



An Indigenous-assisted cultural perspective on conservation of New Zealand soils and the biota dependent on them

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ABSTRACT

Soil habitat quality is an important indicator of environmental health. New Zealand soils are in critical condition because of various land-use practices, such as intensification of agriculture and urban growth, causing increased erosion and loss of fertile soil. Soil consists of organic (carbon-rich, microbe-laden detritus) and inorganic (weathered rock particles, minerals, water, air) components that are vital for sustaining flora and fauna, including humans. Soil in and of itself is alive with various forms of biota. Soil conservation takes an anthropocentric, utilitarian approach to policy and planning, whereas soil preservation takes an ecocentric or nature-centred approach. When the catchment boards of the earlier eras [governed by the Soil Conservation and Rivers Control Act 1941 (NZ)] were decommissioned to make way for regional councils around the time when the Resource Management Act 1991 (NZ) came into force, the soil scientific expertise was largely lost. At the same time, soil quality in New Zealand has been deteriorating ever since. In this paper, I argue for the establishment of community-based soil conservancies and conservancy officers and, ultimately, the legal endowment of personhood on soil in order for kaitiaki oneone (soil guardians) to be appointed. These measures will assist in the protection of soils, which will lead to better outcomes for the environment and generations to come.

Keywords: conservancies, environmental legislation, integrated resource management, New Zealand, personhood, policy and planning, preservation, soil conservation.

Introduction

Much of New Zealand's ploughable soil, especially in the South Island, comes from the weathering of loess or windblown (primarily) silt sheets of Pleistocene glacial origin, which can reach up to 18 m in thickness (Goudie 1990, p. 101). Soil needs to be protected as an organic (carbon-rich, microbe-laden detritus) and inorganic (weathered rock particles, minerals, water, air) medium for supporting vegetative growth and dependent invertebrate and vertebrate biota, including humans (Odum 1971; Fromherz 2012). Apart from intrinsic reasons to preserve soils, soil also requires protection for agrarian purposes (Fromherz 2012).

Soil issues (adverse effects on soil) in New Zealand include erosion, loss of carbon and organic matter, compaction and compromised soil structure, nutrient loss, acidification and agro-industrial contamination (Grinlinton and Palmer 2008). Most notable of these is erosion, including surface erosion (sheet, rill, gully), mass movement (landslides or slips, earthflows, slumps), fluvial (stream-related) and streambank (riparian) erosion, due to various land-use practices (Hicks and Anthony 2001).

For the purposes of this paper, I will introduce and discuss novel planning solutions to intervene in the exploitation of New Zealand soils. Soil conservation planning is analysed for better outcomes so as to safeguard soils against land-use exploitation, driven by free-market factors. Instigating community-based soil conservancies, guided by soil conservancy officers, is one option worth considering. Another option is to seek recognition for soil as a legal entity, with the subsequent appointment of kaitiaki or guardians. Culturally, kaitiaki are a group of significant persons or beings (including

animals), acting as carers, protectors, or custodians of nature on behalf of the original spirit deities in Māori cosmogony (Roberts *et al.* 1995). Precedent already exists for legal personhood of components of the environment in the spirit of kaitiakitanga (Lyver *et al.* 2019; Walker *et al.* 2019), i.e. under the Te Urewera Act 2014 (NZ) and Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 (NZ) (Hutchison 2014; New Zealand Government 2014, 2017; Kramm 2020; Ireland 2021). These planning options will be shown to be more than merely optional, but in combination crucial to strengthen soil conservation measures.

Soil conservation can be advanced through interventional planning by instituting soil conservancies and kaitiakitanga (custodianship). Kaitiakitanga is highly regarded in New Zealand as a multicultural incentive to act responsibly towards the environment generally. Planning interventions that can be considered to ensure soils are better protected in New Zealand, apart from bringing back the catchment boards (New Zealand Government 1941; Mather 1982; Greater Wellington Regional Council 2015), include the establishment of soil conservancies and the appointment of kaitiaki or Māori guardians (Roberts *et al.* 1995; Walker *et al.* 2019). Such an approach is likely to work because Māori authority is held in high esteem by both Māori and Non-Māori people alike. Kaitiaki have been successful in conservation efforts whether for a mountain (New Zealand Government 2014; Lyver *et al.* 2019) or a river (Hutchison 2014; Kramm 2020). Personhood can be extended to non-human natural entities, and granted similar rights to those of a legal person (Ireland 2021). Given the dire straits in which New Zealand soil (oneone) finds itself (Mather 1982; Fromherz 2012), this is an imperative step to take.

Origins of the problem

New Zealand's land management practices have resulted in soil erosion, silted-up waterways and estuaries, algal blooms and dense aquatic weed growth due to nutrient-rich runoff (Hicks and Anthony 2001). Substantive advancement has been made in reaching more sustainable production; however, significant problems have persisted. The land-use capability (LUC) system has been used in New Zealand to help achieve sustainable outcomes for land development and management on farms, in catchments, and at district, regional, and national levels since 1952 (Lynn *et al.* 2009). LUC classes range from LUC 1 (highly arable) to LUC 8 (marginal), increasing in limitations and decreasing in versatility for use by agriculture and forestry. Historic drivers of soil- and water-related problems have been a combination of moderately high rainfall and a decrease in native vegetation cover from 80% pre-human settlement to less than 25% in present times (Grinlinton and Palmer 2008).

There is no universal model to protect soils despite international policy agreements (Grinlinton and Palmer 2008). Free-market exploitation is a global problem of modern democracies, although the implementation and impacts of neoliberal policies on local environments vary considerably between countries due to a diverse political, institutional, economic, environmental, and social landscape (Liverman and Vilas 2006). The international community has largely ignored soil as the foundation of life in conservation efforts and legal reforms (Fromherz 2012). Free-market exploitation has driven land-use intensification to the detriment of soils (Lilburne *et al.* 2002; Castree 2010a, 2010b), including soil biota (Minor and Robertson 2006; Minor *et al.* 2016).

Neoliberal theory is the driver for economic growth responsible for 'the American dream' (freedom, prosperity and success) (Castree 2010a, 2010b; Jackson 2019). Neoliberal ideas and policies encourage capitalist economies of the West to become exponentially skewed towards inflicting environmental harm on the biophysical world in the name of profit (Castree 2010a, 2010b). The neoliberal movement of the 1980s is largely to blame for this environmental exploitation (Ericksen *et al.* 2017; Jackson 2019), leading to intensive land-use practices (e.g. overgrazing of farmland) and agro-industrialisation (Mather 1982; Fromherz 2012). Neoliberalism meant that farmers, as a large landholder block, started to treat soil as a business commodity to maximise profits (Hunt *et al.* 2013), leading to its degradation. However, some environmentally aware farmers have used business acumen to build long-term resilience and mitigate against risks of disaster and economic upheaval, without harming the environment for short-term gains.

Rural landscapes in recent decades have been transformed by farming practices, moving away from management models with a small environmental footprint (e.g. lower stocking regimes of traditional sheep farming) to highly industrialised dairy outfits, where removal of shelterbelts to make way for pivot-irrigation schemes has exacerbated topsoil loss to wind erosion (Auckland Council 1999; Hicks and Anthony 2001; Fromherz 2012; Greater Wellington Regional Council 2015; Knight 2018, p. 126; Phillips *et al.* 2020). In the past, livestock husbandry has largely consisted of dryland farming, especially in Canterbury, with lower stocking rates, but in recent years production has shifted from predominantly sheep farming to intensive dairy farming with the development of irrigation schemes (Amuri Irrigation Company 2022). Basal ground cover needs to be maintained to prevent damage to soils (Hicks and Anthony 2001; Phillips *et al.* 2020). Basal cover is the proportion of the surface area covered by grass going into the soil. If the basal cover is insufficient to hold down soil particles under high wind conditions (e.g. equinox winds), topsoil is lost and carried away. If grazing pressure becomes too high, the basal cover drops below environmental bottom lines, meaning overgrazing drives up

erosion from baseline levels as the amount of ground cover gets reduced and soil vulnerability increases (Phillips *et al.* 2020).

A utilitarian approach to planning is risky for the environment if unsustainably managed, while soil preservation that takes a purist, ecocentric or nature-centred view (e.g. in wilderness areas outside of human settlement) is problematic where humans live and work. Since the advent of a free-market economy in New Zealand, government subsidies to farmers to assist them in conserving soils had ceased (Braden 1991; Gómez-Baggethun and Naredo 2015). The Ministry of Works and Development had been disestablished prior to the Resource Management Act 1991 (NZ) (known as the RMA) (New Zealand Government 1991), to devolve centrally-controlled regional and district planning to local governments (Ericksen *et al.* 2017). The RMA provides for an ecological bottom line within a sustainable management framework, integrated with a consenting and enforceable regime of local governance in terms of consent applications for specific water and soil uses (Grinlinton and Palmer 2008). The RMA ushered in the regional councils, with their jurisdictional boundaries corresponding to the watershed boundaries of the previous catchment boards and regional water boards, so as to improve the prospects for effective management of renewable resources that require regional coordination (Ericksen *et al.* 2017). When the RMA came into force, the catchment boards of earlier decades had become redundant with the introduction of regional councils, which meant the soil scientific expertise was fragmented. Soil quality in New Zealand has been in decline ever since (Lilburne *et al.* 2002).

Exploring solutions

The establishment of the RMA in New Zealand was a world first in biodiversity and sustainability legislation for holistically protecting the environment against adverse effects, regardless of the activity or type of development proposed (Ericksen *et al.* 2017). The RMA promoted sustainability of natural and physical resources through a cooperative system of devolved governance, requiring individuals or groups to carry the environmental costs for using, developing, and protecting these resources (Ericksen *et al.* 2017). Several former Acts have been incorporated into the RMA (Grinlinton and Palmer 2008; Ericksen *et al.* 2017). Both anthropocentric and ecocentric principles feature in this Act, which has partly failed to protect soils over the last three decades (Meyer V, unpubl. data). The RMA's effects-based planning (as opposed to activities-based planning) is pragmatic for integrated environmental management, which will become more evident with the new Natural and Built Environments Act (NZ) coming into effect soon (Ministry for the Environment 2022).

Nudge psychology – the concept of ethical behavioural change without overriding a person's freedom of choice but increasing the predictability and likelihood of choosing one option over another – used with care, can be effective in swaying public opinion on soil conservation, as has been done successfully by making recycling of domestic waste easier, so as to benefit the environment, by so-called green nudges. Psychological nudge techniques (e.g. Hagman *et al.* 2015) can help to modify and guide public behaviour towards responsible environmentalism (Steg 2016), especially from a national policy level. If focussed on better individual outcomes rather than on society as a whole, people are generally more receptive to change (Hagman *et al.* 2015). This is not entirely surprising, as it is human nature to be selfish, hence our environmental dilemma (Gómez-Baggethun and Naredo 2015). Nudge psychology does not work for everyone nor in every situation, as self-autonomy (intrinsic motivation) overrides self-regulation (van Gestel *et al.* 2021). The latter requires extrinsic motivation when intrinsic motivation is lacking (Steg 2016). However, with a majority consensus and determined effort, existential threats can be overcome (Gómez-Baggethun and Naredo 2015).

Since 1940, soil management legislation in New Zealand has had far-reaching implications for environmental planning. Soil erosion had been accelerated by agriculture and pastoralism, aggravated by the disconnect between the soil scientific community and land managers who discounted a correlation between land-use practices and soil erosion rate (Mather 1982). Soil conservation laws were put in place to mitigate the effects of poor land-use practices (e.g. unsustainable farming) on water bodies. Currently, New Zealand is in the middle of environmental law reform, pending the repealing of the RMA in the face of new resource management legislation (Ministry for the Environment 2022). The question is to what extent should the law be ecocentric (i.e. less anthropocentric), and should the pre-RMA laws and/or their agencies be reintroduced (Greater Wellington Regional Council 2015), e.g. catchment boards. From a practical point of view of having been a Cadet Ranger for Natal Parks Board/Ezemvelo KwaZulu-Natal Wildlife in South Africa, nature conservancies were set up along the South Coast of KwaZulu-Natal as a way of joining conservation areas and adjacent farmland under one management strategy to improve conservation outcomes (Meyer 2011, pp. 9–18). A number of nature reserves in a geographic region, together with their staff, collectively made up a conservancy in order to have large-scale cooperation and advice from experts and landholders, so as to ensure long-term environmental sustainability in the area. This concept led to a similar setup for the proposed soil conservancies never trialled in New Zealand before, except for the catchment boards that had a similar function (Mather 1982). Soil conservancies should be established through participatory programs involving local communities. I propose soil conservancies to be geographically manageable areas administered by knowledgeable members of the local

community to police and protect soils, similar to what the professional catchment board officers did in the 1940s to 1980s (Mather 1982). Such conservancies can be set up through public meetings, forums or surveys, using effective promotional and marketing strategies (Wilcox 1994; Säynäjoki *et al.* 2014; Booth *et al.* 2019). Public participation programs must be genuine without tokenism (Arnstein 2019). The importance of soil conservation can be further promoted by means of Indigenous land care, geoparks and geotourism (Fromherz 2012; Lyver *et al.* 2019; Newsome and Ladd 2022).

Soil conservancy officers knowledgeable about soil typology, e.g. traditional land-use capability (LUC) zoning (Ministry of Works 1971; Lynn *et al.* 2009; Ericksen *et al.* 2017), have to be recruited from the community. The proposed soil conservancies are based on community factors, such as people and industry networks. Collins *et al.* (2015) proposed a National Soil Management Group, however, my proposal is different in that it diversifies expertise into community groups across the country. The demography of soil conservancy officers should be reflective of the community. Candidates of integrity – with mana (influence, status, spiritual power) – are respected members of their communities. Officers should be trained and paid by the relevant local district or regional council. Soil conservancy officers can be supported nationally by regulatory, statutory plans under resource management legislation, and regionally by non-statutory plans under the Local Government Act 2002 (NZ) (New Zealand Government 2002). These officers educate landholders how to conserve soils better, provided quality candidates are selected for the program.

In the spirit of kaitiakitanga, soil could be given the same legal right as that of a person. Over and above current legislation protecting soils (e.g. New Zealand Government 1941, 1991), living soil (Fromherz 2012) could be granted personhood in recognition of the Indigenous Māori view that mauri (life force) is in all nature (Roberts *et al.* 1995; Walker *et al.* 2019). Kaitiaki oneone (soil guardians) should be appointed as human custodians of soil, as has been done for the Whanganui River/Te Awa Tupua (Ireland 2021). These kaitiaki or guardians are of Māori descent (Roberts *et al.* 1995), i.e. part and parcel of the environment in need of kaitiakitanga – guardianship and protection. Soils are connected to land by area (Myers 1987), and Māori already see water, land and soil as taonga or treasures (Ireland 2021). As tangata whenua (original inhabitants of New Zealand), they are the people of the land (Roberts *et al.* 1995; Lyver *et al.* 2019). Acknowledging soil's cultural significance from a First Nations perspective, and declaring it a legal entity, will provide a further layer of protection for soils, which is vital for preserving life and livelihoods.

Western scientific planning can epistemologically benefit from Indigenous input. A technocratic approach (Gómez-Baggethun and Naredo 2015) to policy and planning ought to be enhanced by mātauranga Māori (Indigenous

knowledge) (Martin *et al.* 2016; Lyver *et al.* 2019). After legislation has been enacted to acknowledge living soils as having personhood (*sensu* Hutchison 2014; Kramm 2020; Ireland 2021), statutory planning at national level will provide impetus for non-statutory plans to be drafted and implemented at local government level. A personhood approach is neither anthropocentric nor ecocentric (Ireland 2021), but will lead to more sustainable outcomes for soil conservation than ever before.

Statutory plans, including national policy statements and national planning standards (Ministry for the Environment 2021), are planning instruments that generally do not contradict soil conservancy and soil personhood principles. There are no soil-specific national policy statements that regional plans have to give effect to, except when soil erosion affects water bodies, e.g. sedimentation (Greater Wellington Regional Council 2015; Phillips *et al.* 2020). There are no national planning standards specific to soil conservation (Greater Wellington Regional Council 2015). The Auckland Regional Policy Statement (Auckland Council 1999) contains a chapter on soil conservation measures that regional, district and unitary plan/s should take into account. The Soil Conservation and Rivers Control Act 1941 (NZ) (New Zealand Government 1941), although not ineffective in its role to conserve soils, can be amended to include 'soil conservancies' (without repealing catchment boards entirely as a plan B). This is more than a rebranding exercise of the old 'catchment boards' (although they have been disempowered and legal compensation for those in their employ has been repealed by the RMA). The catchment boards were staffed by soil professionals such as soil scientists and hydrological engineers (Gregg 2008), whereas the new soil conservancies will be community-led, council-remunerated and operating in non-statutory space.

Discussion and conclusion

An unexpected complication of the old catchment boards was that the expert soil conservation advice, e.g. to reduce soil erosion, was so good that farmers began to increase stocking rates as carrying capacity improved to the point of the advice being exploited for maximising profits, adding unduly to pressures on soils and rendering the advice counterproductive (Mather 1982).

Soils can be better conserved through bicultural planning interventions such as setting up soil conservancies and declaring soil a legal entity. There is a third, localised approach that can be applied as highlighted by Newsome and Ladd (2022) and Newsome *et al.* (2022). Although exhibiting and protecting selected geomorphic features of the landscape by such an approach, it doesn't cover a national grid as the proposed soil conservancies, which cover the length and breadth of the whole country.

However, geopark tourism does give an international perspective and provides direction as to how soils might be protected via educational strategies and local community development. Soils can be employed as a tourism attraction and soil conservation fostered via geopark development and increased public awareness. This includes the engagement of politicians who preside over natural resource legislation (Newsome *et al.* 2022).

In order for soils to be adequately protected in a market-driven world, a multi-faceted approach to environmental planning is needed. It is therefore proposed that soil conservancies be established across the country, serviced by soil conservancy officers from the community. The legal personification of soil, similar to what has been enacted by the Te Urewera Act 2014 (NZ) and Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 (NZ) (New Zealand Government 2014, 2017), and the consequent appointment of kaitiaki oneone, will lend a further layer of protection to New Zealand soils. The soil conservancy officers connect with the community (landholders), while kaitiaki oneone represent the interests of the soil in a legal sense. Soil conservancies and their conservancy officers, as well as soil personhood and its kaitiaki, will significantly raise the level of soil conservation planning in New Zealand to ensure the health and integrity of soils, including resident biota, for future generations. Progression towards such ends can be fostered via the current geopark movement in New Zealand. Collaboration between local government, Indigenous people, and Earth Science specialists who form part of the Waitaki Whitestone Geopark (Waitaki Whitestone Geopark Trust 2022), could help in raising public awareness about New Zealand soils in the spirit of kaitiakitanga.

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