

Authors: Dr Colin D Meurk, BSc (Hons) (Canterbury), PhD (Otago) Senior Scientist, Landcare Research
Cerasela Stancu, Sustainability Advisor, Landcare Research
Dr Ann Smith, BSc(Hons) (Adelaide), PhD (London) Senior Advisor, Landcare Research

Landcare Research
PO Box 69, Lincoln 8152
New Zealand

Telephone: +64 3 321 9740
Fax: +64 3 321 9998
E-mail; meurkc@landcareresearch.co.nz

Title: **Biodiversity in Crisis: A Crucial Role for Business**

Abstract

New Zealand's unique biodiversity is collapsing. It is ill-adapted to the tidal wave of introduced species that accompanied human colonisation. Contemporary New Zealanders have grown up surrounded by exotic nature, and therefore have historically identified with that, so resistance to native vegetation recovery adds to an already high ecological hurdle faced by our biota. Biodiversity, landscape and indigenous culture are special attributes of the country that create an enduring identity and authentic branding opportunity. It is vital that New Zealand's clean green image is underpinned by our biodiversity if we are to maintain a genuine point of difference culturally and in the market place.

The Convention on Biological Diversity identifies the role of business and industry as crucial in protecting and restoring biodiversity, but the New Zealand Biodiversity Strategy fails to acknowledge this. The Resource Management Act implies that responsibility for sustainable development and biodiversity recovery belongs to everyone. Corporates have an influential role in society and role models have an obligation to act responsibly. To be effective, this must go beyond sponsorship - by instilling among staff a conservation ethic and conveying this to the wider community.

Whereas business overseas is strongly linked with biodiversity, this has not been widely the case with corporate New Zealand. Our research has nevertheless found examples of business involvement in high profile biodiversity projects. For some, this involvement is largely patronage where the benefits accrue more to company image than to biodiversity needs. Others such as quarrying, courier, and ecotourism businesses, property developers and accountants have demonstrated more tangible commitments to conservation. The wine industry's environmental commitment stands out, as in Marlborough and Waipara, and the Australian Murray Valley. These model companies are often inspired by champions, are developing environmental plans, minimising waste and energy use, integrating native habitat into their lands, and seeking similar commitments from suppliers.

Introduction - New Zealand's Biodiversity is Collapsing

The unique attributes of any nation are its endemic plants, animals and microbes, its indigenous or mature culture(s) and its underpinning landscape. Most countries of the world have recent or contemporary connections to major land masses of the world, so their biota is often only slightly divergent from that of their wider continental context. It follows that the more different or rare an organism is, the more valuable it is – how ever you want to pay for it. When that difference represents ancient lineages or forms that are ancestral to the commonplace species of the world, then that value is further enhanced. This describes much of New Zealand's biota. Most of it is endemic (found nowhere else in the world) and much of it is ancient (Wilson 2004), and sadly some is already extinct.

A terminological confusion needs to be clarified at the outset when discussing biodiversity. There seems to be a widespread belief in New Zealand, that species richness is the same as biodiversity (www.biodiversity.govt.nz). Species richness is merely the total number of species in a location, whereas biodiversity is a global concept encapsulating the totality of species, gene and ecosystem variation. Each country contributes its unique (endemic) species to this total. Thus packing more introduced species into New Zealand or into a region, does not increase biodiversity. More than likely, each additional imported species will displace what was there before. Creating super species too, is likely to exacerbate the problem, so we need to be careful about the introduction or breeding of new genetic entities.

Al Gore's movie, *An Inconvenient Truth*, graphically presents a convincing case for climate change and human culpability. But concludes with an optimistic message of how humans can also be the solution. Others have, again optimistically, suggested we have 50 years to make a difference to avoid global environmental collapse (Diamond 2005). These are all matters affecting the physical environment, human physical health, production and business. There is also expected to be a continuing loss of species over the next decades - c. 16, 000 or 40% of all species that are classed as threatened (IUCN Red List of Threatened Species 2006). New Zealand has a biota with one of the highest proportions of threatened species. All these statistics are well quantified by Meurk & Buxton (1990), Wilson (2004), Walker & Lee (2006), and Meurk & Hall (2006). There is no doubt New Zealand's biodiversity and natural habitat especially in the lowlands and valley floors is in deep trouble. Meurk & Swaffield (2000) have highlighted the serious, self-reinforcing cultural implications of this; and Louv (2005) provides empirical data that corroborates the importance of especially childhood experience of nature if society is going to identify with, comprehend and protect the environment and the special local plants and wildlife.

New Zealand's Commitments and Effectiveness in Implementation

New Zealand has signed and ratified the Convention on Biological Diversity (1992), increased the biodiversity provisions in the Resource Management Act (1991) two years ago, published the New Zealand Biodiversity Strategy in 2000 and established numerous regional policy statements and district plans which provide the framework for implementation of biodiversity protection. But this hasn't stopped the attrition. The combination of defended private property rights in a more competitive economy, the shortage of ecological expertise to gain site-specific habitat details and contextual information before losses occur across vast rural lands, lack of resources to compensate foregone productivity, and legal inequities (When 2002) have been

detrimental to habitat and biodiversity in this country and led to divisions between conservation groups and land owners. It is not a matter of apportioning blame; there has been an unfortunate convergence of many historical factors: a culture still emerging from a land developing colonial past, the wholesale displacement of indigenous species by exotics across the cultural landscape, and the consequent loss of identity with New Zealand's unique flora and fauna. Biology and environment are taught in New Zealand schools at generic levels and there is seldom any emphasis on familiarity with plants and animals unique to this country. Even those administrators with impeccable environmental management credentials may not comprehend the special, even counterintuitive, circumstances of New Zealand's biogeography.

For instance, removal of environmental pressure is almost everywhere in the world beneficial to biodiversity, such as the return of the Thames salmon (Mawle & Milner 2003) and recovery of the grey form of common lichen moth in formerly smog-blackened London. Pond management in England can be achieved by creating a watertight hollow in the ground, letting nature take its course and eventually introducing non-vagile organisms like great crested newts. Constructing such a pond in New Zealand, inevitably leads to the colonisation of the water margins, not by native riparian species but by many of the English plants that do the right job in their homeland. The only difference is the lack of newts! In New Zealand, unless environmental enhancement is accompanied by rigorous weed and pest control, local biodiversity is usually swamped by competitively advantaged exotic species. In these circumstances, extinction of indigenous biota, at least locally, is likely to be permanent.

Tangible Reasons for Preserving Biodiversity

For treaties and laws to be effective, the wider community needs to understand and buy in to the argument. It has to mean something at a material, personal, emotional or spiritual level (which usually follows from the other reasons). The fundamental problem has to be conveyed that it is easy to destroy things with the technological and economic power at the disposal of unknowing people and institutions, but it is excruciatingly difficult to rebuild complex biological systems that have been lost.

Costanza *et al.* 1997 estimated the total value of the world's ecosystem services at over US\$30 trillion. Subsequent estimates have put the figure much higher, but in the end a dollar amount cannot really be placed on intrinsic value because this implies that you can replace it from a supermarket shelf or reconstruct it. But biodiversity is the end product of aeons of perhaps divinely inspired evolution. It is inappropriate to equate this with a commodity to be bought and sold.

More pragmatically, we might consider the replacement cost of a natural habitat as one way of estimating the value of nature – as long as it is not already extinct. We figure that the full market rates for reconstructing (only the structural and visually prominent elements of) an ecosystem are in the order of NZ\$100 000 per hectare. This includes cost of plants, site preparation, planting and maintenance labour, ameliorating severe climate conditions during establishment, and weed and pest control for at least five years. For full restoration, this last item might need to be maintained indefinitely. The figure is far greater in New Zealand than it would be in most countries because here the battle requires exotic species to be held at bay while the indigenous species are establishing. For some ecosystems complete sustainability

without intervention may never be achieved; hence the increasing use of predator-proof fences around habitats in New Zealand.

A few years ago, a 400 ha block of century old matagouri shrubland was sprayed out for farm development in the Hurunui high country. To rebuild this valuable plant association (which naturally fixes nitrogen, provides stock shelter, feeds kakariki, and hosts a biocontrol agent of grass grub) would, on the above estimates, cost in the order of \$40 million. And we can only imagine the complexity of the soil fauna and microbes, invertebrates and associated species, and the additional cost of reintroducing all these organisms. It will still be a hundred years plus of ongoing pest control before true replacement has been achieved. Wouldn't it be so much easier (and sustainable) to just save it in the first place? There would also have been other ways that cattle production could have been increased in matagouri woodland, utilising the attributes above, without eliminating century old trees. It goes without saying, that if managers had to pay the real cost of environmental destruction, it would never be contemplated. Ironically, this kind of development has accelerated under the RMA (our much vaunted environmental flagship legislation) because of loopholes that allow 'death by a thousand cuts' (Wheen 2002), perhaps in conjunction with a deregulated economy that has become increasingly litigious instead of compensatory measures being put in place – such as cash for protection and associated lost production.

The key messages are that New Zealand's unique and precious biological cargo, much of which derives from the Mesozoic Gondwana, is beyond value. These values are largely in the unquantifiable intrinsic, evolutionary, emotional, nationalistic, moral and spiritual realms. Furthermore, it is much more sustainable to protect existing habitat, no matter how degraded, than it is to believe we can replace it or shift it; and we cannot buy time. Opportunities do also exist to realise material values from our indigenous species on a sustainable basis. Although we mined the timber and soils for over a century and repeatedly burnt the regenerating scrub (Pawson & Brooking 2002), we can now slowly return our native species – whether they be totara for durable timber or kereru for cultural harvest – into a sustainable crop (Meurk & Hall 2006). We hasten to clarify that this does not mean further eroding our rare primary habitats under the guise of sustainable development. Rather we refer to the establishment of new plantations of native timbers and robust populations of kereru.

Socio-cultural Values and Implications for Sustainability

There may still be a question about what does biodiversity have to do with sustainability. Notwithstanding the ecological services argument, it has to be said that New Zealand could exist economically and socially without any indigenous species being present. There are well over 30 000 exotic organisms from temperate and subtropical zones already present in the country that would be quite capable of taking over all the ecosystem roles in New Zealand from the approximately 70 000 native land and freshwater species (www.biodiversity.govt.nz). Probably about 5000 plants, animals and microbes have already achieved this and occur spontaneously in the wild. This is somewhat contrary to the notion that the 'best' plants and animals for an area are those that evolved there. Clearly, this sentiment doesn't stand up to scrutiny and our countryside is glaring testimony to this.

Elsewhere Meurk & Swaffield (2000) have demonstrated a relationship between experience of nature and protectiveness towards it. If that nature is fundamentally exotic, then this is what people will tend to identify with – that which is most familiar – and want to preserve. Louv (2005) has reached a similar conclusion about the importance of early childhood nature experience becoming imprinted. It also follows that exposure, especially as a child, to semi-wild environments and the ability to explore and interact with nature – testing its limits through informal play, will internalise notions of life processes: seasonality, environmental gradients, reproduction, regeneration, and decomposition. This experience is likely, in adulthood, to translate into an appreciation of life and natural processes, and the dependence humans have on balanced, sustainable ecosystems.

So why wouldn't we let our biodiversity gradually become extinguished? We argue that homogenising the temperate world – and occupying it with common, vigorous Eurasian and North American species removes regional distinctiveness. In general we, as a species, seem to value these points of difference. There is a strong bond between indigenous people and the natural resources their ancestors depended upon. Customs, traditional crafts, language and songs or chants all feed off the continued presence of the plants and wildlife in the environment (cf Matunga 2000, Matunga 2002, Mihinui 2002). Without this, the links to the land and the parables relating to sustainable use of resources will be severed. What would songs about 'heart of oak' mean to Englishfolk if we replaced oaks in England with totara?

The simple fact is that the majority of people actually say they want more (indigenous) nature in their daily environment (Craig 2005, Christchurch City Council Annual Civic Survey 2003, several Christchurch surveys of park users – personal observations). It stands to reason that unless we nurture a healthy relationship between land, nature and people there is little chance that the human collective, manifest in democratic societies, will have the experiential basis for understanding sustainability and accordingly directing decision-making towards sustainable management of resources. This includes an appreciation of local endemic species – not only as indicator species of environmental health, but also as a point of difference from other regions in the country, and other nations in the world (Meurk *et al.* 2006) and their individual right to existence. We argue that this is one of the fundamental needs of humanity – appreciating nature and natural processes, appreciating natural and cultural diversity and recognising ones own distinctiveness.

Unless biodiversity is mainstreamed through education, business, popular music and sport, and if indigenous nature retreats to remote national parks or the fringes of the city, there is a real danger it will become irrelevant to the majority of people (Meurk & Swaffield 2000, Craig 2005). There are all kinds of subtle messages inherent in landscaping and city design that convey integrity or the notion that indigenous nature is a second class citizen – always in the background behind the more dominant, powerful or colourful exotica. Over time this undermines a sense of national and regional identity built around a strong presence of the unique plants and wildlife of the area. It institutionalises and normalises a view that indigenous nature (and sometimes linked to indigenous culture) is inferior and marginal to core values (Meurk 2005). Rather, the cultural norms should be underpinned by these values which need to be visible, their ecology or place in the environment and landscape proudly understood and celebrated. In this way there is a mutually reinforcing

relationship between nature and a mature culture that is rooted in the land – which we would argue all sophisticated and enduring cultures must be (Hillel 1992). When this is the case then protectiveness towards the indicators of the land's health and of the special taonga (treasures) will follow.

Accordingly it can be said that sustainability is equally about natural resources (to maintain production and human livelihood), biodiversity (to maintain the soul and sense of place) and culture (that symbolises and integrates these two factors through traditional practices and art (see Kawharu 2002, Sims & Thompson-Fawcett 2002). Each ingredient is essential to sustainability of the other, and biodiversity survival depends on both ecological sustainability (habitat and demographic balance) and cultural sustainability (enculturation of nature so that the vital links between nature, cultural integrity and survival are internalised). We might now construct a metaphor in which we can recognise that commerce is the bread and butter of a nation, the physical environment is the heart and biodiversity the soul. And as we know, 'man' cannot live on bread alone.

Role of Business

Business is fundamental to society. Everyone is engaged in it in some way. Businesses are by definition economically powerful and in many respects dictate or condition the values of society. For society to be both moral and liberal, businesses must also operate in this way, and as far as the environment is concerned, not only act legally, but also responsibly – taking a leadership role. Whether they choose or not, businesses are role models and set the tone for society.

The values of biodiversity to business are the same as for society or nations at large. Businesses rely on ecosystem services i.e. raw materials, energy, clean air and water, thermal regulation, oxygen production, nitrogen fixation, filtration, decomposition, amenity and aesthetic values (Daily 1997). Points of difference in terms of landscape character and rare or endemic species provide marketing and branding opportunities (Meurk *et al.* 2006, www.banrockstation.com).

Again, these are all essential ingredients for environmental sustainability and, in terms of market choice, consequent commercial sustainability. Just as the discerning shopper is increasingly basing their purchase choices on social, health and environmental values (Cowe & Williams 2000), we can envisage a time in the near future where some measure of biodiversity awareness, protection and sustainability is also a key factor in product choice. The revelation that some profits from Banrock wines go into protection and restoration of wetlands in the regions where the wine is purchased is a positive selling point for some consumers (www.banrockstation.com).

Modern business ethics also dictate that commercial enterprises should not only be profitable, but should be good neighbours and corporate citizens, and take responsibility for their decisions that affect the wider community (Reichert *et al.*, 2000). Given their resources they are also in a position to provide positive leadership that evokes a sustainability ethic. The particularities of each business, and the interests of their management may dictate which of the many possible causes they will support; but all should be compatible with and be subsumed by a commitment to promoting environmental and biodiversity sustainability.

Business and biodiversity

Biodiversity is on the agenda of a growing number of corporates in the UK, USA, Australia and Japan through a programme called *Business & Biodiversity*. This scheme was developed by the Earthwatch Institute (Europe) and endorsed by the International Union for Nature Conservation (IUCN) and World Business Council for Sustainable Development (WBCSD). *Business & Biodiversity* has three basic steps: assessment to identify biodiversity holdings (or impacts) of an organisation; the development of a biodiversity action plan (BAP); and the integration of the BAP into the organisation's environmental management system (EMS).

Numerous examples of biodiversity benefits due to engagement of businesses are documented in the *Business & Biodiversity Handbook* produced by Earthwatch, IUCN and WBCSD (2002). These include a one thousand fold increase in bird use of a wetland reserve protected through activities of the Kennecott Utah Mine owned by RioTinto, and investment in basic botanical research by ALCOA in a long term partnership with the Western Australia Botanical Gardens to develop methods for restoring fragile jarrah forests.

Business and biodiversity projects overseas have demonstrated economic benefits in terms of job creation, tourist revenue, investment in biodiversity projects, and adding value to businesses themselves. Industry assets held in global funds that feature a screen of some type of social responsibility grew from \$US40 billion in 1984 to \$US2.16 trillion in 2003 (Social Investment Forum Report 2003). Biodiversity is increasingly included in these ethical investment criteria. There is a business imperative for New Zealand companies to participate in reversing the decline in indigenous biodiversity through direct involvement in ecosystem management and by promoting biodiversity objectives through private sector investment.

Good News Stories

In New Zealand, possibly because of smaller company size, turnover and margins, interest in biodiversity has been slower to get off the ground except with those specifically trading on environmental associations (in order to offset negative images of their operation) or who have an interdependent connection with the environment, such as ecotourism or outdoor recreation. Even in these latter cases there is the danger of mixed messages. For instance, rugged outdoor experiences are tagged to ownership of 4WD vehicles, sometimes shown in television commercials ploughing up riverbeds, apparently oblivious to vulnerable wildlife and the danger of introducing serious weeds such as gorse, broom and lupins that further threaten nesting birds. And some eco-tourist ventures emphasise the 'adventure' side of things – including cliff climbing and skiing where grooming of slopes and rocks may be detrimental to precious and precarious life found clinging to ledges and other formerly protected sites. Companies in New Zealand have traditionally sponsored the arts, sport and aid foundations (Meurk & Stancu 2006).

We carried out a survey of businesses that professed support for the environment and specifically biodiversity, first on the internet and through collegial informants, then by interviews with selected and representative cases. From this we reported observations from the banking, timber, wine, clothing, (quarrying, tourism), energy, and courier sectors. The bracketed cases were based on observation and remote research rather than direct interview, although information about them is well documented. We were

especially interested in the way in which support was given to the environment, how this came about, whether it was part of the culture of the business, and how secure it was.

Some medium sized wine businesses represent highly motivated groups of people who are striving to achieve a quality experience for their customers. Land is an integral part of their business and so there is scope for direct action on habitat protection, restoration or landscaping. This is being pursued in all the cases investigated. In general, they seem to be trading on the environment as an added value or point of difference – presumably appealing to the middle class, environmentally educated and sensitive demographic. Good examples are Banrock Station in South Australia, Grove Mill in Marlborough, and numerous winegrowers who are part of the ‘Greening Waipara’ project in North Canterbury (Meurk *et al.* 2006). Champions at the owner, director or managerial levels seem to be behind these initiatives and they are generally involving all the staff in the process. Because these are generally small, sometimes family companies, there is a high degree of ownership of the concepts and an effort to inform all staff about their values. The credentials of new staff need to be compatible with the company values and they receive an orientation at the outset to convey these standards in detail.

A similar level of commitment was observed in one courier company (Urgent Couriers of Auckland) which was supporting restoration projects by providing transport services at cost and involving staff in tree planting. Untouched World similarly has a manager/owner with strong personal convictions that drives the environmental standards in the company. The company supports staff and school students in environmental education and participation in tree planting and management on an island reserve administered and in partnership with the Department of Conservation (DoC). Within this group should go the unique partnership between Lamb & Hayward Funeral Directors, Ngai Tahu (Mana Whenua of central and southern South Island), and DoC administrators of a formerly weed-infested wetland wildlife refuge on the northern perimeter of Christchurch city. This was an important funereal site for Ngai Tahu in former times, and the company through the initiative of one of the directors/owners approached DoC with a proposition for setting up a memorial park that they would sponsor, DoC would manage and Ngai Tahu would oversee in terms of cultural sensitivity and providing labour. Lamb & Hayward pass a small commission from each funeral to the project and this arrangement has persisted for nearly 15 years.

Banks, such as BNZ are providing environmental support usually through the medium of sponsorship. The *Kiwi Recovery Programme* has been a major ongoing collaboration between BNZ and DoC. They have environmental managers, but in general, the distinction between the needs of environment in general and biodiversity in the New Zealand context may be lost sight of – as described in the introduction. This conflict may be exacerbated where there is restructuring and bottom line profitability is under the spotlight. Although some staff may get involved directly in kiwi work and good news stories are broadcast through staff newsletters, in general it is not an overriding theme in the company culture.

A large timber company has supported *Project Crimson* (protecting pohutukawa and rata) from its inception, although again change of ownership, restructuring and change

in philosophy may see the end of this association. A drier economic approach may be encroaching on what has traditionally been something of a “directors choice”. Some new directors are taking the stance that company shareholders should be given any profits from a well performing business and they can then make their own choices as to whether or not they sponsor worthy causes and which ones. The problem with this may be that profitability in some cases may be linked to the environmental causes they support so one is not independent of the other. The personal interest in these projects by former directors of the companies seems to have been a factor in these sponsorships. Whereas Transpower sponsor the Landcare Trust, engineering and economic bottom lines have been the main influences in this energy transmission company, and only now is there a more environmental ethic being promoted by the management team responsible for this area.

Some quarrying companies, conscious of their environmental impacts, have chosen to make a virtue out of their land altering activities and developed new habitats for conservation purposes. Isaacs of Canterbury are a good example. Not only do they breed rare and endangered birds, but they sponsor a conservation scholarship through Lincoln University. This again stems from a strong personal environmental ethic on the part of the family owners of the business, carried on by Lady Isaac. Likewise Comalco has had a strong association with the *Kakapo Rescue Programme*, no doubt partly as mitigation for the impacts of power demand. Staff that wish to volunteer for kakapo work on Codfish Island are supported by the company and they have provided other (engineering) services on the island from time to time.

Ecotourist operators, such as *Whale Watch* in Kaikoura and *BlackCat* in Banks Peninsula have a strong commitment to ensuring their operations are compatible with and indeed enhance the object of their business. Staff of such enterprises generally undergo training to ensure they set a good example, or they may carry out surveillance or other support for DoC (www.heritage-expeditions.com).

Overall, there are some fine individual examples of support for the environment and biodiversity within corporate New Zealand. However, sometimes corporate environmental management is more conversant with protection of the physical environment e.g. air and water quality, and may not specifically include the state of the biological environment. It is apparent that the ‘champion’ factor is an important impetus for the companies that have adopted biodiversity initiatives. The direct engagement of company staff is prominent in the smaller, sometime family-owned boutique industries, or in those cases where there is a physical proximity between the company operation and location of the biodiversity project – such as with Comalco’s kakapo support. In larger companies, where security of the arrangements seems to have been strong over the past decade, recent upheavals in the business world may disrupt some of these sponsorships. Discretionary spending by corporates will always be at the mercy of the vicissitudes of the market place.

Conclusions – Some Model Rules for Business

Some general themes emerge. Firstly, we want to emphasise the dangers our unique biodiversity faces and that there is an urgency to its protection and enhancement of habitat and endangered populations. Secondly, we have demonstrated the connection between sustainability of the economy, the physical environment, biodiversity and the culture that arises from this nexus. A clean physical environment does not necessarily

colinmeurk 11/23/06 3:13 PM
Formatted: Not Highlight

equate to a biodiverse environment. It has been proposed that the culture of any land must draw its strength and point of difference (important in the global market as well as for secure self identity) from the unique attributes of the land – the landscape, the indigenous (and endemic) biota, and the indigenous as well as emerging cultures.

Businesses, because of their pivotal position and interdependent role in our community, have a special responsibility to support that community and its culture. Although there is a delicate balance between reflecting and directing cultural norms, it is suggested that companies can take a positive and legitimate lead in biodiversity advocacy and support or management as in New Zealand there have been many forces operating to undermine its integrity.

Where companies are involved with land directly or through investment, they need to ensure that protection of nature and primary habitats is a paramount priority – even if some level of profit must be forgone. This will be one of the most valuable contributions that can be made to biodiversity protection – saving what is left. Restoration is however an important but last resort. It is a humbling experience to discover how excruciatingly difficult it is to bring back indigenous nature in the face of rampant exotic grasses, weeds and animal pests. One of the great benefits of directly engaging the business community and their employees in hands-on work is to impress them with the need and difficulty. If this increases awareness and appreciation of the task that DoC and community groups face, this will be a valuable consciousness raising function for a part of the community. This will be greatly superior to just throwing money at the problem in uninvolved sponsorship.

Company champions need sufficient resources to be able to take a lead. Perhaps one of the more difficult but important needs is to have experienced and ecologically aware personnel (both biodiversity and physical environment specialists) on company boards of directors – along with representatives of the indigenous peoples and social scientists. Only then will we have a true triple bottom line that is environmentally proactive.

Acknowledgements

This work was supported by the CRI Capability Fund administered by the Ministry of Research Science and Technology. Thanks those companies referred to in the text and others who participated in the survey. Statements, interpretations and conclusions are ours and do not necessarily reflect views of the participating businesses.

References

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

Cowe, R., Williams, S. 2000. Who are the ethical consumers? Report for the Co-operative Bank of UK. >44pp.

Daily, G. C. (ed.) 1997. *Nature's Services, Societal Dependence on Natural Ecosystems*. Island Press, Washington DC.

- Diamond, J. 2005. Tokugawa Shoguns vs Consumer Democracy. *New Perspectives Quarterly* 22: 7-13.
- Earthwatch Insitite, The World Conservatoin Union (IUCN) and World Business Council for Sustainable Development (WBCSD) 2002. *Business & Biodiversity. The Handbook for Corporate Action.* Geneva, WBCSD.
- Hillel, D. 1992. *Out of the Earth: Civilization and the Life of the Soil.* University of California Press.
- IUCN Red List of Threatened Species. 2006, IUCN.
- Kawharu, M. (ed.), 2002. *Whenua: Managing our resources.* Reed ooks, Auckland.
- Louv, R. 2005. Last child in the woods: saving our children from nature-deficit disorder. Algonquin Books of Chapel Hill, North Carolina.
- Matunga, H. 2000. Urban ecology, tangat whenua and the colonial city. Pp 65-71 in Stewart, G.H., Ignatieva, M.E. (eds). *Urban biodiversity and ecology as a basis for holistic planning and design.* Proceedings of a workshop held at Lincoln University, 28-29 October 2000. Lincoln University International Centre for Nature Conservation Publication Number 1.
- Matunga, H.P. 2002. Foreword, Pp 7-8 in Kawharu, M. (ed.), *Whenua: Managing our resources.* Reed ooks, Auckland.
- Mawle, G.W., Milner, N.J. 2003. The return of salmon to cleaner rivers - England and Wales, pp. 186-199 in Mills, D. (ed.). *Salmon on the edge.* Blackwell Science, Oxford.
- Meurk, C.D. 2005. Cities are cultural and ecological keys to biodiverse futures. Pp 301-310 in M. I. Dawson (ed.) *Greening the city: bringing biodiversity back into the urban environment: proceedings of a conference held by the Royal New Zealand Institute of Horticulture in Christchurch, 21-24 October 2003.* Royal New Zealand Institute of Horticulture, Lincoln University.
- Meurk, C.D., Buxton, R.P. 1990. What is happening to the natural landscape of Aotearoa? *Proceedings of the New Zealand Grasslands Association* 51: 35-38.
- Meurk, C.D., Hall, G.M.J. 2006. Options for enhancing forest diversity across New Zealand's managed landscapes based on ecosystem modelling and spatial design. *New Zealand Journal of Ecology* 30: 131-146.
- Meurk, C. D., Stancu, C. 2006. Business and biodiversity initiatives in New Zealand, Case studies report. Landcare Research Report (in press).
- Meurk, C.D., Swaffield, S.R. 2000. A landscape ecological framework for indigenous regeneration in rural New Zealand-Aotearoa. *Landscape & Urban Planning* 50: 129-144.

Meurk, C.D., Wratten, S., Sam, S. 2006. Greening Waipara. *Indigena*, June 2006: 27-30.

New Zealand's Biodiversity Strategy, Our chance to turn the tide. 2000. Department of Conservation & Ministry for the Environment, Wellington, New Zealand.

Pawson, E., Brooking, T. (eds) 2002. *Environmental histories of New Zealand*. Oxford University Press.

Reichert, A.K. Webb, M.S., Thomas, E.G. 2000. Corporate Support for Ethical and Environmental Policies: A Financial Management Perspective. *Journal of Business Ethics* 25: 53-64.

Sims, M., Thompson-Fawcett, M. 2002. Planning for the cultural landscape. Pp 252-271 in Kawharu, M. (ed.), *Whenua: Managing our resources*. Reed books, Auckland.

Social Investment Forum 2003. Report on Socially Responsible Investment. Trends in United States. Washington, SIF.

United Nations 1992. *The Convention on Biological Diversity*.

When, N. 2002. A history of new Zealand environmental law. Pp 261-274 in Pawson, E., Brooking, T. (eds). 2002. *Environmental histories of New Zealand*. Oxford University Press.

Williams, P.A. 1997. Ecology and management of invasive weeds. *Conservation Sciences Publication No. 7*. Department of Conservation, Wellington.

Wilson, K-J. 2004. *The flight of the huia*. Canterbury University Press, Christchurch, New Zealand.