

SUSTAINING THE COUNTRY: Ideals, opportunities and imperatives for future rural landscapes

¹Simon Swaffield

Introduction

Rural New Zealand is being transformed by a number of intersecting pressures and dynamics. Some are locally driven, but many are generated by changes taking place in the global economy. The 2007 State of the Environment Report [MfE 2007] has highlighted that these transformations have significant environmental consequences, some of which are coming into tension with the rising expectations of overseas consumers, as well as urban New Zealanders. This paper briefly reviews some historical and current factors that shape contemporary rural landscapes. It critiques the dominant model of environmental planning; identifies limitations and future challenges; and presents an alternative vision for the future. The main theme of the paper is to highlight the potential of landscape regeneration as an integrating vision. It argues for a national policy statement that establishes a strategy and targets for the regeneration of the ecological infrastructure of rural New Zealand. The aim is to create a long term matrix of sustainable and self regenerating ecosystems within which productive land uses can be undertaken. Landscape thinking and understanding becomes a means to stimulate the rural transformation needed to achieve sustainability goals.

The productive rural nation

For much of its history as a modern nation, NZ identity has been shaped by agrarian ideals [Bell 1996]. The promoters of European settlement emphasized the availability of fertile, bountiful land - a 'Britain of the South'. Pastoral agriculture replaced temperate rain forest [Park 1995] and created a southern extension of the 'Empire of Grass' [Pawson and Brooking 2002]. Maori customary practices based upon hunting, gathering and gardening were displaced, and in many rural areas the new pastoral culture and practices became adopted and naturalized by Maori [Iheremeia 1994].

Agricultural issues dominated the NZ political economy. The rural landscape was productive and inhabited by a community of largely shared values and interests, centered upon the 'family farm'. The uncertainties were those traditional farming challenges of weather and market prices. Despite being predominantly urban dwellers, New Zealanders drew extensively upon rural ideals for their popular culture. When town went to the country, it was largely upon the country's terms. Planning and environmental management [such as there was] supported the agrarian status quo- protecting rural land from forestry and urbanization, and providing support for erosion control, flood management, and land improvement [O Connor 1993].

¹ Professor Simon Swaffield. Lincoln University New Zealand. Contact: swaffies@lincoln.ac.nz

The end of an era

The political and economic revolution of the 1980s shattered these arcadian ideals. The accession of the UK to the EEC had already dislocated the taken for granted market for traditional meat, wool and dairy products, and NZ was slipping behind its contemporaries in economic growth, and into debt. The subsequent programme of economic reform and trade liberalization of the 4th Labour Government under David Lange radically changed the nature of NZ agriculture, as it was forced away from production goals and subsidies and towards consumer demand and markets [Boston et al 1991].

The shift in domestic policy was paralleled by an equally dramatic transformation in international markets, as the globalization of trade, technology and society restructured established relationships. Described by the theorist Ulrich Beck [2003] as a 'second modernity', the nature of globalization has been much debated, as has its relationship with New Zealand society and economy [Baragwanath et al 2003]. However, whether one adopts the view that late 20th century globalization represents a significant new type of socio economic relationship, or an intensification of historical trends, the practical effects on rural NZ have been profound.

In the context of rural transformations, the extension of what has become known as the open market agenda is particularly significant. Promoted by institutions such as the World Trade Organisation, the open market agenda seeks to reduce and remove trade barriers between nations, enabling a more direct and responsive link between supplier and consumer. In so doing, it places the condition of the rural landscape firmly in the focus of consumer sentiment and expectation.

Whilst much of the discussion of globalization is focused upon its expression in trade, there has been an equally significant transformation of global policy about sustainability. Stimulated by the report of the Brundtland Commission in 1987, a global sustainability agenda has emerged and acquired a rapidly growing sense of urgency. The UN World Environmental Summit at Rio in 1992 provided the backdrop to a series of sustainability policy initiatives, ranging from the bottom up Agenda 21 programme for sustainable communities, to global conventions on Biodiversity and Climate Change.

These developments have in turn been paralleled within New Zealand by a growing political and social awareness of New Zealand's unique biodiversity, and its bicultural foundations. Tribunal hearings and the subsequent negotiation and settlement of claims by iwi under the Treaty of Waitangi have lead to a progressive transformation of the role of Maori within New Zealand agriculture, Increasing areas of rural land have been returned or transferred to iwi and hapu, and new Maori incorporations are becoming major landowners and managers. At the same time, advocacy by crown agencies and NGOs has raised the profile of

biodiversity issues, expressed in a growing number of voluntary conservation groups, covenants and rural initiatives, and in the adoption of the NZ Biodiversity Strategy 2000.

Rural landscape transformation

NZ rural landscapes are now being transformed at the intersection of these two very different policy agendas.

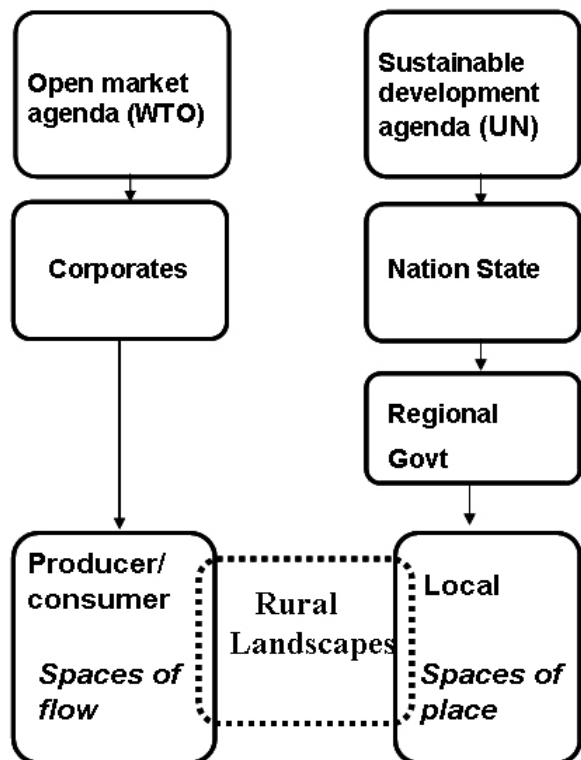


Figure One: Rural landscape at the intersection of two policy agendas [after Primdahl 2007]

On the one hand, the open market agenda promoted by institutions such as the WTO and OECD is stimulating the development of vertically integrated corporate supply chains. These link individual producers- farmers- through corporate structures such as Fonterra and the large retail supermarkets to individual consumers in the developed countries. This creates what Castells [2000] has described as the 'space of flows'. Individual farms are becoming more closely linked functionally and financially with consumers on the other side of the world than they are with neighbouring farms [Primdahl and Swaffield 2004]. Old ideals are being challenged, and the family farm is no longer pre eminent in many rural areas.

At the same time, the global sustainability agenda is being extended through the hierarchy of government. In New Zealand, there is a national programme of action on sustainable development, and sustainability [in its various forms] is now embedded in the purpose of a number of statutes [most notably in this context, the Resource Management Act]. These provisions enable and require actions at regional, district and local levels, aimed at conserving and protecting for future generations the natural and cultural qualities and resources of the local 'space of place' [Castells 2000].

New Zealand rural landscapes are caught in the tension between these two dynamics. The political response has been to separate out functions and roles. They have been separated in space, in institutions, and in policy, to reinforce historical trends towards what Park [1995] has described as 'a divided landscape'. There are three main divisions:- the rural landscape of production, the rural landscape of consumption, and the conservation estate.

The production landscape

The rural landscape of production is an expression of the agri-industrial rural ideal [Marsden 2003]. It emphasizes efficient and profitable food production, based upon integrated commodity chains serving global markets. In this rural space, production is managed privately, through the decisions of farmers, influenced by the quality control and marketing systems of the industrial food companies. The landscape is valued for its biological productivity, as a material resource. Production systems are highly capitalized, increasingly specialized, and as a consequence are continually under pressure at the economic and environmental margins.

Landscapes with access to reliable water and processing facilities are becoming highly intensive:- particularly those based upon dairy or viticulture. Intensification has changed the character of both landscape and community, with shelterbelts removed and replaced by large open irrigated pastures, woolshed replaced by high-tech milking sheds, pasture replaced by grapevines, and family farms replaced by corporate structures [Primdahl and Swaffield 2004].

With the globalization of markets, NZ producers have shifted focus towards adding value. The 'Clean and Green' New Zealand brand and campaign has been widely adopted by agriculture. Significantly, as agribusiness moves from cost minimization to value maximization, the *landscape* of production becomes an increasing factor in marketing products. But this poses a new challenge. Eco-consumers are willing to pay higher prices for products, but want to know that they are not only affordable and healthy, but also morally good [Marsden 2003]. They are concerned about animal welfare, environmental standards, and food miles. They want products that make them feel good. The production landscape itself becomes part of the brand.

One response to the rise of eco-consumerism has been for industries to introduce requirements and incentives for their suppliers to meet environmental standards. Examples include product certifications schemes such as the Forestry Stewardship Council, and industry agreements such as the Dairying and Clean Streams Accord. Poor environmental performance by a supplier leads to the risk that they will lose access to the premium markets- and be either forced back down the value chain to less discerning consumers, or driven out of business.

These types of industry based management approach – seeking environmental quality through imposing standards within the space of flows- are an important part of the sustainability solution- but are not sufficient in themselves. The reason is that all production spaces are also part of local landscapes. Production landscapes comprise a complex mosaic of suppliers working to the needs of different markets. One farm may be supplying Fonterra, but an adjoining one may provide deer velvet to Germany. A farm focused upon providing organic beef to the most discerning Japanese consumer cannot isolate itself in the customers perception from a poorly performing neighbour. Landscapes are contiguous, and much of the brand value of any particular product is in New Zealand Inc. In short, a production unit- a farm within a landscape- relies upon the integrity of the wider landscape setting for its brand value.

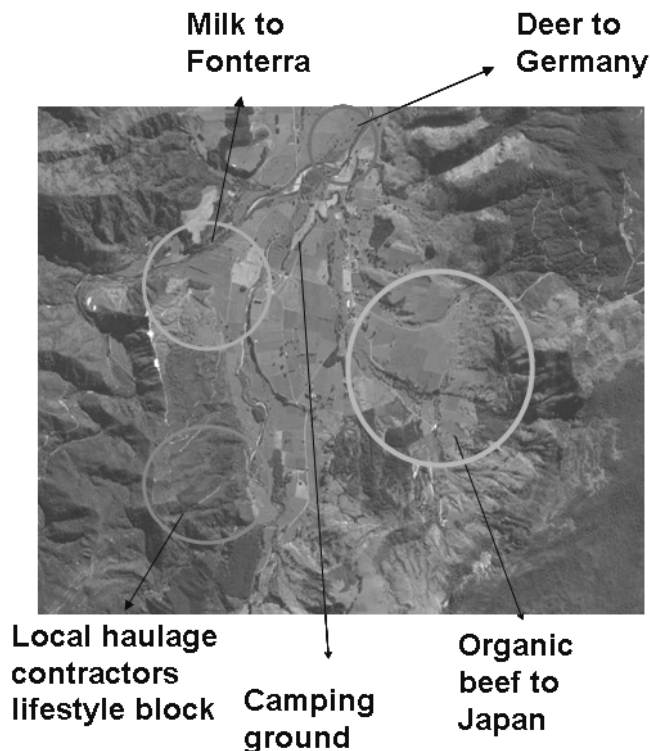


Figure Two: Production landscapes are a complex mosaic of suppliers to different markets. They rely upon the integrity of the whole landscape for their 'moral legitimacy'. [Marsden 2003]

The Consumption Landscape

The second category in the divided rural landscape is the landscape of consumption [Pawson and Swaffield 1998]. These are private lifestyle landscapes along lakesides, coasts, and around the main cities. They are also part of the global space of flows, and follow international design fashions. They have high land values, expensive houses, with high energy demands and servicing costs, and equally high costs of maintenance.

The problem with these rural landscapes of consumption is that while they only cover a very modest proportion of the NZ land area [albeit a very visible proportion] they require continual urban investment. In some European countries, agricultural production now plays such a small role in the national economy that the rural landscape is almost entirely a landscape of urban consumption, with small part time farmers maintaining a traditional looking rural landscape, based upon financial support from governments and the European Commission. Many commentators believe this to be unsustainable, even in urban and industrial Europe [Marsden 2003]. In the NZ context, consumption landscapes are even more problematic. Continued dependence upon agricultural production as a significant part of GDP makes any significant public subsidy of the extensive 'middle' rural landscape impossible. These rural landscapes of consumption need to be re-grounded in sustainable local landscapes.

The Landscape of Conservation

The third type of divided landscape is the landscape of conservation managed by the Department of Conservation [DOC]. The conservation estate covers over 30% of NZ land area, but is concentrated geographically in the uplands of the North Island, and along the central divide and west coast of the South Island. It is unrepresentative ecologically [Ewers et al 2006], and distant from most urban population centers. The estate is made up of a combination of high value enclaves [National Parks, Conservation Parks and Reserves] and other areas of land of moderate conservation value that had insufficient production potential to warrant being privatized during the 1980s.

The conservation estate is also under pressure. Its area has been increasing as an outcome of the High Country Tenure Review process, and DOC is facing budget constraints, needing to divide its energy between managing public 'visitors' to the estate, pest management, and conservation initiatives relating to threatened species. Much of the 'Clean and Green' and '100% Pure NZ' marketing for NZ products has been based upon imagery of the iconic landscapes of the conservation estate. However as consumers demand transparency throughout the supply chain, the limitations of the role of the conservation estate as a surrogate for clean and green production will become more evident. Productive rural NZ cannot rely upon a picturesque mountain backdrop for its green credentials in an increasingly discerning global market.

Management across the interface

At the interface of these different landscapes there are a number of statutory and voluntary institutions, most notably, the Resource Management Act [RMA]. In the RMA framework, production and consumption are private functions that overlay a safety net of public regulation of minimum environmental standards. Most commentators agree that the RMA has been partially successful. Unfortunately we cannot agree which half. Developers and land owners argue that the RMA has been too weighted towards conservation, with excessive protection, regulation and compliance costs. Conservationists, local communities and sustainability scientists tend to argue the reverse- that the RMA has been too liberal, and has failed to protect essential natural resources [including landscape].

The empirical evidence offers most support to the second position, but the picture is uneven and nuanced. There are both successes and failures, and individual winners and losers. On the development side, the rural sector has been able to transform itself dramatically in many regions. There has been diversification and intensification, and while it has remained a world leader in many traditional areas, NZ is becoming a significant new player in others [eg wine]. Many farmers have been able to realize the increasing capital value of rural land through subdivision [in so doing, creating the lifestyle landscapes described above].

On the conservation side, there have been a range of successful voluntary and cooperative conservation and sustainable projects, nationally through organisations such as QEII Trust and NZ LandCare Trust, and locally through community based organizations such as the Banks Peninsula Conservation Trust. Many individual land development projects have successfully balanced conservation and economic outcomes through mechanisms such as local management agreements, customary management agreements, whole farm plans, integrated catchment management, and creative site design.

However these largely bottom up conservation initiatives are limited in their overall contribution. They are typically in less intensively managed landscapes and cover only a modest proportion of the production landscape. QEII National Trust covenants for example cover less than 1% of the total land area in production. The problem is that the combination of voluntary initiatives and the effects based regulation of minimum standards, with top down product certification, has been least successful where it is most needed- in those areas undergoing rapid transformation [PCE2001, Heitzmann 2007]. In particular there has been a system wide failure to strategically manage the cumulative effects of intensification and development [Oram 2007].

This is particularly evident in three key respects. Agriculture is the largest user of freshwater in NZ, and with the widespread conversion of farms from dryland pastoralism to irrigated dairy production, demands upon water are increasing and

exceeding supply in a number of areas. There is a widely documented decline in the quality of lowland waterways and lakes [MfE 1997, MfE 2007]. Whilst there are intense scientific and political debates about the detail of the relationships between soil type, irrigation regimes, stock numbers and management, and change in water quality, monitoring indicates a growing overall problem with non point source pollution.

Biodiversity decline was identified in the 1997 State of the Environment Report [MfE1997] as the most significant environmental problem facing NZ, and whilst there are now other contenders for that position, the decline in biodiversity has continued. It is most notable in the lowlands [Ewers et al 2006] where the impact of agricultural intensification is concentrated.

There has also been incremental sub urbanization of rural landscapes around cities, and of iconic landscapes with particular attraction for holiday and lifestyle development. Reports by both the Parliamentary Commissioner for Environment [2001] and the Environmental Defense Society [2004] have highlighted the failure of RMA instruments to deal with the cumulative effects of incremental urban development. The main failing, agreed by most presenters to the 2007 EDS conference on 'Beyond the RMA' [EDS 2007], has been a 'failure to address strategic issues' [Randerson 2007:99]. Reporting on an extensive review of plan making, Crawford noted well recognized problems of lack of capacity and resources, but also identified a lack of political commitment to achieve real results as a major and continuing problem [Crawford 2007].

As Rod Oram noted, 'the RMA has helped New Zealanders begin to learn how to allocate and manage resources. But we are clearly struggling to meet mounting pressures on them. And, crucially, the sustainability challenges ahead dwarf anything we have attempted so far.' [Oram 2007:37].

Future rural landscape challenges

These challenges arise from changes in both global systems and in markets:

Climate change means that rural landscapes will experience increasing frequency and intensity of extreme weather events such as windstorm and flood [NIWA 2008]. This will place many areas of erodable hill country under increasing risk, and also create risk for the intensive production landscapes on the plains. There will also be more frequent and intensive droughts, which highlights and places pressure upon the issues of water allocation, use and management that the RMA has so far failed to manage effectively. Soils, shelterbelts, river systems, agricultural infrastructure, and crops and stock will therefore be increasingly vulnerable to degradation through both short intense events and seasonal variations. Landscapes will also face localized but intense impacts of projects implemented to reduce that vulnerability, particularly large scale water storage.

The emergence of a new carbon economy as part of the public policy response to climate change is also of major landscape significance. The proposed emissions trading scheme will impose increasing economic costs on many aspects of conventional intensive agriculture, increasing the pressure upon farmers to seek maximum productivity from their land. At the same time, the emergence of a market for carbon sequestration may stimulate alternative land uses based upon tall woody vegetation in more marginal areas.

Peak Oil reinforces the impacts of anthropocentric climate change. The combination of policies to reduce carbon emissions, and the rapidly increasing cost of oil is creating a rapidly growing demand worldwide for alternative sources of energy. This includes biofuels as an alternative fuel, and development of renewable energy sources, particularly wind energy. Biofuels increases competition for land and water, whilst renewable energy development creates intense albeit relatively localized landscape impacts [PCE 2006].

Eco consumers: The increasing costs of transportation from carbon emissions regimes, combined with increasing costs due to peak oil, mean that the historical tyranny of distance is rapidly reasserting itself. This intensifies the dependence of New Zealand producers upon premium value added markets. Yet these premium consumers are also the most sensitive to the environmental integrity of food and fibre. As eco-consumers they need to be reassured that not only is the transportation of products across the world more beneficial in terms of the carbon footprint than is locally sourced supplies [Saunders et al 2007], but also that the landscape from which they are sourced is *morally legitimate* [Marsden 2003]. As green consumerism has emerged, the consequences of intensification have also become more evident and understood. 'Clean and Green' has acquired commercial value, but has also become vulnerable.

The problem faced in New Zealand is that current rural planning policies fail to deal with the consequences of the agri-industrial model in an environmentally sustainable way, but equally fail to come to terms with the socio economic dynamics of eco-consumerism and of the consumption landscape. There are tensions within the different types of landscape, across their interfaces, and across the whole system, and the tensions are increasing.

Principles and Goals for our future rural landscapes

The emerging risks and tensions cannot be managed by continuing with the current approach. A new vision for rural New Zealand is needed. It must:

- *respond* to growing risks and opportunities arising from the global imperatives of climate change, peak oil, eco consumerism and changing markets, and the sustainability agenda;
- *learn* from the successes of current bottom up initiatives, and
- *combine* them to create a strategic vision for the wider rural landscape.

As Robert Costanza noted in his presentation at the beginning of the 2008 EDS conference, we need to re- design rural landscapes to maximize their total value to society.

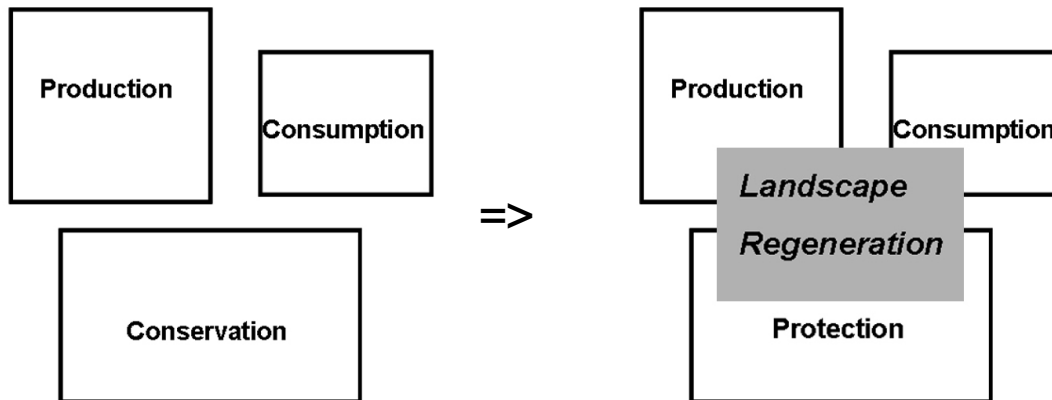


Figure Three: Moving from the currently divided landscape to an integrated vision

Transformed rural landscapes require renewed principles. They need to be:-

Integrated systems: A series of seminal papers and international reports have highlighted the total interdependence of human activity with biophysical systems [Costanza et al 1997, Millennium Ecosystem Assessment 2005]. Rural agricultural landscapes are human ecosystems [Lyle 1985] that combine natural and human processes at every level. Humans live in a world that is radically transformed by human activity, and strategies and principles of rural management and governance need to recognise this integration [Novacek and Cleland 2001]. The proposition that launched the RMA in 1991, that the public interest in the rural environment should be focused upon the maintenance of an 'environmental bottom line' was always deeply flawed, and is now seriously outdated. It needs to be replaced by a political commitment to visionary and collaborative design and management of complete systems- as pioneered in the Integrated Catchment Management approach.

Resilient: The increasing uncertainty, instability and variability in both climatic and market systems means that all rural landscapes- production, consumption and conservation- need to become more resilient to external stress [PCE 2002]. What does a resilient rural landscape comprise? The short answer is we don't know exactly, and it will in any event vary significantly across different landscapes, but there are a number of characteristics that suggest greater rather than less resilience. These include a 'deep' biophysical structure that is robust and *persistent* over time, maintaining a flow of ecosystem services despite variations in the environment [Costanza et al 1997]. Resilient landscapes are *self regenerative*- the system is continually enriching its abiotic, biotic and cultural

resources [Lyle 1985]. They need to be capable of *responding* to rapid change. These qualities will require the deliberate provision of a measure of structural *redundancy* within the system, and an *adaptive and experimental* approach to its design and management [Walters and Holling 1990].

Regenerative: Australian author Tim Flannery used the term 'Future Eaters' [1994] to describe the way in which human cultures initially take the easy options when entering new environments- for example hunting the megafauna at the top of the food chain- and that only when this has been exhausted do they attempt to better fit their demands to the capacity of the environment. NZ agriculture has – in common with modern agriculture throughout the world- relied for its productivity upon historical stores of nutrients from newly cleared forest soils. As these run down, then new, often mined, supplies need to be imported into the system, often at high energy cost [PCE 2004]. The loss of biodiversity is another dimension of the same process, as complex natural ecosystems have been replaced by simplified production systems. The growing understanding of the significance of ecosystem services in supporting production systems [Costanza et al 1997] highlights the need to find ways to regenerate the capacity of production landscapes to supply a range of functions and materials on a *continuing* basis. This can be done at the field scale- introducing new plants and organisms into vineyards to provide biological pest control [Fieldler et al 2007]. A complementary approach is needed at the landscape scale, re-establishing ecosystems [such as riparian corridors] whose role is to sustain the functioning of the production landscape. Lyle [1985] described this as *regenerative* systems.

Moral and expressive: Mike Barry, Head of Corporate Social Responsibility at Marks and Spencer, UK, speaking to the EDS 2008 conference via video link, emphasized that 'green consumerism' depends upon clear communication and trust. He argued that green consumers typically did not have the inclination to follow through every link in the product chain, but did need to see and trust that the supplier had a legitimate *plan* to deliver 'green' products. He suggested using a limited number of 'proof points' to show how the plan was being implemented. This reinforces the argument made by Marsden [2003] that production landscapes need to be seen as *morally legitimate*. They must *express* values that give legitimacy to the act of consumption- *be seen to be green*. This is why the Icebreaker story presented to the EDS 2008 conference by Jeremy Moon was based around compelling and evocative imagery, and why the Greening Waipara project described by Steve Wratten includes signs, leaflets and visually attractive plantings. These features are not needed for the biological organisms that provide the ecosystem services. They are needed to show the humans involved that the landscape is legitimate and cared for [Nassauer 1995a]. Sustainable rural landscapes of the future need to express their sustainable functions in both their structure and their appearance [Nassauer 1995b]

Multifunctional: The final essential feature of regenerative rural landscapes is their multifunctionality [OECD 2001]. Multifunctionality is a complex and value

laden term [Brandt & Vejre 2006]. It is associated by some with ecosystem services [OECD 2001], but by others with the politicized trade negotiations around the so called European model of agriculture [Potter and Burney 2002]. In this paper, the focus is upon recognizing that there are a range of landscape functions that are essential to sustainability- food and fibre production, ecosystem services, identity and enjoyment- which are all necessary outputs from a sustainable rural landscape. However it is not viable or necessary to pursue all functions equally in all places. The key question is how the functions are interrelated in space and time [Brandt and Verje 2006]. The point of *landscape* multifunctionality is that it recognizes the need for a range of functions at the landscape *scale* [Forman 1995, Selman 2006].

A National Policy Statement

Implementation of a renewed vision for a sustainable rural New Zealand will require these principles to be extended through a range of policy frameworks. Most importantly, a clear statement of vision and direction is needed at national level, in the form of a National Policy Statement. There is also a need for spatial strategies and targets at Regional and District levels, and an expanded suite of policy mechanisms at local levels.

At national level, a longer term *strategic* vision is required that better matches policy goals to the scale and nature of risk and opportunity [Steinitz 2004]. The challenges faced have moved beyond the concerns and fortunes of individual farmers and local communities and are now expressed at national and global level. Indeed, the challenges of the 1970s and 1980s were at national level, and the policy response was framed at national level, but it [wrongly] presumed that the visions and actions could all be individualized. However it is absolutely clear that the challenges of eco-consumerism, climate change and peak oil need a collective vision. A National Policy Statement for Sustaining Rural New Zealand could usefully include the following elements:-

1. *A vision of Landscape as a means to achieve sustainability goals*, rather than an end in itself [Selman 2006]. To date, landscape thinking in NZ has been bound up –literally- in the endless arguments over Section 6(b) of the RMA. Important though it is to keep the places and qualities we value, landscape protection is not a *constructive* focus. Future generations need to be able to experience the outstanding landscapes of New Zealand, but rural NZ more urgently needs landscape *regeneration*. So the focus in a National Policy Statement needs to widen from the protection of icons to the creative ecological reconstruction of the working rural landscape.

2. *Values and goals*: There is currently no clear vision for rural New Zealand to replace the arcadian ideal of the family farm. There is opportunity [and a pressing need] to draw together the threads of sustainability science and management and to articulate a statement of what constitutes a sustainable rural condition in New Zealand. In Europe, the development and adoption of the European

Landscape Convention has provided a stimulus to research and action [Jones et al 2007]. There, the vision is focused upon recognizing the way that historical cultural identity is embedded in contemporary landscapes. For the Europeans, in an expanded and rapidly globalizing political and economic union, cultural identity is a vital key to wellbeing. There is opportunity in New Zealand to shape a different, but equally vital landscape vision, shaped around practices of integrated sustainable management. As Kenneth Boulding put it, ‘integrative power often rests on the ability to create images of the future and to convince others that these images are valued’ [Boulding 1990:122 cited in Wescoat 2007:18]. Landscape can provide that integrating vision.

3. *Baseline knowledge*: The NPS also needs to provide direction in the development of baseline knowledge. In Europe, the ELC has stimulated the integration of diverse disciplinary understanding within pan European data bases and inventories [Jongman and Wascher 2004]. In NZ, the State of the Environment reports and other related projects has lead to more systematic collation of parametric knowledge. Mapping projects such as the LCDII and LENZ initiative are useful for scientific evaluation, but they do not translate easily to the public arena. In the UK, landscape character mapping has now provided a common and easily accessible baseline by which to assess goals and options for protection and regeneration. New Zealand also needs a national landscape classification and characterization system [Brabyn 1996] to synthesise and communicate the diverse qualities that underpin a sustainable rural future.

4. *Spatial priorities*: The final key contribution of an NPS would be to establish spatially expressed priorities for protection and regeneration [Blaschke 2006]. At present, decisions over new projects and investments are made primarily in relation to local environmental resources and landscape values. Yet the challenges faced are national in significance. An NPS could identify where there are unique and distinctive rural resources that need protection, and more importantly, where landscape regeneration is most needed and will have most effect. The landscape consequences of climate change in particular need consideration at a national level, but so also do needs and opportunities for other rural resource decisions, for example water allocation, renewable energy, carbon sequestration, biodiversity restoration. An NPS would provide a clearer framework and targets towards which regional policy and district plans could be directed. However, these targets should be used as a means to promote regeneration, rather than as an end in themselves [Margules 2005].

Regional Landscape Frameworks

The key landscape strategy needed to achieve long term rural sustainability is to create green/blue frameworks [Ahern 2002]. These are networks of essential resource systems that will continue to protect and regenerate ecosystem functions through successive cycles of productive land uses undertaken in the interstices of the framework.

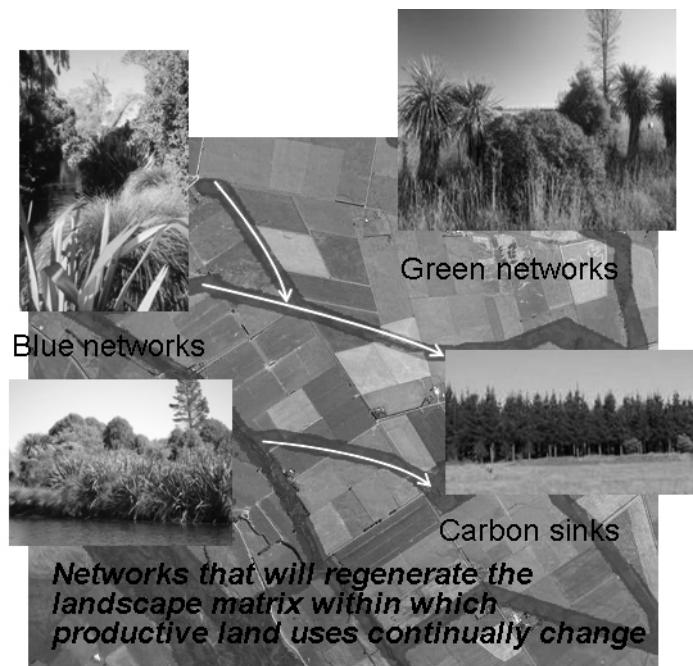


Figure Four: A regenerative green blue landscape network

There are three key landscape elements to such a framework: wetlands and waterways, erosion prone slopes, and regenerating areas of tall woody vegetation and scrub.

New Zealand landscapes are extensively shaped by their hydrological systems, and waterways in their many forms provide a key expression of landscape structure. Given the significance of water in rural sustainability, and the high value assigned to water quality by New Zealanders of all cultures [Hughey et al 2006], water provides the most hopeful basis for a shared and collaborative vision of rural sustainability. So the first element of a strategy is to target all permanent and seasonal wetlands and waterways as locations for green blue corridors.

The second element is erosion prone slopes. As events such as Cyclone Bola demonstrated, the removal of tall woody vegetation from steep uplands to create pasture has been a major cause of accelerated soil erosion. Re establishment of trees and scrub on the most erosion prone areas has been a continuing priority in many areas for decades. In some areas, re-vegetation is occurring as a consequence of reduction or withdrawal of grazing. In others, such as the Gisborne East Coast, active replanting is undertaken. The mechanisms will vary with location and need, but the essential principle is the same.

The third element may overlap geographically with the previous two, but is based upon a different spatial logic. In 2000, Meurk and Swaffield proposed a vision for the regeneration of rural New Zealand based upon three linked arguments. First, that biodiversity conservation could not be relegated to the conservation estate, and indigenous biodiversity needed to be re-integrated into all productive landscapes in New Zealand. Second, that this is likely to gain most acceptance, and be most effective in stimulating wider public support, if the indigenous elements were introduced in the first instance into established cultural features, such as shelterbelts. Third, that sufficient areas of restoration were needed to enable species to become self-regenerating.

The notional target proposed by Meurk [1999] was that 20% of an area should be in a natural or regenerating condition, and Swaffield and Meurk [2000] adopted that figure as the guideline for their vision. Other ecologists have proposed figures ranging from 10%, to 40% [Ewers et al 2006, Norton & Roper Lindsay 2004, Rutledge 2003]. Calculations are typically based upon what has been described as the 'extinction' threshold- the proportion below which a species is unlikely to be able to maintain its viability [Andren 1994]. The science is contested and complex [Norton and Miller 2000], and such calculations are always context dependent [Norton & Roper Lindsay 2004]. However, there is enough evidence to suggest a pragmatic working target in the middle of the range- an 80:20 target. That is, for every 80ha of production, at least 20ha should be allocated to regenerative functions, such as biodiversity, riparian margins for water quality, shelter, and carbon sequestration. This target is heuristic rather than normative- its role is to provide a plausible goal to stimulate the transitional design that is needed [Swaffield 1991].

The location and configuration of the 20% is critical [Forman 1995]. It needs to be within the same landscape setting as the production lands- typically within a kilometer or so. The spatial configuration needs to enable sufficient core area [away from the edges] to support a full range of species [Meurk and Hall 2006]. Depending upon the local biodiversity priorities, the areas might be either isolated patches, or part of a continuous network [Hobbs and Norton 1996, MacIntyre and Hobbs 1999, Norton and Miller 2000]. A landscape approach would focus such areas as much as possible upon the deep landscape structure [Lyle 1985], that is, the hydrological systems and distinctive landforms that shape the function and character of an area, combined with opportunities offered by major cultural infrastructure- for example, transportation corridors.

Expanded Policy Portfolio

How could such a vision be achieved? Implementation of a regenerative rural landscape will need the existing voluntary initiatives to be continued and strengthened, and for the policy portfolio [Doremus 2003] to be extended. Most fundamentally, there is opportunity to incorporate regenerative elements and a long term landscape structure into every new rural development project. The best time to allocate land for green blue corridors and regenerative networks is during

periods of landscape transformation- when new investment is being made in intensive production systems, or when land is being withdrawn from production, or reallocated to different production systems.

Just imagine, for example, the sustainability gains that could have been achieved if every dairy conversion over the past 10 years had, as a matter of course, fenced off 20m corridors along all existing swales, wetlands and riparian margins at the time of conversion, and implemented re-vegetation projects. The opportunity costs would have been long overtaken by rising returns, and the ecological and symbolic benefits would have already been contributing value to both NZ products and the environment.

Imagine further, if the promoters of projects such as the Central Plains Water proposal in Canterbury were to incorporate a green blue landscape framework throughout their scheme, based upon the water races and infrastructure. Instead of trying to persuade Canterbury communities that increased production, land value and profits for the scheme promoters will also be good for the wider community, they could be explaining how their proposal will be regenerating the ecological sustainability of the Canterbury plains, and adding environmental as well as economic value.

Implementation of regenerative goals in every new project will require wider use of innovative management and policy tools, some of which are already being developed in a range of pilot projects. Examples include Environmental Farm Plans [Blaschke and Ngapo 2003], Integrated Catchment Plans, and the use of Rural Area Structure Plans to better link RMA provisions and requirements with private investment goals, and with community visions and infrastructure being developed under the Local Government Act. The goal should be to expand their use countrywide. Management experiments [Walters and Holling 1990] could also be undertaken to find ways to incorporate registered whole farm and catchment plans as discretionary alternatives to district plan regulations in different types of landscape – providing a strong incentive to rural landowners to take ownership of the regeneration process.

Public Private Partnerships are attracting increasing attention in relation to transportation and urban infrastructure, and could perhaps be explored as a way to create and manage *rural* green blue networks- capturing carbon credits from regenerative plantings, providing walkways and cycleways. In the Central Plains Water project for example, there is opportunity to use the water distribution networks as the framework for greenways that link the mountains to the upper reaches of the spring fed streams in the lower plains- and thence through to Waihora- Lake Ellesmere, the Waimakariri Regional Park, Christchurch and the sea. A partnership of this kind could provide a major boost to the community based vision of Greenways Canterbury, and demonstrate a wider environmental and social vision for the irrigation project.

Greater use could also be made of RMA environmental compensation provisions in rural intensification projects. Guy Salmon, in his presentation to the EDS 2008 conference, highlighted the inconsistency in the taken-for-granted informal institutions that shape rural planning and decision making. He noted the general lack of control over some agricultural activities that have major environmental effects [particularly associated with non point source pollution], whilst other activities [such as tree planting] with potential environmental benefits are controlled. Similarly, water is allocated rent free, with minimal constraints on its use. It might well be asked, why is there no requirement for environmental compensation –such as re-vegetation of waterways -as a condition of activities that cause non point source pollution, or in exchange for water extraction, redistribution and discharge?

The future challenges facing rural New Zealand will require both increased voluntary contributions, and more strategic and constructive regulation. There is opportunity for the rural sector to take a lead in shaping the balance between these mechanisms. Equally, there is an obligation upon government at every level to provide leadership upon visions, goals and targets, and to provide more robust policy and regulation where management incentives, voluntary mechanisms, and partnership approaches do not suffice [OECD 2007, Heitzmann 2007].

Scenic and Ecological aesthetics

What will the regenerative rural landscapes of the 21st century look like? They will vary widely depending on circumstances. They will all incorporate green blue networks that reveal and express the hydrology of the area. They will include much more tall woody vegetation, particularly on steeper land and associated with waterways. There will be more indigenous vegetation, in many cases interwoven with exotic species- for example in shelter belts, and as understory to plantations [Brockhoff et al 2003, Carnus et al 2006, Meurk and Hall 2006]. But they will not look as picturesque as the food adverts suggest.

Current NZ rural landscape ideals and their use in branding and promotion are firmly grounded in the 18th C landscape tradition [Egoz et al 2001, Egoz and Bowring 2004]. Gobster [1999] describes this as 'Scenic Aesthetics', characterized as a static view framed by picturesque conventions, whose purpose was to hide the reality of the rural landscape and present it in a socially acceptable way. The emergence and development of an 'ecological ' approach to design and planning [McHarg 1969] has led to the recognition that what looks good, according to picturesque conventions, may not be good ecologically, whilst what may be good in ecological terms, may not look good when judged by conventional scenic aesthetics [Nassauer 1995]. Instead, a new frame of aesthetics is needed, described by Gobster as 'Ecological Aesthetics'. An ecological aesthetic is based upon an understanding of ecosystem dynamics, and its values are shaped through the revelation of ecosystem function [Brown 1999].

These two aesthetic frames are in tension [Egoz et al 2001], but do not need to be mutually exclusive. Development of a regenerative rural landscape that emphasizes ecosystem functions and services, and their re generation, will require a progressive and creative reframing of expectations and aesthetic responses. Nassauer [1995] has argued that a key part of this process will be the use of recognizable 'cues for care'- signs in the landscape, both literal and figurative, that signal the presence of human management and attention. This was a major rationale behind Meurk and Swaffield's [2000] argument to reintroduce indigenous biodiversity incrementally within existing landscape infrastructure, such as shelterbelts. In the regenerative landscape of the 21st century, it will continue to be essential to *demonstrate* the presence of responsible management- for farmers self esteem, for community acceptance, and to provide confidence to distant consumers that the NZ rural landscape truly is a morally legitimate source of food and fibre.

Conclusion

- New Zealand rural landscapes are being transformed at the intersection of the open market and sustainability policy agendas.
- There are additional future management challenges from the direct effects of climate change, peak oil, and eco-consumerism, and from the new policy regimes that are emerging in response to these global dynamics.
- The current mix of rural ideals, institutions and policy has strengths at the local and industry level, but is ineffective in dealing with the speed and extent of change, and lacks the capacity to deal with future global challenges.
- A new and longer term collective vision is needed to shape and inspire the reconstruction of a sustainable rural sector.
- A strategic landscape approach is proposed, focused upon the creative regeneration of multifunctional rural landscapes, which are resilient in the face of external change, and express their sustainability in a way that is legible to consumers.
- The current risks are global, national, regional and local, and the rural policy portfolio needs to be extended at national, regional and district levels to better match the risks.
- A landscape regeneration target is proposed, that by 2050, a minimum of 20% of the area of every production landscape will be in green blue networks and reserves, centred upon waterways and steep land.

- Implementation of a regenerative vision will require inspired leadership from rural stakeholders and politicians, as well as committed and consistent policy and planning.

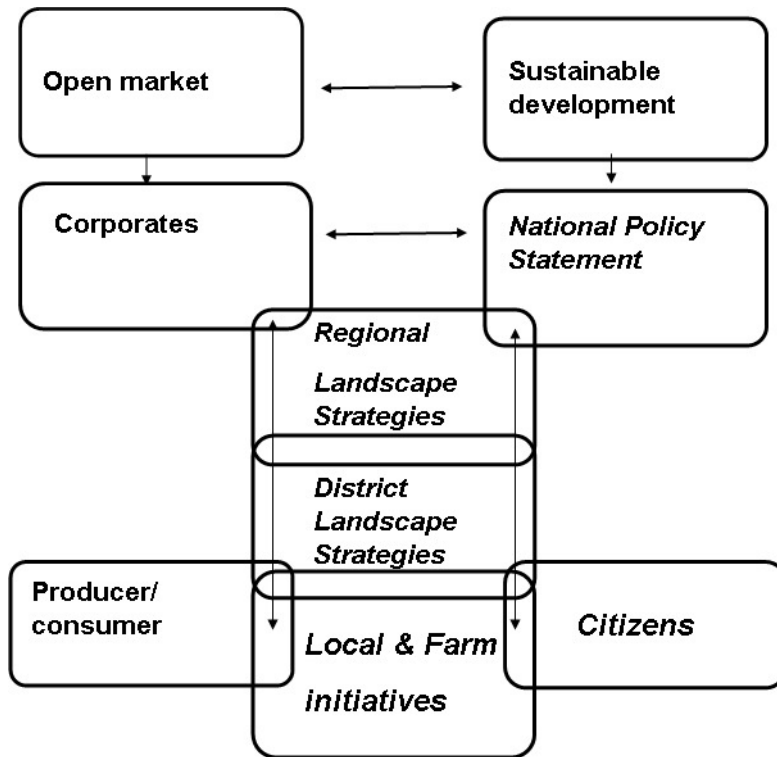


Figure Five: Integrating spaces of flow and spaces of place through regenerative landscape strategies.

Acknowledgements

Professor Eric Pawson provided helpful critique on an early version of the conference presentation, upon which this paper is based.

Work undertaken as part of the *Forestry and Environment*, programme, funded by the Foundation for Research Science and Technology through Ensis Ltd, has contributed to the preparation of this paper.

Opinions and errors are the sole responsibility of the author.

References

- Ahern J 2002. Greenways as strategic landscape planning: theory and application. The Netherlands, Wageningen University.
- Andren H 1994. Effects of habitat fragmentation on birds and mammals in landscapes with different proportions of suitable habitat: A review. *Oikos* 71:355-366.
- Baragwanath L, McAloon J, Perkins HC, 2003. Globalisation and New Zealand: Anchoring the Leviathan in a regional context. *NZ Geographer* 59(2) 16-26.
- Beck U, 2000. *What is Globalisation?* Cambridge, Polity Press.
- Bell C, 1996. *Inventing New Zealand: Everyday myths of Pakeha Identity* Auckland, Penguin Books.

Blaschke T, 2006. The role of the spatial dimension within the framework of sustainable landscapes and natural capital. *Landscape and Urban Planning* 75: 198-226.

Blaschke, P, and Ngapo N, 2003. *Review of New Zealand Environmental Farm Plans*. Wellington, MfE.

Boston J, Martin J, Pallot J, and Walsh P, 1991. *Reshaping the State*. Auckland . Oxford University Press.

Brabyn L, 1996. Landscape Classification using GIS and national digital data bases. *Landscape Research* 21(3) 277-300.

Brandt J, and Verje H, (eds) 2003. *Multifunctional landscapes: Monitoring, diversity and management*. Southampton UK, WIT Press.

Brockerhoff EG, Eckroyd CE, Langer ER 2001. Biodiversity in New Zealand plantation forests: Policy trends, incentives and the state of our knowledge *NZ Journal of Forestry* 46:31-37.

Brown B, 1999. Eco Revelatory Design. *Landscape Journal* Special Issue.

Carnus J-M, Parotta J, Brockerhoff E, Arbez M, Jactel H, Kremer A, Lamb D, O'Hara, K Walters B. 2006. Planted Forests and Biodiversity. *Journal of Forestry* March 2006 65-77.

Castells M, 2000. *The Rise of the Network Society*. Oxford, Blackwell.

Costanza R, d'Arge R, de Groot RS, Farber S, Grasso M, Hannon B, Limburg K, Naeem S, O'Neil RV, Paruelo J, Raskin RG, Sutton P, van en Belt M. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387:253-260.

Crawford J, 2007. More Effective Policy and Plans. Chapter Fourteen in *Beyond the RMA: An in depth exploration of the Resource Management Act 1991 : Conference Proceedings 30-31 May 2007* Auckland; Environmental Defense Society pp213-222.

Doremus H, 2003. A policy portfolio approach to biodiversity protection on private land. *Environmental Science and Policy* 6:217-232.

Egoz S, Bowring J, Perkins HC, 2001. Tastes in Tension: Form, Function and Meaning in NZ farmed landscapes. *Landscape and Urban Planning* 57(3) 177-196.

Egoz, S, and Bowring J. 2004. Beyond the Romantic and Naïve: The Search for a Complex Ecological Aesthetic Design Language for Landscape Architecture in New Zealand. *Landscape Research* 29(1) 57-73.

Ewers RM, Kiskey AD, Walker S, Rutledge D, Hardings JS, Didham RK 2006. Past and future trajectories of forest loss in New Zealand. *Biological Conservation* 133:312-325.

Fieldler A, Landis DA, Wratten SD, 2007. Maximising ecosystem services from conservation biological control: The role of habitat management *Biological Control* 45(2) 254-271.

Flannery T, 1994. *The Future Eaters: An ecological history of the Australasian lands and their people*. Australia, Reed Books.

Forman RTT, 1995. *Land Mosaics: The ecology of landscapes and regions* Cambridge, CUP.

Gobster P, 1999. An ecological aesthetic for forest landscape management. *Landscape Journal* 18(2)54-64.

Heitzmann M, 2007. Lessons from the past and advice for the future. Chapter Ten in *Beyond the RMA: An in depth exploration of the Resource Management Act 1991 : Conference Proceedings 30-31 May 2007* Auckland; Environmental Defense Society pp149-180.

Hobbs RJ, and Norton DA, 1996. Towards a conceptual framework for restoration ecology *Restoration Ecology* 4:93-110.

Hughey KFD, Kerr GN, Cullen R. 2006. *Public perceptions of New Zealand's Environment 2006* EOS Ecology Christchurch

Ihimaera W, 1994. *Bulibasha- King of the Gypsies*. Auckland, Penguin Books.

Jones M, Howard P, Olwig KR, Primdahl J, and Sarlov I, 2007. Multiple interfaces of the European Landscape Convention. *Norwegian Journal of Geography* 61 207-215.

Jongman RHG, and Wascher D, (eds) 2004. *The New Dimensions of the European Landscape*. Dordrecht Springer.

Kates RW, Robert W. Kates, William C. Clark, Robert Corell, J. Michael Hall, Carlo C. Jaeger, Ian Lowe, James J. McCarthy, Hans Joachim Schellnhuber, Bert Bolin, Nancy M. Dickson, Sylvie Faucheux, Gilberto C. Gallopin, Arnulf Grübler, Brian Huntley, Jill Jäger, Narpat S. Jodha, Roger E. Kasperson, Akin Mabogunje, Pamela Matson, Harold Mooney, Berrien Moore III, Timothy O'Riordan, Uno Svedin. 2000. Sustainability Science. *Science* 292 no 5517 pp 641-642

Lyle JT, 1985. *Design for Human Ecosystems*. NY, Van Nostrand Rheinhold.

McHarg I, 1969. *Design with Nature*. NY, Doubleday.

MacIntyre S, and Hobbs RJ, 1999. A framework for conceptualizing human impacts and landscapes and its relevance to management and research *Conservation Biology*. 13:1282-1292.

Margules C, 2005. Conservation planning at the landscape scale. in Weins J Moss M (eds). *Issues and perspectives in landscape ecology*. Cambridge, CUP.

Marsden T, 2003. *The Condition of Rural Sustainability* Ultgeverij van Gorcum

Meurk CD, 1999. Proposed quantitative thresholds for adequate protection of natural areas at a district scale. Appendix in Norton DA Roper Lindsay J *Criteria for assessing ecological significance under Section 6c of the Resource Management Act*. Wellington MfE.

Meurk CD, and Swaffield SR, 2000. A landscape ecological framework for indigenous regeneration in rural New Zealand Aotearoa. *Landscape and Urban Planning* 50:129-144.

Meurk CD and Hall GMJ 2006 Options for enhancing forest biodiversity across NZ managed landscapes based on ecosystem modeling and spatial design. *New Zealand Journal of Ecology* 30(1) 131-146.

Millennium Ecosystem Assessment Programme, 2005. *Ecosystems and Human Wellbeing*. Washington DC Island Press.

Ministry for Environment 1997. *State of the Environment Report*. Wellington MfE.

Ministry for Environment 2007. *State of the Environment Report*. Wellington MfE.

Nassauer JI, 1995. Culture and changing landscape structure. *Landscape Ecology* 10:229-237.

Nassauer JI, 1995. Messy Ecosystems, Orderly Frames. *Landscape Journal* 14(2)161-170.

Norton DA 2000. Conservation biology and private land: shifting the focus. *Conservation Biology* 14:1221-1223.

NIWA 2008 <http://www.niwa.cri.nz/news/mr/2008/2008-05-27>

Norton DA and Miller CJ 2000. Some issues and options for the conservation of native biodiversity in rural NZ. *Ecological Management and Restoration* 1:29-37.

Norton DA and Roper Lindsay J 2004. Assessing significance for biodiversity conservation on private land in New Zealand *NZJ Ecol* 28(2) 295-305.

Novacek MJ and Cleland EE 2001. The current biodiversity extinction event: Scenarios for mitigation and recovery *PNAS* 98:10 466-470.

O'Connor K 1993. Rural and Mountain Land Use, Chapter Six in Memon PA and Perkins HC *Environmental Planning in New Zealand* Palmerston North Dunmore Press.

OECD 2001. *Multifunctionality: Towards an analytical Framework*. Paris, OECD.

OECD 2007. *OECD Environmental Performance Review: New Zealand*. Paris, OECD.

Oram R 2007. The Resource Management Act: Now and in the Future. Chapter Two of *Beyond the RMA: An in depth exploration of the Resource Management Act 1991 : Conference Proceedings 30-31 May 2007* Auckland; Environmental Defense Society pp5-37.

Park G 1995 *Nga uruora (The Groves of Life): Ecology and History in a New Zealand Landscape* Wellington Victoria University Press.

Pawson E and Brooking T (eds) 2002 *Environmental Histories of New Zealand* Victoria Aus. OUP.

Pawson E and Swaffield SR 1998 Landscapes of Leisure and Tourism Chapter Fifteen in Perkins HC and Cushman G (eds) *Time Out? Leisure Recreation and Tourism in New Zealand and Australia*. Auckland Longman.pp254-270.

PCE 2001a *Managing Change in Paradise: Sustainable development in peri urban areas*. Wellington Office of the Parliamentary Commissioner for Environment.

PCE 2002 *Weaving resilience into our working lands: Recommendations for the future roles of native plants*. Wellington, Office of the Parliamentary Commissioner for Environment.

PCE 2004 *Growing for Good: Intensive farming, Sustainability and New Zealand's Environment*. Wellington, Office of the Parliamentary Commissioner for Environment.

Pearl R, 2004. A Place to Stand: *The protection of NZ's Natural and Cultural Landscapes* Auckland EDS.

Pearl R, 2007. Results of a survey of Resource Management Practitioners. Chapter Sixteen in *Beyond the RMA: An in depth exploration of the Resource Management Act 1991: Conference Proceedings 30-31 May 2007* Auckland; Environmental Defense Society pp243-250.

Potter C, Burney J, 2002. Agricultural multifunctionality in the WTO: Legitimate non-trade concern or disguised protectionism? *Journal of Rural Studies* 18(1)35-47

Primdahl J 2007 Globalisation and the local agricultural landscape: Change patterns and policy developments in three OECD countries, In Bunce RGH, Jongmaan RHG, Hojas L, & Weel S. *25 Years of Landscape Ecology: Scientific Principles in Practice* Proceedings of the 7th IALE World Congress Part I Wageningen The Netherlands July 2007.pp36-37

Primdahl J, and Swaffield SR, 2004. Segregation and Multifunctionality in New Zealand Landscapes. Chapter Fourteen in Brouwer F (ed) *Sustaining Agriculture and the Rural Environment: Governance, Policy and Multifunctionality*. Cheltenham UK Edward Elgar.

Randerson A 2007 The beginnings of the Resource Management Act. Chapter Six in *Beyond the RMA: An in depth exploration of the Resource Management Act 1991: Conference Proceedings 30-31 May 2007* Auckland; Environmental Defense Society pp83-104.

Rutledge D 2003 *Landscape indices as measures of the effects of fragmentation: can pattern reflect process?* Internal Series 98 Wellington DOC.

Saunders C, Barber A Taylor G 2007 *Food Miles: Comparative energy/emissions performance of NZ agricultural products*. AERU Report 285 Lincoln University.

Selman P 2006 *Planning at the Landscape Scale* Routledge

Steinitz C 2004 From project to global: on landscape planning and scale. *Landscape Review* 9(2) 119-129.

Swaffield, S.R. 1991 Transitional design. In *Proceedings of an International Conference on Sustainable Land Management*. Napier, Hawkes Bay, 17-23 November 1991: 318-322. Hawkes Bay Regional Council.

Swaffield SR Primdahl J 2006 Spatial concepts in landscape analysis and policy: Some implications of globalisation. *Landscape Ecology* 21(3) 315-331.

Walters CJ Holling CS 1990 Large scale management experiments and learning by doing. *Ecology* 71(6)2060-2068.

Walker S Price R, Rutledge D, Stephens RTT, Lee WG, 2007. Recent loss of indigenous cover in New Zealand. *New Zealand Journal of Ecology* 30(2) 169-177.

Wescoat JLJr, Johnston DM (eds) 2007 *Political Economies of Landscape Change: Places of Integrative Power*. Dordrecht; Springer.