



Environment & Society Portal



The White Horse Press

Full citation:

Knight, Catherine. "The Paradox of Discourse Concerning Deforestation in New Zealand: A Historical Survey." *Environment and History* 15, no. 3 (August 2009): 323–42.

<http://www.environmentandsociety.org/node/3383>.

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The Paradox of Discourse Concerning Deforestation in New Zealand: A Historical Survey

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ABSTRACT

When the European settlement of New Zealand began in earnest in the mid-nineteenth century, the landscape too underwent a dramatic transformation. Much of the forest was destroyed by milling and fire, and the land converted to pasture for farming. While seen by many as firmly within the prevailing ‘doctrine of progress’, this transformation was viewed with misgivings by others, who observed how deforestation led to erosion and floods, and advocated more prudent forest management.

This paper explores the historical discourse on deforestation around the latter part of the nineteenth and early part of the twentieth centuries and how it contrasts with the recent discourse following major floods in 2004, in which the discussion of deforestation as an underlying cause of floods and erosion is notable in its very absence. This paper will seek to explain the paradox apparent in the development of New Zealanders’ understanding of the connection between deforestation and the devastating flood events and severe erosion occurring in New Zealand today. While this is a connection that was repeatedly and cogently expressed by our forebears over one hundred years ago, it is one that most New Zealanders today are ignorant of.

KEYWORDS

Deforestation, floods, erosion, environmental knowledge, discourse

INTRODUCTION

As Pawson and Brooking note in their introduction to *Environmental Histories of New Zealand*, 'relatively little is known about how environmental knowledge evolves through time, or how environmental ideas are transmitted, and when and why they change'. In this paper, it will be argued that environmental knowledge is not simply the product of an intellectual process – it is also, and perhaps more vitally, the product of a more intuitive, emotional process, evolving as our perceptions towards the environment develop over time.¹

Only 150 years ago, New Zealand's environment was vastly different from the one we see today. Much of the country was still covered with dense forest. But in the latter half of the nineteenth century, the New Zealand landscape underwent a dramatic transformation. Much of the 'tangled and impervious forest', which seemed interminable to the first European settlers, was destroyed by milling and fire, and the countryside transformed into pasture for farming. Within 60 years of European colonisation of New Zealand, native forest cover had been reduced by half.

The transformation of New Zealand's environment from forest to pasture was seen by some as one of 'the outstanding achievements of our people', but was viewed with misgivings by others.² Among the settlers were those – foresters, politicians, scholars and farmers alike – who observed how deforestation led to erosion, landslips, silting of rivers, and floods, and who advocated more prudent forest management and afforestation.

For the most part, however, these cautionary voices went unheeded, and New Zealand is today a 'pastoral paradise' that the country's farming pioneers would have been proud of. But true to the predictions of their more cautious contemporaries, New Zealand is now plagued by erosion and floods, which have become increasingly severe as the cumulative effects of previous floods – land destabilisation and the silting of rivers – leave their legacy.

In 2004, New Zealand experienced its most devastating flood in 100 years. This flood left many parts of the lower North Island scarred by thousands of landslides and bereft of many million tonnes of topsoil, irretrievably washed out to sea by the floodwaters. Hill country erosion was identified as the key cause of the floods. In response, the regional government launched an initiative to manage hill country more sustainably. However, attempts to encourage the replanting of hill country have been met with hostility and suspicion by many farmers, who believe that planting of uplands will have no positive effect on erosion and flooding, and indeed, may even exacerbate the problem.

This leads to the question: why is the idea of afforestation met with such resistance today, when it was advocated so ardently by our forebears? This paper proposes that the explanation lies not only in economic factors, but also in the way New Zealanders perceive their environment – the collective 'cultural

imprint' of the landscape on the national psyche. While for the settlers, the vision of a land blanketed in dense luxuriant forest was a vivid memory, and the impacts of deforestation were immediate and personal, few New Zealanders today have even an inkling of their land's forested past, nor of the connection between the environmental events we experience today and our treatment of the environment in the past.

THE DESTRUCTION OF THE BUSH

Prior to human colonisation, it is thought that the New Zealand landmass was almost entirely covered in forest, apart from alpine areas. Between the beginning of Polynesian settlement in New Zealand around the fourteenth century and the beginning of organised European colonisation in the nineteenth century, it is estimated that forest cover was reduced by about half, largely through fire. When the European settlement of New Zealand began in earnest in the 1840s, it is estimated that forest, or 'bush' in the vernacular, covered about two thirds of the North Island and about 25 to 30 per cent of the South Island. In the decades that followed, bush was destroyed through milling and fire to make way for settlements and farms. By 1900, forest cover had been reduced by half again, to about 25 per cent.³

For the three decades following 1840, forest milling was concentrated primarily in the coastal regions. The early mills provided timber for the burgeoning European population as well as being exported to Australia. Timber was ubiquitous in the colony: it was used for building ships, railways, roads, bridges, houses, fencing, posts, carts, carriages, barrels and boxes. It was also used for firewood: for cooking, heating homes and heating water. The pace of milling quickened from the 1870s, in step with the demands of population growth and heightened economic activity. Railways made formerly unexploited regions accessible for milling. During this period, the trade in timber constituted a large proportion of economic activity: in the mid 1880s, timber and firewood accounted for half the freight carried by the railway in many regions. The choice of wholesale milling, as opposed to selective logging, led to substantial waste, and extensive areas of forest being destroyed in a short space of time.⁴

In the decades following 1870, a renewed assault on the forest began. Settlers pressed into uncolonised regions further inland, which were at that time still largely forested. For these settlers, the priority was the clearing of land for conversion to pasture, and they did this not by milling, but by fire. Stubborn remnants of bush were then removed in a labour-intensive process called 'stumping' and 'logging up'. In the period between 1886 and 1909 alone, the remaining 22 million acres of forest had been reduced to 19 million acres. But as Wynn points out, the unrepentant, systematic destruction of the forest was

supported by the prevailing philosophy of progress and improvement. The clearing of the bush was likened to spiritual enlightenment: 'If you find your mind, your heart to be a wilderness', the Wesleyan missionary Cort Schnackenberg had urged his converts in 1841, 'cultivate it in the same manner as you do your fields, cut down the bush, great and small – spare no sin'. The forest was seen by some as a symbol of retrogression – as the antithesis of civilisation and progress: '... a people settling in a forest country must destroy that forest or it will conquer them. The forest is conservative, repressive, making not for culture or advancement ... Some day a civilised tribe, from open lands, happens along, and hews down that forest ...'.⁵

As Star observes, the wholesale destruction of the bush by the settlers has been interpreted as a product of loathing for the bush by some historians. However, in his review of historical writings on the subject, Star finds little evidence of this. He suggests that instead, settlers were generally indifferent to the bush, and their motivation for its clearance was not an emotional one but a practical one: their sole purpose was to convert it to farmland so that they could forge a living in their adopted land.⁶

THE HISTORICAL DISCOURSE CONCERNING FOREST DESTRUCTION

Nevertheless, not all saw the clearing of the forest in a positive light. As they witnessed the destruction around them, many people had misgivings about the doctrine of untrammelled 'progress' and the wasteful and reckless destruction of New Zealand's forests.⁷

James Inglis, with his knowledge of the careful harvesting of India's forests and the elaborate care given to plantations in Britain, was appalled at the wholesale destruction of forests he witnessed in 1885 when visiting the Seventy Mile Bush settlements in the lower North Island. Naturalist Thomas Potts, on seeing the burning of vegetation on Canterbury's Port Hills, 'covered, for weeks together, with thick lurid smoke', complained of the 'barbarous improvidence' of contemporary attitudes towards the forest. Scottish-born geologist, natural scientist and explorer James Hector urged millers to practise more careful and selective logging rather than continue their wholesale and rapid destruction of forests.⁸

Writing in 1909, historian and journalist Guy H. Scholefield was particularly scathing of what he saw as the settlers' wanton and wasteful treatment of the forest, describing it as a 'pitiful and wicked war' in which hundreds of mills were 'killing, and slaying and burning and wasting' in 'a reign of unbridled rapine and licence'.⁹

The *pakeha* [European New Zealander] simply wallowed in the destruction of the forest. If he required boards to build a three-roomed *whare* [house], he

devastated an acre of timber. If he wished to plant potatoes or wheat, he put the flames through the undergrowth, felled the large trees, and dragged them aside to rot. The destruction was appalling, and it went on for thirty years without the slightest check or protest.¹⁰

Writing in the 1930s, journalist and scholar, James Cowan observed: 'The forest, too, has passed away, or all but passed, before it was realised that its wholesale destruction was a crime and national disaster'. Concern about wasteful destruction of the forests was even expressed by the very people responsible for it: Dunedin timber miller John McLay condemned 'the cruel Ruthless hand of man' for cutting down trees and 'destroy[ing] God's beautiful work – all for the lust of money that sends so many to destruction'.¹¹

But the discourse went beyond merely lamenting the loss of forest; it also identified the link between deforestation and downstream (both literally and figuratively) environmental impacts, most notably erosion and flooding. As early as 1868, Thomas Potts and a number of other educated and influential individuals had identified the ways in which deforestation worked to disturb the 'equilibrium' arrived at by nature, recognising the links between forest clearance and hillside erosion, flooding and loss of fresh-water supplies. In particular, removal of the forest was identified as being 'a primary cause of excessive inundations'.¹² Similarly, Potts' contemporary, W.T. Locke Travers, a lawyer and Member of Parliament, emphasised the relationship between deforestation and flooding in his submissions to Parliament in 1868, stating:

The destruction of the forests in the upper portion of the larger valleys had a most pernicious effect on the drainage of the country, and by precipitating the rainfall into the rivers with great rapidity, produced the destructive floods that had become common.¹³

These concerns underpinned attempts to introduce legislative measures to preserve forests during the latter part of the nineteenth century. In 1874, Premier Julius Vogel introduced the Forests Bill, which recognised forests as finite resources and sought their managed use. However, while the Bill was passed, it was in a much diluted form, and soon after, its financial provisions were rescinded, leaving it a toothless statute. Furthermore, in 1877, before any state forests could be established under the Bill, Inches Campbell Walker, the first Conservator of State Forests in New Zealand, left the country.¹⁴

Later attempts at legislation were marginally more successful, but nevertheless limited in their scope. In his role as Conservator of State Forests, Campbell Walker asserted the need for forest reserves on upland slopes beyond the reach of wise settlement, stating in 1877:

I should view with very greatest anxiety any clearing of the hills which form the dividing range or back-bone of the island, and am convinced that it would be followed sooner or later, by the most disastrous results, both in the shape

of deterioration of the climate, dangerous floods and drying up of springs and sources of rivers.¹⁵

Following Campbell's departure from New Zealand, there was some progress in establishing the forest reserves for which he had advocated that half a million acres should be set aside by 1881 under the 1877 Land Act for the 'growth and preservation of timber' or 'climatic forest conservancy'. In 1886, under the provisions of the State Forests Act (1885), new mountain reserves were established to protect rivers, streams, and climate. However, little effort was given to managing these or other state forest lands.¹⁶

Sometimes political recognition of the issue of deforestation came from unexpected quarters. Even in the Lands Department, for which the promotion of settlement was always the foremost priority, officials acknowledged the importance of forest cover for watershed protection, and as early as the 1870s, some grew concerned about the ecological consequences of turning marginal land into farms.¹⁷

In 1900, the Surveyor General made recommendations that forests be conserved to maintain water supplies and climatic equilibrium, to prevent degradation of the high country and deposition in the lowlands, and to protect flora, fauna and natural beauty. However, without legislation or resources to implement these recommendations, these words had little force.¹⁸

In his survey of environmental anxieties in New Zealand from the mid-nineteenth century to the early twentieth century, Beattie highlights how a general shift in emphasis in concerns about deforestation in New Zealand is apparent around the turn of the century. Initially, concerns had focused on preventing climatic deterioration as well as soil erosion and flooding, but by the 1900s, fears of soil erosion and flooding had overtaken concerns about climate change. He suggests that this shift was in part as a result of the loss of currency of climatic arguments among the international scientific community, and in part due to the increasing prominence of soil erosion in the New Zealand environment by this time.¹⁹

This change of emphasis is evident in J.P. Grossmann's book entitled *The Evils of Deforestation*, published in 1909, in which he describes at length the consequences of deforestation, citing numerous international case studies in Europe, Asia and North America. Grossmann states: 'Foremost among the inevitable effects of deforestation we must, therefore, rank floods and landslips'.²⁰

In his 1909 publication, 'New Zealand in Evolution', Scholefield clearly identifies these consequences:

In this period the denudation of the forest already had some detrimental effect on the climate here and there, and the severity of floods in the rivers was marked.

With the hillsides and the upper reaches bare to the elements, the snow or rain-water passed off rapidly. The streams rose without the slightest warning, tearing down through gorges, eroding the banks, overflowing farms, and devastating the lower alluvial flats with silt and boulders. It was a very disastrous retribution for the recklessness of white man.²¹

In a 1910 paper entitled 'The effects of the disappearance of the New Zealand bush', Archdeacon Walsh cogently outlined the effects of deforestation, both climatic and topographical. Of floods he states:

Floods have doubtless been always prevalent in New Zealand; with its peculiar geological formation and its abundant rainfall it could not be assumed otherwise. But with the removal of the bush they have assumed a form unknown before both in regard to their magnitude and their power of destruction.²²

He observes how the removal of forest had led to erosion and in steeper places, landslips – whole hillsides sliding away in some cases.²³

This discourse on the negative effects of deforestation was not limited to the scholarly discussions of naturalists and botanists or the parliamentary debates of politicians. A survey of New Zealand newspapers dating from 1840 to 1915 reveals that it was a topic that featured not infrequently in newspaper coverage. Articles on the topic carried such headings as 'The evils of deforestation'; 'Forestry: the ills of deforestation', 'Exhausted land', 'The passing of our forests', 'Destruction of our forests' and 'Unwise deforestation', somewhat dramatic and emotive headlines which give some indication of the level of concern surrounding the issue.²⁴

Many of these articles make the link between deforestation and the effects of erosion and flooding. For example, an article entitled 'Deforestation and its consequences' published in the *Hawera & Normanby Star* in 1910 refers to the consequences of deforestation in China and states of New Zealand:

... it is no exaggeration to say that there is not a single district in the Dominion in which the native bush has been cleared away round the head-waters of the rivers that does not exhibit some of the disastrous consequences above described. It is only necessary to mention the matter to recall to the recollection of the general public the extent to which floods have increased in recent years throughout these Islands, in all the districts watered by rivers flowing down from hills where the bush has been partially or wholly cleared away.²⁵

An article in the *Evening Post*, published in 1911, cites the New South Wales Inspector of Forests on his visit to New Zealand, who stated:

Denudation, largely the result of deforestation, has wrought conspicuous evils. When the trees and their root reticulation are destroyed, hill-sides, rendered

unstable, begin to slip into the streams, floods carry the gravelly substance down into the rivers, and scatter it over the banks, destroying fertile alluvial land, or deposit it in shoals, to the danger of navigation. Streams are liable to change their courses, and riparian troubles ensue. These processes, general enough, have a special application in New Zealand, owing to the large proportion of hilly country which lends itself to erosion when deforested ...²⁶

As an indication of how internationally-aware discourse on deforestation in New Zealand was at this time, a *Taranaki Herald* article of 1909 outlines forestry practice in Japan, which it compares favourably to practices in New Zealand, stating: 'The far-sighted people of Nippon have foreseen the results of the destruction of their extensive mountain forests, and have safeguarded themselves by placing all of these under Government control'. Other articles refer to practices in China, North America, and a number of European nations.²⁷

Of particular relevance to the case study in this article is commentary on the effects of deforestation in the Manawatu region. For instance, an article published in *The Evening Post* (1910) reports that:

Local bodies, as well as private owners, on the banks of rivers like the Rangitikei and Manawatu, are already realising to their cost some of the results of deforestation in loss of considerable areas of land and in expensive protective works to avert still further destruction.²⁸

Writing around the turn of the twentieth century, the historian and journalist T.L. Buick describes the Manawatu River and its risk of flooding:

The river thus deriving its supplies from such a large area, and from so many extended sources with such widely different weather aspects, is naturally subject to periodical and heavy floods, which have been considerably intensified since the denudation of the forest began, and the question of re-foresting the upper portions of the ranges about the head waters of the river and its principal affluents, will no doubt arise in the future.²⁹

In 1910 Archdeacon Walsh wrote of the 'great floods' that took place in the Hawke's Bay and Manawatu districts in 1893, and again two or three years later. From Napier to Wanganui, roads and railways were dislocated and bridges swept away, stock was drowned and farms and townships submerged under floodwaters. It was said at the time that the height of the floodwaters was unprecedented, and Walsh suggests that these levels were 'in great measure due to the increasing extent of clearing on the high lands where the rivers have their origin'. Further, he predicted: 'As time goes on, phenomenal floods will occur again, and former records will be beaten; for as the hills become more denuded the floods will become proportionately more destructive'.³⁰

Grossman too highlights the impacts of floods and erosion in the Manawatu region:

Some years ago Mr R. W. Holmes, now Engineer-in-Chief to the Public Works Department, reported to the Feilding Borough Council on a serious washout at the junction of the Oroua and Kiwitea rivers, involving the loss of over 50 acres of valuable land, and he attributed this disastrous flood entirely to the destruction of the bush along the upper courses of the rivers. Throughout the Wellington and Wanganui districts the same tale can be told. The Manawatu, the Wangaeahu, the Rangitikei, the Turakina have all followed the same course, with the same unfortunate consequences.³¹

Grossmann concludes in a statement that could equally apply to the situation in New Zealand today:

Surely this constant and steadily increasing drain upon our resources [due to the cost of damage to property, clean-up, and repair of infrastructure] calls for a little forethought and prudence on our part, and emphasises the demand that the authorities should arrange for an exhaustive investigation in the well-known and generally admitted connection between the cutting away of the bush and the increased frequency and destructiveness of floods throughout New Zealand.³²

Grossman's book also carries graphic photographs showing the effects of floods and erosion, ones that echo (or more accurately, portend) the photographs taken in the aftermath of the 2004 floods a century later. For instance, one photograph shows a house teetering on the edge of a flood-swollen river, strikingly similar to an image of a house about to fall into the swollen Kiwitea Stream in Feilding in 2004 (one of the towns most seriously affected by the floods of that year) (see figures 1 and 2).

The commentary outlined above clearly demonstrates that people were aware of the links between deforestation, erosion and flooding in the late nineteenth and early twentieth centuries. Their knowledge was informed by a combination of first-hand experience of what was happening in New Zealand and international literature which drew on case studies from around the world. In particular, many writers were influenced by the work of George Perkins Marsh, whose landmark publication of 1864, *Man and Nature*, highlighted the effects of deforestation, both in North America and internationally. The commentary also highlights that the consequences of deforestation had been brought to bear in New Zealand numerous times already, including in the region which is the subject of the case study in this article. These writers warned that if current land clearance and management practices were allowed to continue, these issues would only worsen over time, predictions that have been borne out over the subsequent 100 years, culminating in the most destructive flood event to date, the floods of February 2004.

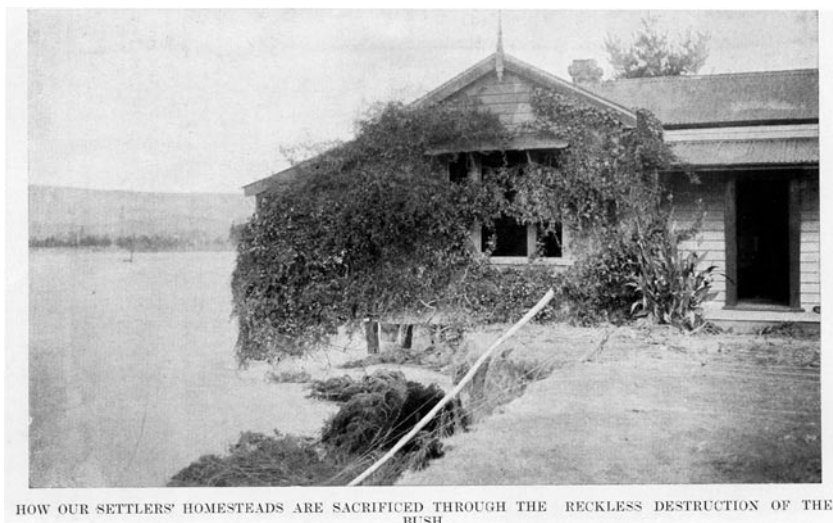


FIGURE 1. A house teetering on the edge of a flood-swollen river, with original caption (source: Grossman 1909)



FIGURE 2. A house overhanging the banks of Kiwitea Stream, Feilding 2004 (source: Manawatu District Council)

THE 2004 FLOODS OF THE MANAWATU-WANGANUI REGION AND THE DISCOURSE THAT FOLLOWED

Between 14 and 17 February 2004, intense rain fell over the lower North Island on land already saturated from previous severe weather. The rainfall experienced in the region in February 2004 was the most widespread and heavy rainfall event on record since the extensive deforestation which took place when the region was settled in the late nineteenth and early twentieth centuries. River levels in the Manawatu-Wanganui region rose swiftly. The Manawatu River peaked at its second-highest level on record. Many rivers breached their banks, spilling silt-laden floodwater through towns and across farmland. A number of rural communities were evacuated, with about 2,300 people forced to leave their homes and farms at the height of the emergency.³³



FIGURE 3. Erosion in the Pohangina Valley, Manawatu 2004 (source: Manawatu District Council).

The floods cost over \$112 million in insurance payouts, and \$135 million in government aid was granted to farmers affected by the floods. The total economic impact was estimated to be about \$400 million. The damage to land was also substantial: the flood resulted in approximately 62,000 landslides and

the loss of an estimated 200 million tonnes of top-soil – approximately half the average nationwide figure for an entire year.³⁴

In its report on the February 2004 floods, the regional government with jurisdiction over most of the flood-affected region identified the fundamental cause of the floods as hill country erosion, a direct outcome of historical deforestation. Approximately 60 per cent of the Manawatu-Wanganui region, the region most seriously affected by the storms of February 2004, is hill country. Sixty-five per cent of this consists of unstable hillsides and gullies. Despite the application of fertilisers to increase fertility, hill country soils under pasture have become shallower (i.e., the topsoil layer is becoming thinner), more drought sensitive, and more poorly drained, making soils more susceptible to erosion. Erosion has deposited a large quantity of gravel, sand and silt in the river systems, causing lowland river channels to rise, and making rivers more susceptible to flooding. Over time, the cumulative affects of previous floods – the destabilisation of land, the silting and clogging of rivers with debris – have increased the frequency and magnitude of floods in the region.³⁵

Understandably, the focus of most media discourse relating to the floods in the weeks that followed (as reflected in newspaper coverage) concerned the aftermath of the floods and the recovery of the region. Once the immediacy of the recovery subsides, there is increased discussion of flood prevention. However, most coverage focuses on flood mitigation works such as the raising of stop-banks. An article which is typical of this kind of response is one published in the *Manawatu Evening Standard* in July 2004. It states that, owing to climate change, the magnitude of floods in the Manawatu is predicted to increase in future, and reports that more investment is planned for river and flood-control works in the region. Another article, published in the same paper, refers to an independent report which concludes that flood warning and protection systems need to be improved. Neither article refers to the issue of deforestation nor the long-term prevention or amelioration of flooding through afforestation initiatives. However, a later article acknowledges the limits of conventional flood-control measures such as the raising of stop-banks: according to one regional government official, there is scope to raise river stop-banks only once more in the future, before other, more expensive measures, such as the building of dams, will become necessary.³⁶

The discourse that does feature afforestation as a preventative measure relates to regional government initiatives to encourage more sustainable management of farmland, a key element of which is the afforestation or retirement of hill country farmland vulnerable to erosion. An initiative launched by the regional council in response to the floods provides farmers in the region the opportunity to have their farm assessed, encompassing aspects such as soil composition and susceptibility to erosion. Implementation of the resulting farm plan is not mandatory. The cost of implementation is shared between the landowner and

the regional council, the proportion funded by government commensurate with the benefits to the region's environment and economy.³⁷

The response to this initiative, particularly from farmers, is revealing, and demonstrates how environmental knowledge is not necessarily a linear, ever-evolving intellectual process – rather, it is a process influenced by the way in which people perceive their environment and engage with it. The discourse reveals that there is a conviction among many farmers that erosion and floods are natural phenomena, and afforestation and land retirement initiatives are an attempt to resist the forces of nature. A leader in the farming community, the president of the Federated Farmers Association, comments that in its initiatives to reduce erosion and run-off, the regional government is 'trying to defy nature'. Further, many farmers claim that the planting of trees on hill country does nothing to prevent erosion, and may in fact exacerbate it. Many also believe that pasture is comparable, or preferable, to tree cover in preventing erosion. One farmer states that in spite of 50 years of tree planting, erosion is worse among his trees than on bare pasture. He claims that trees exacerbate flooding damage because they block rivers and smash bridges, stating: 'Just leave it – erosion is a process that has been going on for millions of years'. Another farmer claims that forests surrounding his farm suffered more damage in the 2004 floods than steep hill country pasture, stating that: 'entire hillsides under virgin bush (sic) collapsed and slid into the gorges'.³⁸

There is also a marked lack of general commentary in the media concerning the links between deforestation and flood events such as that of 2004. One of the few exceptions is an article reporting on a public lecture given by a prominent business commentator on the vulnerability of New Zealand's 'clean, green image' to criticism in light of the country's environmental record. He cites as one key example of poor environmental performance the magnitude of the erosion and loss of topsoil experienced in the 2004 floods, which he correctly attributes to hill country deforestation.³⁹

This paucity of the discourse concerning the links between deforestation and this major flood event stands in stark contrast to the prominence of the discourse in the late nineteenth and early twentieth centuries. This poses a paradox: while our ecological and environmental knowledge has heightened markedly and has become more widely disseminated throughout society than it was over a century ago, our understanding (or at least acknowledgement) of these links appear to have regressed. How can this be explained?

The lack of discourse is not only prominent in the farming sector, where individuals may feel that there is a financial incentive to remain with the status quo – it is widespread throughout society, even among sectors of society which have no economic interest in maintaining the status quo. Therefore, while economic factors clearly play an important part in the resistance to change among a section of society, they cannot explain the lack of discourse across society as a

whole. Nor can the lack of discussion be explained by an absence of ecological awareness, because it is beyond question that awareness and knowledge has increased, rather than decreased, over the last century or more. It is this author's belief that this paradox can only be fully explained by the idea that environmental understanding is not only an intellectual process, but also a product of how we perceive our environment.

To better illustrate this theory, the case of forestry in post-World War Two Japan offers an insightful comparison to the New Zealand situation. Japan shares a number of geological and climatic similarities with New Zealand. It is an archipelago of similar land mass, made up of four main islands, and a number of smaller islands. Like New Zealand, Japan is characterised by its upland geography: about 75 per cent of Japan's land surface is mountainous, with a mountain chain running through the main islands. Dense forest used to cover much of the land area, owing to the topography, volcanic soils, very high average annual rainfall and temperate climate. Now approximately 70 per cent of Japan is forested, most forests coinciding with mountainous terrain. Forest cover is made up of 60 per cent indigenous forest and 40 per cent plantation forest.⁴⁰

Ironically, the reason for the extensive forest cover today is the large-scale logging which took place in Japan during the pre-war and wartime periods. This high level of felling had major environmental consequences, causing landslides, extensive flooding in many downstream districts of Japan, and transforming much of Japan's forested countryside into an expanse of scarred and denuded hill slopes. It also left Japan with a serious timber shortage. Recognising the urgency of these problems, the government launched a nation-wide reforestation programme following World War Two to restore tree cover to the denuded uplands – though primarily with introduced coniferous species rather than natural broadleaf species. In the following four decades an estimated 10 million hectares of new timber forest were planted, reinstating the national landscape of verdant hills and mountains. As a result of this policy, Japan's forested area has actually increased over the twentieth century, from around 22.5 million hectares in 1900 to the present coverage of more than 25 million hectares.⁴¹

There are a number of possible reasons for the swiftness of the government response to the flooding and landslips caused by deforestation in Japan. One is that the comparatively high density of the human population in Japan, even in rural areas, means that floods or landslips of any significant magnitude generally result in fatalities. This compares with New Zealand where these events invariably lead to significant property and infrastructural damage, but only rarely human fatalities. The likelihood of further human casualties on a potentially catastrophic scale if the cause of floods and landslips was not rectified meant that the impetus for action was far greater in Japan than in New Zealand.

Further, much of the upland areas that had been deforested were under state ownership, so that from an administrative perspective, reforestation was a relatively straightforward proposition. For land that was privately owned, the

government offered financial incentives and guidance to landowners willing to convert their land to coniferous forestry.⁴²

However, it is the author's belief that these factors alone do not entirely explain the difference in responses – the relationship between environment and culture is also an important factor. In Japan, as is the case in New Zealand, most lowland forest has long been destroyed and transformed into farmland and urban development. However, unlike the New Zealand experience, much of the hill terrain had remained forested until the pre-war period (though always exploited to some extent, forest on hillsides was rarely subjected to wholesale clearing). This was in recognition of the importance of forests in maintaining a steady and consistent water supply essential to the paddy-field system of rice farming, which has in turn been integral to the Japanese culture and economy for many centuries. The idea that hills and mountains coincide with forest is reflected in the term most commonly used to describe hills and mountains in Japanese, namely *yama*. Though literally translating as 'mountains', the image the word generally conjures for Japanese is one of forest-covered hills or mountains. Conversely, a mountain or hill that is bare of tree cover seems somewhat incongruous to the Japanese, and the use of the term *yama* becomes inappropriate. Thus, following the extensive deforestation which occurred preceding and during World War Two, the sight of hills devoid of forest was so unnatural to the Japanese that they felt the need to qualify the term *yama* by referring to these bare hills as *hage-yama* (bald hills/mountains) or similar terms. This demonstrates how the imprint of forested uplands – i.e., the idea that uplands are *supposed* to be forested – has remained in the collective cultural memory of the Japanese. Thus, when this landscape was destroyed through human interference, this was seen as a temporary aberration, rather than a new environmental (and cultural) norm.⁴³

This collective cultural memory is absent or at the very least dilute among New Zealanders. So determined and complete has been our transformation of the countryside from one of forest to one of domesticated pasture-lands that we have also erased the historical imprint of the landscape from our collective memory. Thus, the pervasive lack of discourse might be best explained by a form of historical amnesia – a gap in our collective memories concerning our country's environmental past, and our role in transforming our landscape. As a consequence, we no longer appear to make the link between our environmental past and the environmental present intuitively, as many of our forebears did.

CONCLUSIONS

This case study demonstrates the importance of historical memory in relation to our natural environment. This understanding enables us to confront the environmental issues we face today not only on an academic and scientific level, but on an intuitive and emotional level, as many of the early settlers,

introduced in this paper, did. During the latter half of the nineteenth century and early decades of the twentieth century, this understanding was unavoidable – the forest destruction and its consequences were occurring before their own eyes. For these individuals, the natural equilibrium was a forested landscape, any departure from which had recognised environmental consequences. For New Zealanders today, buffered from our environmental history by generations of New Zealanders before us who have laboured relentlessly to ‘break in’ and transform the land from a thickly forested landscape into a ‘productive’ landscape of pastured plains and rolling hills, the landscape that we see today has become the new norm or ‘natural equilibrium’. Any attempt to change this landscape is seen by some as ‘defying nature’.

Writers such as Buick, Grossman and Walsh described in some detail the flood disasters that had already racked the Manawatu and lower North Island region in the late nineteenth and early twentieth centuries and warned that without intervention, these events would only continue to worsen. They may have been disappointed to discover that their warnings have in large part gone unheeded, and their predictions borne out, as the 2004 floods, and numerous other flood events before it, demonstrate. Thus, the case study vividly illustrates that it is a mistake to assume that our environmental understanding is perpetually improving, at least in so far as our understanding of the connection between our historical impacts on the environment and the environmental problems that manifest themselves today.

In order for New Zealanders to progress towards a more sustainable future, it is this author’s belief that there is a need to re-familiarise ourselves with our environmental history, and collectively, harness our imaginations to visualise the land as it was when our ancestors – whether Maori, European, or otherwise – arrived here. It is only with this appreciation of our environmental past that this country can effectively tackle the significant land management issues, such as erosion and flooding, faced today.

NOTES

¹ Pawson and Brooking (2002), 13.

² Jobberns (1956), 3, cited in Wynn (2002), 100.

³ Anderson (2002), 20, 24, 30–32; Wynn (2002), 105; Star (2003) 468.

⁴ Wynn (2002), 105–6.

⁵ Wynn (2002), 106, 109–10; Star and Lochhead (2002), 119; Levy (1949), 45; Park (2006), 87; Best (1907), 200.

⁶ Star (2003), 469.

⁷ To place this in international context, as the nineteenth century neared its end, concern about forest destruction was also mounting in both North America and Europe. On these continents, forest destruction had escalated as a result of the growing demands of

increasingly industrialised, urban populations and large areas of pioneer land settlement (Williams 2003, 324).

⁸ Arnold (1994), 32; New Zealand Parliamentary Debates (NZPD) (1868), 188–9, cited in Wynn (2002), 111 and Wynn (1979), 179; Hector (1870), cited in Simpson (1973), 226.

⁹ Scholefield (1909), 51–2.

¹⁰ Scholefield (1909), 48–9.

¹¹ Cowan (1966), 8; McLay (n.d., unpublished manuscript), cited in Beattie and Stenhouse (2007), 434–5.

¹² NZPD (1868) 4, 189, cited in Wynn (1979), 180.

¹³ NZPD (1868), 4, 191, cited in Roche (1987), 73.

¹⁴ Roche (1987), 80; Wynn (2002), 115.

¹⁵ Appendices to the Journal of the House of Representatives (1877), C3, 48, cited in Roche (1987), 85–6.

¹⁶ Roche (1987), 91–2; Wynn (2002), 113.

¹⁷ Wynn (2002), 114.

¹⁸ Wynn (2002), 114.

¹⁹ Beattie (2003), 380.

²⁰ Grossmann (1909), 9. This book is comprised of papers which were first published as a series of articles in the *Auckland Graphic Weekly*.

²¹ Scholefield (1909), 48–9.

²² Walsh (1910), 440.

²³ Walsh (1910), 441.

²⁴ *Hawera & Normanby Star* (1903); *Evening Post* (1910); *Evening Post* (1909); *Evening Post* (1879); *Hawera and Normanby Star* (1903). This survey was made using the New Zealand National Library archive *Papers Past*, a database which contains more than one million pages of digitised New Zealand newspapers and periodicals. The collection covers the years 1840 to 1915 and includes publications from all regions of New Zealand.

²⁵ Anon. (30 June 1910), 2.

²⁶ Anon. (26 April 1911), 8.

²⁷ Anon. (23 February 1909), 9.

²⁸ Anon. (9 June 1910), 6.

²⁹ Buick (1903), 119.

³⁰ Walsh (1910), 441–2.

³¹ Grossmann (1909), 33–4.

³² Grossmann (1909), 34.

³³ McSaveney (2007). Horizons Regional Council (2004), 29.

³⁴ McSaveney (2007); Horizons Regional Council (2004), 2; Ministry for the Environment (2007), 242.

³⁵ Horizons Regional Council (2004), 29–30. Based on a number of scientific studies on rates of erosion, it is estimated that similar levels of rainfall falling on forested hillsides would cause between one-tenth to one-half the erosion as that falling on pasture-land (HRC (2004), 29). A number of scientific studies have investigated the relationship

between soil cover and erosion in New Zealand. Studies that analysed satellite imagery of rural areas have revealed that the likelihood of erosion is five to ten times higher under pasture than under forest (Hicks and Crippen (2004), cited in Horizons Regional Council (2004), 37). Previous New Zealand studies have made similar findings (Hicks et al (1992); De Rose (1996); Page et al (1999); Reid and Page (2002) cited in Horizons Regional Council (2004), 37).

³⁶ Wallis (27 July 2004); Wallis (28 July 2004); Anon. (14 July 2006). The present author searched the Factiva database using relevant key words to find articles discussing the 2004 floods and related topics.

³⁷ Horizons Regional Council (2007).

³⁸ Annabell (2005); Annabell (2006); Grant Cooper, pers. comm. (1 April, 2008). There is very little – if any – true virgin forest remaining in New Zealand; therefore, it is very unlikely that the vegetation to which this farmer refers was virgin forest, particularly given its proximity to areas of human settlement. The farmer probably intended to refer to it as ‘native bush’.

³⁹ Meylan (2006).

⁴⁰ Knight (2008), 41.

⁴¹ Knight (2003), 32; Hatakeyama (2005), 65; Maita (1998), 40; Hatakeyama (2005), 66; Knight (2003), 32; Umebayashi and Oya (1993), 203, cited by Knight (2003), 32.

⁴² Maita (1998), 40.

⁴³ Knight (2003), 31. In Takahata Isao’s animated film about the destruction of forests in the hills around Tokyo for the construction of a suburban housing development, the hills are referred to as *noppera-oka* (bald hills).

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