Culture Shock: the legacy of the 1960s power generation schemes in Aotearoa New Zealand

Moira Smith

ABSTRACT: In 1960s Aotearoa New Zealand the response to a post war energy shortage was to look to the country's rivers, lakes, and geothermal areas as a source of electric power. The Ministry of Works began a programme of dam building which peaked in the 1960s and made irreversible changes our lakes, rivers, and landscapes. Although New Zealand now produces about 80% of its electricity through renewable energy, the 1960s also saw a rise in environmental activism and a revaluing of the natural "wilderness." Professor John Salmon's influential book, *Heritage Destroyed: The Crisis in Scenery Preservation in New Zealand* (1960), drew public attention to the environmental degradation caused by large-scale engineering projects, and the decade ended with the "Save Manapouri" campaign which, in the early 1970s, prevented the raising of lakes Manapōuri and Te Anau to guarantee power to the Tiwai Point aluminium smelter. This paper considers the legacy of the 1960s power generation schemes, including changes to the physical landscape; new legislation for the preservation of the built and natural environments; and alternative ways to consider the cultural and natural landscapes that prioritise Te Mana o te Wai.

In 1960s Aotearoa New Zealand the response to a post war energy shortage was to look to the country's rivers, lakes, and geothermal areas as a source of electric power. The Ministry of Works began a programme of dam building which made irreversible changes our lakes, rivers, and landscapes.

Although New Zealand now produces about 80% of its electricity through renewable energy, the 1960s also saw a rise in environmental activism and a revaluing of the natural "wilderness." Professor John Salmon's influential book, *Heritage Destroyed: The Crisis in Scenery Preservation in New Zealand* (1960), drew public attention to the environmental degradation caused by large-scale engineering projects, and the decade ended with the "Save Manapouri" campaign which, in the early 1970s, prevented the raising of lakes Manapōuri and Te Anau to guarantee power to the Tiwai Point aluminium smelter.

This paper considers the legacy of the 1960s power generation schemes, including changes to the physical landscape, new legislation for the preservation of the built and natural environments, and the development of new ways to consider the cultural and natural landscapes that move beyond the narrow focus of "scenery preservation."

Scenery preservation before the 1960s

Gavin McLean argues that in the nineteenth and early twentieth centuries, "outside the tissue-thin ranks of the urban élite, most New Zealand colonists demonstrated little interest in conserving the cultural heritage landscape."[1] In his essay "Where Sheep May Not Safely Graze," he writes that they "were burners, builders, and boosters for the most part – people who wanted to leave their mark."[2]

"Burners" left behind an apocalyptic landscape that converted pristine forests into charred stumps, and "builders" constructed ersatz European towns in timber dressed up to resemble stone.[3] "Boosters," and "boosterism," or the promotion of the new colony as a destination for settlers and investment, paradoxically, relied on a portrayal of the country's scenic beauty. In the pre-Kodachrome era of colour photography, landscape paintings were sent to Britain to

[1] McLean "Where Sheep May Not Safely Graze" p 25.

[2] McLean "Where Sheep May Not Safely Graze" p 25.

[3] Cochran "Styles of Sham and Genuine Simplicity" p 107.

publicise the visual appeal of the new colony.[4] Until the mid-twentieth century, most paintings produced in New Zealand were of landscapes.

Topographical paintings such as Charles Heaphy's depiction of Wellington in 1841[5] tended to show well-ordered towns, fertile farmland, and peaceful relationships with Māori. While artists (when not employed in producing topographical paintings), often followed the European traditions of the Romantic/Sublime, the Picturesque, or the Ideal. These traditions demonstrate a nostalgia for the wilderness that developed in response to European industrialisation and urbanisation during the Industrial Revolution.[6] New Zealand provided a natural landscape that was less modified by human activity than most of Western Europe. And its wild places attracted the attention of artists, illustrators, and amateurs including Petrus van der Velden, John Gully, John Barr Hoyte, William Fox, and Charles Blomfield.

The repositioning of the wilderness from "wastelands" to "scenery" helped to promote and popularise places that had not been converted to farmland. By the early 1870s, New Zealand had a nascent tourism industry, evidence by the 400 or so tourist diaries published by that date.[7] Places with geothermal activity were particularly valued - for their scenic beauty, for their supposed curative properties, and "as the loadstone destined, before long, to attract to our shores wealth, fashion, and rank, invalids, artists, and men of letters."[8]

As wild places were revalued, it became apparent that they required intergenerational protection beyond that provided by benevolent landowners. Internationally, new ways of protection in perpetuity developed in the 1870s, particularly when the USA sought to protect one of their own thermal wonderlands with the establishment of the Yellowstone National Park. New Zealand soon followed, and in 1887 Ngāti Tūwharetoa chiefs, led by Horonuku Te Heuheu Tūkino IV, proposed a gift to the Crown of Tongariro, Ruapehu, and Ngāuruhoe as the basis of a national park.[9] When the Tongariro National Park was established in 1894, it was the fourth national park in the world, and the first for New Zealand.[10] The gift was given with the intention that iwi and Crown would "take joint responsibility for protecting the sacred maunga."[11] Governance and access to land gifted or compulsorily purchased for national parks and scenic reserves has since been contested and revisited, particularly through the Waitangi Tribunal in recent decades.

As the clearance of forests increased in the nineteenth century, concerns were raised by scientists about deforestation, the loss of indigenous flora and fauna, and for the protection of pre-historic and historic sites. [12] Local forms of protection developed sporadically - some scenic areas were purchased or protected privately – such as Wilton's Bush in Wellington; urban Scenery Preservation Societies formed in Dunedin, Taranaki, Nelson, Wellington, Christchurch, and Auckland; and some offshore islands were set aside as flora and fauna reserves – including Resolution Island, Secretary Island, Little Barrier Island, and Kapiti Island. More

[4] "Beginnings" np.
[5] Heaphy "View of a part of the town of Wellington"
[6] "Beginnings" np.
[7] Nightingale and Dingwall *Our Picturesque Heritage* p 13.
[8] "Rotomahana" p 60.
[9] "[untitled]" (17 February 1887) p 4.
[10] "History and Culture" np.
[11] ""Tongariro mountains protected" np; Oliver "Te Heuheu Tūkino IV, Horonuku" np.
[12] Nightingale and Dingwall *Our Picturesque Heritage* p 6.

piecemeal protection followed, including the Land Act of 1892 which allowed for the retention of Crown Land for the purpose of scenery preservation. In 1897, the country acquired Ship Cove in the Marlborough Sounds to preserve the scenic beauty of the historic site. A *New Zealand Mail* article about the purchase[13] includes this enthusiastic outpouring with:

> Ship Cove, the historical spot where Captain Cook rested in Queen Charlotte Sound and refitted his ships and rested his crews, is not to be desecrated by the foot of a single sheep. The Government has decided to reserve the spot (some 2011 acres), which is nearly all forest in its pristine beauty, exactly as it, was when the famous discoverer landed on January 15th, 1770, in H.M. barque Endeavour.[14]

Funds for the acquisition of more land were forthcoming in the Scenery Preservation Act of 1903, which was enacted "to provide for the Acquisition of Lands of Scenic or Historical Interest, or on which there are Thermal Springs."[15] This was intended "to halt the widespread destruction of beauty spots, an issue attracting increasing public, media and political attention."[16] The *Northern Advocate* recorded that:

> There is a very general sympathy with the object of "The Scenery Preservation Act, 1903," lately introduced by the Premier. With the theory that the scenic, thermal, and historic lands of the Colony should be reserved as an " inalienable patrimony of the people of New Zealand," few will be found to disagree. For, both from an aesthetic and a utilitarian standpoint, it is recognised that such reservation is highly desirable. We are not, on the one hand, so ultra-practical that we can stand impassively by while our Colony's rich endowment of natural beauty is ruthlessly destroyed. Nor, on the other hand, have we reached so hyper-aesthetic a stage as to be blind to the fact that the preservation of our scenic advantages will mean increased attractions for tourists and an augmentation of the value of that traffic. Consequently, there is a strong predisposition to welcome the Bill.[17]

The Act allowed for the compulsory purchase of private land and Māori (then Native) land,[18] and established that in the case of Māori land, that the funds were to be invested by the Public Trust. It set aside £100,000 for the purchase (and subsequent conservation, and preservation) of scenic, thermal, or historic places, and established a board to spend the funds. The powers of preservation were limited, as the only offences were for felling bush, lighting fires, or destroying bush on gazetted reserves. The Act also allowed that any land taken for the purposes of scenery preservation could also be used for public works.[19]

Māori had mixed views on the Scenery Preservation Act, which allowed for the protection of some significant native forests, but which led to "a decade of intense acquisition of Māori freehold lands."[20] In 1913, of the 59 reserves that were gazetted, 22 were formerly Māori land and this rose to 63 by 1917. Māori politicians argued unsuccessfully against methods of valuation of Māori land; against the retention and investment of payment for Māori land by the Public Trust; and for continuing rights of access to ancestral land including the use of customary resources and the right to maintain urupā (burial grounds).

By 1920 the original £100,000 provided by the legislation was paid out, and later scenic and

[13] Which provides the title of Gavin McLean's article of "Where Sheep May *Not* Safely Graze" (my emphasis)
[14] "[untitled]" (25 November 1897) p 17; McLean "Where Sheep May Not Safely Graze" p 25.
[15] Scenery Preservation Act 1903
[16] Nightingale and Dingwall *Our Picturesque Heritage* p 13.
[17] "Scenery Preservation" p 2; A J A "Protection of forest reserves" p 5.
[18] As defined by the Native Lands Act 1865.
[19] Scenery Preservation Act 1903.
[20] "Maori and scenic reserves" np.

historic reserves were generally established on Crown land. Reserves were often established in places accessible for tourism - along road and rail routes, and beside navigable rivers. They included pā sites as potential historic reserves – some of which were suggested by the original commissioners Percy Smith and Major Hoani (Hone) Paraone Tunuiarangi (Rangitane, Ngati Kahungunu), a prominent member of the Kotahitanga (Māori Parliament).[21]

The Scenery Preservation Act was superseded by the 1953 Reserves and Domains Act, and by the 1950s there were more than 1,300 reserves that covered 947,000 acres (384,000 hectares). Other significant legislation in the 1950s included the 1952 National Parks Act, and the Historic Places Act of 1954 which was:

> AN ACT to make provision for the preservation and marking of places and things of national or local historic interest and the keeping of permanent records in relation thereto.[22]

Electricity production before the 1960s

While New Zealand was developing some environmental legislation in the early twentieth century, it was also investing in developments to produce electricity – particularly through the use of waterways to produce hydroelectricity. Early commercial hydroelectric generation was small in scale, and did not initially raise concerns about scenery preservation.[23] The earliest commercial hydroelectric schemes include Bullendale (Shotover River) built in 1886 to power a stamper battery for gold extraction, and a hydroelectric scheme in Reefton (Inangahua River) that provided power for streetlighting from 1888.

By the early 1900s, the New Zealand government established a state monopoly on the commercial distribution and sale of hydroelectricity. The 1903 Water-power Act vested all rights to the Crown for use of water held in lakes, falls, rivers, or streams to generate electricity (but with exceptions to allow factories and industries to develop their own local power stations).[24] This was followed by the Public Works Amendment Act of 1908 which allowed government to licence water for "electrical use" again presumably for individual factories and industry.

Small-scale hydroelectric schemes were established under the Act by local authorities and power boards, while the Public Works Department started to develop larger schemes like Lake Coleridge (commissioned in 1915).[25] Dam building began in earnest in the 1920s – following the passing of the State Supply of Electrical Energy Act in 1917, and following the end of the First World War which allowed the state to finance the construction of power generation schemes and to sell electricity to consumers.[26] Most hydroelectric power schemes were small in scale, but notable Public Works Department schemes include Mangahao (Mangahao River) to power Wellington, Arapuni (Waikato River) for Auckland, and Tuai (Lake Waikaremoana). Relatively few hydroelectric schemes were completed during the depression era of the 1930s – the most notable being Waitaki (Waitaki River), which was designed and constructed by the Public Works Department.

Hydroelectric schemes that created new lakes were often considered to enhance scenic beauty. And "wild rivers" (in their natural form) were often described as "treacherous,"

[21] Nightingale and Dingwall *Our Picturesque Heritage* p 55.
[22] Historic Places Act 1954.
[23] For a list of power stations in New Zealand see "List of power stations in New Zealand" np.
[24] Muir *Opus Works* p 103; Water-power Act 1903.
[25] Muir *Opus Works* pp 103, 199.
[26] That could generate more than 1MW.

"unconquerable."[27] The Press Association's praise of the Waitaki dam is typical of the era, with a description of the "beautiful lake" created by the dam, which:

> provides an enthralling picture in its setting of mountain grandeur. The tips of poplar and willow trees, which surround submerged homesteads, are peeping above the surface of the water, appearing like miniature islands. A magnificent spectacle is provided by the great fall over the spillway, the largest waterfall in the Dominion. The disrupters in the downstream face of the dam break the fan and form it into a sparkling, effervescing cascade which, in a curtain of mist, disappears into the turbulent waters below.[28]

The newspaper article concludes with praise for man's domination of nature, with:

> The sight of this monument to the ingenuity and perseverance of man among the majestic mountain scenery is one that will live long in the memories of the hundreds of people who congregated there to-day.[29]

The start of the Big Dam Era

Although there were many small dams in the early twentieth century, the country's "big dam era"[30] began with the creation of the Ministry of Works in 1943. The country's electrical generation capacity (for distribution and sale) was about 700MW (less than 7% of today's total capacity), and almost all was generated by hydroelectric power. The Ministry of Works programme of dam building ended with the commissioning of the Clyde Dam in the early 1990s. By then, the ministry was restructured and effectively privatised; electrical generation capacity was about 8,500MW; and about 25% of electricity was generated by other sources including wind, geothermal energy, and thermal power stations fuelled by coal, oil, or gas.

Karapiro on the Waikato River was one of the first hydroelectric power schemes to be completed after the Second World War, and was commissioned by the Ministry of Works in 1948. Significant power stations commissioned in the 1950s include Meremere (thermal/coal on the Waikato River and decommissioned in the 1990s) and Wairakei A (geothermal), and significant hydroelectric schemes included the continuation of works to the Waikato River with Maraetai I and Whakamaru, the construction of the Roxburgh dam on the Clutha,[31] and the start of the Waitaki hydroelectric scheme which first raised the level of Lake Pukaki in 1952. By the end of the 1950s, the capacity to produce electricity had more than doubled to 1850MW.

The Ministry of Works was, by this time altering the urban and rural landscapes with a multitude of engineering projects, including the construction of ports, airports, roads, railways, and bridges. As well as the construction of new suburbs of social housing, particularly in the Hutt Valley, Porirua, and South Auckland, and the construction of new towns of workers' accommodation for its large-scale construction projects.

Although workers' camps of tents and temporary huts had been provided for earlier construction projects, including at Karapiro in the 1940s, the construction of permanent accommodation was a new development. James Muir, author of *Opus Works*, argues that the new towns were a necessity, needed to attract workers and their families at a time of exceptionally low unemployment. Mangakino, a new town designed for workers

[27] "Harnessing the Waitaki" p 5.
[28] "Harnessing the Waitaki" p 5.
[29] "Harnessing the Waitaki" p 5.
[30] A term usually used to describe public works in the USA from the 1930s to 1960s to produce hydroelectric power, but also to provide construction jobs during the depression, encourage industrialisation, and as flood prevention.
[31] Constructed by Cubitts & Zschokke, an overseas consortium, of because of labour shortages.

on the various electricity generation schemes in the Waikato, was designed by Ernst Plishke with input from the YMCA, and included community halls, a hospital, schools, a library, sports fields, tennis courts, a bowling green, golf course, a gymnasium, and a cinema. [32]

Public opposition

Although the hydroelectric schemes of the 1950s were constructed on a scale never seen before in New Zealand, most critical comment focussed on the post-war power shortage. Increasing the supply of electricity was seen as "the principal physical agent in raising the standard of living."[33] Hydro resources were "underdeveloped,"[34] and demand for electricity was increasing. Other sources of power, including nuclear power plants, were considered too expensive; gas production from coal was generally at a small scale; while "the possibility of finding natural gas or oil in commercial quantities"[35] (including the offshore oil and gas reserves at Taranaki) was still to come.

In comparison with the UK, New Zealanders were complacent about the effects of large-scale electricity generation and distribution projects. An article in the *Press* in 1954 noted public opposition to "new electric-power proposals" in the UK, where "no steam power station or major transmission line can be built without public inquiry if local interests demand."[36] The article went on to note that:

> Proposals such as New Zealand's Aratiatia Rapids or Huka Falls power stations, for instance, would bring out a swarm of local bodies and pressure and defensive groups of various kinds. The State Hydro-Electric Department hardly realises how fortunate it is in resting, however judicially, on the use of authority that the Government long since assumed on behalf of the general public.[37]

By the late 1950s the New Zealand Travel and Holidays Association began to protest against "hydro schemes in scenic areas." The chief executive, Mr NE Lobb said that he:

> wished to record an emphatic protest at the further plans for hydro developments involving some of our best-known scenic attractions such as the Aratiatia Rapids. "The power report indicates that the choice of Aratiatia Rapids for hydro development is based principally on cost, that is pounds a kilowatt. Surely it would be wise for us to decide for posterity that it should pay more for power from an alternative site and thus preserve an everlasting attraction with an everlasting earning capacity."[38]

By the end of the decade, other groups began to criticise proposed hydroelectric schemes – including the Royal New Zealand Institute of Horticulture, the Automobile Association, the Royal Society of New Zealand, and the Wanganui-Rangitikei Electric Power Board.[39]

JT Salmon, speaking for the Royal Society's conservation committee, criticised the State Hydroelectric Department as "practically dictatorial."[40] To which the Department's general manager, Mr AE Davenport, said that it was "not worth commenting" on Salmon's statement, and that "It is a misunderstanding of the situation to suggest that we, with so-called dictatorial powers, have planned to destroy beauty."[41]

Dismissing Salmon's opinion may well have been a tactical error by the State Hydroelectric

[32] Muir *Opus Works* p 247.
[33] "Science - the handmaid of industry [Advertisement]" p 9.
[34] "Hydro Power Resources" p 12.
[35] "Hydro resources favoured for country's power needs" p 10.
[36] "English Power Line Dispute" p 5.
[37] "English Power Line Dispute" p 5.
[38] "Hydro Schemes in Scenic Areas" p 10.
[39] "Destruction of Rapids" p 18; "Powerhouse at Aratiatia" p 10; "Destruction of scenery by hydro-electric works" p 23; "No assurances Huka Falls and Aratiatia not for hydro scheme" p 7.
[40] Galbreath "Salmon, John Tenison" np.
[41] "Destruction of scenery by hydro-electric works" p 23.

Department, as Salmon went on to open the June 1959 convention of the New Zealand Travel and Holiday's Association with a talk titled "You can eat your cake and have it too."[42] By which Salmon meant that it was possible to provide electricity without scenic destruction. Salmon used his opening speech to criticise "engineers' pipe dreams" and "indifference in official circles" to a request for an "inspector to police and protect scenic resorts."[43] The request from the Royal Society had, according to Salmon, been met with "cold refusal from the Government."[44]

A response by government came in November 1959 when it held a second convention on the conservation of New Zealand's scenic attractions, this time chaired by the Ministry of Works. Salmon called this later convention a "carefully engineered sop to an outraged public opinion," and was critical of the way that concerns about the "Aratiatia project," and proposal for a nature conservation agency, had been dismissed by government officials.[45]

Despite Salmon's condemnation of the convention, the government agreed in November 1959 to establish a committee to "preserve scenic areas."[46] Membership would include the National Parks Authority, Works Department, and the Electricity Department, along with "representatives from the Royal Society, Forest and Bird Protection Society, Federation of Mountain Clubs, the National Parks Board, the Forest Service, the Internal Affairs, Land and Survey, and Tourist Departments."[47]

Heritage Destroyed

The key points of JT Salmon's speech at the June convention were expanded to form the basis of his influential book *Heritage Destroyed: The Crisis of Scenery Preservation in New Zealand*, which was published in 1960. *Heritage Destroyed* drew public attention to the effects of hydroelectric power developments on New Zealand's scenery and natural environment, and "helped spark the environmental movement, which eventually led to a mass movement to save Lake Manapōuri from being raised to produce electricity."[48]

The author, John Tenison Salmon (1910-99), was an entomologist and senior lecturer in the Zoology Department of Victoria University College, in Wellington in 1960, who later became head of the zoology department. He was an active member of many scientific organisations, including as a Fellow of the Royal Society of New Zealand, as president of the Wellington branch of the Geographical society, and as secretary of the Arts Galleries and Museums Association of New Zealand. A Carnegie Fellowship in 1958 allowed for travel to the USA, and Salmon experienced how national parks and scenic reserves were administered, and how scientists were taking active roles in advocating for the importance of conserving nature.[49]

Heritage Destroyed is a short book of about 100 pages that was written as a rambling (and sometimes repetitive) thesis in two parts. The book's popularity is perhaps due to the way that it interweaves emotive descriptions of the country's natural environment, and of its destruction, alongside critical analysis of the government's arguments for development, including, for example, detailed analysis of

[42] "Hydro-power and lakes" p 15.
[43] "Hydro-power and lakes" p 15.
[44] "Hydro-power and lakes" p 15.
[45] Salmon *Heritage Destroyed* p 41.
[46] "Committee set up to preserve scenic areas" p 16.
[47] "Committee set up to preserve scenic areas" p 16.
[48] Phillips "Ideas in New Zealand" np; Nightingale and Dingwall *Our Picturesque Heritage* p 57; Wright *Hydroelectricity or wild rivers* p 6; Nathan "Conservation" np.
[49] Galbreath "Salmon, John Tenison" np.

the economic viability of the Tiwai Point Aluminium Smelter. The first section reviews a "vanishing wilderness," while the second section reviews several completed and proposed hydroelectric power schemes.

Reminiscent of the landscape paintings of the nineteenth and early twentieth centuries, the book begins with an Arcadian description of pre-industrialised New Zealand as a "land of unrivalled beauty, clothed with luxuriant forests and prolific with the bounty of Nature."[50] Paradise had, however, been destroyed under the "impressive name of progress" by "axe, in fire and under the plough" by European settlers over the past 140 years.[51] Not all was lost, and Salmon praised the "farsighted citizens and statesmen who believed that some, at least, of the most interesting and beautiful areas should be preserved"[52] as scenic reserves and national parks. But "in spite of official assurances to the contrary, we see these places [national parks and scenic reserves] being systematically plundered and destroyed"[53] by the Electricity Department and the Ministry of Works.

Salmon continued with a critique of New Zealand's attitude to conservation and intergenerational trusteeship, which he considered to be accepted as good practice by "almost all civilised countries."[54] He noted that the philosophy of conservation "has never received official acceptance in New Zealand."[55] In contrast with "most countries," New Zealand "has no overall conservation authority, few conservation laws … and has only a small national park system."[56] New Zealand's nature conservation laws in the 1950s, according to Salmon, were piecemeal, and sought only to protect native birds, native plants, and to prevent soil erosion. They were administered in an "uncoordinated fashion" by "seven different Government departments, [and] by three Government agencies."[57] And the "sanctity" of national parks, and scenic and historic reserves, could be "violated at will by the State"[58] under the Public Works Act.

The status quo was due, in part, to "public apathy,"[59] despite the loss or despoilation of "scenic assets" such as lakes Waikaremoana, Monowai, Pukaki, Tekapo, and Hawea due to hydroelectric schemes, and the reduction in geothermal activity in Geyser Valley at Wairakei due to both hydroelectric and geothermal electricity production schemes. Future losses predicted by Salmon included the loss of the Aratiatia Rapids and Huka Falls which are "in the process of being converted to hydro-electric power generation and will virtually cease to exist after 1964 as scenic spectacles."[60] Other scenery due to be "greatly spoiled"[61] included lakes Manapōuri, Te Anau, Ohau, Wanaka, Hauroko and Poteriteri. While the "reticulation system" of pylons that "parallels the Desert Road from Waiouru to Lake Taupo, that crosses Wilton's Bush and enters Central Park in Wellington, or that strides blatantly through the alpine gardens in Arthurs Pass National Park" were also criticised.[62]

Salmon's commentary on the natural environment was holistic. *Heritage Destroyed* raised concerns about over-grazing and sawmilling in "mountain watersheds,"[63] which

[50] Salmon *Heritage Destroyed* p 9.
[51] Salmon *Heritage Destroyed* p 9.
[52] Salmon *Heritage Destroyed* p 9.
[53] Salmon *Heritage Destroyed* p 10.
[54] Salmon *Heritage Destroyed* p 10.
[55] Salmon *Heritage Destroyed* p 10.
[56] Salmon *Heritage Destroyed* p 10.
[57] Salmon *Heritage Destroyed* p 11.
[58] Salmon *Heritage Destroyed* p 11.
[59] Salmon *Heritage Destroyed* pp 11-12.
[60] Salmon *Heritage Destroyed* p 12.
[61] Salmon *Heritage Destroyed* p 12.
[62] Salmon *Heritage Destroyed* p 12.
[63] Salmon *Heritage Destroyed* p 13.

led to a loss of flora and fauna, soil erosion, degradation of rivers, and flooding in downstream cities and towns. Salmon argued that unrestricted exploitation of the natural environment on a "vast scale" was a product of the "industrial age in western civilisation."[64] The antidote to an industrialised world was nature conservation designed to "cater for the aesthetic, cultural, and physical well being of mankind."[65] Conservation should extend beyond concerns for scenic beauty, and encompass soil fertility and erosion, maintaining forests in their natural state, flood prevention, ground water, protection of wild animals (in which Salmon, an entomologist, includes soil inhabiting organisms), and the eradication of pest species. Because:

> As industrialism spreads, the conservationist will, of necessity, have to turn his attention also to man himself in what might be termed social conservation, to save man from becoming a victim of his own industrial civilisation.[66]

The only cure for people trapped in an industrialised world was, according to Salmon, the "cultural and aesthetic uplift imparted … [to individuals and communities] by wilderness experience."[67] Denying people access to "open spaces, water and sky, is dangerous," and:

> To cater for this almost insatiable appetite for knowledge, and for the benefit of science generally, the selective conservation, protection and preservation of wilderness areas, natural scenic spectacles, or monuments, is a very real and urgent necessity in New Zealand.[68]

Once Salmon established spiritual and cultural requirements for nature conservation, he progressed to economic arguments. Conservation of natural resources in the short term allowed for sustainable harvests in the longer term. The science of landscape architecture ensured that the "natural beauty of the countryside can be preserved, and sometimes enhanced."[69] The solution to creating acceptable hydroelectric power schemes would be by "combined planning" particularly "if they were carried out by engineers in co-operation with conservation experts."[70]

One of the most powerful arguments for nature conservation was for recreation – tramping, mountaineering, fishing, swimming, or the study of wildlife – and especially for tourism. Even in the nineteenth century, the tourism routes around Rotorua and Taupo included the Aratiatia and Huka Falls, and geothermal activity at Geyser Valley, Waiora Valley, Orakei Korako and Waiotapu – all of which were, in the 1960s, being modified by the Electricity Department. Salmon argued that scenic assets "unbulldozed and undammed – constitute the wares of the industry: the raw material from which tourism draws its life blood."[71] Preservation of these scenic places, preferably following the ideal of the US National Parks service and the Nature Conservancy in the UK, was Salmon's proposed solution.

Was heritage destroyed?

The answer is yes, although not in the same ways that JT Salmon predicted in 1960. Destruction was inevitable given the size and scale of development in the 1960s which saw the construction of at least eleven hydroelectric power stations, a geothermal, and two thermal power stations. Commissioned power stations of the 1960s

[64] Salmon *Heritage Destroyed* p 14.
[65] Salmon *Heritage Destroyed* p 14.
[66] Salmon *Heritage Destroyed* p 15.
[67] Salmon *Heritage Destroyed* p 17.
[68] Salmon *Heritage Destroyed* p 17.
[69] Salmon *Heritage Destroyed* p 19.
[70] Salmon *Heritage Destroyed* p 19.
[71] Salmon *Heritage Destroyed* p 26.

include – Kawerau (geothermal), Marsden A (thermal/oil, mothballed in the 1990s, and subsequently decommissioned), Otahuhu (thermal/gas, and now decommissioned), and hydroelectric power stations at Waipapa, Atiamuri, Ohakuri and Aratiatia (all on the Waikato River), Benmore and Aviemore (both on the Waitaki River), Matahina (Rangitaiki River), Waipori 2A (Clutha River), Hinemaiaia B (Hinemaiaia River), Wahapo (formerly Ōkārito Forks at Lake Wahapo), and Kuratau (Kuratau River).

The Cook Strait Cable was completed in time to serve the newly commissioned Benmore power station in 1965. The works included a high voltage direct current (HVDC) transmission system that started at Benmore and now extends up the South Island in overhead power lines to Fighting Bay in the Marlborough Sounds. From there the link continues in cables laid under the Cook Strait, re-emerging at Oteranga Bay near Wellington, and via overhead powerlines to the Haywards substation in Lower Hutt.

Other significant power stations were planned and partially constructed in the 1960s, including a thermal power station in New Plymouth that was originally intended to be coal-fired, but was redesigned to utilise oil and gas with offshore discoveries in 1969. They also include hydroelectric schemes at Lake Manapōuri, Maraetai II (Waikato River), the Kaimai hydro scheme, Tokaanu (utilising several headwaters including of the Waikato & Whanganui rivers), Tekapo B (Waitaki River). All of which were completed in the 1970s.

The projects that were critiqued and castigated by Salmon in *Heritage Destroyed* include Aratiatia (completed in 1964), a dam proposed for the Whanganui River, and a proposal to raise the level of lakes Manapouri and Te Anau.

Aratiatia

The Aratiatia rapids on the Waikato River were established as a scenic reserve in 1906,[72] and became the focus of attention for Salmon and the tourism industry in the 1950s when the Ministry of Works proposed a new hydroelectric scheme for the rapids. The Aratiatia rapids are near the head of the Waikato River which runs from Lake Taupō to the sea. They have been a tourist attraction since at least the 1870s.[73]

By 1960 the Waikato River had been modified to produce electricity with seven downstream power stations, and by the addition of control gates at the entrance to the river from Lake Taupō. The control gates regulate the flow of water down the river, to the Huka Falls - a canyon where the river narrows from about 100m wide to 15m, and flows down a series of small waterfalls, descending about 8m. From the Huka Falls, the river travels less than 10km to the Aratiatia rapids. In their natural state these were a series of waterfalls where the Waikato River descends approximately 28m over the course of one kilometre.

A hydroelectric power station was proposed at Aratiatia in the early 1950s, and JT Salmon was reported in the *Press* in June 1959 as saying that he:

> could not conceive of how any intelligent person could accept the scheme to develop the Aratiatia rapids on the Waikato scheme as not interfering in any way with the scenic values of the rapids.[74]

The Minister of Electricity (coincidentally

[72] Nightingale and Dingwall *Our Picturesque Heritage* p 55.

[73] "From Dunedin Downwards" p 1.

[74] "Hydro-power and lakes" p 15.

named Mr Watt)[75] argued in September 1959, that the power station had to be developed to avoid electricity rationing. He continued with reassurances that:

> The design of the Aratiatia power station had been carefully planned. All construction works would be kept clear of the rapids. A low dam upstream of the rapids is proposed, and this will raise the present river level by about 16ft [4.8m]. The resulting small lake will extend back to the Huka Falls, and under normal operating conditions at the station, this will have no significant adverse effect on the scenic values of the falls … The power station is to be located so it will not be visible from the present vantage points used for viewing the rapids.
> The spillway in the dam will be placed in the present river bed, and the control gates are designed to be of a non-obtrusive type … When the spillway gates are discharging, water will flow down the rapids as at present. The gates can be regulated to give any rate of flow required to provide the spectacular effects now seen in the Aratiatia rapids and these will remain a feature of the site.
> The Government is quite convinced that the scenery of Aratiatia will be enhanced by the advent of this scheme. Many more people than those who go there now, will be able to view and enjoy the attractions of the site in comfort, and, along with this, the major part of the power potential will be available for the needs of the country.[76]

Here it should be noted that the Aratiatia power station is the second smallest on the Waikato River with a capacity of less than 80 MW (compared to Maraetai I & II which total over 350MW), and so it is possible to conclude that the Aratiatia power station makes little difference to the country's overall capacity to supply electricity. Salmon was similarly unconvinced about both the benefits of the development, and the potential environmental degradation, noting that:

> These statements do not stand up to critical examination. As soon as the Waikato River is bypassed through underground tunnels to a powerhouse the Aratiatia Rapids must cease to exist as such. No amount of assurances about not harming the Rapids can alter the fact.[77]

He went onto criticise "an engineers' pipe-dream to tame the Waikato River from Lake Taupo to the sea."[78] And to note that the scheme would affect the Huka Falls, as the newly created lake would raise the water level at the foot of the falls by 3 to 4.5m. Salmon commented that:

> It seems obvious that, whatever happens, the Huka Falls will not remain the awe-inspiring sight they are today, but will be reduced to a mere cataract at the end of the gorge.[79]

And that:

> such a project cannot succeed, and that talk of keeping the Rapids as a scenic attraction is only a blind to keep public criticism quiet until this scheme is completed.[80]

Salmon's dire predictions about the loss of the rapids as a scenic attraction do not seem to have eventuated. The Aratiatia Rapids continue to be a Scenic Reserve and are now described by the Department of Conservation (DoC) as "a spectacular sight."[81] The original rapids act as a dam spillway, and water is released at several scheduled viewing times each day. There is a carpark for tourists, who can also complete the two-hour walk (or 45-minute mountain bike ride) upstream to the Huka Falls. Both the Huka Falls and Aratiatia Falls, in their altered states, remain as scenic tourist attractions.

But the cultural values of the Aratiatia rapids extend beyond their use as a local tourist attraction. Iwi views on the use and misuse of

[75] A watt, in electrical terms, measures the rate of energy transfer.
[76] "Decision to begin work on Aratiatia Hydro" p 11.
[77] Salmon *Heritage Destroyed* p 57.
[78] Salmon *Heritage Destroyed* p 59.
[79] Salmon *Heritage Destroyed* p 59.
[80] Salmon *Heritage Destroyed* p 60.
[81] Department of Conservation Te Papa Atawhai "Aratiatia Rapids tracks" np.

the Waikato River came to the fore in the Waitangi Tribunal, as much of the land that was flooded by the multitude of Waikato hydroelectric power schemes had been confiscated after the New Zealand Wars.[82] Concerns about the Waikato River were raised in the Waikato-Tainui WAI 30 claim filed in 1987.

Iwi consider that:

> To Waikato-Tainui the Waikato River is a tupuna which has mana and in turn represents the mana and mauri of Waikato-Tainui. To Waikato-Tainui the Waikato River is a single indivisible being that flows from Te Taheke Hukahuka to Te Puuaha o Waikato. The relationship of Waikato-Tainui with the Waikato River and their respect for it lies at the heart of their spiritual and physical wellbeing, and their tribal identity and culture.[83]

WAI 30 resulted in settlements in 1995 (whenua) and 2010 (awa). The Waikato-Tainui Raupatu Claims (Waikato River) Settlement Act 2010, embedded the concept of "Te Mana o te Awa" into legislation. Over time this has developed into Te Mana o Te Wai to embrace freshwater in all of its forms (wai), rather than focussing only on rivers (awa).[84]

Te Mana o te Wai has recently been defined as a fundamental concept in the National Policy Statement for Freshwater Management,[85] as follows:

> Te Mana o te Wai is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.[86]

The National Policy Statement is a high-level statutory instrument in the country's planning system that will affect the decision-making processes for future hydroelectric developments. Regional and District Plans must give effect to the National Policy Statements, and Te Mana o te Wai will need to be considered in resource consent (planning) decisions.

The Whanganui River Proposal

In May 1960 the Minister of Works (again Mr Watt) received a "60-strong deputation of Wanganui river residents protesting at the proposal to dam the river at Parikino for a hydro-electric power scheme."[87] The deputation was led by RE Jack, MP for Patea, and Mrs IM Rātana, MP for Western Māori. Jack noted that "practically every hydro station built in the North Island had affected Māori lands,"[88] and the, mainly Māori, delegation were concerned that their lands would be alienated and flooded.

Salmon also expressed concerns that:

> The Electricity Department expects to submerge some of the North Island's richest alluvial flats, much of New Zealand's historic past, many settlements that by heredity belong to our Maori people and have been farmed by them for generations, and much scenery for which, in years past, the Wanganui River was almost a byword in households here and abroad.[89]

Proposals for the Whanganui River included a 450 feet (137m) high earth dam, and several

[82] For example at Karapiro – see "Electricity Generated at Karapiro Hydro" p 5.
[83] "Settlements" np.
[84] Te Aho "Te Mana o te Wai."
[85] National Policy Statements are a high-level statutory document under the Resource Management Act 1991.
[86] National Policy Statement for Freshwater Management p 5, section 1.3.1
[87] "Wanganui River power plan" p 19.
[88] Sir Roy Emile Jack (1914-77) "Biographies of Former and Current Speakers" p [3]; Iriaka Matiu Rātana, who was the first female Māori member of parliament. Ballara "Rātana, Iriaka Matiu" np.
[89] Salmon *Heritage Destroyed* p 68.

locations were investigated including at Atene, which would have created a lake "twice the [surface] area of that at Benmore."[90] The results of a trial tunnel at Atene were not encouraging, and by 1965 the proposal for a single large dam was in doubt, in part due to underlying geology.[91]

Although the Whanganui River dams were not constructed, works began in 1964 on the Tongariro Power Development that eventually redirected some of the headwaters of the Whanganui, Whangaehu, and Rangitikei rivers into Lake Taupō and onto the Waikato River. The *Press* commented on the vast quantities of construction works and materials[92] required to construct 50km of concrete lined tunnels, seven dams ranging in height from 13m to 67m, two pumping stations, three power stations, and a new town at Turangi to accommodate 3,500 people. The location at Turangi was chosen "with the full concurrence of the Maori people who own the area."[93]

Although the works envisioned by Salmon on the Whanganui River did not eventuate, the cultural heritage consequences once again extended beyond the concerns of scenery preservation. Ngāti Rangi and Whanganui iwi consider that the "the mixing of their waters with those of other iwi damages the wairua (spirituality) of the people." [94]

Whanganui River Report to the Waitangi Tribunal in 1999 includes the whakataukī that has come to summarise the cultural significance of the river with:

E rere kau mai te awa nui nei,
Mai te kahui maunga ki Tangaroa,
Ko au te Awa
Ko te Awa ko au

The river flows from the mountain to the sea
I am the river
The river is me[95]

In 2004 Ngāti Rangi appealed consents for the Tongariro hydro scheme to the Environment Court. The Court recognised that diverting water from the Whanganui catchment into Lake Taupō and the Waikato catchment has a "considerable effect on cultural and spiritual values."[96] In 2017 the Whanganui River gained "legal personhood" under the Te Awa Tupua (Whanganui River) Claims Settlement Act.[97]

The Manapōuri Scheme

A possible hydroelectric power project at Lake Manapōuri was proposed in June 1956 by the New Zealand Electricity Department. A few months later Consolidated Zinc Proprietary Limited/ Comalco Power Limited began negotiations to acquire electricity for an aluminium smelter that would become the largest single-user of electricity in the country. In 1960 the government signed an agreement to enable the construction of a power station at Lake Manapōuri and the Tiwai Point Aluminium Smelter.[98]

The agreement, which violated the National Parks Act and required subsequent enabling legislation, gave Consolidated Zinc exclusive rights to the waters of Lake Manapōuri and Te Anau for 99 years. Although licencing the use of water for electric production for factories and industry had been allowed for in

[90] Benmore, New Zealand's largest earth dam is 100m; "Trial tunnel may save £2m" p 3.
[91] "Atene power" p 20.
[92] Siers "Nine years to go at Tongariro" p 17.
[93] Siers "Nine years to go at Tongariro" p 17.
[94] Wright *Hydroelectricity or Wild Rivers?* p 10.
[95] Waitangi Tribunal "WAI 167: Whanganui River Report" section 3.2.09.
[96] Wright *Hydroelectricity or Wild Rivers?* p 10.
[97] Te Awa Tupua (Whanganui River Claims Settlement) Act 2017.
[98] "Manapouri Power Station" np.

legislation in the first half of the twentieth century, the scale of the Manapōuri/Tiwai Point development is unique. Consolidated Zinc planned to build dams that would merge both lakes by raising the level of Lake Manapōuri by 30m and Lake Te Anau by over 7m. In 1963 Consolidated Zinc advised that they could not construct both the smelter and the hydroelectric scheme, and the government took over the construction of the power station.

Work on the first stage of the scheme began in 1964 with a power station at Deep Cove in Doubtful Sound.[99] The power station began generating electricity in 1969, and (with some later alterations) has the country's highest capacity to produce hydroelectricity - with a peak capacity of 800 MW (of which the smelter uses about 570 MW).[100]

The second stage of works at Manapōuri proposed the construction of new dams that would raise lake levels, and it is this proposal that became the focus of the environmental movement in the 1960s and 1970s. JT Salmon dedicated at least 10 pages from his 100-page book to "The Manapouri Scheme" in a chapter which followed on from detailed assessment of earlier works which raised lake levels at Monowai, Pukaki, Tekapo, and Hawea. He criticised fluctuating water levels which "bring about a tide mark of desolation which encircles the lake[s],"[101] along with damage to forests around the lake edge, including changing conditions for the microfauna in the soil. He noted that damage to forests leads to "floating debris from a drowned forest [that] will persist for about 50 to 200 years."[102] And that decaying matter tends to acidify lakes "creating intolerable conditions for many of the smaller forms of marine life."[103] Large trees that are submerged can "persist under water for at least 2,000 years."[104] He uses the example of Lake Monowai that:

> was the first of our lakes to be treated in this way. About thirty years ago the level was raised some fifteen feet to give additional water storage for electric power generation. Today the lake is an eyesore. Acres upon acres of dead and decaying trees stick forlornly out of waters which once had the living forests dipping into them.[105]

He continued with an emotive critique of Lake Pukaki where a scenic island (featured on the country's five-pound note) had been submerged in the 1950s. At Lake Tekapo "beautiful picknicking spots and the old hotel so beloved and popular with travellers have gone forever."[106] And he compared the construction works at Lake Hawea to a battlefield – which was emotive language when you consider recent history of both world wars.

Salmon noted that "Lake Manapouri and Lake Te Anau are the most beautiful lakes in New Zealand, in fact, two of the most beautiful in the world."[107] And accused the "Electricity Department … [of] setting about the deliberate destruction of something that has no equal in New Zealand or anywhere else."[108] The proposal to raise the lakes would affect the "whole future of our National Parks" and the "future well-being of large agricultural areas."[109] He was scathing of the enabling legislation to allow for large-scale development within the newly formed Fiordland National Park calling this the "smug

[99] "Manapouri Power Station" np.
[100] "Tiwai Point aluminium smelter to lower its electricity consumption" np.
[101] Salmon *Heritage Destroyed* p 70.
[102] Salmon *Heritage Destroyed* p 70.
[103] Salmon *Heritage Destroyed* p 71.
[104] Salmon *Heritage Destroyed* p 77.
[105] Salmon *Heritage Destroyed* p 71.
[106] Salmon *Heritage Destroyed* p 72.
[107] Salmon *Heritage Destroyed* p 73.
[108] Salmon *Heritage Destroyed* p 74.
[109] Salmon *Heritage Destroyed* p 74.

autocracy of our present bureaucratic machine."[110] He also commented that:

> Consolidated Zinc are not coming to New Zealand because of any altruistic interest in our scenery. They are coming here for cheap electric power and profit. You cannot preserve scenery, nor enhance it, by submerging it beneath 100 feet of water.[111]

Heritage Destroyed was a call-to-arms for environmental groups, such as the Royal Forest and Bird Protection Society, who encouraged an apathetic public to write letters to politicians, and to the editors of newspapers from at least 1960.[112] An anonymous letter writer with the non-de-plume "STING" suggested that the government gift the South Island to Consolidated Zinc and rename the country "New Zincland."[113]

The "Save Manapouri Campaign" began in Invercargill in October 1969. The campaign delivered the country's largest-ever petition to parliament and was signed by 260,000 people (nearly 10% of the population in 1970).[114] Manapōuri has, in the words of Alan Mark, writing in the *Dictionary of New Zealand Biographies*:

> come to be recognised as the greatest environmental debate in this country's history and the major milestone in New Zealand's transition from the pioneering era of resource exploitation to the sustainable management of our natural and physical resources.[115]

The issue was resolved by the election of Norman Kirk's Labour Government in 1972, which passed legislation to protect the natural level of the lake.

Large scale energy projects continued to be a significant political issue, with the subsequent election of Robert Muldoon's National Government (1975–84) where Muldoon championed the "Think Big"[116] growth strategy. "Think Big" projects were intended to diversify the country's economy through creating new primary industries and developing fuel and energy projects. These include a synthetic-petrol plant at Motunui, the expansion of the Marsden Point Oil Refinery, and the construction of the Clutha Dam.

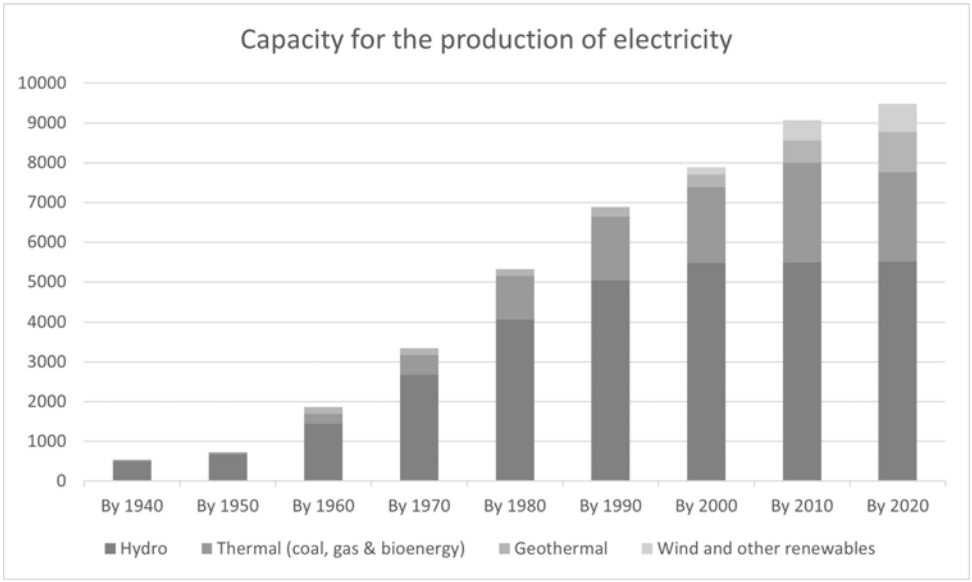
Although Lake Manapōuri was the focus of environmental campaigns in the 1960s and 1970s the environmental outcomes of the Tiwai Point Aluminium Smelter are now under scrutiny. The smelter is adjacent to the Awarua Wetlands (a wetland of international importance listed under the RAMSAR Convention).[117] Investigations have found "numerous legacy and ongoing sources of contamination to the environment"[118] with costs of remediation estimated to be in the order of $700 million. The smelter is due to close in 2024, and its ongoing operations rely on a deal with its power supplier, Meridian Energy to supply low-cost energy.[119] Supply of power to Tiwai Point is said to add $200 per year for every household in New Zealand (because the power demand increases the wholesale rate of electricity), and is sold to the smelter at half-a-billion-dollar discount.[120]

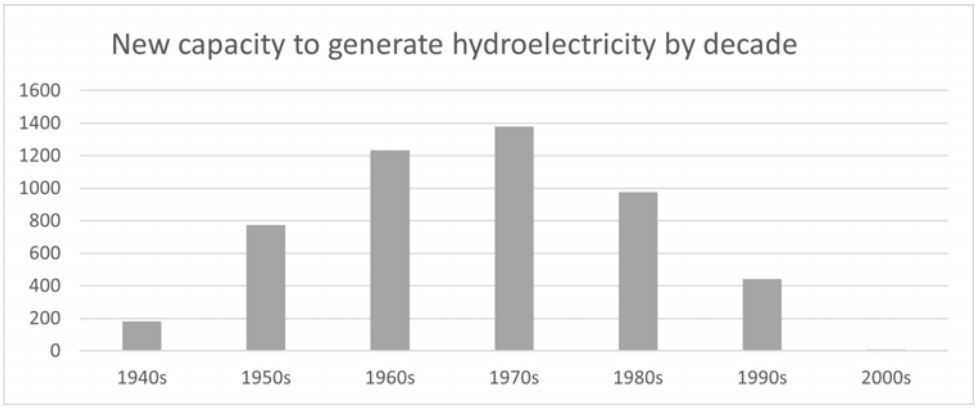
[110] Salmon *Heritage Destroyed* p 74.
[111] Salmon *Heritage Destroyed* p 76.
[112] For example - "Threat to Manapouri and Te Anau" p 9; "Lake Manapouri" p 3.
[113] "Threat to Manapouri and Te Anau" p 9.
[114] "1970 - key events" np.
[115] Mark "McLean, Ronald James" np.
[116] Sometimes "Think Pig" as Muldoon's nickname was Piggy Muldoon; see Gustafson "Muldoon, Robert David" np.
[117] "Ramsar Convention on Wetlands"
[118] Lloyd "Significant contamination at Tiwai Point" np.
[119] Pennington "Toxic waste buried at Tiwai Point" np.
[120] "Tiwai Point aluminium smelter to lower its electricity consumption" np.

After the 1960s

Following on from the 1960s, the country's electricity generation continues to be mostly supplied by renewable energy, and the average of production in 2013-17 was 59% hydro, 16% thermal (oil, gas & coal), 17% geothermal, 5% wind, and 3% co-generation.[121] The five power stations with the largest capacity are currently Huntly (thermal/gas & coal, 953 MW including "standby" units), Manapōuri (hydro, 800 MW), Stratford (thermal/gas, 577 MW including "standby" units), Benmore (hydro, 540 MW), and Clyde (hydro, 464 MW).

The following graph shows the increase in the capacity for electricity generation over the past 80 years. Key trends include the production of hydroelectric electricity as the primary source of electricity, but with little increase in production capacity since the end of the twentieth century. Thermal electricity production has fluctuated as power stations have been built and decommissioned, due in part to a government policy to reduce reliance on fossil fuels such as coal, gas, and oil. Geothermal energy now provides more electricity than was available in 1950 for all of New Zealand, while wind generation is the energy sector that shows the greatest growth in capacity now and in the future.





[121] New Zealand Electricity Authority *Electricity in New Zealand* p 29.

Most hydroelectric generating capacity was commissioned in the 1960s (over 1200 MW), and 1970s (over 1350 MW). This dropped to about 970 MW newly commissioned in the 1980s; while the Clyde Dam (464 MW) accounts for most of the additional capacity commissioned in the 1990s. Very little hydroelectric capacity has been added in the first two decades of the twenty-first century (approximately 12 power stations delivering 40 MW).

The issue is not a lack of exploitable rivers, as a 1990 government report found potential hydro resources of up to 12,380 MW. This is more than twice the current 5,000 MW of hydroelectric generation capacity, and more than the country's current combined total electrical generation capacity of about 10,000 MW. The report considered that 2,000 MW of hydroelectric energy could be easily developed.[122]

Unlike the 1960s, new conservation laws, and agencies provide scrutiny of potential hydroelectric power schemes. These include the Conservation Act 1987, and the Resource Management Act 1991 (RMA) which is the country's primary planning legislation.

The Conservation Act 1987 established the Department of Conservation (DoC) as a conservation authority, much like the one that that JT Salmon and others had campaigned for (seemingly unsuccessfully) in the 1960s. The Act gives effect to the principles of the Treaty of Waitangi, and DoC are required to:

* Manage land, and natural, and historic resources held for conservation purposes.
* Preserve freshwater fisheries.
* Advocate for nature conservation.
* Take a stewardship role for present and future generations.
* Educate and disseminate information.
* Foster tourism and recreation.

The (soon to be replaced) RMA provides environmental legislation to promote the sustainable management of natural and physical resources. The Act seems to respond to JT Salmon's declaration that "You can eat your cake and have it too;"[123] or in the terms of the legislation have development that:

> enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—
>
> (a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
> (b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
> (c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.

The RMA includes provisions for Water Conservation Orders which are now the main way to protect a lake or river. Water Conservation Orders were originally included in an amendment to the Water and Soil Conservation Act 1967 to protect wild and scenic rivers from degradation due to hydroelectric power generations and use for irrigation. A Water Conservation Order can recognise and sustain:

> (a) outstanding amenity or intrinsic values which are afforded by waters in their natural state:
> (b) where waters are no longer in their natural state, the amenity or intrinsic values of those waters which in themselves warrant protection because they are considered outstanding.

And finally, the RMA includes provisions for National Planning Standards which are used to support the implementation of the Act. These include the recent NPS For Freshwater Management which embeds "Te Mana o te

[122] Martin "Hydroelectricity" np.

[123] "Hydro-power and lakes" p 15.

Wai" as a fundamental concept within the planning framework.

Conclusions

JT Salmon's influential book *Heritage Destroyed* begins with a frontispiece that quotes (or possibly mis-quotes) William Pember Reeves with:

"Pity the thought, is this the price we pay,
The price for progress, beauty swept away?"[124]

The quotation comes from Reeves history *The Long White Cloud: Ao Tea Roa* (1898) where he included a revision of his most popular poem *The passing of the forest: A lament for the children of Tanē.*[125]

Sixty years later, Salmon called for developments carried out in the name of progress to be balanced with considerations of other, environmental values - with his declaration of "You can eat your cake and have it too." This vision of a balance between development and environmental considerations was later embedded into the Resource Management Act 1991. Although again, (coincidentally) sixty years on from the publication of *Heritage Destroyed*, the government is replacing the RMA with a new Natural and Built Environments Bill that is currently proceeding through parliament.[126]

Salmon's vision for integrated conservation legislation (for the natural environment) has, to some extent, come to fruition in the Conservation Act 1987. And his vision for a government agency to champion the natural environment, has been fulfilled with the establishment of the DoC. Whether Salmon would consider these agencies and legislation to be fit for purpose is unknowable, but *Heritage Destroyed*, at the very least, established a need for environmental regulation, and suggested solutions for sustainable development.

A question for us all is, what is the difference between the 1960s and today? And why? We are certainly not constructing multiple hydroelectric power schemes on the vast scales of the developments on the Waikato River, or of the South Island schemes, including at Benmore and Manapōuri. This is despite an apparent untapped potential of more than twice the current supply of hydroelectricity in New Zealand.

But some of the factors that drove the construction of hydroelectric power schemes in the 1960s are no longer in force. The immediate requirement for more electricity is no longer as apparent, as the country is no longer experiencing power shortages and the potential for electricity "rationing". The Ministry of Works has been disbanded and privatised, and there is no government organisation to plan, design, develop, construct, and distribute power. New power generation projects that typically take decades to plan, especially to procure land and consents, are unlikely to be financed or backed by successive governments. And consequently, hydroelectric power schemes in the twenty-first century have tended to be developed by individual power companies, and are relatively small in scale.

Looking forward to the future, of the 27 proposed new power generation projects noted in the *Wikipedia* list of New Zealand's power stations,[127] 13 are proposals for wind

[124] Reeves quoted, Salmon *Heritage Destroyed* p [4].
[125] Sinclair "Reeves, William Pember" np.
[126] For more information on the effectiveness of the RMA see Resource Management Review Panel "New Directions for Resource Management in New Zealand [Randerson Report]"
[127] "List of power stations in New Zealand" np.

farms with a combined capacity of over 3,000 MW, two are tidal (11 MW), two are solar (65 MW), three are thermal (gas, coal, or oil and proposed combined capacity is 380 MW), and seven are hydroelectric. Of the proposed hydroelectric schemes most are small (less than 25 MW) or are part of an existing hydroelectric scheme (such as at lakes Coleridge and Pukaki).

The obvious exception is a proposal at Lake Onslow in the South Island that would provide a pumped hydro storage scheme with 1,200 MW in capacity. Lake Onslow could become the country's most productive hydroelectric power station and "the country's biggest infrastructure project since the 1980s."[128] The early-stage investigations are being funded by government.

The fundamental legacy from the hydroelectric power schemes of the 1960s is an understanding that infrastructure projects and the environment are political issues. Public opinion, and public protest can influence change – most importantly for politicians, elections can be won or lost on environmental issues.

Now, in the twenty-first century, the Treaty of Waitangi is embedded into legislation including the Conservation Act 1987, the Resource Management Act 1991, and the soon-to-be enacted Natural and Built Environment Bill (due to pass into legislation sometime in 2023). This has led to the inclusion of the new provisions for wai (freshwater) including co-governance, legal personhood, and the inclusion of concepts such as Te Mana o te Wai into high level planning instruments such as the NPS For Freshwater Management.

Future debates about large-scale hydroelectric schemes, such as Lake Onslow, will (hopefully) be scrutinised under a stronger planning framework than the Scenery Preservation Act of 1903.

[128] Williams "Lake Onslow plan an "incredible project"" np.

REFERENCES

"1970 - key events" *Ministry for Culture and Heritage* https://nzhistory.govt.nz/culture/the-1970s/1970

A. J. A. "Protection of forest reserves" *New Zealand Herald* (21 November 1903): 5 (Supplement).

"Atene power" *Press* (5 May 1965): 20.

Ballara, Angela "Rātana, Iriaka Matiu" *Dictionary of New Zealand Biography* https://teara.govt.nz/en/biographies/5r7/ratana-iriaka-matiu

"Beginnings" *Ministry for Culture and Heritage* https://nzhistory.govt.nz/culture/nz-painting-history/beginnings

"Biographies of Former and Current Speakers of the New Zealand House of Representatives" *New Zealand Parliament* https://www.parliament.nz/media/2269/biographies-of-all-speakers.pdf

Cochran, Chris "Styles of Sham and Genuine Simplicity: Timber Buildings in Wellington to 1880" *The Making of Wellington* ed David Hamer and Roberta Nicholls. Wellington: University of Wellington Press, 1990: 107-128.

"Committee set up to preserve scenic areas" *Press* (25 November 1959): 16.

"Decision to begin work on Aratiatia Hydro" *Press* (3 September 1959): 11.

Department of Conservation Te Papa Atawhai "Aratiatia Rapids tracks" https://www.doc.govt.nz/parks-and-recreation/places-to-go/central-north-island/places/taupo-area/things-to-do/aratiatia-rapids-tracks/

"Destruction of Rapids" *Press* (29 November 1957): 18.

"Destruction of scenery by hydro-electric works" *Press* (6 December 1957): 23.

"Electricity Generated at Karapiro Hydro" *Waikato Independent* (11 April 1947): 5.

"English Power Line Dispute" *Press* (13 March 1954): 5.

"From Dunedin Downwards" *Otago Daily Times* (17 November 1877): 1 (Supplement).

Galbreath, Ross "Salmon, John Tenison" *Dictionary of New Zealand Biography* https://teara.govt.nz/en/biographies/6s3/salmon-john-tenison

Gustafson, Barry "Muldoon, Robert David" *Dictionary of New Zealand Biography* https://teara.govt.nz/en/biographies/6m1/muldoon-robert-david

"Harnessing the Waitaki" *Poverty Bay Herald* (27 October 1934): 5.

Heaphy, Charles "View of a part of the town of Wellington, New Zealand, looking towards the south east, comprising about one-third of the water-frontage [drawn] in September 1841 by C Heaphy, Draftsman to the New Zealand Company" Alexander Turnbull Library, Wellington, New Zealand Ref: C-025-009. https://natlib.govt.nz/records/23008813

Historic Places Act 1954 (NZ)

"History and Culture" *Department of Conservation Te Papa Atawhai* https://www.doc.govt.nz/parks-and-recreation/places-to-go/central-north-island/places/tongariro-national-park/about-tongariro-national-park/history-and-culture/

"Hydro-power and lakes" *Press* (20 June 1959): 15.

"Hydro Power Resources" *Press* (20 October 1955): 12.

"Hydro resources favoured for country's power needs" *Press* (18 September 1959): 10.

"Hydro Schemes in Scenic Areas" *Press* (26 June 1957): 10.

"Lake Manapouri" *Press* (17 March 1961): 3.

"List of power stations in New Zealand" *Wikipedia* https://en.wikipedia.org/wiki/list_of_power_stations_in_new_zealand

Lloyd, Maddie "Significant contamination at Tiwai Point Smelter site, report finds" *One News* (14 September 2022) https://www.1news.co.nz/2022/09/14/significant-contamination-at-tiwai-point-smelter-site-report-finds/

McLean, Gavin "Where Sheep May Not Safely Graze: a brief history of New Zealand's Heritage Movement 1890 - 2000" *Common Ground? Heritage and Public Places in New Zealand* ed Alexander Trapeznik, Dunedin: University of Otago Press, 2000: 25-44.

"Manapouri Power Station" *Engineering New Zealand* https://www.engineeringnz.org/programmes/heritage/heritage-records/manapouri-power-station/

"Maori and scenic reserves" *Ministry for Culture and Heritage* https://nzhistory.govt.nz/culture/scenery-preservation/maori-and-scenic-reserves

Mark, Alan F. "McLean, Ronald James" *Dictionary of New Zealand Biography* https://teara.govt.nz/en/biographies/5m23/mclean-ronald-james

Martin, John E. "Hydroelectricity: Hydro and the environment" *Te Ara: the Encyclopedia of New Zealand* http://www.TeAra.govt.nz/en/hydroelectricity/page-4

Muir, James *Opus Works: Short History of the New Zealand Government's Infrastructure Development*, DIY Publishing Ltd, 2020.

Nathan, Simon "Conservation: a history: A background issue, 1908–1965" *Te Ara - the Encyclopedia of New Zealand* http://www.TeAra.govt.nz/en/ephemera/13916/heritage-destroyed

New Zealand Electricity Authority *Electricity in New Zealand* [Wellington]: Electricity Authority Te Mana Hiko, 2018. https://www.ea.govt.nz/assets/dms-assets/20/20410Electricity-in-NZ-2018.pdf

New Zealand Government "National Policy Statement for Freshwater Management" (August 2020) https://environment.govt.nz/assets/Publications/Files/national-policy-statement-for-freshwater-management-2020.pdf

Nightingale, Tony and Paul Dingwall *Our Picturesque Heritage: 100 years of scenery preservation in New Zealand* Wellington: Department of Conservation, 2003.

"No assurances Huka Falls and Aratiatia not for hydro scheme" *Wanganui Chronicle* (22 August 1950): 7.

Oliver, Steven "Te Heuheu Tūkino IV, Horonuku" *Dictionary of New Zealand Biography* https://teara.govt.nz/en/biographies/2t19/te-heuheu-tukino-iv-horonuku

Pennington, Phil "Toxic waste buried at Tiwai Point aluminium smelter, former staff say" *Radio New Zealand* (6 April 2021) https://www.rnz.co.nz/news/national/439872/toxic-waste-buried-at-tiwai-point-aluminium-smelter-former-staff-say

Phillips, Jock "Ideas in New Zealand: Identity politics" *Te Ara - the Encyclopedia of New Zealand* http://www.TeAra.govt.nz/en/document/45515/heritage-destroyed

Pointon, Nicholas "Tiwai Point smelter subsidy may leave households paying up to $200 more in power" *Newshub* (17 October 2021) https://www.newshub.co.nz/home/new-zealand/2021/10/tiwai-point-smelter-subsidy-may-leave-households-paying-up-to-200-more-in-power.html

"Powerhouse at Aratiatia" *Press* (27 August 1958): 10.

"Ramsar Convention on Wetlands 10th Conference of Parties factsheet" *Department of Conservation* https://www.doc.govt.nz/about-us/international-agreements/ecosystems/ramsar-convention-on-wetlands/publications/ramsar-convention-on-wetlands-10th-conference-of-parties-factsheet/#:~:text=At%20present%2C%20New%20Zealand%20has%20s

ix%20%E2%80%98Ramsar%20sites%E2%80%99,and%20Estuary%205%20Farewell%20Spit%206%20Awarua%20Wetlands

Reeves *The Long White Cloud: Ao Tea Roa* (London: George Allen and Unwin Ltd. 1898) http://nzetc.victoria.ac.nz/tm/scholarly/tei-ReeLong.html

Resource Management Review Panel "New Directions for Resource Management in New Zealand [Randerson Report]" (June 2020) https://environment.govt.nz/assets/Publications/Files/rm-panel-review-report-web.pdf

"Rotomahana" *Hawke's Bay Times* (23 December 1873): 60.

Salmon, J.T. *Heritage Destroyed: The Crisis in Scenery Preservation in New Zealand* Wellington: A.H. & A.W. Reed, 1960 https://archive.org/details/salmon-1960-heritage/page/n5/mode/2up

"Scenery Preservation" *Northern Advocate* (2 November 1903): 2.

Scenery Preservation Act 1903 (NZ) (3 Edward VII No 54)

"Science - the handmaid of industry [Advertisement]" *Press* (18 June 1957): 9.

"Settlements" *Waikato Tainui* https://waikatotainui.com/about-us/settlements/

Siers, J. "Nine years to go at Tongariro" *Press* (2 October 1965): 17.

Sinclair, Keith "Reeves, William Pember" *Dictionary of New Zealand Biography* https://teara.govt.nz/en/biographies/2r11/reeves-william-pember

Te Aho, Linda "Te Mana o te Wai: An indigenous perspective on rivers and river management" *River Research and Applications* (12 October 2018) 35(10): 1615-1621, https://onlinelibrary.wiley.com/doi/full/10.1002/rra.3365

Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 (NZ) No 7.

"Threat to Manapouri and Te Anau [Letters to the Editor]" *Press* (14 September 1960): 9.

"Tiwai Point aluminium smelter to lower its electricity consumption" *Radio New Zealand* (18 April 2021) https://www.rnz.co.nz/news/business/441349/tiwai-point-aluminium-smelter-to-lower-its-electricity-consumption

"Tongariro mountains protected" *Ministry for Culture and Heritage* https://nzhistory.govt.nz/tongariro-mountains-gifted-to-crown

"Trial tunnel may save £2m" *Press* (29 April 1964): 3.

"[untitled]" *New Zealand Herald* (17 February 1887): 4.

"[untitled]" *New Zealand Mail* (25 November 1897): 17.

Waitangi Tribunal "WAI 167: Whanganui River Report" Wellington: GP Publications 1999 https://forms.justice.govt.nz/search/documents/wt/wt_doc_68450539/whanganui river report 1999.pdf

"Wanganui River power plan" *Press* (19 May 1960): 19.

Water-power Act 1903 (NZ) (3 Edward VII No 26)

Williams, Guy "Lake Onslow plan an "incredible project"" *Otago Daily Times* (27 July 2020) https://www.odt.co.nz/regions/central-otago/lake-onslow-plan-incredible-project

Wright, Jan *Hydroelectricity or Wild Rivers? Climate change versus natural heritage* Wellington: Parliamentary Commissioner for the Environment Te Kaitiaki Taiao a Te Whare Pāremata, May 2012.