jointly by iwi and power generating authority have yet to be evaluated. An eel management plan is still in preparation. Only within the last decade have steps been taken to restore this much-depleted habitat.

Chapter six, meanwhile, concerned the most dynamic aspect of environmental modification at Lake Waikaremoana, that is, lake level manipulation controlled by tunnels and siphons from 1946 onwards. The net effect has been the lowering of the lake by around 5 metres, although it should be remembered that the post-hydro-electric development lake level has only been stable - in the sense that the annual range of approximately 3 metres has been similar to the pre-1946 natural range - since the mid-1960s. At that point in time, the connection of the North Island and South Island electricity grids, and increasing generating capacity generally, meant that the Waikaremoana power stations were no longer indispensable to North Island electricity supplies, and so the Electricity Department was able to adopt a more careful approach when it came to drawing water out of Lake Waikaremoana. This state of affairs was first consolidated by the ‘Gentleman’s Agreement’ between the Electricity Department and the Urewera National Park Board in 1970, and then reconfirmed by the more formal lake level reviews by the Hawke’s Bay Catchment Board in 1980 and 1986, and by the Hawke’s Bay Regional Council consents hearing in 1998.

This was in stark contrast to the situation in the two decades after 1946, when the Lake Waikaremoana environment was disregarded in the quest to extract hydro-electric power. The upshot of this approach by the New Zealand Electricity Department was the wild fluctuations in lake level depicted in Figure 6.1. Whenever power shortages arose, the

Electricity Department resorted to drawing the lake down, by as much as 13 metres below the natural level at times, and then left it to fill again once the crisis was passed. Some idea of how unnatural these rapid falls and rises were may be gauged from the fact that the 9 metre lake level rise in eight months in 1958 was three times the average natural range for a year. An additional degree of artificiality was imposed, even after the period of wild fluctuations was at an end, by the Electricity Department practice of generating in the winter and storing up water in the summer, whereas naturally the lake was high during winter and low during summer, in keeping with the area's rainfall pattern. This 'reverse seasonal periodicity' was perpetuated until the start of the 1980s, and even now the seasonal variation is somewhat removed from the natural one.

Although these lake level changes only affected a small zone around the lakeshore, they have had and are still having a wide range of impacts on the natural environment at the lake and Maori interaction with it. The most obvious of these was a change in the shoreline, with what was formerly the nearshore now being stranded above the new waterline. Although the exposure of this band of bare shoreline was obviously unappealing from an aesthetic viewpoint, particularly as the forest surrounding the lake has previously reached the water's edge, this lowering was also significant in terms of some of the lake's natural features. For example, what was Patekaha Island, home to perhaps the most sacred urupa in Lake Waikaremoana, became a peninsula.

Another cause of concern to Waikaremoana iwi was the appreciable increase in erosion from the mudstone shore platforms and alluvial fans around the lake edge, which will continue until the new shape of the shoreline reaches equilibrium with the current lake level. This has the potential to be particularly serious in Home Bay, where shore protection measures have been implemented to protect an oxidation pond which lies close to the lake edge.

Apart from these purely physical changes, the fluctuations in lake level also had consequences for plant and animal communities just below and just above the water surface. In terms of aquatic biota, the steep surrounds of Lake Waikaremoana meant that although the total lake area did not change much, the area of lake littoral (where sunlight reaches the lake bottom) shrank by almost a fifth. Naturally, this reduced the amount of food available for fish in the lake, thereby causing a decline in fish numbers. Furthermore, abrupt fluctuations in level have had the potential to strand fish when spawning. Although

iwi representatives have raised the issue of reduced fish stocks when commenting upon the Crown allowing the economic value of the lake to diminish, the fact that the lake has been cut off from traditional Maori fisheries in the Waikaretaheke River by hydro-electric development, has meant that fluctuation since lowering have been outweighed by larger concerns about environmental damage in the Waikaretaheke Valley.

For Maori, the changes to shoreline vegetation have potentially had a greater impact. After the post-1946 lake lowering, many of the exposed lake flats were overrun by weed species, such as thistles and blackberry, which then colonised small clearings where local iwi had traditionally harvested plant materials. The new post-1946 vegetation has also had a negative impact on a special taonga to local iwi, namely the kiwi. Mustelids, such as ferrets and stoats, have found the new lakeside vegetation a favourable habitat, and as their numbers have increased, they have contributed to the decline in kiwi numbers in the area. In the circumstances, it is fitting that one of the ecological restoration projects in the Waikaremoana area contributed to by Genesis has been the Puketukutuku Peninsula Kiwi Restoration Project.

Turning now to environmental governance at Lake Waikaremoana, the subject of chapter seven, one finds that the most obvious trend is of a widening 'circle', so to speak, of agencies involved in managing the lake. Whereas after 1946 the State Hydro-Electric Department had almost exclusive control over the artificial manipulation of the lake's waters, now several agencies, ranging from the Hawke's Bay Regional Council, the Department of Conservation, Genesis Power, and the Tuhoe-Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards, have varying degrees of authority over what happens at the lake. This greater degree of inclusiveness is to a large extent an outcome of the growth of environmental legislation. This has reined in the power of the lake's successive electricity generators, to the point where Genesis' activities are circumscribed by both the Department of Conservation (acting as the lake-bed's lessee), and the Hawke's Bay Regional Council. Further aiding this shift in focus from economic utilisation to environmental preservation at Lake Waikaremoana has been the dwindling relative contribution of the power schemes in the Waikaremoana area to national energy supply (notwithstanding its continuing importance to power supplies in the Gisborne region).

Despite all these changes, local iwi have typically been marginalised when it comes to lake management. Up until 1954, the Crown might have tried to justify this by continuing to

assert their ownership of the lake-bed, but the recognition of 'native title' in that year had surprisingly little effect. There appears to have been no instances of consultation with Maori prior to actions being taken until 1964, and even then, in the case of tree stump removal, Maori were viewed simply as an interested party.

Similarly, although Waikaremoana iwi gained some financial recognition of ownership in the lease agreement signed with the Crown in 1971, there was no provision in the lease allowing the lessor a right of review over the management practices of the lessee (Urewera National Park Board), unless one counts the fourth clause. This clause, which stipulated that if the lessee failed to meet its financial and custodial obligations, the lessor could negate the lease by repossessing the land, was to be highlighted by the actions of the protest group Nga Tamariki o Te Kohu in 1998. In the absence of such drastic action, however, the only protection for iwi at the time was the board's interpretation of the National Parks Act 1952.

Since this time, the general trend has been for increasing iwi involvement in governance mechanisms, but progress has been slow. The first step in this direction was the Urewera National Park Management Plan of 1976, which recognised that the board should maintain a close liaison with Maori communities. Four years later, the Hawke's Bay Catchment Board, when formally fixing the normal operating range of Lake Waikaremoana for the first time, actively sought out iwi opinion on the issue. Although the Catchment Board might have satisfied itself by obtaining the views of only the Tuhoe-Waikaremoana and Wairoa-Waikaremoana Maori Trust Boards, it extended this consultation further, to Sam Rerehe from Waimako marae. That both Maori Trusts Boards and Mr Rerehe were happy for the Park Board's submission to stand for them may been seen a something of a vote of confidence in the Park Board's conduct. In light of this, it is strange that when the Catchment Board reviewed the lake level regime in 1986, no submissions from iwi organisations were sought.

Despite this apparent regression, the promise of greater Maori input into decision-making at Lake Waikaremoana was soon raised by the Conservation Act 1987. This was reflected in the Te Urewera National Park Management Plan 1989 which offered iwi not just liaison but consultation. Having said this, the change in role took a while to filter through into Department of Conservation practice. Consultation would also be a key element of the Resource Management Act 1991, which was first tested on a large scale in the Waikaremoana area in 1994 when ECNZ began the process of putting in applications for

resource consents for its power schemes. The inclusion of representatives from both the Tuai-based Haumapuhia Waikaremoana Authority and the Wairoa-Waikaremoana Maori Trust Board on ECNZ's Working Party, together with ECNZ's meeting with several other iwi organisations between 1994 and 1998, signified that ECNZ at least was now taking Maori concerns seriously. In consequence, ECNZ also instituted a limited degree of co-management with Maori, in the form of the eel transfer programme in the Waikaretaheke Valley. The Department of Conservation, meanwhile, after being stung by criticism from local Maori during the 1998 Joint Ministerial Inquiry, also sought to expand iwi roles in governance, through the third Te Urewera National Park Management Plan, produced in 2003. This looked forward to opportunities for co-management, though Coombes has concluded that to date that this has not been implemented in practice. This picture of increasing consultation by Crown agencies in the 1990s has not been universal though, as seen in the case of the proposed sale of power stations - in this instance, the Government of the day seems to have been intent on a quick sale, despite the hostility of local Maori to sales going through until Treaty issues were addressed.

Another issue that emerges from chapter seven is the spatial severance of iwi from Lake Waikaremoana's management. This is principally evident in the physical separation of iwi from the lake, as a result of the steady alienation of the lake's surrounds to the Crown, and the provision of the Maori reserves in the Waikaretaheke Valley in return. As a result of this separation, it has been difficult for local Maori to exercise kaitiakitanga. This is exemplified by a statement made by Tuhoe Lambert in an interview with the authors at Tuai, in relation to wahi tapu being daubed in graffiti. He said that, 'the reason why they get away with that is because like we keep saying tangata whenua live down here. You can't protect a place when you live somewhere else'.[988] Rodney Gallen's evidence suggested that it was just this sort of difficulty that made the owners accept the idea of leasing the lake in 1971. This, in turn, goes a long way towards explaining the complaints levelled against the Department of Conservation in the Joint Ministerial Inquiry in 1998. In essence these complaints were, that the owners had entrusted the lake into the Crown's stewardship, but the Crown (as National Park manager) had, according to the protestors, failed to maintain the lake in its 1971 condition.

Potentially, Maori participation in management may also have been limited by physical separation from decision-making within the managing agencies. Since the disestablishment

of the Urewera National Park Board, the managing agency has been based either in Napier or Gisborne. As Coombes observed, when the East Coast National Parks and Reserves Board replaced the Urewera National Park Board, there was a drastic reduction in the number of meetings held at Aniwaniwa on the shore of Lake Waikaremoana. This issue has to date been circumvented by the willingness of Aniwaniwa field office staff to enter into informal co-management arrangements, but the fact remains that the priorities for conservation in the minds of local iwi and Aniwaniwa office staff are not necessarily the same as those of the East Coast Hawke's Bay Conservancy, or those of the Department of Conservation's Head Office.

These chapters demonstrate that Crown actions, whether in the course of trout management, tourist accommodation, national park policies, or hydro-electricity construction and production, have had considerable impacts on the natural environment of the lakes, and on Lake Waikaremoana and the upper Waikaretaheke Valley in particular. These impacts, in turn, have usually had a negative impact on Waikaremoana Maori, not only in the material loss of resources but also in terms of spiritual values. In addition, Waikaremoana Maori experienced a loss to the Crown in control and management of the lakes' environment for most of the twentieth century. This has only begun to be addressed in the last decade.

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[988] Tuhoe Lambert, Interview with Nga Rauru o Nga Potiki, 22 November 2003

Appendix 1: Waitangi Tribunal Research Commission

Wai 894

WAITANGI TRIBUNAL

CONCERNING the Treaty of Waitangi Act 1975

AND the Urewera Inquiry

DIRECTION COMMISSIONING RESEARCH

1. Pursuant to clause 5A of the second schedule of the Treaty of Waitangi Act 1975, the Tribunal commissions Dr Robin Hodge, Dr Garth Cant and Leanne Boulton, the latter being a member of staff, to complete a research report examining environmental impacts affecting Lakes Waikaremoana and Waikareiti. The report will cover the following matters:

    a) The extent to which Waikaremoana Maori have maintained ownership, management and access to customary resources in the two lakes;

    b) The effect of environmental impacts (if any) on these rights and resources, including the following:

        (i) Excavation and installation of hydro-electric works on the Waikaremoana lake-bed;
        (ii) Long-term impacts of the hydro-scheme on Lake Waikaremoana;
        (iii) Alteration of the levels in Lake Waikaremoana;
        (iv) Water pollution (sewage, oil leakage from hydro works, other sources);

(v) Granting of resource consents for hydro-electric and other purposes;

(vi) Impact of military exercises conducted by the NZ Army and Airforce;

(vii) Provision of water and power supply to local Maori communities at Waikaremoana;

(viii) Impact and control of tourism activities including tramping, hunting, boating and fishing;

(ix) Construction of works affecting lakes (including, tracks, roads, bridges, jetties, lodges, houses, tramping huts and sewage facilities);

(x) Introduction, acclimatisation and management of fisheries and other organisms in the lakes;

(xi) Conservation authorities' (including Urewera National Park) policy and practices in relation to the lakes;

(xii) Water quality of the lakes: extent to which it has been affected by land run-off, terrestrial poisoning programmes etc.

(xiii) The level of consultation and ongoing involvement of Waikaremoana Maori in the management of Lakes Waikaremoana and Waikareiti.

2. The researcher(s) will consult with affected claimant groups to determine what issues they consider to be of particular significance to their claims and to access such relevant oral and documentary information as they wish to make available. The researcher(s) will conduct interviews with affected claimants and nominated claimant representatives. Transcripts of these interviews will be included as appendices to the final report.

3. The commission commences on 19 September 2003. A complete draft of the report must be submitted by 30 January 2004.

4. The commission ends on 27 February 2004, at which time one copy of the final report will be submitted for filing in unbound form, together with indexed copies of any supporting documents or transcripts. An electronic copy of the report will also be provided on diskette or CD, preferably in Word 97 or Adobe Acrobat format.

5. The report may be received as evidence and the author may be cross-examined on it.

6. The registrar is to send copies of this direction to:

Dr Robin Hodge
Dr Garth Cant
Dr Vaughan Wood
Leanne Boulton
Claimants for Wai 894
Counsel in the Urewera inquiry
Tuhoe Waikaremoana Maori Trust Board
Wairoa Waikaremoana Maori Trust Board
Urewera National Park Board
Deputy Chief Historian
Ralph Johnson
Solicitor General, Crown Law Office
Director, Office of Treaty Settlements
Dr Chris Ward, Department of Conservation, Gisborne
Department of Conservation, Urewera National Park Office, Aniwaniwa
Secretary, Crown Forestry Rental Trust
Chief Executive, Te Puni Kokiri
Chief Executive, Ministry for the Environment

Dated at Rotorua, this day of October 2003.

Judge P J Savage
Presiding Officer
WAITANGI TRIBUNAL

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