Environmental Anxiety in New Zealand, 1840–1941: Climate Change, Soil Erosion, Sand Drift, Flooding and Forest Conservation

JAMES BEATTIE

Department of History
University of Otago
PO Box 56, Dunedin, New Zealand
Email: beaja241@student.otago.ac.nz

ABSTRACT

The history of environmental anxiety in nineteenth- and twentieth-century New Zealand can be traced by focusing on problems caused by deforestation. In the 1840s concerns emerged that deforestation was causing climate change, soil erosion, sand drift and flooding. In the 1900s concerns about soil erosion overtook fears of climatic deterioration. A continued priority towards agricultural development at the expense of forestry constantly hampered conservation efforts throughout the nineteenth century. Only when the extent of agricultural expansion slowed down in the 1900s could these concerns be addressed; only then could a stronger, independent forestry service be established.

KEY WORDS

Forest conservation, soil erosion, climate change, flooding, sand drift

INTRODUCTION

In nineteenth- and twentieth-century New Zealand fears abounded that deforestation was causing climate change, sand drift, soil erosion and flooding. These concerns tell a history of environmental anxiety, a history which begins in the 1840s with fears of human-caused climate change and continues in the 1940s with fears of human-caused soil erosion. Equally, they complicate the image of nineteenth-century Europeans as environmental wreckers, hell bent on transforming landscapes and oblivious to the consequences of their actions. It was widely believed that forest conservation and tree planting would alleviate these problems. Stopping the negative effects of deforestation therefore became an

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important rationale for the establishment of forestry reserves and a forestry service. Initially, concern focused on preventing climatic deterioration, soil

FIGURE 1. Joseph Osbertus Hamley, *Sandhills and waterfall near Tauranga*, 1864? Watercolour on cream paper, 162 x 275 mm. Alexander Turnbull Library E-047-q-047.

Agriculture in New Zealand, put simply, was to underwrite civilisation. It would sustain everything from social mobility to the nation's economy. Without agriculture, it was widely believed that humanity slipped into barbarity. Agricultural development thus received primacy over forest conservation since lowland forests often impeded agricultural expansion.[3]

Converting forest to farm commenced at the outset of European migration in the 1840s. So too did concern about deforestation. The relatively treeless provinces of Otago and Canterbury enacted cutting restrictions and forest reservation in the 1850s and '60s. In the next decade these provinces passed legislation encouraging tree-planting. Individuals also spoke up against deforestation.[4]

In 1844 German naturalist Ernst Dieffenbach lamented increased levels of soil erosion in New Zealand, which he believed were brought about by deforestation. Dieffenbach also held that 'forest-lands render rains more frequent than they would perhaps be if the land were cleared' by causing the near-saturated air to condense. He did not, however, see this process occurring in New Zealand. In 1859 another German scientist, Ferdinand von Hochstetter, cautioned that deforestation should not be allowed 'to turn the country into a desert to the detriment of whole generations to come'. Further anxieties (and hopes) about forests appeared in the 1860s, promulgated by Scottish natural historian William

Lauder Lindsay, politician John Gillies and naturalist Thomas Potts. Lindsay supported forest conservation because it promoted efficient use of timber, protecting the colony from timber famine and diminished rainfall. Gillies, conversely, believed tree planting in dry Central Otago 'would convert that district into the garden of Otago' by bringing more rain to the region. He illustrates the idea that tree-planting could improve upon nature.[5]

FEARS AND FOREST DEBATES: 1860s–1870s

In 1868 Thomas Potts introduced the first Bill before parliament for assessing the nation's forestry resources 'with a view to their better conservation'. Forests must be left in place, he urged, 'merely in a climatic point of view and with reference to the fertility of the soil, for they had evidence all over Europe of the evil effects' of deforestation. In Italy, Spain and Greece, he continued somewhat desperately, 'the soil had not only ceased to be fertile, but had been absolutely washed away'. W.T.L. Travers, lawyer, explorer and naturalist, agreed. He lamented that deforestation 'produced the destructive floods that had become so common' on Banks Peninsula and elsewhere. Forest destruction to make way for agriculture, he ended, wasted money by burning valuable timber, and had a destructive effect upon climate. Politician Charles O'Neill referred to conservation in the state of Victoria. Deforestation had caused more frequent floods and increasing areas of wasted fertile lands in Alpine France, Spain, Palestine, parts of Asia and Northern Africa. Potts's Bill failed, but it illustrates that fears of soil erosion, flooding and climate change informed arguments for forest conservation. Overseas examples, as used by O'Neill, Travers and Potts, furthermore, gave authority and urgency to conservation, offering terrifying lessons of what could happen if deforestation continued.[6]

Anxieties about soil erosion, flooding and climatic change increased dramatically in both scientific and parliamentary circles in the 1870s. In 1873 Charles O'Neill introduced the Conservation of Forests Bill, urging conservation 'so that history might not be able to relate that they [settlers] received a fertile country, but, by a criminal want of foresight, transmitted to posterity a desert'. O'Neill presented a nightmarish vision of an unproductive and desolate New Zealand wracked by deforestation. He bolstered his presentation with terrifying illustrations of the effects of timber felling, provided by Alexander Humboldt, Victoria's Minister of Lands, and (most probably) G.P. Marsh. O'Neill also provided reasons reading like a set of Biblical injunctions against deforestation: 'Ali Pacha burnt down the forests…and then came famine and drought'; the Russians changed the climate of the Caucasus, and 'the land became barren, drought ensued'. The moral imperative was clear: it was a Christian duty to prevent land becoming waste.[7]

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of both main political groupings to the pursuit of development as a means of lifting New Zealand out of depression. The Liberal Government pushed even harder for development to meet their aim of closer settlement. Under this policy forest acreage 'dropped in 1893 and did not exceed its former extent until 1900'. Agricultural needs, clearly, overrode environmental anxieties.[15]

Yet while the Liberals were taking out large areas of forestry before 1900, they also enacted scenery preservation laws. Scenic preservation occurred in areas of no economic use, and thus was no threat to agriculture. The Minister of Lands introduced the Tongariro National Park Bill (1893) by stressing that the land had no other benefit than scenery. Other factors also played a part in conservation. These included nationalism (the kiwi became a national symbol in the 1890s), growing fears of faunal and floral scarcity and ecological concerns. A rejection of displacement theory also furthered protection. Displacement theory held that native species inevitably succumbed to the relentless progress of European plants and animals.[16]

Fears of soil erosion, sand drift, flooding and climate change, meanwhile, continued to play an important role in conservation. Nationalism and aesthetics now entered these debates too. In 1897 Government heeded the recommendations (including the climatic considerations) of the 1896 Timber Conference to form a national forestry branch. This new branch came under the control of the Department of Lands and Survey.

FIGURE 3. Thomas Good, *Bush Clearing near Oeo*, 1893. Ink and wash on sheet, 136 x 224 mm. Alexander Turnbull Library A-329-005.

Forestry conservation continued to interest many of New Zealand's most prominent and influential scientists. In 1895 Augustus Hamilton, ethnologist, biologist and future Director of the Colonial Museum (1903–1913), stressed the need for forest conservation because forests maintained aesthetics, rainfall and soils. Hamilton's reliance on New Zealand examples contrasted with the reliance of earlier authors on overseas examples of deforestation (Hamilton only referred to Indian forestry). Hamilton drew heavily on Campbell Walker's 1877 parliamentary report on environmental anxieties in New Zealand. Archdeacon Walsh, in 1910, also wheeled out the familiar anxieties about deforestation, that it decreased rainfall, but increased flooding and soil erosion, and brought about aesthetic losses. Walsh also relied heavily on New Zealand examples to argue his point, including Campbell Walker's report and the work of J.P. Grossmann. Grossmann, journalist, academic and conservation zealot, wrote *The Evils of Deforestation* (1909). This book brought together international and New Zealand examples of the follies of timber cutting. Reprinted from the *Auckland Weekly News*, Grossmann aimed to 'rouse public interest' in conservation, believing 'it was the positive duty of all civilised States' to conserve forests.[17]

These examples from the 1900s, firstly, underline the enduring New Zealand–Indian forestry link, especially through Campbell Walker's influence. Environmental anxieties of the 1900s, in the second place, now concentrated on New Zealand examples of deforestation, instead of largely overseas evidence. Conservation ideas thus had been adapted to the New Zealand context, bearing out historian of science Roy MacLeod's observation that: 'In Australasia, independent traditions were fostered *within* the ambit of colonial science, which sustained colonial Europeans on the march to nationhood.'[18]

THE SHIFT TO SOIL AND WATER CONCERNS: 1900s–1940s

A move towards soil and water conservation concerns and away from climatic ones occurred in the 1900s. Grossmann had signalled it when he wrote that 'the worst effect of deforestation is EROSION'. Two things account for this change: growing evidence of land deterioration; and a change of emphasis in conservation literature towards soil erosion concerns.

Ecological concerns furthered anxieties about soil erosion and sand drift in New Zealand. Leonard Cockayne, and later G.M. Thomson, pioneered the field of ecology in New Zealand. Cockayne's alarming report on the failure of the 1903 Sand-drift Act to arrest shifting sands offers one example. Widespread evidence of land deterioration is another. Erosion was increasingly evident in many areas in the 1900s. High country burning in the South Island, 'fern crushing' (the replacement of fern with grassland) in the North Island, rabbit infestations, and other environmental problems all served as timely reminders of the difficulties facing many farmers.[19]

Overseas scientific publications also emphasised soil conservation over climatic conservation, as New Zealand's influential 1913 Royal Commission on Forestry illustrates. Its report included three overseas (and one New Zealand) works on this subject. The Royal Commission recommended upland forest

Lecoy and Campbell Walker, also played an important role. These examples and authorities not only demonstrate the cultural exchange of ideas within empires (as Tony Ballantyne highlights in his essay ‘Empire, Knowledge and Culture’), but also those from without. No amount of anxiety or authority, however, could alter the fact that in New Zealand forestry assumed secondary importance to

[6] Thomas Potts, *New Zealand Parliamentary Debates* [henceforth *NZPD*] (7 October, 1868), 190. W.T.L. Travers, *NZPD* (7 October, 1868), 191. Charles O'Neill, *NZPD*, (7 October, 1868), 191–2.
[7] O'Neill, *NZPD*, (1 October, 1873), 1545.
[8] Founded in 1868, transcriptions and reductions of papers presented before New Zealand's Philosophical Institutes appeared in the *TPNZI*. W.T.L. Travers, 'On the Changes Effected in the Natural Features of a New Country by the Introduction of Civilized Races', Part III, *TPNZI* 3 (1870), 326–8. In essence Marsh doubted forests had a significant influence on rainfall. David Lowenthal, 'Nature and Morality from George Perkins Marsh to the Millennium', *Journal of Historical Geography* 26 (2000), 3–27. J.C. Firth, 'On Forest Culture', *TPNZI* 7 (1874), 195. Dr. A. Wjeikof, 'The Results of the Destruction of Forests upon the River Wolga at Astracan', *TPNZI* 4 (1871), 374–6.
[9] On the Bill see Graeme Wynn, 'Pioneers, Politicians and the Conservation of Forests in Early New Zealand', *Journal of Historical Geography* 5 (1979), 171–88; Lanna Brown and A.D. McKinnon, *Captain Inches Campbell Walker: New Zealand's First Conservator of Forests* (Wellington: New Zealand Forestry Service, 1966). On deforestation rates see Roche, *History of Forestry*, 86.
[10] On the origins of Indian forest conservation see, for instance, Grove, *Green Imperialism*, 380–473. On Fergusson, see Roche, *History of Forestry*, 85, 88; on Cracroft Wilson see Paul Star, 'T. H. Potts and the Origins of Conservation in New Zealand (1850–1890)' (M.A. diss., University of Otago, 1991), 84.
[11] Inches Campbell Walker, 'State Forestry: Its Aim and Object', *TPNZI* 9 (1876), 187–203; 'The Climatic and Financial Aspects of Forest Conservancy as Applicable to New Zealand', *TPNZI* 9 (1876), xxvii–xlix; 'Report of the Conservator of State Forests', C-3 1, *Appendices to the Journal of the House of Representatives* [henceforth *AJHR*] 1877 C-3 1, 12–49.
[12] For background and area of reservation see Brown and McKinnon, *Captain Inches Campbell Walker*, 11–16, 18. '1877 Land Act', *Statutes of New Zealand* (1877), 177–179.
[13] On floods and sand dunes see, for instance, H.P. Higginson, 'On Floods in Lake Districts and Flooded Rivers in General, with Methods Adopted for their Prevention and Control', *TPNZI* 10 (1877), 180–9; Travers, 'Remarks on the Sand Dune of the West Coast of the Provincial District of Wellington', *TPNZI* 14 (1881), 89–94. On physiocracy see Elizabeth Fox-Genovese, *The Origins of Physiocracy: Economic Revolution and Social Order in Eighteenth-Century France* (Ithaca and London: Cornell University Press, 1976), and its influence on French forestry. Grove, *Green Imperialism*, 259. Frederick S. Peppercorne, 'Influence of Forests on Climate and Rainfall' *TPNZI* 12 (1879), 24–32. A. Lecoy, 'The Forests Question in New Zealand' *TPNZI* 12 (1879), 3–23.
[14] Vogel, *NZPD*, (7 July, 1885), 445–53; Roche, *History of Forestry*, 94–5; *NZPD*, (26 June, 1885), 200–11; T.H. Kirk, 'Progress Report of the State Forests Department', *AJHR* 1886 1 C-3D, 3.
[15] On the repeal see 'State Forests Act Amendment, 1888', *Statutes of New Zealand*, (1888), 71–2. On closer land settlement see Tom Brooking, *Lands for the People? The Highland Clearances and the Colonisation of New Zealand: A Biography of John McKenzie* (Dunedin: Otago University Press, 1996), 176–8. For last quote see Roche, *History of Forestry*, 137–8.
[16] Star, 'From Acclimatisation to Preservation: Colonists and the Natural World in Southern New Zealand, 1860–1894', (Ph.D. diss., University of Otago, 1997), 199; Star

and Lynne Lochhead, 'Children of the Burnt Bush: New Zealanders and the Indigenous Remnant, 1880–1930', in *Environmental Histories of New Zealand*, ed. Eric Pawson and Tom Brooking (Melbourne: Oxford University Press, 2002), 119–35; Beattie, 'Rapists or Romantics? European Views of the Otago Environment, 1840–60', in *South: Celebrating Otago and Southland's Heritage* (forthcoming, December 2003).

[17] 'Timber Conference', *AJHR* 1896, H-24 3, 5, 33; Mr. Prouse, 'The Preservation and Utilisation of our Forests', *AJHR* 1896, H-24 3, 28–29. See Roche, *History of Forestry*, 149 for formation of new forestry branch. On official reports see A. Lecoy, 'Papers Relating to Suggestions on Forests in New Zealand', *AJHR* 1880 H-3, 1; Kirk, 'Progress Report of the State Forests Department', *AJHR* 1886 C-3D 1, 3. On the use of aesthetic and climate and flooding arguments in the 1893 debate over native conservation see, for instance, *NZPD* (9 July, 1893), 262–9. A. Hamilton, 'On the Forests of New Zealand', *TPNZI* 28 (1895), 147–63; Walsh, 'The Effects of the Disappearance of the New Zealand Bush', *TPNZI* 43 (1910), 436–47. J.P. Grossmann, *The Evils of Deforestation* (Auckland: Brett Printing and Publishing Co., 1909).

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tive of the Stabilisation and Afforestation of Coastal Sands in New Zealand (Christchurch: Canterbury University Press, 1999); Roche, *Land and Water*.

[22] Tony Ballantyne, 'Empire, Knowledge and Culture: From Proto-Globalization to Modern Globalization', in *Globalization in World History*, ed. A.G. Hopkins (London: Pimlico, 2002), 115–40. James Braund, for instance, emphasises the importance of German scientists to New Zealand. Braund, 'German-speaking Scientists in New Zealand 1773–1951: Research Past, Present and Future' (paper presented at the Inaugural New Zealand European Studies Conference, National Centre for Research on Europe, Christchurch, 31 May, 2002).