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Decolonising Flooding and Risk Management: Indigenous Peoples, Settler Colonialism, and Memories of Environmental Injustices

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Abstract: This paper examines the history of settler-colonialism and how settler-colonial-led policies and projects to remake the landscapes and waterscapes of Aotearoa New Zealand resulted in the production of Indigenous environmental injustices. Underpinned by theorising on ecological justice and decolonisation, we draw on archival sources and oral histories of Māori and Pākehā (European) individuals living in a single river catchment—the Waipā River—to trace how actions to remove native vegetation, drain wetlands, introduce exotic biota, and re-engineer waterways contributed to intensifying incidence of floods. While Pākehā settlers interpreted environmental transformation as inherently positive, Indigenous Māori perceived it as profoundly negative, a form of ecological dispossession. We demonstrate that while Pākehā narrated floods as disaster events, Māori viewed colonisation as the true disaster, with floods and fires merely products of settlers' mistreatment of the environment. Moreover, the colonial government's efforts to control floods resulted in Māori being further alienated from and losing access to their rohe (ancestral lands and waters) and witnessing the destruction of their taonga (treasures including forests, wetlands, and sacred sites). For Māori of the Waipā catchment, flood risk management regimes were far more destructive (socially, economically and spiritually) than flood events.

Keywords: flood; environmental justice; Indigenous peoples; Māori; settler colonialism; disasters; risk perceptions

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1. Introduction

Floods are narrated within academic and public discourses as the epitome of disaster events. In 2017, the United Nations (UN) General Assembly adopted the definition of a disaster as a "serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts" [1,2]. Floods, using the above definition, are disasters causing widespread disruption, damage, and losses. Concerns over floods and the potential for damages and losses in human and environmental terms are exacerbated by concerns over climate change.

In Aotearoa New Zealand, a recent report found that floods caused 120 million dollars (NZD) worth of (privately-insured) damages in Aotearoa New Zealand between the years 2007 and 2017 [3]. In February 2004, for instance, regional and local councils announced that flooding along the Waipā River, the focus of our study, caused more than three million dollars in damage to local roads and bridges. Newspapers reported that 5000 hectares of "productive farmland" as well as parts Ōtorohanga township (including six houses and the local primary school) were inundated by floodwaters, with financial damages estimated at close to half a million dollars [4,5]. Numerous floods occurred along the Waipā River in the years and decades prior to the 2004 flood.

A wealth of research from around the world documenting historic and contemporary flood events demonstrate how floodwaters can and do result in widespread destruction,

damages, and losses (to people's lives, property, and livelihoods). Yet, at the same time, floods are not necessarily devastating disaster events for all people, societies, and living things. Indeed, it is a matter of perception and values. Recent fluvial geomorphological and freshwater ecology studies, for instance, emphasise the importance of flooding events to the functioning of freshwater and terrestrial ecosystems [6–11]. Moreover, centuries before these Western scientific studies, Indigenous peoples' knowledges recognised that floods played a crucial part in maintaining health and wellbeing of all (human and more-than-human) who dwelled within waterscapes [12–18]. Understandings and responses to disaster (indeed what constitutes a disaster) are, therefore, socially, and culturally situated. Floods (and disasters) are not merely biophysical events, but rather occur within diverse socionatures (interwoven social, ecological, political, economic, and metaphysical worlds).

In this paper, we contribute to addressing the gap in scholarship about how different social groups understood and responded to environmental risks within the waterscapes and landscapes in Aotearoa New Zealand (hereafter Aotearoa). We focus on the Waipā River catchment in Aotearoa to examine divergent perceptions that Māori and Pākehā (European) held about flooding regarding what constituted safe, productive, and healthy waterscapes during the 1860s to the 1960s. These differences were, we maintain, founded on significant ontological and epistemological divergences, which shaped how different groups (and individuals within each group) imagined, perceived, and responded to hazards. We demonstrate how the dominance of settler conceptions of floods as hazard perpetuated maladaptive responses and environmental injustices that adversely affected Māori and their relationship to the natural world, which continue into the present. Rather than claiming that Māori environmental injustice was a product of distributive inequities (whereby Māori were more likely to be exposed to flood risk than Pākehā), we stress that environmental injustices arose because of the lack of respect given to Māori knowledge, values, and ways of life by settler society (and by government officials in particular). Finally, we consider the implications for Māori of maintaining the status quo given the likelihood of increased and more intense flood events because of climate change.

We begin the paper by first offering a brief overview of key scholarship and ideas that provide the theoretical cornerstones on which our study is premised. We outline how environmental risks are not simply natural (climatic or geological) phenomena but also social, cultural, political, and economic, and are interconnected with different social imaginaries of waterscapes and landscapes. We contextualise this within settler colonial societies as this reflects the colonial experience in Aotearoa. Following this, we explore some of the contrasting views of Māori and Pākehā people held about the waters and lands of the Waipā River catchment, and what was perceived to be healthy and desirable environments. Lastly, we outline how the efforts taken by governments and individuals to remake the existing landscapes and waterscapes of the Waipā contributed to increased vulnerability to flooding and loss of resilience. The most hazardous thing for Māori was not floods or fires, but settler colonialism, which threatened the health, wellbeing, and cultural continuance of Māori through a multitude of actions (and inactions).

Dominant Narrative of Floods: Disasters and Risk Perceptions

Disasters are pivotal moments when collective memories, narratives, values, histories, and futurities are observed and experienced because they propel the query of conformability with specific socio-cultural norms, worldviews, and power structures [19–22]. The framing of flooding as a disaster event and responses to it confers an opportunity for a settler colonial society and powerful interest groups within it to delineate and reassert its boundaries of social, economic, and cultural formations (which privilege the values and modes of living of settlers).

In a diversity of colonial contexts (settler societies, plantation colonies, post-colonial nations), governments embarked on projects to transform existing freshwater systems. Such actions, implemented throughout the nineteenth and twentieth centuries, are termed "colonial hydrology" by historian D'Souza and included wetland drainage, irrigation, water

infrastructure, and flood control schemes [23–27]. These projects were used to justify the rule of the colonisers and/or settlers because the interventions vowed to effect positive material benefits to people's lives and livelihoods [24].

As experiences that are both individually and collectively significant, disasters are not innate but rather constitutive of particular social structures and ways of seeing the world, what Guernesy (2021, p. 3) terms "elements of perception" [28]. Instead of being a personal matter, perception is socio-cultural structured process. Settler colonial perception of environments and environmental conditions (wetlands as threatening and unproductive wastelands, flooding as disasters, farms, and homesteads as desirable and productive places) possessed a material and political infrastructure in the sense that they were founded on normative and economic conditions that refracted the settler colonial and heteropatriarchal practices of the hegemonic settler society. Ordinary and extreme events were interpreted through the lens of settler perceptions, experiences, and histories, which were then crystalised into intentional modes of bodies, subjects, communities, and behaviours that privileged settler ontologies and knowledge practices over those of Indigenous peoples [14,26,29,30].

One of the principal effects of both the historic and contemporary discussions about environmental issues is they frequently obfuscate the real and persistent environmental struggles of Indigenous peoples (which includes their capacities to access and enact their self-determination rights over and inherited responsibilities towards their ancestral lands, waters, and more-than-human kin) as well as the sources of environmental degradation and crises (colonisation and capitalism) [31–33]. As Whyte observes, settler colonialism is a "structure of oppression that specifically targets Indigenous people's ability to experience the world as imbued with responsibilities" [34]. Thus, settler colonial infrastructures (which include both material artefacts and perceptions) do not simply create spaces and practices of social inclusion and exclusion, but also the socio-cultural processes that seek to diminish and/or completely erase Indigenous peoples' eco-social kinship relationships (centred on reciprocal relations) with environments and beings (both human and more-than-humans).

The exclusion and marginalisation of Indigenous peoples from environmental management processes has increasingly been conceived of as evidence of environmental injustice [35–38]. As the work of Schlosberg demonstrates, participation is a critical part of environmental justice [39,40], with the inclusion and exclusion of people from decision-making processes and their capacities to participate clear evidence of whether governance and management regimes employ fair, transparent, and equitable processes. More recently, Indigenous environmental justice scholars have drawn attention to the injustices arising from failing to recognise group difference and point to the ontological and epistemological violence experienced by Indigenous peoples and local communities arising from processes and actions that misrecognise or exclude difference. Conflicts between settler and Indigenous people's ontological and epistemological understandings of what constituted 'good' and 'bad' (safe or hazardous) landscapes or waterscapes manifest in institutional structures that reinforced and sought to reproduce settler imaginaries.

2. Materials and Methods

The research outlined in this paper is part of a larger project exploring how settler colonialism contributed to changes within the human and ecological communities of the Waipā River over the last two centuries, which draws on mixed methods. We use the term "mixed methods" to refer, as Indigenous scholar Chilisa does, to the use of both Western research paradigm and methodologies as well as Indigenous research paradigm and methods [41]. We use Western research methods such as historical research based on the examination of archival sources and oral histories, as well as Indigenous research methods including gathering Indigenous stories, songs, and proverbs, and Indigenous interviewing techniques.

Four main historical materials were consulted for this paper: historical images (including photographs and maps); personal letters, diaries, and memoirs (held in private

and public archival collections); historical newspaper articles; and oral histories. Included were newspaper articles and advertisements, government and personal correspondence, local committee meeting minutes sourced by the lead author from digital and physical archives from public libraries (Auckland, Hamilton, Te Awamutu, Wellington) as well as Aotearoa NZ's government archival collections (National Archives as well as the archives of the Waikato Regional Council).

The diversity of historical materials collected in this study was a much-needed way to counterbalance the colonial nature of the archives [42–44]. Collections held in national or regional archival collections are the records of central or local government departments' who are legally required to prepare and deposit departmental documents with archives as certain time periods [42]. Materials held in public libraries include books, magazines, as well as some archival materials usually about local people and events (such as photographs, maps, and oral histories). In addition, public libraries also receive donations from personal collections of individuals or families that are considered significant for the history and heritage of the nation or region (often linked to an individual's political, social, cultural, economic, and scientific achievements). Accordingly, the archival and (to a lesser extent) public library collections in Aotearoa NZ, as with many other countries, are dominated by materials written by Pākehā (European) men and reflective of Western knowledge, worldviews, and values. Accordingly, the perspectives of Indigenous peoples, women, gender non-binary/diverse and other non-Indigenous non-Māori people seldom feature with archival collections. We approached archival texts with critical awareness of the incompleteness and exclusion of Indigenous voices; this included considering how kin-centric and holistic knowledges and practices featured in (or were excluded from) written texts, which were often written by Indigenous peoples for non-Indigenous readers (such as settler government officials). Thus, for the purpose of our research project, it was necessary to go beyond archival collections and seek out other empirical materials to fill the gaps and silence in the historical documentary records. We did this through collecting and analysing newspaper articles, images, and oral histories, as well as locating texts that were created by and for Māori including waiata (songs), whakataukī (proverbs), whakapapa books (recording genealogy of a family or tribal group), and Māori iwi and hapū institutions' reports on environmental issues.

In this research, we listened to, transcribed, and then analysed the audio recordings of oral histories of Pākehā and Māori and who lived in the Waikato and King Country during the late-nineteenth and first half of the twentieth century. The recordings, made by historians over the last four decades as part of life histories projects, were held by National Library and Hamilton City Libraries for researchers to use. In addition, we collected semi-structured interviews with twenty-one people (Māori and Pākehā) who live and work within the Waipā River catchment in the present-day (between the years 2017 and 2019), and who are involved in efforts to govern, manage and/or restore rivers and lands in the region.

We sought to collect the stories of people's experiences of and responses to historic and contemporary environmental changes within the Waipā River catchment. We adopted an Indigenous rhetorics approach centred on the in-depth analysis of Indigenous texts (oral, material, alphabetic, visual, digital, and performative), which is founded on the recognition of Indigenous sovereignties as well the diversity of Indigenous cultures, histories and subject positions that exist under the general term Indigenous.

3. Results and Discussion

3.1. Floodwaters as Healthy: Maintaining the Mauri (Life Force) of Awa (Rivers)

The Waipā River (see Figure 1) is the main tributary of the Waikato River, the longest river in Aotearoa. Like many rivers in Aotearoa, the Waipā flooded intermittently since well before British colonisation commenced in the 1840s, with the evolution of complex freshwater ecosystems along the river. The existence of large wetlands throughout the Waipā catchment attested to this environmental history as does the abundance of aquatic

and riparian flora and fauna. In line with wider mātauranga Māori (the Māori system of knowledge), iwi (tribes) whose rohe (ancestral lands and waters) encompass the Waipā catchment narrate the relationships between rivers and flooding as part of the ongoing reciprocal and interwoven connections between worlds (social, spiritual, metaphysical, and biophysical). One waiata (song) from Ngāti Maniapoto (whose rohē includes the middle and upper reaches of the Waipā River) highlights this interweaving of Māori waterscapes:

> Like an atua [god] I wing my way into the heavens above! I gaze down! There below lies my river Waipā, cutting her way over the breast of my native land. My eyes brim with tears at the vision of splendour, 'tis the love of my river that meanders away. My eyes gaze intently upon the deep pools of the river they are myriad lairs of Waiwaia [a taniwha, or supernatural creature, who is a guardian of the river]; the atua who gathers food for the people. The rocks of the river are an easy pillow for my head. The deep stretches of the river are a bed that rejuvenates my spirit and my body. I am sustained by the river, by taking the waters of the ancients, drawing the waters from the atua, by procuring the very water of life!

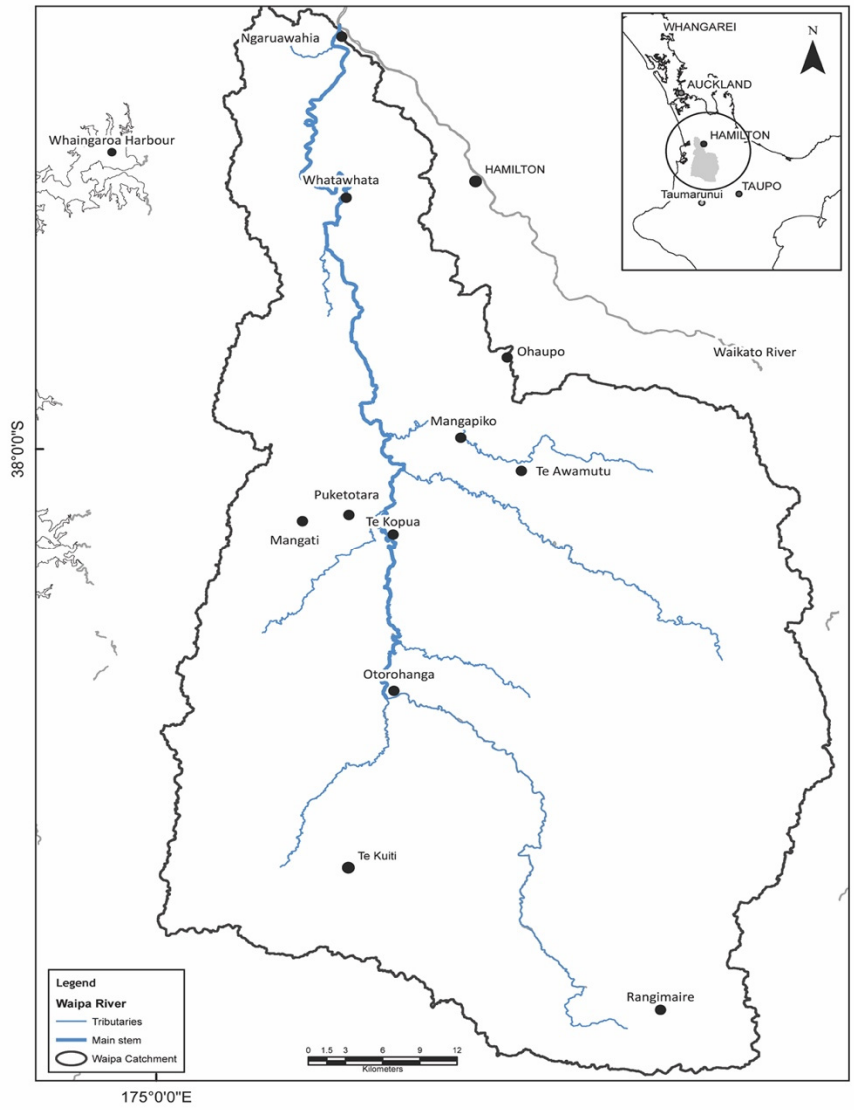

Figure 1. Map showing location of Waipā River.

As Māori Studies scholar and Ngāti Maniapoto elder Tom Roa described, floods "were not a time of dread" for Māori living alongside the Waipā River but instead flooding meant

iwi were ensured ample food supplies "since the repo (swamp) . . . would be teeming with tuna [eels] and ducks" [45]. Flooding, thus, enabled whānau (extended family), hapū (sub-tribes), and iwi to harvest enough foodstuffs, medicines, as well as materials used for their buildings, clothing, and artworks (see Figure 2) from close to where they lived, which meant they did not need to devote all their energy to travelling to hunt, fish, and harvest further afield.

Figure 2. Māori kainga (village) at Te Kuiti. Note the buildings and fences are all constructed out of materials procured from local environment (including from reeds from the wetlands). (Source: Maori pa at Te Kuiti. Cussen: Photographs of the Te Kuiti—Hamilton area. Ref: 1/2-045719-F. Alexander Turnbull Library, Wellington, New Zealand).

Floods were also perceived as important ways to cleanse and maintain balance within the taiao (environment) [18,46,47]. Indeed, Māori recognised that floodwaters distributed both wai (water) and kōtai (alluvial soil) across their whenua (land), which improved the fertility of their soils, and ensured that their cultivations would be more productive in the next growing season. Accordingly, flooding was situated as part of normal functioning within social-ecological systems, which were premised on reciprocal and enduring kin-based relationships between Māori and more-than-human-beings (rivers, lands, seas, plants, animals, supernatural beings, gods) within their taiao (for more details about Māori worldviews, values and knowledge systems see the recent article by Parsons and Fisher 2020) [48]. A key part of Te Ao Māori relates to the ongoing intergenerational duties and responsibilities that local iwi, hapū and whānau possess for caring for their rohe and its more-than-human beings (their kin), based on the principle of kaitiakitanga (environmental guardianship) [49–51]. Rather than thinking about adopting a short-term (days, months, or years) view of environmental management and the material security of homes and livelihoods, Māori (paralleling many Indigenous groups) adopted a longer-term framing [16,46,52,53]. Hence, even when flooding caused damage and loss for Māori (of lives,

settlements, and cultivations), it was not necessarily deemed a disaster or emergency event due to the benefits that Māori and their more-than-human kin (both current and future generations) derived from the floodwaters.

The differences between Māori and Pākehā views of flooding became apparent in the years following British invasion of the Waikato (which took place between 1863–1864) when Pākehā residents began to write letters of complaint about the threats that flooded rivers (and wetlands) posed to their safety and economic security [54–56]. During the summers of 1868 and 1869, for example, flood events destroyed cultivations situated on the riverbanks of the Waikato and Waipā Rivers. Pākehā criticised Māori for their "folly in persisting to cultivate [on] such low lying land" [57]. There was no recognition amongst Pākehā that their actions contributed to Māori being forced to live and farm in vulnerable (marginal) locations; instead, blame rested on Māori for putting themselves in harmful locations. Pākehā did not acknowledge that the invasion and raupatu (confiscation) of Māori land as well as the destruction of the pre-war Māori economy meant Māori were forced to cultivate whatever land remained in their possession.

Local Māori along the Waipā River, however, did not interpret the 1869 flood in the same way as Pākehā. Instead, Māori declared that the floodwaters were positive and helped to ensure the fertility of their soils and the productivity of their crops in the coming growing seasons. Local iwi, thus, preferred the lowlands "to the hills, which were comparatively barren" [57]. In the 1880s, British travel writer Kerry-Nicholls journeyed through the central North Island and recorded his observations of the "whole wide valley of the Waipa" as being "very low, . . . comprised, for the most part, by rich alluvial soil" [58]. He reported seeing Māori "cultivations and settlements . . . dotted along the whole course of the river . . . densely populated" [58]. Decades later, a local Pākehā historian recounted how the first Pākehā settlers who arrived in Ōtorohanga at the end of the nineteenth century were surprised to encounter a landscape teeming with Māori horticultural operations [59–61]. Large in size and "numerous" in number the "cultivations reached for miles in places along the fertile valleys of the Waipa, Waitomo, Mangaoronga and Mangawhero streams" [60]. Diversification was key to Māori gardening success, with a wide range of crops grown; this included kumara and potatoes, as well as "quantities of wheat, Indian corn and gourds". In addition, large stands of "peach, lemon, apple and cherry trees" grew in the "sheltered groves . . . [in] the valleys protected from the sweeping winds" [60]. Despite the supposed dangers of wetlands and flooding (un-tamed waters and lands), Māori people and their economies did more than simply cope (survive) but also successfully adapted to (thrived) these liminal, unpredictable, and changeable landscapes and waterscapes (see Figure 3).

3.2. Colonising the Rivers and Stopping the Waters: 1860s–1900s

After the British military's invasion and confiscation of the majority of Māori land within the Waikato region in 1863–1864, Pākehā settlers sought to establish and secure their authority in the newly formed settler colonial state through acts of environmental transformation [18,62–65]. Forests were felled or burnt, wetlands drained, hills and plains seeded with thousands of bags of grass seed, and gorse and blackberry hedges were grown to mark farm boundaries, and exotic trees (eucalyptus, oak, pine and plane) planted to shade and absorb unwanted dampness and odours [66–68]. An essential part of this transformation was the remaking of waterscapes. Actions to remake waterways were shaped by Pākehā imaginaries of what good rivers looked like (styled on the heavily regulated waters of the Thames, Rhine, and other European rivers) [55,69]. Indeed, some companies referred to the Waikato River as the "Rhine of New Zealand" as a way to encourage journey (via boat) on the river and to purchase products produced in the Waikato region [70]. The primary goal of such imaginative geographies was to enhance the productivity of landscapes while remaking existing rivers to accord to European ideals (see Figure 4). Rivers were (from a Pākehā worldview) something to be used by people for utilitarian purposes (to transport goods, to extract gravel, water, and fish, and to dispose of unwanted waste products into) that would benefit the wider settler colonial project. By the

end of the nineteenth century, most of the land along the riverbanks of the Waipā River was owned and farmed by Pākehā, who reported their crops were regularly washed away from flooding. Settlers acquired Māori land after Māori converted their communal landholdings to individualised titles (through the Native Land Court system) and Māori selling their land due to financial necessity.

Figure 3. The kainga (village) of Te Kumi situated beside a tributary to the Waipā River, photograph taken by Alfred Henry Burton in 1885 (Source: 1/2-021475-F. Alexander Turnbull Library, Wellington, New Zealand).

Settlers in the so-called 'backblocks' of Waikato and Te Rohe Potāe (the King Country) wrote (in their diaries as well as in letters to family, friends, editors of newspapers, and government officials) about troublesome and threatening behaviour of the local freshwater systems. Settlers frequently complained to government officials about the unfair financial burdens they faced because of needing to drain and protect their lands from the ever-present dangers of too much water. The mere presence of wetlands inspired in Pākehā feelings of dismay and melancholy and prompted them to take actions to remove all traces of these troublesome muddy blue spaces [71]. Similarly, flood events caused environmental anxieties amongst Pākehā, not just because of the flood-induced damages and losses caused to people's lives and livelihoods, but also because each flood brought with it the threat of return of the Waipā wetlands (the "vast melancholy sea of rush", the "dreary wilderness") which Pākehā sought to erase [55,72].

Figure 4. Photograph of Pākehā family on their farm in the Waipā River catchment circa 1890s. (Source: AWNS 19010419 4 3, Auckland City Libraries, Auckland, New Zealand).

These environmental anxieties were in part connected to the fact that rivers such as the Waipā, with their muddy waters, its changeable channels and variable flows, and its vast and seeping wetlands, did not accord to what was perceived to be the correct type of waterscapes. Many of Britain's rivers had been engineered into straight lines and controlled by dams, locks, and canals over the previous two hundred years; accordingly, the ubiquitous, straightened, and controlled rivers were assumed to be a "natural" part of the environment (rather than a product of human interventions). Aotearoa's muddy environments and rivers were a cause of persistent distress for Pākehā inhabitants, with freshwater ecosystems imagined as threatening the safety, well-being, health, and economic survival of the settler body politic. In late January and early February 1893, flooding resulted in the "serious destruction" of crops "along the river flats" of the Waipā River (see Figure 5) [73,74]. A large portion of newspaper reports highlighted the damage flooding caused to bridges and farmlands of prominent Pākehā settlers [73–76]. Mr John Martin, living on the rich terraces near Ngaruawahia, reported the loss of "some nine acres of potatoes, five acres of maize, and fifteen acres of oats, all of which [were] gone, the land . . . covered with from two to three inches of sandy mud" and the grass "completely spoilt" [73]. Many Pākehā, a local newspaper reported, felt "the loss of their crops very keenly" and were being forced to sell livestock because their "pastures being temporarily destroyed by heavy flood deposits" [73].

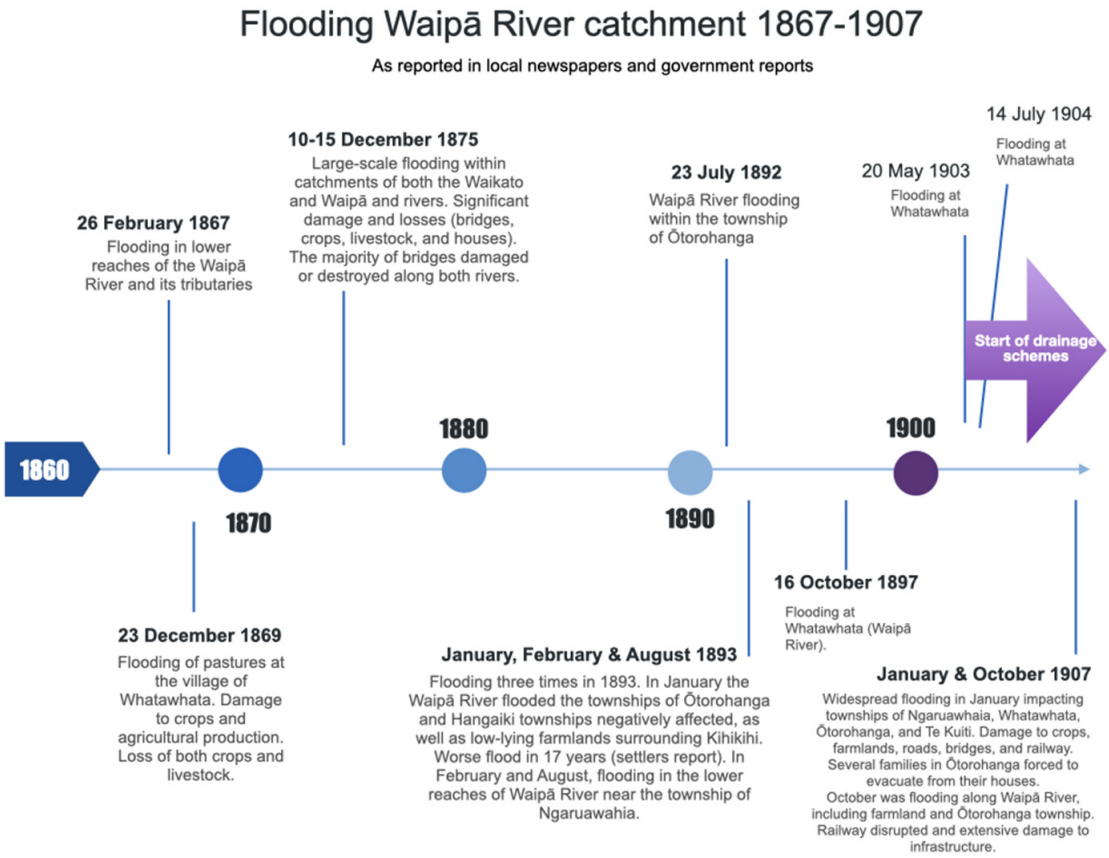

Figure 5. Timeline of flood events on Waipā River 1867–1907.

Newspapers did not criticise Pākehā settlers in the Waipā for their decision to live and work on flood-prone areas (as they had Māori in 1869). Instead, journalists reported on the unprecedent nature of the flooding and extended sympathies to farmers negatively affected [73]. While most newspapers emphasised the suffering of Pākehā farmers, one newspaper, *Auckland Star*, published a letter from Pākehā settlers that appealed to the "public of Auckland" to help Māori affected by the 1893 flood. The letter, authored by Patrick Corray (a Whatawhata settler), requested that people contribute money (to a total of 100 pounds) and seed (to help "buy food and seed to be used for a crop for next year") [77]. Corray wrote that "the Natives" along the Waipā River were "[a]mongst the greatest sufferers [from the recent flood] . . . hav[ing] lost all their crops" of potatoes, oats, wheat and root vegetables. A "number of Maori whares [sic, whare translates to hut or house] were quite covered in water" and what "food remain[ed was] half rotten . . . from the continuous wet" [77]. Māori were, at least from Corray's viewpoint, rendered "absolutely destitut[e and were] *in imminent danger of dying of starvation* and [would] *undoubtedly do so*, unless the most charitable and kindly disposed of both races promptly come to their relief" [77]. Corray took pains in his letter to assure the public that those Māori affected by the flood and who needed assistance were all Christians, who included former chiefs and the children of ministers (Rawhiri Hemi and Abraham Barton) who were "gentle . . . trustworthy and reliable men" who "speak by the book" [77]. No follow up reports on what (if any) contributions were received by the group; however, a government official did record that Māori living in Otorohanga (upstream of Whatawhata within the Rohe Potae/King Country) did make a request that the central government provide them with assistance to help them replant following the flood; likewise, the flooding of Waikato River in August 1893 led to reports of Māori being left destitute [76,78]. As with other archival sources, Māori lived experiences of the 1893 flood (as with their wider lives) remained

largely absent from written accounts; thus, we are forced to acknowledge the silences and gaps within the historical records. What is clear, however, was that Māori were increasingly alienated from their lands and resources in the late nineteenth century and occupied socio-economically and politically marginalised, which in turn resulted in a decrease in Māori capacities to manage climate variability and extremes (as discussed previously by Parsons and Nalau [18]).

A key feature of flood management was not just the application of technologies but also its firm foundations within scientific knowledge [79]. Floods, in this secularised flood defence paradigm, were primarily biophysical events that necessitated quantitative research and engineering solutions (to predict and prevent) [24,80,81]. The paradigm was interlinked with the development of scientific knowledge and the field of engineering as a profession and the application of engineering works to govern and manage hazards. In the nineteenth century, professional engineers, first in Europe, then North America, and later in Aotearoa New Zealand, became the experts responsible for society's progress. In mid-nineteenth century Britain, the Institution of Civil Engineers was created to promote "the art of directing the Great Sources of Power in Nature for the use and convenience of man" [81]. Flood control schemes, which were built based on technical developments and the professionalisation of engineers, focused on ways of transforming freshwater and riparian environments (canal building, wetland drainage, and irrigation). Other forms of knowledge and ways of managing and/or relating to rivers were denigrated and marginalised within colonial societies (as our case study from Aotearoa New Zealand highlights). Levees (known in Aotearoa New Zealand as stopbanks) were the first formal measure used to control flooding by the settler colonial state; while certainly not original to Britain or British colonies, their use in Aotearoa came directly from British experiences (see Figure 6).

Figure 6. Dredging machine being used on the Rangitaiki River (Bay of Plenty) in 1910 as part of the government's efforts to drain the wetlands. Similar equipment was used for drainage and river realignment on the Waipā River. (Source: Tonks, Hylton Gary, 1940–: Photographs of dredging of Rangitaiki—Whakatane Rivers 1910. Ref: 1/4-016471-G. Alexander Turnbull Library, Wellington, New Zealand).

Floods were interpreted by Pākehā as evidence of the untamed (un-colonised) nature of freshwater systems, something that needed to be urgently controlled (or at least mitigated) through interventions. The first response to "flood menace", documented by historians Catherine Knight and Katie Pickles in regard to the Waimakariri River (Christchurch) and Manawatu River (Palmerston North), were ad hoc levees (stopbanks) built from the mid-nineteenth century onwards [65,82,83]. Individual Pākehā settlers constructed levees (and sometimes groynes in estuaries) along their riparian lands to protect (defend) their properties from unwanted and unruly floodwaters. However, each levee served to deflect water from one spot along the river to others (flooding neighbouring properties downstream). The result was a form of 'stopbank warfare' where affected landowners built their own levees and at night went out and destroyed the newly built levees of their neighbours. The result was "water being turned on to another property till the sufferer could build a bank higher than his neighbour to keep it out" [82]. Those who built their own flood defence structures (from rocks, soil, and wood) were accused by their neighbours of increasing the quantity and speed of floodwaters which flowed over their properties and caused significant damage. Complaints were made to government and threats of legal cases. By the early twentieth century, flood control became the domain of local government authorities.

The first legislation regarding the management of rivers—the River Boards Act—was introduced in 1884, which allowed for the creation of river boards that were charged with mitigating flooding [84]. The boards, however, were hampered by their lack of funding, being restricted to managing a section of a river (sometimes just one side of a riverbank), and an inability to implement strategies. Within the first three decades of the twentieth century, the central government had completed twenty commissions of inquiry into perceived inadequacies with the nation's freshwater systems (swamps, floods, pollution) [82,85,86]. In these inquiries, engineers and government officials declared the country's rivers highly problematic but improvable. Rivers, they argued, should be fixed in course and width with steady flow, rather than meandering and changeable with porous boundaries between water and land. Drawing on geomorphological and engineering knowledges, officials and engineers advocated for the radical remodelling rivers to make them flow straight, more directly to the ocean, the construction of levees to protect (land and people) against flooding, and the dredging of riverbeds to reduce flood risk and improve navigability for boats [76,87,88]. In reaction to concerns about unruly rivers, the central government enacted numerous pieces legislation, which included various acts that governed the drainage of wetlands [89–92]. Drainage works encompassed economic development (designed to expand agriculture production), public health (with wetlands incorrectly believed to be the cause of much human diseases), and control (over unruly nature and unruly natives). Drainage schemes, as we previously argue [46], were a colonial artefact, a fundamental part of the settler colonial project in Aotearoa New Zealand [18]. Moreover, drainage works were interconnected with flood management (and were perceived by Pākehā in the late nineteenth and early twentieth centuries as one as the same thing as both were about the unwatering of land). Alongside drainage works, the clearance of land was a key activity undertaken by settlers (or at least overseen by Pākehā employed local Māori as labourers and paid them low wages to do the hard physical work of draining and clearing the land). Much of the indigenous vegetation of the Waipā catchment, like elsewhere in the Waikato region, was removed (cleared through felling or fire), then re-seeded with exotic grasses, and farmlands and townships quickly established in the late nineteenth and early twentieth centuries. The types of policies, interventions and strategies that were funded, and who benefited from those actions, were all reflective of the privileging of scientific (specifically engineering) knowledge and Pākehā culture (and lifeways) over all other.

3.3. Debates about the Causes of Flooding

From the turn of the twentieth century onwards, international and national scientific discussions began to draw links between soil erosion, the reduction in forest cover, and

the flooding of rivers. For instance, writer J.P. Grossman wrote about the "evils of deforestation'" in 1909 and warned about the "heavy price" Aotearoa NZ society was paying for their "recklessness". The "heavy penalty" was not only in the "money value of land washed away or overlaid[ed] with debris, in stock drowned, and property destroyed" but also in the constant need to rebuilt roads and bridges, and strengthen "groins and embarkments" [93]. However, no substantive actions were taken to reduce the clearance of vegetation cover in the Waipā catchment or elsewhere. In 1938, several large floods took place in the East Coast of the North Island and prompted renewed political and public attention to questions of how land-use change was contributing to flooding. A prominent Pākehā historian (James Cowan), who grew up on a farm near the Waipā River, wrote an opinion piece for a national newspaper in 1938 about the negative impacts of forest clearance. The primary result, Cowan wrote, was the erosion of the "soft rich soil" off hillsides whenever it rained which was leaving farmers with unproductive "hard clay or rock" to try and farm. The secondary result, he noted, was the rivers being spoiled by sediment washed off [94,95]. Cowan's views were later backed up by scientific and government studies, most notably through research by geographer Kenneth Cumberland [95–98]. The central government (under the authority of the Minister in Charge of Scientific and Industrial Research) set up a Committee of Inquiry in 1939 to investigate "measures necessary for the preservation of vegetation in New Zealand with particular reference to the incidence, control, and prevention of land erosion" [99]; the focus (as already) was on land rather than water (specifically with the aim of protecting and maximising the agricultural productivity of land).

Matters of flood management were primarily directed to matters of soil erosion and the economics of farming rather than disaster risk reduction. Farmers whose rivers bordered rivers began to complain to government officials and journalists that every time it flooded, the rivers were eating more and more of their land away. Floods were an economic disaster above all else. Navigable river channels were becoming shallow and boat travelled upstream became more difficult and impossible in some areas [94]. The 1939 Inquiry Committee concluded that deforestation had contributed to increased soil erosion and flooding throughout the country (see Figure 7). Accordingly, a new approach was needed. The central government's response was to advance a new bill to control soil erosion and rivers together. The bill was informed by the latest domestic and international scientific research (specifically from the United States) and focused on the links between forest cover, erosion, and flooding [99]. The government declared it was not possible to completely prevent flooding through the restoration of vegetation cover; however, it was possible to reduce the incidence of flooding nearer to the "order [that] exist[ed] under primitive conditions" through the careful application of engineering knowledge and technologies [99].

The new national legislation—the Soil Conservation and Rivers Control Act (1941)—enacted in 1941 continued to encapsulate Pākehā perceptions of the existing landscapes and waterscapes as something that could always be commanded-and-controlled and, more importantly, improved upon [62,100,101]. Valuations of land and water were decidedly utilitarian and focused on how natural resources could be used by people (specifically for economic purposes). The primary goal of the Soil Conservation and Rivers Control Act was "the conservation of soil resources and for the prevention of damage by erosion", with a secondary focus being making "better provision with respect to the protection of property from damage by floods" [102]. The act established the National Soil Conservation and Rivers Control Council, which was tasked with coordinating river control projects as well as the activities of the newly established regional catchment boards. Drainage boards were to become incorporated together into whole of river catchment management approach for the first time in Aotearoa. The problem of soil erosion and its connection with flooding was, like drainage and wetlands in the past decades, regarded as a matter of urgency for the (settler colonial) nation-state. The legislation formally recognised that particular types of land-use were exacerbating of flooding. It was recorded that the past actions of settlers:

> 'breaking in the country' upset the balance of Nature . . . [with the] destruction of the natural forest cove[r], by fire, axe and pests, the burning of hill pastures and the over-stocking of much land, result[ed] not only in spectacular and costly floods, but also in a steady, unspectacular and more costly impoverishment of the nation's prime asset—its soil [103].

While the language of drainage was replaced by that of soil conservation and flood control in the 1940s onwards, the practical applications, knowledge and skills remained steadily centred on viewing rivers (and associated wetlands) as problematic entities requiring technical (scientific) solutions. The focus remained on the expansion and intensification of agricultural development throughout the nation, with flooding posing a threat to economic prosperity.

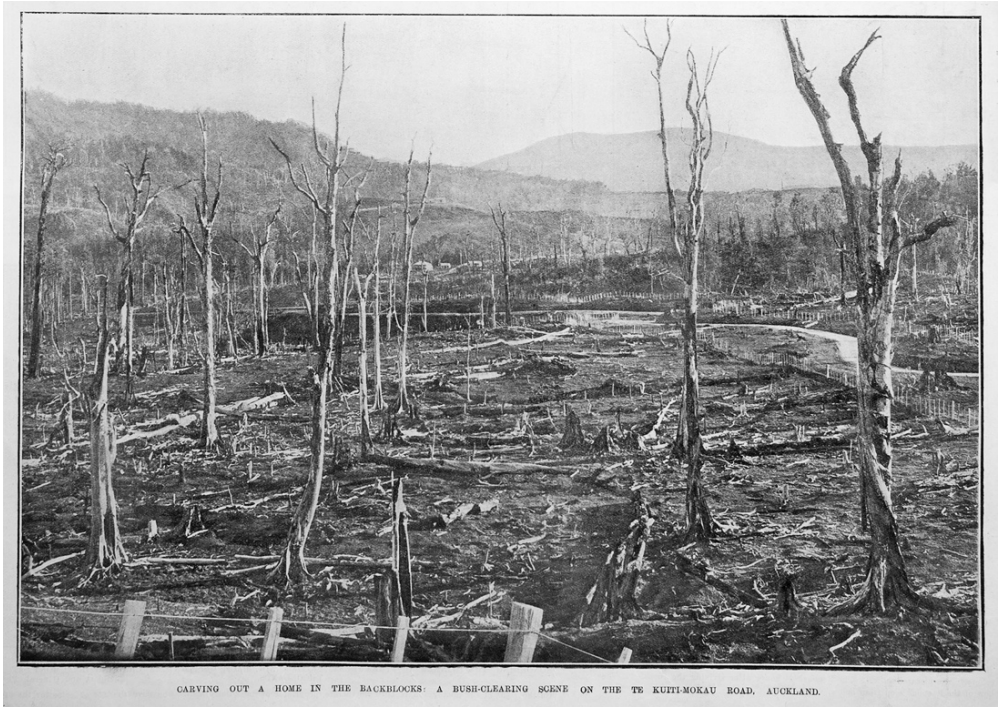

Figure 7. Deforestation within the Rohe Potāe in 1911. Although some logging activity occurred in the area, most forests were just cleared (felling and burning off) and the wood was not used. (Source: Auckland Libraries Heritage Collection AWNS-19110907-3-2).

3.4. Application of Science and Technologies to the Waipā River

In marked contrast to the earlier predictions of non-Māori scientists and government officials about flooding in the Waipā River, the reduction in the size of wetlands and clearance of riparian vegetation did not decrease the incidence or extent of flooding. Instead, the newly created lowland pastures experienced worsening flood events (greater frequency and intensity) in the mid-decades of the twentieth century. Indeed, despite persistent attempts by the state to tame, control, and re-engineer (colonise) its waterscapes, the Waipā River remained an unruly (resistant) colonial subject. The awa (like its human kin) resisted in numerous ways (see Figure 5). Straightened and defined channels reverted to their original courses, dredged riverbeds quickly filled up with rocks, logs, and soil, vegetation regrew, and banks overflowed to drown newly created dryland (once more wetland).

Local government officials reported in the mid-1930s how waterflows in the Waipā River and its tributaries (including the Mangapu Drainage District) were greater (in terms of water speed and quantity) and were more noticeable following heavy rainfall events (see Figure 8). The increasingly fast flowing watercourses were also contributing to undesirable outcomes in terms of more soil erosion [104–106]. Local government officials perceived these changes to be a product of incomplete drainage works, too many trees along river-

banks, and the continued lack of development of Māori lands, rather than the result of settler-led actions to drain wetlands and clear forests.

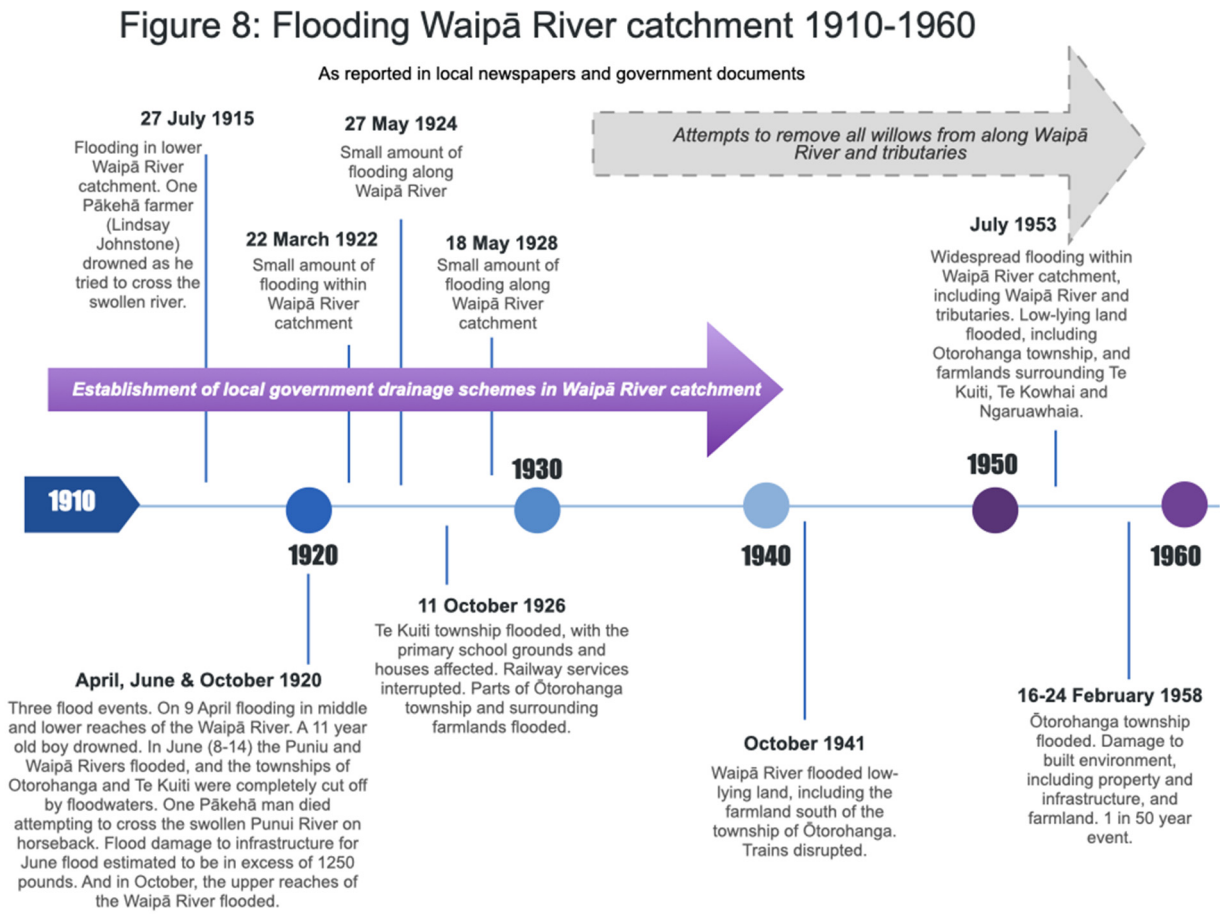

Figure 8. Timeline of flood events on Waipā River 1907–1957.

In 1956, a new local government institution—the Waikato Valley Authority (WVA)—was established to "control of the waters which drain into and from the Waikato River and its tributaries" [107]. The WVA took on the functions, powers and liabilities of a catchment board as defined in the Soil Conservation and Rivers Control Act (1941). Local councils retained responsibility to conduct works within their own districts but did so under direction of the WVA. All other matters including "dredging and other works for maintaining the beds and channels of the Waikato and Waipa Rivers" and the "protection of property from damage by floods and matters related thereto" was the direct responsibility of the new authority [108].

Between 16–24 February 1958, heavy rainfall occurred in the Waikato and Waipā catchments, averaging 15 inches, which was concentrated in the upper catchment of the Waipā River (see Figures 8 and 9). The rain fell onto ground already in a "saturated state" due to heavy rain in the previous month. On 24 February 1958, the Waipā River broke through its levee at the township of Ōtorohanga and floodwaters (up to six feet) raced through the town. The river sought to resume its "old flood channels" (pre-engineered course) and travelled in the most direct route south to join with the Mangapu River. The force of the floodwaters tore up roads and footpaths and resulted in the evacuation of more than two hundred households as well as all the patients in the town's hospital [109]. No people lost their lives, but large numbers of livestock died, and hundreds of residents from Ōtorohanga were forced to evacuate and hundreds of thousands of pounds in property damage was recorded (estimated at £350,000). Flooding also occurred elsewhere in the Waipā catchment, with 1000 residents evacuating their homes in Te Awamutu, and widespread damage to

properties and infrastructure was recorded. The Ministry of Works reported that the cost of repairs to Waikato infrastructure would amount to £11,000 [110].

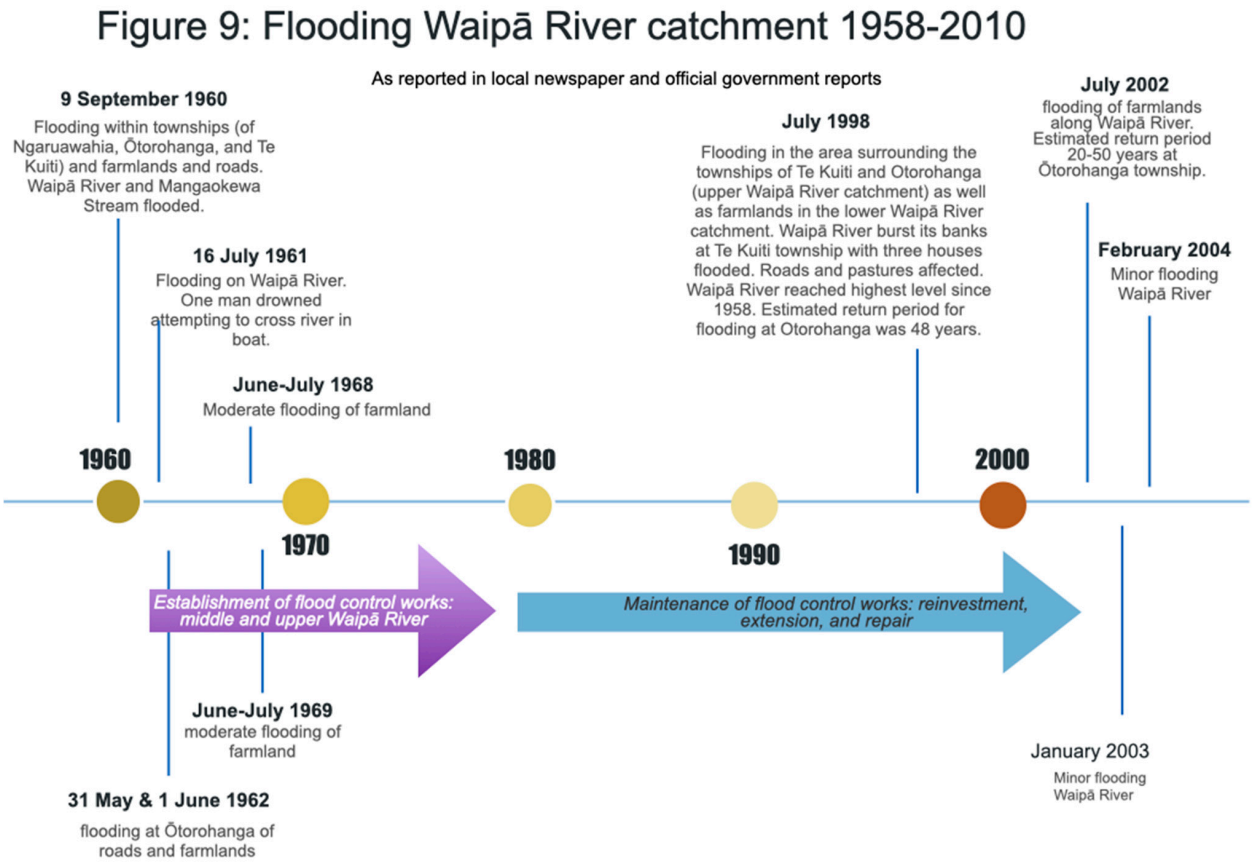

Figure 9. Timeline of flooding 1958–2000.

Immediately after the 1958 flood, Ōtorohanga residents and central government officials demanded action be taken to address flood risk by the local government agency responsible for flood controls (WVA). It seems most local residents who demanded action were Pākehā (although official records never recorded the ethnicity of people Pākehā unless they were Māori or sometimes other non-Māori non-Pākehā). Indeed, iwi members we interviewed (some of whom were small children at the time of the flood) spoke about how their whānau members (cousins, aunties, parents and grandparents) told them stories of how their houses were not affected by the floods and they (and other members of Ngāti Maniapoto) were firmly against the flood control works [111–114]. So, we make the tentative assumption that most people who campaigned for the flood controls were Pākehā not Māori residents from Ōtorohanga.

In March 1958, representatives from local government (WVA, the Otorohanga and Te Kuiti Borough Councils) and central government institutions (War Damage and Earthquake Commission) met in Ōtorohanga to discuss the February 1958 Otorohanga flood. The District Commissioner of Works, C. J. W. Parsons, expressed concern the flood, deemed a one in 50-year-event, was a result of development of land adjoining the river, and that further development along the same lines would only worsen run-off into the river and increase the incidence of flooding in future [115]. There was no engagement with tangata whenua (the Māori iwi who geneolgoically connect to the local area in which they live) about the proposed flood control works, with no legal requirement on local bodies or central government agencies to consult with Māori (or stakeholder groups). Accordingly, Māori perspectives were silent (at least within the official archival records) on the proposed flood controls. Although government authorities were not required as part of their planning and decision-making processes to consult with the public or Māori, they did often consult with

primary industry-related stakeholder groups (most notably Federated Farmers, which was formerly known as the Farmers' Union). For instance, the Ministry of Agriculture organized a specific meeting (at the request of Federated Farmers) between farmers in the Ōtorohanga district and officials from the Ministry of Agriculture and Ministry of Works as well as WVA and the local council. At the meeting, farmers were able to express their concerns about the damage flooding was causing to their farmlands, as well as petition central government to provide them with financial support and technical assistance to recoup flood-induced damages and losses to their properties. They wanted government funding to allow them to restore their now water-logged pastures, rebuild their damaged fences and other infrastructure, and replace their lost livestock. They also wanted the government to take actions to protect their properties from future flooding. Central government officials, while not willing to provide a firm promise about any grants of large financial assistance to farmers, did express firm support for the farmers' views and agreed the government would institute a coordinated approach that would protect farmers (and other residents) from flood events [109,116,117].

Despite the rhetoric of flood control being about reducing the dangers posed by flooding to people, the majority of flood mitigation efforts were more focused on economic productivity and efficiency [25,118]. It was widely known by the 1950s that government authorised and prompted drainage schemes, canals, irrigation projects, and forest removal practices ran counter to the prevention of floods, with the alteration of river systems, poor water management, and sedimentation creating floods and contributing to riverbanks bursting after heavy rainfall. Government officials and engineering experts, therefore, arrived at an approach to flood mitigation that required ever more complex and widespread technological systems intended to exclude natural processes as much as physically possible. These systems focused on the establishment of barriers (most notably levees and dams), diverting, and dredging of watercourses, and the drainage of wetlands and lakes. River management strategies used previously in Britain were imported and adapted in the Aotearoa context and emphasised even more extensive and costly command-and-control style approaches to manage rivers.

Engineers working for the WVA proposed four different options for Ōtorohanga flood control works, all of which involved levees and river re-alignment; there was no discussion of spatial planning or other non-engineering initiatives [119]. Each option was similar except for costs. The option chosen involved extensive engineering interventions (including river diversion and levees). In December 1960, one hundred and twenty residents approved the WVA's flood control scheme at a council meeting in Ōtorohanga. No record was kept of how many of the resident were Māori. However, iwi members recall their own families' negative experiences with local council officials (of racism and discriminatory policies) and how there were no mechanisms to allow Māori to participate in local government decision-making processes. Even when there were instances were individuals and groups did attempt to engage with local government officials, their views were disregarded, as local decision-makers focused on "betterment of settlers" at the expense of Māori [114].

The planned flood control interventions were expensive and exceeded the financial resources of the WVA or the Ōtorohanga Borough Council. Accordingly, local government authorities sought to increase local taxes (rates) for landowners and central government also provided additional funding. Funding for flood control works was channelled through the National Water and Soil Conservation Organisation, under the direction of the Ministry of Works, with additional subsidies provided by the National Roads Board and the Railways Department. The Ministry of Works relied on the Public Works Act to acquire land for the flood control scheme, which involved the acquisition of private-owned land (a large portion of which was Māori land) to construct its series of flood control interventions. The cost of the flood control scheme was originally estimated to be £680 000, which was later increased to £3 million (paid for by loans and an increase in local government taxes that added further financial pressures on Māori landowners) [120,121].

In 1961, work began on the Lower Waikato-Waipā Flood Control Scheme, which covered both the Waipā and Waikato Rivers. As part of this scheme, the Waipā River at Ōtorohanga received extensive flood control interventions; this included the clearance of riparian vegetation, the construction of higher levees and the realignment of the Waipā River [122]. Engineers created a new channel for Waipā River by cutting through land and widening and straightening the awa as it passed through the township of Ōtorohanga (replacing the three meandering loops) (see Figure 10) [123]. A new bridge was built at Honikiwi (west of Ōtorohanga), and the river widened. At Te Kuiti, less extensive structural interventions also occurred, which included vegetation removal and the construction of levees. In March 1966, the Ōtorohanga flood control was officially opened; however, land acquisition and construction work continued into the mid-1970s.

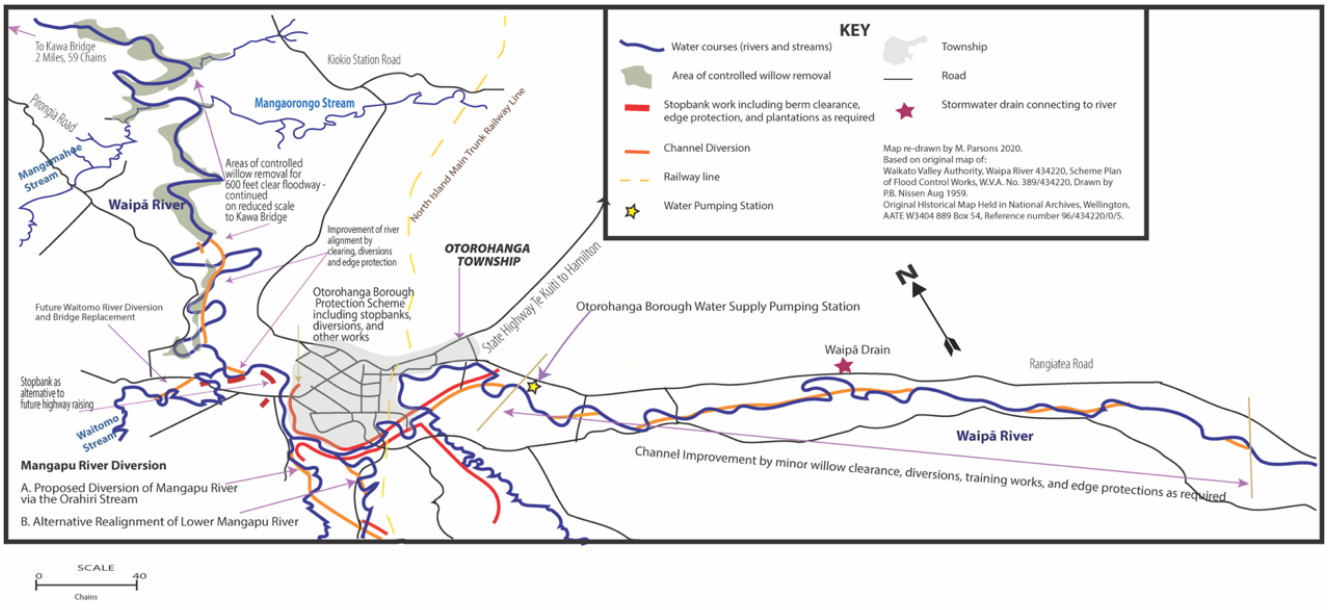

Figure 10. Map showing river re-alignment in Otorohanga and flood control works.

Since Māori were landowners in Otorohanga township, they became caught up in the WVA's plans to compulsorily acquire privately-owned land for the flood mitigation measures in Otorohanga (as well as elsewhere along the Waipā and Waikato Rivers). One Ngāti Maniapoto iwi representative recalled how his mother and her whānau were made "homeless in Ōtorohanga because of the [post-1958] river diversion. . . . Homeless, landless, resource-less, economy-less [sic]. All of that sort of stuff [came] from the river diversion in Ōtorohanga" [114]. Under Section 32 of the Public Works Act 1928, the local government (Otorohanga Borough Council) compulsorily acquired Māori land (which included houses and an urupā/burial ground) beside the Waipā River in Otorohanga. Minimal or no consultation about the scheme was undertaken with local Māori. In 1964, the central government's Ministry of Works (N.C. McLeod) wrote to the local government's Resident Engineer to request a report on all significant sites impacted by the flood control works. Particularly "whether there [were] any buildings, yards, gardens, orchards, vineyards, ornamental parks, pleasure-grounds, or burial grounds proposed to be taken" (underlined in original document) [122]. The local government did not supply the correct information to the Ministry of Works and the spatial planners were unaware that the flood control scheme would destroy an urupā.

A request such as this was made frequently by government officials during this time; however, it appears that correct processes were not followed in this instance. The records held in the archives do not indicate if any engineer or local government officials actually investigated the site, or contacted the registered landowners or local Māori communities to determine what features were of particular significance to them. In August 1970, the Resi-

dent Engineer R. A. Burnett informed the District Commissioner of Works there "appears to be no objection to the taking of the 19.8 perches for River Control purposes. The area is at present pasture, and no burial ground is visible or known of by local people". This statement was incorrect; Otorohanga Borough Council described the land as "Rangituatahi Burial Ground" when it issued its official announcement that the land would be acquired for flood control works on 15 July 1970. Earlier, the District Commissioner requested the Registrar of the Māori Land Court investigate whether the land included an urupā and the court informed the District Commissioner that it was intended to be reserved as an urupā. Seven years earlier, Maude Davis testified before the court that her family members were buried on the site, with 20 to 30 marked gravesites recorded in 1963 [124]. However, despite reports that indicated the land was registered and used as an urupā by Māori, the Registrar's office and the District Commissioner of Works declared the area consisted of pasture (with no graves visible). Moreover, the Ministry of Works reported that Māori did not submit any official objections against the land being taken for flood control works, which they interpreted as evidence that the land was unimportant to Māori (or that Māori supported flood control scheme). Yet, the lack of objections was likely a result of poor practices by the Ministry; it seems likely that officials did not consult with Māori communities in the district about any freshwater or environmental management decisions at the time. The failure to consult iwi about their urupā highlighted the ways in which Māori were deliberately excluded from decision-making processes that directly impacted not only their health and wellbeing (hau ora) but also those of their ancestors and their more-than-than human kin.

Despite the Ministry of Works reporting that no Māori submitted objections to the destruction of their urupā, at different times and using different mediums, generations of Māori did in fact write and speak out against government policies and practices in the Waipā and elsewhere. They wrote to government institutions (including drainage boards, local councils, and central government departments) to complain about how government agencies were disregarding the interests of their iwi, hapū, and whanau. They spoke, wrote countless letters, and filed legal cases in which they outlined the multiple ways government actions directly contributed to them being alienated from their whenua (land), awa (river), tūpuna (ancestors), and kai (food sources) within the Waipā catchment [114,125–130]. Yet, government officials consistently downplayed or ignored their complaints, and no substantive changes in policies or practices occurred.

Even when there were government processes in place to identify sites of significance to local communities (which included Māori) such as in the case of the Otorohanga urupā, local and central government officials did not follow their own procedures. In Otorohanga, officials failed to consult with landowners (even though the rules of their own institutions required them to do so) and did not undertake the necessary investigations about the urupā (such as visiting the site and talking to people whose family members were buried there). No attempt was made to inform (let alone consult) with Māori about the flood control works and the implications on their lands and their sacred sites. The Public Works Act provisions required that certain areas of land that were especially economically or culturally important (as determined by governmental officials) such as orchards, "pleasure grounds", ornamental parks and cemeteries required ministerial approval for the land to be acquired for public works (Māori wāhi tapu, or sacred sites, excluding urupā were not recognized as culturally important). While on other occasions the Ministry of Works did take into account and refuse to take areas deemed important to Pākehā (such as parks and cemeteries), in Otorohanga, government officials did not adequately investigate urupā and notice the graves that local Māori had identified (and given statements about to the Māori Land Court) seven years earlier. In Otorohanga, post the flood control works, the remaining piece of land continued to be used by tangata whenau as a urupā and grave markers were added to the remaining graves after 1970. In contrast, nearly a century earlier, when settlers complained about the Waipā River flooding and causing damage to the Whatawhata cemetery (which included the graves of British soldiers who fought in

the Waikato Wars as well as other settlers), the local government took immediate actions to protect the cemetery (clearing vegetation, restoring graves, and establishing barriers to prevent flooding) [131].

The river diversion and construction of flood controls in Otorohanga following the 1958 flood was firmly located in the wider processes of Māori dispossession. As one iwi member informed us "[i]f you … search anywhere for any of the history around … the Waipā River diversion in Ōtorohanga, all you'll find [will be] the stuff … about the development". However, such an "understanding of all of that history—[is] untold history—because it's only told among [members of Ngāti Maniapoto iwi] … but by and large, the rest of community" (meaning Otorohanga's Pākehā residents) "knows nothing about it" [114]. His own whānau lost their land as a consequence of the river diversion and flood control works, but even more significant than the loss of "legal title to [their] land [was the earlier] loss of th[eir] ability … to manage their own land" [114]; this loss of authority (rangatiratanga) was a direct consequence of the Crown's failure to honour both the Tiriti o Waitangi/Treaty of Waitangi signed in 1840 between representatives of Māori and the British Crown as well as the 1880s agreement between Ngāti Maniapoto and the Crown about the construction of railway line through Te Rohe Potāe (which historian Michael Belgrave discusses in his book *Dancing with the King*). The "rules that were applied by council" to Māori land, including the imposition of local rates (taxes) to fund drainage and flood control works as well as town infrastructure (often not provided to Māori households), resulted in Māori (as one Ngāti Maniapoto interviewee stated):

> "communal[ly held] land [becoming] uneconomical [to farm] … even though [Māori] were already farming it and all the produce went to … sustain[ing their whānau]" [114].

It was the perspective of local council officials in Otorohanga, paralleling the dominant views of central and local government officials throughout Aotearoa, that Māori land was "not economic, so [the government said it was] going to take the management of" it off Māori landholders and ensure the land was "developed" and used (in ways that conformed to the values of Te Ao Pākehā/the Pākehā or Western world) [114].

Nationwide, the pattern of local councils 'taking' Māori land using a range of mechanisms such as the Public works Act, was so far-reaching and prevalent across the country throughout the twentieth century that many scholars, ourselves included, argue it is difficult to not conclude that local government authorities (including those in the Waipā catchment) deliberately targeted Māori land because it was politically easier and financially cheaper to acquire than general land [132–137]. (Indeed, since there was a lack of Māori political representation at a local government level, substantive difficulties in participating in decision-making processes, and limited access to financial resources, few Māori landholders were able to mount successive challenges to local government actions to acquire their lands (notable exceptions include the 1977–1978 sit-in protest by Ngāti Whāuta iwi of Bastion Point/Takaparawhā and 1978 sit-in protest by Tainui hapū led by Eva Rickard of Raglan golfcourse).)

Although Māori landowners had little ability to challenge the ability of the central or local governments to take their land under the Public Works Act, they were able raise objections and seek better financial compensation than that offered by government. However, decisions frequently favoured government rather than Māori landholders and few received more money as a consequence of their protests [138–140]. Yet, despite Māori protests and attempts to challenge the status quo, Māori were overwhelming negatively affected by the acquisitions of their small remaining areas of land for flood control, just as they were with other public works (including roads, railways, drainage works, and power plants); each parcel of land taken compounded those already experienced by previous generations of tangata whenua who were increasingly landless as a consequence of government policies (as the work of historians including Aroha Harris and Richard Boast aptly demonstrates in further detail) [141–143]. Māori had already lost significant tracts of land due to discriminatory government policies, infrastructure construction (railway, roads, and drainage), the

activities of the Native Land Court, and economic hardship. Thus, the acquisition of Māori land (including homes and burial grounds) for the flood control works were part of the wider and ongoing settler colonial processes of Indigenous removal and erasure (of biota, of people, of landscapes and waterscapes): alienating Māori from their lands and waters were acts that deliberately sought to dispossess Māori of the material and metaphysical relationships. Secondly, flood works involved the removal of vegetation along riverbanks, dredging of riverbeds, and the diversion of watercourses, all of which contributed to the loss of native flora and fauna (which meant Māori were unable to harvest their traditional food sources from their whenua and awa). The destruction of sites of cultural significance included both physical and metaphysical things, including places where taniwha, and a wāhi tapu site (associated Battle of Huiputea that took place between Ngāti Maniapoto and Nga Puhi). Accordingly, the Waipā catchment's depletion and loss of tuna, interlinked with broader reductions in indigenous biodiversity, was felt by tangata whenua in terms of the diminishment of mana (authority), mauri (force of life), and interconnections between one another each other (whanau, hapū, iwi, and pan-iwi), their rohe, and more-than-human actors. Ngāti Maniapoto reports:

> For many of the Otorohanga Māori community there remains a keen sense of loss relating to their land. With the loss of land came the destruction of pā, burial sites, living spaces, place names that recorded their tupuna oral history, ceremonial places, waterways, pā tuna, mahinga kai, horticultural kai, horticultural gardens, repo pātaka kai (wetland food baskets) destruction of native bush (used for pataka kai—food basket), and puna (fresh water springs) and waters that were used for all manner of purposes. These included, among other things water used for drinking, food gathering and preparation, cleaning, health promotion, spiritual cleansing, ceremonial rituals, birth rituals, rituals for preparation of deceased; most of which (puna) were destroyed in the draining of land for farming purposes earth moving for diversion of the Waipā River and construction of flood stop banks, construction of the Main Trunk Railway Line and subdivision developments of the Otorohanga Township for Pākehā settlement [45].

As described in the quote above, government actions to address flood risks further compounded wider processes of settler colonialism and the injustices those processes and practices created. Iwi members were, as a consequence of loss and damage to their land and waterways, less able to provide food for their whānau (maintain food security) and their capacities to manage external disruptions were reduced as a consequence of the diminishment of their abilities to make decisions about how best to manage environmental resources and conditions.

3.5. Conflicting Viewpoints, Differing Risks

A plethora of research demonstrates that hydrological engineering works undertaken within Aotearoa's river systems during late nineteenth, twentieth, and twenty-first centuries has contributed to increasing the vulnerability of communities (both ecological and humans) to flooding [18,64]. Scientists observe that wetlands absorb excess flows of water, which significantly reduces the speed, height, and force of floodwaters. Accordingly, the diminishment of wetlands combined with sedimentation of riverbeds, vegetation change and engineering interventions, all fundamentally altered the flow and behaviour of water. Put simply, actions to radically change the waterscape of the Waipā into grasslands resulted in the increased biophysical vulnerability of communities to flood events. As wetlands were lost and forests removed, the long-standing pattern of regular small-scale flood events occurring within the Waipā River catchment was replaced by one of gradually worsening flooding unpredictable in timing and effect. As drainage canals where built, rivers straightened so the waters flowed fast and more directly to the sea, and plains became planted with exotic grasses, trees, and modified by built structures, the previously slow and meandering waters of the Waipā became raging torrents that frequently threatened to dislodge the physical (and discursive) markers of settler colonial progress.

For Pākehā residents—living in these newly created (but frequently still muddy) pastures—their attachments to place (their feelings of belonging) were anchored within their histories (personal, family, and social) and lived experiences of radically remodelling nature. Their efforts to modernise, remake and create new and improved landscapes and waterscapes were a fundamental part of their sense of self and how they related to environments. The construction of the flood controls, like the earlier building of the railway, clearance of the forests, and drainage of the wetlands, were narrated as, in the words of one Pākehā resident:

> "white m[e]n . . . [laying the] foundation for the . . . . progress of New Zealand . . . [through] their grit and determination, their energy and enterprise. [They transformed] the pristine wilderness into a land of industry and farming . . . [which leaves residents with] high hope[s] of still greater development and expansion of settlement and industry in the . . . future" [60].

From this perspective, flood risk extended beyond the potential for damage and loss of material things (be it lives, livestock, property, or livelihoods) and encompassed the emotional, personal, and relational. As geographer Lavau observed in the context of the Goulburn River in Australia, fluctuating and highly mobile rivers were more than a mere unruly annoyance for settlers; the persistently untameable rivers were systemic and discursive threats to the supposed settler colonial order of things [26]. The unpredictability of rivers, which overflowed their banks causing damage to houses, roads, farms, grasses, and trees, and killing people and livestock, was a challenge to the economic progress and moral stability of settler colonialism. The creation and continuation of productive landscapes was narrated as the essential duty of all Pākehā. Therefore, the inconsistent, fluctuating, and frequently moving nature of freshwater systems were more than just unruly annoyances for settlers, floods were both material and discursive risks to the imagined colonial order of things [26]. The unpredictability of rivers and their potential to cause damage (to houses, roads, infrastructure, roads, grasses, crops, livestock, and people) and kill (people, plants, animals), combined with the frequent regrowth of indigenous flora (raupō reeds and manuka trees) within the 'unwatered' grasslands presented threats to the newly made and 'settled' landscapes and waterscapes as unruly waters, like unruly plants raised deep-seated fears of unsettlement, instability, and remerging of unruly natives. The possibility of flooding and the risk of restoring past waterscapes and habitats was used to support policymakers' decision to engage in large-scale infrastructure and vegetation clearing activity along the Waipā River and its tributaries. Each flood event prompted government and public discussions about how to solve the flooding issue. The end results of these discussions, however, was the reinforcement of the status quo. The existing (maldaptive) flood risk management pathway was maintained through further financial investments in projects to continue and expand drainage and hydrological engineering works within the freshwater system, and the clearance of even more vegetation. All of this served to heighten the risks associated with flooding in the future, clear evident of path dependent institutions [18].

Floods were not necessarily interpreted as a disaster event for Māori within the Waipā; however, the settler-state's responses to flooding were a disaster (part of the continuing disaster of colonisation). Moreover, the history of flooding in the Waipā River and the state's efforts to mitigate flooding demonstrate how environmental injustices are not necessarily the product of a one-off event (such as a flood), a discriminatory government policy, or one actor (such as a factory polluting a waterway); rather, injustices can slowly accumulate over time. Just as soil slowly eroded away over the last century (washing off whenua that was once covered in a protective shield of vegetation) and filled up the ancestral rivers of Māori iwi and hapū within Waikato and Te Rohe Potāe districts, so too environmental injustices gradually amounted against Māori. The policies and practices taken to prevent the normal ebb and flow of the Waipā built upon top of earlier acts of colonial violence and dispossession, the destruction of taonga (treasures that included their wetlands), the loss of mahinga kai (food gathering sites) as a consequence of drainage works and

deforestation, and numerous other colonial interventions that disrupted Ngāti Maniapoto capacities to access resources, exercise their authority as mana whenua (authority holders within their tribal boundaries) and enact their responsibilities to their kin (human and more-than-human beings).

Many iwi members spoke about how (from their perspective as Ngāti Maniapoto), any conception of environmental justice inevitably includes their connections with all their kin (human and more-than-human) including the river. It includes everything within their rohe (plants, animals, waters, lands, rocks and supernatural beings), and these relationships (based on genealogy) need to be kept in balance (through reciprocal practices of caring) [112,144]. The Waipā River (as a living entity and relative of Ngāti Maniapoto), for instance, practiced reciprocity towards its fellow kin through numerous ways, including its flood waters washing over the whenua (land) bringing with its nutrients that helped Māori grow crops. Accordingly, the interruption of these reciprocal relationships is an injustice against both tangata whenua as well as the river itself. Justice, from this perspective, is not something that human beings seek to govern or determine. From Ngāti Maniapoto's perspective, the actions to drain the wetlands, remove indigenous plants and animals, reconfigure the behaviour of rivers (and of people) so that they acted in accordance to settler values and imagined geographies were acts of eco-violence and causes of multiple environmental injustices.

Procedural justice, environmental justice scholars concur, is about how decisions are made, who participates in decision-making processes, and who wields influence [39,40,145]. In the case of the design and implementation of both the wetland drainage works and the Ōtorohanga flood control scheme, it was central and local government officials who made the decisions, but local Pākehā residents and farmers also asserted some influence on decision-making, while Māori remained largely excluded from the process [146,147]. For procedural justice to occur, procedures needed to be established that allowed for "a fluidity of movement of people, ideas and perspectives across the boundaries of institutions between differentiated elite and lays spaces, creating open rather than constricted networks of interaction and deliberation" [146]. However, in the case of the Ōtorohanga flood control scheme no such procedures were put in place. Unsurprisingly, Māori knowledge, values, and views were excluded from the design and operations of the flood control works (paralleling what happened decades earlier with wetland drainage operations in the district). In turn, ongoing intergenerational environmental injustices for Ōtorohanga Māori residents (the majority of whom affiliated to Ngāti Maniapoto) were reported, including the diminished capacities to harvest customary foods, the destruction of habitat of fauna as well as of wāhi tapu of iwi, and the disruption of reciprocal relationships between iwi, their ancestral rivers, and their tupuna (ancestors which include their river).

The lack of respect was shown repeatedly over the early to mid-twentieth century in central and local governments' lack of acknowledgement or misrecognition of Māori culture, including the failure to recognise Māori relationships with their rohe as well as tikanga (laws and protocols) and mātauranga centred on inter-relationships between human and more-than-human relatives. Recognition is closely tied to participation [40,148,149], with groups who are often ignored, derided or discriminated against by the state not able to achieve participatory parity within decision-making processes, which is precisely what Ngāti Maniapoto iwi experienced in the context of flood risk management policies and projects.

The ontological politics of flood risk management demonstrate the injustices that are related to the imposition of settler-colonial understandings of flooding as a disaster and which require governments and individuals to take actions to prevent or mitigate [150,151]. Such ontological and epistemological erasure of Māori understandings of water (and what constitutes a healthy and functioning waterscape) not only involved the sidelining of Māori knowledge, laws, and systems of governance, but also the capacities of iwi/hapū/whānau to harvest foods and care for their rohe, all of which negatively impacted their physical, cultural, and spiritual health and wellbeing.

The physical and ontological erasure of Māori conceptualisations and relationships with their waters and lands are examples of the logic of elimination which underpins settler colonialism. The logic of Indigenous elimination, first described by Australian historian Patrick Wolfe [152], refers to the use of elimination strategies (ranging from genocide, state-sanctioned violence, child removals, breaking down indigenous land tenure systems, discriminatory laws, controlled inclusion) by settler-colonial societies as a way to displace Indigenous populations from their territories and impose settler systems of life. Typically, scholars exploring the logic of elimination emphasise settler-colonial acts to eliminate Indigenous peoples (bodies, minds, and cultures) but our study highlights that the logic of elimination is similarly observable in settler-colonial efforts to erase Indigenous environments (lands, wetlands, forests, waters, flora, and fauna). In the case of Ngāti Manaipoto, the successive actions by settler-colonial governments and individuals' efforts to transform the Waipā River catchment attempted to eliminate Ngāti Maniapoto livelihoods, modes of living, connections with their ancestral river (Waipā), as well as their tikanga and overarching way of seeing the world (Te Ao Māori). This logic of elimination not only explains the initial impulse and actions of settlers in the beginning stages of settler-colonial rule in the Aotearoa (such as the colonial government's refusal to uphold the Treaty of Waitangi in the nineteenth century and the military invasion of the Waikato in 1863) but, critically, this logic also accounts for the creation and imposition of legislation, governance structures, land-use practices, and flood control works in the twentieth century. The drainage of wetlands, the cutting and burning of forests, the removal of Māori families from their homes, the destruction of sacred sites, and the construction of flood controls in the Waipā River were all physical actions that sought to remove Māori landscapes and waterscapes and Māori systems of life.

The Waipā River example highlights how the strategies of Indigenous elimination in settler-colonial societies not only change over time but were (and are still) not restricted to Indigenous peoples, but also extends to include their lands, waters, flora, and fauna. Since Te Ao Māori (Māori world or worldviews) holds that all Māori share kinship ties with their whenua, awa, repo, and indigenous plants and animals, settler-colonial actions that sought to remove and damage their more-than-human kin were alike to acts of physical violence against one of their human family members. Strategies of elimination may vary over temporal and spatial scales, yet irrespective of what the policy changes look like, the imperative logic of elimination remained evident. Following Wolfe, "settler colonialism has both negative and positive dimensions. Negatively, it strives for the dissolution of [Indigenous] societies. Positively, the ongoing requirement to eliminate the [Indigenous] alternative continues to shape the colonial society that settlers construct on their expropriated land base" [152]. Both facets comprise one reality whereby the practices of elimination of Indigenous ways of life, and those comprising the embryonic settler-colonial community, are mutually constitutive and, in fact, from an ontological perspective, cannot be separated. The logic of elimination is part of the operations of settler-colonial societies, yet it is not restricted to actions of physical violence or overt racism against Indigenous peoples and instead can take a variety of forms. The displacement of Māori ways of understandings and responding to flooding is just one example of many of the subtle practices of elimination that took place in Aotearoa.

For Pākehā, the social and ecological transformation of the Waipā River catchment, which included the extensive flood control infrastructure, solidified and firmed-up the sociality of settler colonialism [28]. The physical structures of flood control—levees, drainage canals, pumping stations—helped settlers to establish homes and modes of living (capitalist) for themselves that encapsulated their knowledge, values, and interests. A plethora of recent research from across the globe identifies how the removal of wetlands significantly increases the severity of flood events [18,153,154]. Similarly, researchers concur that the destruction of forests and wetlands also contribute to greater run-off of nitrates and sediment (from the land into waterways) leading to worsening freshwater degradation in the Waipā River (and elsewhere in Aotearoa and around the world). Yet, even after

settlers experienced destructive flood events and water quality decline, they still proudly supported the expansion of further drainage works and flood infrastructure.

4. Conclusions

Māori scholars, activists, and community members have articulated that flood events and radical environmental changes are not novel or singular events. From Indigenous perspectives, destructive flooding, as with other so-called disasters such as wildfires and worsening droughts, are less like a departure from the norm (environmental, climatic, or social), and rather a continuation of the settler colonial ecological violence that commenced more than a century ago with a range of colonial projects [28,155].

Flood events, freshwater degradation, and biodiversity loss within the Waipā River catchment (paralleling decision-making elsewhere in Aotearoa) were managed throughout the nineteenth, twentieth- and early twenty-first centuries in much the same way, with limited evidence of social learning or institutional change [18,82]. At the national and local levels, thus, there is clear evidence of path dependency in the historic and contemporary institutions responsible for governing and managing Aotearoa's rivers. Indeed, how Aotearoa's settler colonial governments (both central and local government bodies) sought to address disasters such as flooding or soil erosion often involved management approaches that perpetuated policies and actions that solidified and re-asserted the "social cohesions of settler colonialism and racial capitalism" at the expense of Indigenous peoples and other marginalised (often non-White) social groups [28].

Since Pākehā residents were overwhelming strong advocates for drainage works and flood controls and comprised most elected and non-elected local and central government officials, Pākehā priorities and approaches to resource and flood management took precedent over those of Māori. At the same time, Māori were experiencing ongoing socio-economic deprivation because of the cumulative impacts of colonial violence, dispossession, and political marginalisation. Thus, Māori were most negatively impacted by such flood control and drainage works than Pākehā, while the hard interventions to re-engineer the waters and lands interrupted the connections the metaphysical and material connections between tangata whenua and their awa. Floods were perceived by Pākehā within the Waipā River catchment as profoundly negative events that needed to be prevented to ensure economic and physical security, the flood control works (as with the drainage works in earlier decades) designed to control the supposedly unruly (uncolonised) Waipā River had far more negative impacts on Māori than any flood event could ever have.

Just as flooding is not inherently a disaster event for Māori communities, the observable impacts of climate change facing Indigenous peoples is not a new environmental crisis or climate emergency. Instead, as we have demonstrated through our analysis, the practices and structures that produce the conditions for destructive flooding can be traced back to settler colonial transformations of landscapes and waterscapes. In the case of the Waipā, this involved the clearance, drying, and re-planting of the land as well as draining, dredging, and re-making waterways, and the marginalisation (and attempted erasure) of Māori relationships with and management of their rohe.

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