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Enhancing the Tax System to Halt the Decline of Nature in New Zealand

Managing New Zealand's natural heritage

New Zealand is world-renowned for its nature – its lush forests, spectacular mountain landscapes, wild and scenic rivers, beautiful coastlines and extraordinary biodiversity. This natural heritage is the foundation of New Zealand's identity and its branding, and the premier attraction for the tourism industry. It provides habitable environments, contributes to economic production and assimilates wastes, and is an important source of great enjoyment, health and well-being (Roberts et al., 2015). Nature contributes to the success of the nation's fishing, farming, forestry and tourism industries, which provide about 52% of national export income (Ministry of Business, Innovation and Employment, 2013). But these values and the well-being and prosperity they enable are being diminished and degraded at an alarming rate. Anthropogenic climate change, degradation of the marine environment, land use change and biodiversity loss, impacts of invasive species, deteriorating quality and diminishing availability of fresh water, soil

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contamination and pathogens degrade both nature and human well-being. Ultimately they threaten life as well as livelihoods.

These issues are neither new nor confined to New Zealand. Indeed, they are a focus of considerable public and government attention internationally. In response, New Zealand has around 22 legislative acts that protect nature in some way (Schneider and Samkin, 2012; Brown, Stephens et al., 2015). A government agency dedicated to nature conservation, the Department of Conservation, has been created and other central government agencies, such as the Ministry for Primary Industries, the Ministry for the Environment and the Environmental Protection Authority, as well as local and regional government also have important nature protection roles.

The New Zealand government has signed six international conventions with commitments to protect nature, and prepared a national biodiversity strategy (Brown, Stephens et al., 2015). Legally protected areas now cover about one third of the country, making New Zealand one of 24 countries to have more than 20% of its land area legally protected (Seabrook-Davison, 2014). Fifteen water conservation orders recognise outstanding values of freshwater ecosystems (Water Conservation Order, 2016), and six wetlands are recognised under the Convention on Wetlands of International Importance (Ramsar, 2016). A growing network of marine protected areas will soon include the Kermadec Ocean Sanctuary, the world's largest no-take marine reserve, covering 620,000 square kilometres or about 15% of the exclusive economic zone (New Zealand Government, 2015).

Additional conservation successes are being achieved through community and business partnerships with the Department of Conservation, local and regional government and the Queen Elizabeth II (QEII) National Trust (which helps private landowners in New Zealand protect special natural and cultural features on their land with open space covenants). There are now over 4,000 QEII private land covenants (covering approximately 200,000 hectares or about 0.7% of the New Zealand mainland and inshore islands) and more than 600 community conservation initiatives under way (Peters, Hamilton and Eames, 2015). The growth and increasing professionalism of voluntary community conservation indicates the increasing public demand and willingness to participate actively in conservation.

And yet, despite the level of public support for conservation and the efforts of legislators, communities and conservation agencies, the rate of decline is greater and the state of nature in New Zealand more threatened now than at any time over the last 65 million years (Bradshaw, Xingli and Sodhi, 2010; Ceballos et al., 2015).

The state of nature in New Zealand

The sixth great extinction is under way (Ceballos et al., 2015), and New Zealand leads the world, with more native species already extinct (40 species extinct, and around 70 not seen for more than 20 years) or at risk of extinction than any other country (Bradshaw, Xingli and Sodhi, 2010). Six of ten taxonomic groups assessed have half or more of their living members classified as threatened or at risk of extinction (see Table 1).

In legally protected terrestrial areas (around 30% of terrestrial New Zealand), endemic vertebrates (bats, birds, lizards and freshwater fish) and large invertebrates such as land snails are facing extinction from invasive mammal predators (Innes et al., 2010) and introduced fish species. Extinction risk has increased between 2005 and 2011 for 7% of species assessed and declined for 1.5% (Ministry for the Environment and Statistics New Zealand, 2015). On private land (the other 65% of terrestrial New Zealand), habitat destruction is a further cause of loss (Cieraad et al., 2015), often accelerating underlying declines caused by introduced mammals. Most native freshwater fish species are threatened by water abstraction, migration barriers and/or deteriorating water quality (Parliamentary Commissioner for the Environment, 2013, 2015a), as well as by introduced predators such as trout, mosquitofish, catfish and perch. Anthropogenic climate change is expected to exacerbate many of the threats described above (McGlone and Walker, 2011).

Large areas of New Zealand are subject to invasive mammal control. Some 37% of the 6.4 million hectares of remaining native forest have recently received some form of predator management (Table 2). About 16% of this was aerial 1080[1] control of possums by OSPRI[2] to manage bovine tuberculosis, 9% was aerial 1080 operations by the Department of Conservation aimed at rat and stoat irruptions during the 2014/15 summer, and another 7% was covered for other purposes between 2010 and 2015. However, the continuing decline of

Table 1: Percentages of taxonomic groups threatened or at risk of extinction

Taxonomic group	Percentage threatened or at risk of extinction*
Vascular plants	39
Marine mammals	27
Bats	75
Birds	81
Reptiles	88
Frogs	100
Freshwater fish	72
Freshwater invertebrates	26
Earthworms	19
Marine invertebrates	76

* Data are percentages of species assessed within each taxonomic group. The number of species assessed in the large invertebrate groups may be insufficient to represent the entire group.

Source: based on data from Ministry for the Environment and Statistics New Zealand, 2015

Table 2: Native forest predator management (~6.4 million hectares)

Management type	Percentage of area
Aerial 1080 – DOC Battle for our Birds*	9
Aerial 1080 – DOC other predator control	7
Traps and hand-laid toxins	5
Aerial 1080 – AHB possum control	16
No management of predators	63

* The Battle for our Birds project was undertaken in the summer of 2014/15. All other management is from 2010 until June 2015.

Source: Walker, Monks and Innes, 2015

endemic forest vertebrates shows that the intensity of these efforts and the area covered are still insufficient to halt the decline of forest species threatened by mammal predators (Walker, Monks and Innes, 2015).

There is little management of habitat loss and degradation for biodiversity compared to predator management. Efforts to monitor habitat loss to date have tended to be uncoordinated and irregular, so there is no definitive source for the rate of habitat loss. This should change with the recent introduction of the Environmental Reporting Act. From various sources, however, it is possible to obtain a picture of recent habitat loss.

New Zealand's regulatory and public-funding approaches to managing nature are presently … isolated from economic policy …

Environment Aotearoa 2015 identified a loss of around 10,000 hectares (0.26%) of indigenous forest since 1996 (Ministry for the Environment and Statistics New Zealand, 2015). However, there is a considerably greater portion of non-forest habitat (wetland, grassland, herbfield, shrubland) that has been lost to agricultural intensification (Cieraad et al., 2015). Approximately 70,000 hectares of indigenous grassland in the central South Island alone was converted to intensive agriculture and forestry between 1990 and 2008 (Weeks et al., 2013), with conversion continuing since.

Why is nature so hard to protect?

The question must be asked: why, despite substantial public and private efforts to conserve nature in New Zealand, is New Zealand's natural heritage still declining?

Brown, Stephens et al. (2015) propose that nature protection in general fails to halt decline and loss because current efforts address proximal rather than fundamental causes of loss. The fundamental cause is the misalignment of government, business, private and public interests in nature's protection. For government at all levels, protecting nature is a controversial demand on an already stretched public purse, often resulting in the underfunding of private conservation. Private landowners and businesses often find the opportunity and management costs of retaining/managing nature outweigh the immediate benefits of its loss, and don't consider the cumulative negative impacts of their individual actions on nature. The public, on the other hand, enjoys both the benefits supplied by nature and some economic benefits arising from its loss to development.

These divergent interests motivate a range of behaviours and conflict. Outcomes for nature are shaped by the distribution of power among stakeholders and mediated through phenomena such as the collective action problem (Olsen, 1965), agency capture (Clare and Krogman, 2013) and bureaucratic slippage (Freudenburg and Gramling, 1994). This can result in the regulated community controlling regulatory decisions and/or performances in a way that serves the interests of the regulated community rather than the interests of the public (Clare and Krogman, 2013).

We argue that effectively halting nature's loss must involve an approach that aligns these interests and incentivises behaviours that promote nature's conservation.

A common institution for bringing divergent interests toward alignment is markets. However, markets typically fail nature because many of nature's uses and characteristics are non-exclusive (that is, it is not possible to obtain full payment for the benefits provided by nature, or the full cost of using nature's benefits can be avoided) and/or non-rival (that is, the use of nature by one individual doesn't affect the use of nature by others) (Randall, 1983). In other words, the public-good (Godden, 2006) nature of nature (whether it is on public or privately managed land) means these markets have not been established and are missing (Randall, 1983).

One policy response is to use regulation. New Zealand has pursued environmental regulation primarily through the Resource Management, Conservation and Wildlife acts. The development of rules and regulations (for example, regional policy statements, regional and district plans, conservation plans) in New Zealand is typically highly litigious, involving long public submission and appeal processes.

The cumbersome and often adversarial nature of these processes creates a self-selection mechanism for participation, with participation being more attractive to those with adequate resources to participate (that is, mostly well-organised groups and organisations) and outcomes favouring those who participate (Freudenburg and Gramling, 1994). Given that the private-interest benefits of degrading nature are often higher and less diffuse than the perceived public benefits of preserving nature, there is: (1) little incentive for members of the public to engage in plan and rule development processes, and (2) a temptation for the public to free-ride by relying on the efforts of others to protect one's own interest in nature's protection.

Policy misalignment or lack of policy integration sends conflicting policy signals, further weakening the existing incentives to preserve nature (Pearce and Turner, 1990). Many of these conflicting policy signals enhance the cost-competitiveness of New Zealand businesses. Part of this cost-competitiveness comes from hidden subsidies (such as no charge on nature and environmental services consumed) and minimal enforcement of resource consent conditions (Brown, Clarkson et al., 2013) and animal welfare, employment and health and safety standards. There are also direct financial subsidies, such as the Irrigation Acceleration Fund, which lowers the cost of production in

the primary sector, or the low valuations of public land transferred to private ownership during the high country tenure review process (Brower, 2016). Policies to conserve nature which increase the financial cost of production without concomitant incentives for conservation are likely to create opposition to reform, particularly if this reduces the international cost-competitiveness of New Zealand businesses.

New Zealand's regulatory and public-funding approaches to managing nature are presently also isolated from economic policy, and a lack of coordination and integration leads to conflict between economic goals and environmental protection. Often environmental protection is perceived as creating unwelcome costs and limits on production, as encapsulated in the phrase used in the release of a draft regional mining strategy: 'red carpet not red tape' (West Coast Regional Council, 2015).

The institutional arrangements to support policy integration are also largely absent in New Zealand. The Parliamentary Commissioner for the Environment is arguably the only institution to have a mandate to scrutinise the environmental implications of sectoral policy-making. While the commissioner provides independent advice and may encourage preventive measures and remedial actions to protect the environment, the decisions to change law, policy and institutional arrangements are the responsibility of Parliament and government agencies. The degree to which these institutions respond to the commissioner's recommendations are variable, especially where politicians and decision-makers may have incentives to seek immediate benefits, avoid controversial reforms and allow costs to fall on future generations.

Formulating an alternative policy response

Where private interests degrade nature, it is frequently because perceived benefits exceed the perceived costs of both degradation and the alternative, maintaining nature. Thus, private interests require incentives for conservation sufficient to match the incentive to degrade nature if their interests are to be preserved.

Policy integration is a key aspect to consider when formulating a policy response to strengthen and align policy signals, as well as help achieve intergenerational equity, which governments arguably should be considering on behalf of their population. Policy integration aims, at a minimum, to take environmental considerations into account. Ideally, it would place environmental considerations at the heart of decision-making in other sectoral policies (Jordan and Lenschow, 2010).

There are many interventions available to help preserve New Zealand's natural heritage. Among them are more effective regulation, collaborative governance, regional landscape planning that accounts for natural capital, enhanced agency accountability for environmental outcomes, expanded tools for private land protection, more public funding for conservation, and strengthened public interest litigation (Brown, Stephens et al., 2015). However, while some aspects of these have been adopted by agencies and landowners both internationally and in New Zealand, there is no evidence to suggest that the improvements achieved are sufficient to halt ongoing loss. Brown, Stephens et al. (2015) argue that this is because they do not adequately address the interests and incentives underlying behaviours that cause nature's loss. For example, none of these interventions address incentives underlying the tendency to allow the cost of immediate benefits to fall on future generations, or provide incentives for government to resist pressures from special interest groups (Pearce and Turner, 1990). A policy response, however, that begins to integrate fiscal and environmental policy and that arguably could provide a stronger incentive to conserve nature in New Zealand is tax reform.

An OECD study of taxation, innovation and the environment (OECD, 2010) argues that environmental taxes can be a basis for policy integration that aligns public and private interests while encouraging private and public sector innovation. The report contends that environmental taxes should be central to a country's environmental policy because they incentivise pertinent innovation for harm reduction and its adoption at least cost. Environmental taxes, it argues, complement and support regulation to better internalise environmental externalities through innovations and behaviours that would be neither devised nor adopted without such taxes. Furthermore, the tax should be levied as directly as possible on the pollutant or action causing the environmental damage, as this stimulates abatement incentives for all possible abatement options (OECD, 2010, p.139).

> The intent of [an enviromental] tax would be to integrate economic and environmental management decisions by internalising environmental costs and incentivising conservation.

While tax reform discussions have begun in New Zealand, they are still in their infancy (Tax Working Group, 2010; Salmond, 2011) and have not yet included consideration of the role of corrective taxes such as those proposed by the OECD. Some of the Tax Working Group's key conclusions were that:

- New Zealand relies heavily on the taxes most harmful to growth, particularly corporate and personal taxes on capital income;
- the tax system lacks coherence, integrity and fairness, with the tax burden disproportionately borne by wage earners, since many with wealth can restructure their affairs through

trusts and companies to shelter income from taxes;
- there will be increasing demands on the revenue base arising from demographic change, the rising cost of financing higher public debt, and, we would add, climate change mitigation costs. (Parliamentary Commissioner for the Environment, 2015b)

A land use tax, while being more of a corrective tax, could potentially address these issues raised by the Tax Working Group.

The most environmentally harmful land uses would attract high per-hectare tax rates, with lower rates for more benign uses and rebates for areas remaining in native vegetation or legally protected for conservation.

Conceptual basis for an environmental tax: the land use tax

Taxes based on the capital value of land and any improvements (e.g. buildings etc.) already exist in New Zealand. Local authorities levy rates on this basis, and many offer rates relief for covenanted natural areas (similar to property tax relief in Canada (Ontario, 2016)). The merits of a national land tax levied on capital value (Coleman and Grimes, 2009) and on an area basis (Brandt, 2014) have also been discussed for New Zealand. Their major environmental drawback is that they create disincentives for conservation that need to be countered with exemptions for natural areas.

Most of New Zealand's pressing environmental problems (water pollution, biodiversity loss and greenhouse gas emissions) arise partly or primarily from the intensification of land use. Therefore, an environmental tax based on the intensity of land use is likely to be an appropriate and effective approach to retaining and maintaining nature's capital stocks and subsequent flow of benefits. Such a tax, following the OECD principles, would be internationally novel, although its potential was explored during property tax reform discussions in Germany (Bizer and Lang, 2000, cited in Brandt, 2014). The intent of this tax would be to integrate economic and environmental management decisions by internalising environmental costs and incentivising conservation.

The basis of a land use tax could follow the Accident Compensation Corporation (ACC) model. ACC views workforce health and safety as a form of public wealth (analogous to environmental goods and services) that is diminished and degraded by injury (analogous to environmentally harmful land use). It classifies business activities according to the likelihood of accident (not the actual harm caused) and applies a variable per-dollar earner levy reflecting the risk associated with each activity class. There is also a mechanism for rewarding good safety performance. Rates are periodically reviewed to account for inflation and other factors that change over time.

We suggest that this conceptual framework could be usefully applied to nature by taxing private benefit on the basis of likelihood of environmental impact (as with ACC). In this way, environmental degradation could be estimated from land characteristics and its management, rather than having to measure actual environmental degradation.

Design of a land use tax for New Zealand

While there are many possible technical formulations for a land use tax, we outline a two-tier approach, in an attempt to reduce the administrative burden of such a tax but also provide an incentive to undertake greater nature conservation actions. The outline provided only sketches out how such a tax might work. Additional design and assessment is required to refine the details of the tax, as well as to more broadly familiarise and engage the general public, government, industry and business with the concept.

This two-tier approach uses categories of land use as surrogates for the level of environmental impact of associated activities. The first tier provides the core framework for the approach and could function as a stand-alone system, while the second tier provides the sophistication and differentiation required to incentivise well-integrated production and environmental outcomes. This two-tier approach is similar to that used for forestry in the New Zealand Emissions Trading Scheme, where Ministry for Primary Industries tables can be used to estimate carbon sequestration (based on species, region and age class), or carbon sequestration can be estimated using more precise methods based on basal diameters of trees (as laid out in the Climate Change (Forestry Sector) Regulations 2008).

Tier one: the core framework

The most environmentally harmful land uses would attract high per-hectare tax rates, with lower rates for more benign uses and rebates for areas remaining in native vegetation or legally protected for conservation. In this way, tax rates could be scaled to the level of environmental externality being generated: as an example, taxes on open space would be lower than on land that is no longer permeable because of paving and buildings, and an intensive use (such as irrigated dairying) would be taxed more per hectare than extensive pastoralism. Different parts of a single property may fall into different land use categories and so be subject to different per-hectare tax rates, depending on property size and the spatial resolution of land categories. Land characteristics and its use could be estimated and regularly updated from satellite imagery and existing databases such as Landonline (for

land title data), the land cover database and protected areas database (for land use information), and S-Map (for soil characteristics).

Tier one is essentially a flat tax (i.e. a uniform fixed rate for each land category) which would be relatively simple, with administrative costs falling almost exclusively on the administering agency and few, if any, additional transaction costs for landowners. However, it is a blunt instrument in that it assumes all land within a category has similar characteristics and is used in the same way, resulting in the same level of environmental degradation. A land manager can only affect tax liability by changing land management in ways that alter the area of different land categories within their property.

Tier two: incentives for better environmental management

Landowners and managers would have more opportunity to affect tax liability (and incentive to integrate production and environmental outcomes) if land within each category were further differentiated according to its capability and actual use. Lower rates could be associated with uses which match the capability of the land, while higher rates are applied to areas where land use exceeds capability. For example, a landowner could intensify land use on flatter land with more stable soils that have lower nutrient-leaching potential, and restore or protect more environmentally sensitive areas of land such as riparian margins. Landowners could then further reduce their tax liability by demonstrating that their management practices (within an area of land of a particular category) have a lower environmental impact or improve the condition of land and its subsequent flow of benefits to a standard that exceeds those specified for the tax rate threshold(s) within that land category. The level of tax deduction could be determined using individual land use and management information such as stocking rates, nutrient inputs, types of mitigation practices and sustainability systems (e.g. green roofing) being used, or level of legal protection for natural areas.

The information and design requirements for this second tier would be greater than the tier-one administrative costs for both government and landowners. Landowners would bear the cost of evidence required to demonstrate that threshold standards had been met, and government would have greater review and verification costs. The benefit gained, however, would be better-integrated environmental and production outcomes through expanded opportunity for landowners to manage their tax liability.

Land-use category tax rates

Given the OECD recommendation (OECD, 2010, p.139) that the tax rate should reflect society's value of the harm done (which likely includes non-environmental harms) as well as government's need to raise revenues, the proposed tax rate would be higher than simply the estimated value of environmental damage to society. This is to better account for the damage to and overuse of the environment by individuals or businesses.

> If the tax rates fully reflect the value to society of all externalities related to land use, then the revenue levied should be of sufficient scale to deliver a combination of otherwise-elusive social benefits.

Tax rates are important as they will be what drive the extent of behaviour change by landowners and therefore the level of additional nature conservation that is undertaken. These rates would be routinely updated to match inflation and reflect changes over time in the relative value of different types of environmental harm.

The number of land use categories and the per-hectare tax rate associated with each are matters that require more detailed research and scenario modelling. This is to understand the implications of different tax rates at the property scale as well as in aggregate for the various land-based sectors, and what, if any, unintended consequences may result.

Tax administration

The administration of a land use tax would likely require new or enhanced systems within Inland Revenue (IRD) to store, process and analyse large spatial databases, potentially including satellite spectral imagery. This may require new capability within IRD. Alternatively, cross-agency partnerships could be created, where agencies such as Land Information New Zealand could provide the required information to IRD.

Some of the data required to implement a tier-one system are already available. For instance, a variety of public domain satellite imagery can be used to define land use intensity categories. Land boundaries and ownership are already defined in cadastral land title databases (and used by regional governments to administer the rating system). The data required for tier two would depend on the eligibility criteria for tax rate reductions. Evidence used to demonstrate compliance with existing resource consents and covenant conditions might help serve this purpose.

Anticipated benefits of a land use tax

The ability of a land use tax to arrest the continued degradation of nature in New Zealand lies in its potential to align the interests of land-based primary industries, government and wage earners with conservation and environmental protection.

Growth benefits

The additional revenue raised through a land use tax could allow a reduction in corporate and income tax rates, which may help facilitate economic growth (Barker, Buckle and St Clair, 2008). It would also present an opportunity to

align personal, company and trust taxes to improve the integrity and fairness of the tax system and reduce tax avoidance. If revenue levied by a land use tax exceeds reductions from other taxes, the surplus could be recycled to:

- support community/public conservation efforts;
- assist low-income or disadvantaged landowners reduce their negative impacts on nature;
- fund future commitments, such as those related to climate change mitigation actions;
- fund the level of pest control required on public conservation land to ensure the persistence of our threatened endemic fauna and flora.

If the tax rates fully reflect the value to society of all externalities related to land use, then the revenue levied should be of sufficient scale to deliver a combination of otherwise-elusive social benefits. While the corrective goal of the tax is to maintain the benefits flowing from nature, the tax has potentially broader benefits through any reduction in the wealth gap (Wilkinson and Pickett, 2009). The wealth gap in New Zealand is large relative to other OECD countries (ninth largest out of 34 countries). Compared to Australia, Canada and the United Kingdom, low-income earners face a higher overall tax burden in New Zealand, while high-income earners face a lower tax burden than they would face in those three countries (Salmond, 2011). The inherently progressive character of a land use tax could change this balance. The area of land owned and the intensity of its use are arguably highly correlated with wealth and therefore ability to pay. Most low-income earners own little, if any, land and would be exposed only through what may be passed on in rents. An additional benefit is the potential for additional tax revenue to reduce the tax rates for lower-income earners.

> The political incentives to accumulate environmental debt rather than implement controversial reform mean that effective steps to curtail environmental degradation are unlikely.

Societal benefits

Tax signals affect business growth decisions, wider investment decisions and strategic development decisions. Fundamentally changing that signal to incorporate the positive and negative impacts that decisions have on nature will provide impetus for landowners to manage land differently. Rational landowners will reduce their tax burden through actions that maximise their total tax deductions or rebates.

Over time, benefits above and beyond the direct financial benefits of a reduced tax burden from enhancing nature will begin to accrue. New Zealanders are likely to see the benefits of more sustainable production systems, improved well-being, growth in industries reliant on healthy ecosystems, and expanded business opportunities from the diversification options available by preserving nature. We should also see the creation of safe refuges for flora and fauna currently being lost through habitat degradation.

Private sector benefits

The greatest financial benefit will accrue to landowners with the lowest environmental impacts. Reductions in environmental impact could be achieved by confining intensive uses to small areas, retaining areas in predominantly natural cover, or implementing management practices that lower negative environmental impacts. For instance, Māori landowners or custodians who own/manage land in native vegetation and derive income from low-impact land-based tourism will benefit from having a lower land tax rate, as well as receiving a tax deduction/rebate for any additional actions to improve the state of nature on their land.

Those businesses managing their operations with a clear focus on sustainable management practices may find additional benefit in the substance and authenticity added to their brands related to the conservation of nature. Businesses in sectors such as tourism, information technology, communications, service, manufacturing, health and education would likely enjoy improved competitiveness associated with both reduced tax liability and greater authenticity of environmental sustainability branding. Many businesses may enjoy a boost from broad-based economic growth promoted by the shift towards taxing the private consumption of public wealth rather than taxing the production of private wealth. Businesses in the primary sector that currently receive hidden subsidies will be incentivised to change the way they operate to lower their negative environmental impacts or face larger costs to continue business as usual.

Concluding reflections

Environmental degradation and biodiversity loss continue because there is insufficient incentive for businesses and households to not harm the environment, and for government resources (including financial, political and capacity) to fully utilise the currently available tools for nature conservation. The complexity of environmental issues combined with the collective action problem mean that those who are affected by environmental degradation are not compensated by those causing the degradation. This resulting 'wicked problem' leaves most environmental problems unresolved and demanding government intervention. A corrective environmental tax like a land use tax could provide a way through at least some of these challenges.

Perhaps the most significant remaining challenge not addressed specifically by a land use tax relates to the political economy. Governments are often guided by immediate political priorities which lead governments to incur debt now,

thereby shifting costs onto future generations. Debt can be in any form: built, financial, social and natural capital. Changing the status quo of policy – whether it is tax reform, environmental regulation or some other policy reform – can affect the election aspirations of government. Thus, governments have an incentive to avoid reform, especially controversial and potentially costly reform, and instead allow debt to accumulate for future generations. Applying this to nature highlights how the misalignment of political and public interests is likely resulting in a socially suboptimal accumulation of environmental debt.

The political incentives to accumulate environmental debt rather than implement controversial reform mean that effective steps to curtail environmental degradation are unlikely. However, New Zealand has demonstrated its ability to address equally challenging problems when it implemented new fiscal policy and incorporated fiscal responsibility requirements in the Public Finance Act 1989. This was to promote fiscal sustainability and limit the level of debt passed on to future generations. Similarly, changes to the Reserve Bank Act 1989 enabled interest rates to be set independently by the bank's governor. Perhaps the impacts and mitigation costs of climate change will lead to something akin to the Fiscal Responsibility Act 1994 to promote environmental sustainability, and to the Reserve Bank Act for politically independent setting of tax rates on land use intensity categories.

1 1080 is a poison which is mixed into baits and used to control a range of pests, especially possums, rats and the stoats which eat the poisoned rats (http://www.doc.govt.nz/1080).

2 OSPRI is the not-for-profit limited company that was established on 1 July 2013 when the Animal Health Board and NAIT (National Animal, Identification and Tracing scheme) merged. OSPRI was set up through an agreement between industry and government and manages two world-class programmes, NAIT and TBfree. NAIT captures data to trace individual animal movements. TBfree plays a vital part in eradicating bovine TB and helping keep it out of our herds (http://www.ospri.co.nz/home.aspx).

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