

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/237091329>

Harmsworth, G.R. 2004: The role of Biodiversity in Maori Advancement: A Research Framework. He Pukenga Korero. A Journal of Maori Studies. Massey University, Palmerston North. Raum...

Article · December 2004

CITATIONS

0

READS

245

1 author:



Garth R Harmsworth

Manaaki Whenua-Landcare Research

109 PUBLICATIONS 1,137 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Clean Water Productive Land 2011-2016 [View project](#)



Waiapu project, Gisborne East Coast [View project](#)

The role of Biodiversity in Māori Advancement: A Research Framework

Garth Harmsworth

Landcare Research New Zealand Ltd – Manaaki Whenua, Papaioea (Palmerston North)

Whakarāpopoto Kōrero

Ko tēnei mea ko te 'biodiversity' he kaupapa whai ora, ōranga tonutanga mō ngā momo āhuatanga o te taiao e tau nei ki runga i a Papatūānuku. Ahakoa anō kei konā ngā āhuatanga o te papa taiao hei maukino, hei whakangaro atu i te ora o te papa whenua. I roto i te kotahi rau tau neke atu ko te tangata tētahi tonu o ngā mea kai te maukino i te papa whenua me te taiao. Ki te ao whānui tonu, e tika ana kia kaha tēnā, me tēnā ki te tiaki i ngā ira o te taiao hei kākahu whakataratara mō ngā whakatipuranga kei te piki ake. Ki roto o Aotearoa, he mahinga nui tā te Māori ki te whakatū, manaaki i aua ira, ēngari kāore hei kaitiaki noa iho, ēngari hei whakatū i ngā whāinga whānui mō aua ira taiao nei, te taha ahurea tikanga, he kaupapa momo mātauranga me te whakatū rautaki mō ngā tau kei mua i a tātau. He maha ngā momo kaupapa rangahau hei tātari kia tutuki ai te tirohanga whānui o te motu mō aua ira taiao.

Abstract

Biodiversity is about existence and well-being based on protecting the variety of earth's life forms. Although natural processes can cause species depletion and extinction, the prime cause in the last 100 years has been human activity. Internationally, everyone has a responsibility to sustain biodiversity and maintain the widest genetic pool of biological wealth for future generations. In New Zealand, Māori have a unique role to play in sustaining indigenous biodiversity, not only in terms of kaitiakitanga but in achieving national biodiversity goals through the provision of another cultural perspective, another knowledge system, which will help plans for the future. Traditional concepts and perspectives are summarised. A research framework is proposed to show the role biodiversity could have for Māori advancement and to underpin a bicultural approach for achieving national biodiversity outcomes.

Background

Internationally and nationally biodiversity has become a major issue. It originated in the latter half of the 20th century when major concerns were raised over the

increasing destruction of the world's forests, freshwater and marine ecosystems. With this destruction have come an alarming decline in life forms such as plant, animal, bird, and fish species, a rapid rise in the extinction of many species, and a reduction in the area and quality of habitat required to sustain a range of life forms. Many believe the future of the Earth and human beings depends on conserving this diversity of species. Links are made between healthy ecosystems and life-supporting capacity, the services provided by environmental systems, and the realisation that most ecosystems require a diversity of life forms to exist and function properly. This holistic thinking has many parallels with the Māori understanding of the environment based on traditional Māori values and beliefs. The biodiversity issue is an enormous one and requires every part of society to be engaged in finding solutions.

Traditional Perspectives

Traditional concepts have shaped the thinking of most Māori, and traditional values are still strongly inherent in contemporary Māori society. The Māori world-view acknowledged a natural order of the universe; the diversity of life is embellished in this world-view through the inter-relationship of all living things to each another and to the environment, and through the overarching principle of balance. Māori were, and are, always striving to understand this balance. The modern use of the term biodiversity is intricately woven into many traditional concepts, such as whakapapa, mauri, taonga tuku iho, and kaitiakitanga.

Māori thinking about the environment is still commonly expressed and explained through these concepts and values:

Man and plants have a common origin. Māori saw plants as having senior status, Tāne created them before mankind, and they were therefore respected as older relatives. They are the link between man and sacred ancestors, Papatūānuku and Ranginui. (Buck, 1950)

Biodiversity, ngā mokopuna o Papatūānuku rāua ko Ranginui, is everything descended from the earth mother

Papatūānuku and the sky father Ranginui.

With the unravelling of the genetic code, traditional concepts have found a new reality in modern science, in areas such as molecular biology, biotechnology, understanding of ecological systems, integrated and holistic environmental research, marine and coastal research, environmental health and links to human health, and the restoration and enhancement of indigenous biodiversity within human landscapes.

Māori and Biodiversity

For a large number of Māori who draw on traditional values in everyday life, biodiversity means the *richness of life*, and the term *Te Ao Marama* is probably a close equivalent, in that it expresses the range of life forms that exist – plants, animals, birds, fish, micro-organisms, the genes they contain, and the ecosystems they form. It is about existence itself and the interdependency between human beings and the environment for food, shelter, recreation, cultural practice, arts, and well-being. Biodiversity in itself is a measure of Māori well-being. Over centuries of close interaction and interdependence with the environment Māori developed a special relationship with indigenous biodiversity, and more recently with introduced biodiversity. This relationship is much more than a clinical approach to conserving biological diversity. Concepts and values therefore not only provide a basis for human survival they also give meaning to the spiritual and tangible dimension of life, human well-being. As well as having a connection with the natural environment through whakapapa, and being traditional users of biological resources, Māori have major interests in agriculture, forestry, fishing, aquaculture, horticulture, urban and rural development, and eco-tourism that are all based on healthy ecosystems and sustaining biodiversity. New Zealand's indigenous biodiversity therefore is of paramount importance to most Māori.

To solve complex world problems, the Pākehā and international view of the world is becoming increasingly holistic. There is a greater need for integrated studies, for collaborative learning, a need to understand how different ecosystems work, to define the life-supporting capacity for these ecosystems, to understand the sensitive balance between human beings and nature, and there is a need for capacity building (e.g., individual and community). In fact, in many areas, we are seeing a re-alignment between indigenous and non-indigenous thinking.

Understanding and valuing the Māori world-view and Māori concepts is an essential first step towards developing a bicultural approach for biodiversity

management that is pragmatic and inclusive. Biodiversity needs to be understood in this context for Māori to participate more actively in research programmes, implementation, planning, and policy development.

Present Māori Involvement in Biodiversity

Since 1990 an increasing number of biodiversity/cultural projects have been, and are being, carried out around the country. While these include some excellent initiatives from local councils and the Department of Conservation (DOC), there are relatively few Māori led biodiversity projects, Māori research projects, or collaborative Māori–Government research projects. Projects involving Māori as key players include: the restoration of Lake Horowhenua; pest control and sustainable management of Motatau forest in Northland; Kiwi protection and breeding programmes; Tuatara breeding; the vision and planning for protection and management of Maungatautari in the Waikato; protection and management of native forest and significant ecosystems on Māori land through Ngā Whenua Rāhui (DOC); private initiatives through kaitiaki plans; the recognition of mātauranga and biodiversity funded by Ngā Whenua Rāhui; and a number of native forest planting, lakeside and river planting, wetland and estuarine restoration, and sand country planting projects involving Māori groups. Many groups are increasingly becoming involved in research and management.

The large number of iwi and hapū environmental management and kaitiaki plans that have been completed since 1991 provide a comprehensive basis, largely through values recognition, for biodiversity and cultural projects. There have also been many initiatives since 1997 in the area of Māori environmental monitoring (Harmsworth, 2002; Tipa & Tierney, 2003) where Māori environmental indicators have been proposed to measure progress towards Māori goals for restoration and rehabilitation of cultural and environmentally significant areas.

The national biodiversity strategy (Department of Conservation & Ministry for the Environment, 2000) developed in consultation with Māori, outlines a vision, strategic framework, key themes, objectives, actions, and performance targets to improve biodiversity management in New Zealand. The strategy prescribes a central role for Māori.

The Role of Biodiversity in Māori Advancement and Self-Determination

Protecting and enhancing biodiversity has an important role in contributing to Māori advancement and



self-determination. The following framework (Table 1) shows areas of biodiversity research and management activity that could contribute to Māori aspirations, such as Māori advancement and development, and also achieve biodiversity outcomes. The main advancement theme areas have been adapted from Durie (1998) and some indicators for measuring contribution and progress towards advancement are provided for example and discussion.

Future Research Themes

All the biodiversity activity and indicator areas in Table 1 have a research component to support practical projects that contribute to Māori advancement. For example, collaborative research and kaitiaki/community-based projects are effective means to engage Māori in achieving personal and community aspirations, and to increase capacity, health, cultural identity, and economic development. Māori research and community projects can

Māori Advancement Area	Biodiversity Activity	Indicator Example
Economic Standing	Sustainable Management of Natural Resources Sustaining Ecosystem Services Resource Allocation and Use Productive Use	Biophysical Indicators, Taonga Inventories, Māori Land Areas, Economic Statistics, No. of Māori Businesses, Industry Groups Māori Branding Māori Wealth Creation
Social Well-being	Biodiversity Planning and Policy Managing Cultural Resources	Socio-Economic Statistics Cultural Statistics
Strengthening Cultural Identity	Indigenous Knowledge Creation of New Knowledge	No. of Kaitiaki Groups Cultural Indicators
Power and Control, Empowerment, Improved Decision Making	Biodiversity Planning and Policy Legislation	No. of Māori Engaged in Policy No. of Areas Being Co-Managed No. of Collaborative Projects No. of Māori Led Projects
Building Human and Social Capacity	Research Projects, Skills, Research Capability Biodiversity Projects	No. of Kaitiaki Groups Engaged in Projects No. of Māori Researchers
Active Promotion of Māori Health	Sustainable Management of Natural and Cultural Resources Improvements to Ecological and Human Health	Socio-Economic Statistics Health Statistics for Iwi/Hapū/Whānau & Urban No. of Cultural Sites Protected
Greater Land Productivity	Sustainable Management, Use, and Allocation of Natural Resources	Biophysical Indicators Māori Business Economics Innovative Products
Promote Education	Kaitiakitanga Biodiversity Projects in Education Environmental Education Information Transfer, Networking, Communication	No. of University/Wānanga Students in Environmental Areas Students Increasing Skills Projects with Kura No. of Kaitiaki/Community Projects
Promote Language	Biodiversity Projects and Research Programmes Policy Based on Cultural Awareness	Use of te Reo in Projects and in Research Programmes Bi-Lingual Databases
Development and Change	Biodiversity and Cultural Programmes Aligned Sustainable Development	Socio-Economic Statistics Cultural Statistics

Table 1: The role of biodiversity in Māori advancement and self-determination

make significant contributions to national biodiversity goals and advancement. Research that supports co-learning, capacity building, sharing information, improved decision-making, partnerships and participation, and co-management (Taiepa, Lyver, Horsley, Davis, Bragg, & Moller, 1997; Taiepa 1999a, 1999b) is strategically important.

Twelve key research themes have been identified to promote discussion and help increase Māori participation in biodiversity research programmes, planning and policy. Rather than an exhaustive list, they represent some key areas where research and knowledge would contribute significantly to biodiversity goals, and in the longer term to Māori advancement. Most themes recorded have been repeatedly discussed at a large number of environmental hui since about 1995 but never collated for this purpose. The themes were further refined during follow-up discussions with a number of researchers and kaitiaki groups. At present very little work is being carried out in any of them. It is hoped they will provide a catalyst for the development of iwi/hapū, whānau, kaitiaki projects, student projects, collaborative Crown Research Institutes, and University. In the 12 research themes below, examples are given of the issue, the potential research that could be carried out, and an outcome.

Mātauranga and Biodiversity

To date mātauranga Māori has seldom been used in any science or research programmes.

Issues: Ongoing loss of mātauranga Māori; lack of mechanisms to give mātauranga legitimacy, protection, promotion and advancement.

Research: Develop knowledge bases and information systems using mātauranga Māori; greater use of mātauranga Māori in science and research; creation of new knowledge, capacity building and collaborative projects, creation of new technology and innovation from mātauranga.

Outcomes: Ensure that Mātauranga Māori is recognised and used in all areas of biodiversity research; Māori projects create new knowledge and development of new systems for transferring and receiving knowledge; establish systems to protect the misuse of mātauranga Māori; increased use of te reo Māori in environmental projects; ensure that the role and use of mātauranga in modern society is understood and valued, as is its role in achieving biodiversity outcomes.

Intellectual Property Rights of Flora and Fauna and Indigenous Knowledge

Issues: Loss of intellectual property; marginalisation

of Māori from their taonga; exploitation of indigenous knowledge and natural resources.

Research: Address intellectual property loss, commercialisation and exploitation of indigenous flora and fauna, and indigenous knowledge. Develop models and increase awareness of intellectual property and protection of significant flora and fauna. Investigate the use and intellectual property rights for commercial development, new knowledge creation, and innovative products.

Outcomes: The definition and recognition within robust frameworks, legislation, and agreements that are based on tikanga and values, of intellectual property rights associated with flora and fauna and indigenous knowledge that meet the requirements of national and international indigenous obligations, agreements and conventions; the recognition and understanding of the role of mātauranga Māori in commercial development for production of innovative products and technologies; Māori participation within culturally appropriate commercialisation of flora and fauna, while safeguarding taonga for future generations; development, recognition and international support of a Māori led intellectual property right model that retains cultural integrity to withstand the pressures and rigours of privatisation, commercial exploitation and globalisation.

Sustainable Management and Protection of Taonga, Endangered Species, Culturally Significant Species

Kaitiaki Māori are key players in protecting and enhancing populations of many indigenous species.

Issues: The rapid decline of indigenous biodiversity, number of taonga species, communities, habitats, ecosystems; many species are becoming endangered or extinct; there is a need to sustain biological wealth and save endangered species.

Research: Address the loss of indigenous biodiversity, and endangered species through collaborative projects; identify bicultural knowledge models, tools and methods to protect indigenous flora and fauna (taonga); build capacity; create new knowledge for sustainable management and protection of taonga.

Outcomes: Protection of culturally significant and endangered species through collaborative research projects; Māori led research, activities, and co-management groups; widespread kaitiaki projects that include species recovery programmes, restoration projects; enhancing habitats and cultural values; environmental monitoring, including taonga inventories and habitat monitoring, are common tools for measuring success.



Customary (Sustainable) Use of Taonga

Issues: Māori have limited access to traditional resources; Māori have been increasingly marginalised from customary harvest, and are often removed from decision-making, planning and policy development.

Research: Māori led research on the sustainable management of flora and fauna, cultural harvest, and kaitiakitanga.

Outcomes: Ensure that Māori are key players in determining the viability, opportunities, and management of cultural harvest under strict conditions and guidelines, using Māori systems of environmental management based on tikanga.

Indigenous Genetic Resources, and the Cultural and Social Implications of the Contamination and Engineering of these Resources

Issues: Genetic engineering, contamination of genetic resources, weakening genetic lines and confliction with concept of whakapapa.

Research: Explore the impact of genetic engineering on tikanga and whakapapa; build capacity and engage Māori in collaborative research and education programmes.

Outcomes: Improved decision-making by Māori on complex genetic issues; development of cultural value-based frameworks; Māori participation in research; increased capacity of Māori to engage, contribute and lead.

Māori Participation in Biosecurity Issues, Control of Weeds and Pests Affecting Culturally Significant Biodiversity

Issues: Introduced pests and weeds are damaging and destroying indigenous flora and fauna, taonga, ecosystems, and productive human landscapes.

Research: Collaborative research to develop shared understanding and knowledge for controlling pests and weeds (biosecurity), improve both access to knowledge and knowledge transfer, and identify priority issues for biosecurity, impacts on Māori values; build capacity, determine Māori training needs, skill development; develop partnership models for biosecurity policy and implementation.

Outcomes: Increased capacity of Māori to engage in biosecurity research, planning and policy and are actively involved in all areas of biosecurity.

Biodiversity Management, Co-Management Models

Issues: There are very few examples of power sharing, effective co-management models, or partnerships in

biodiversity management.

Research: Develop co-management models, guidelines for best practice, effective management and enhancement of cultural values; improve partnerships and relationships between iwi/hapū/whānau, Māori organisations, and the Crown.

Outcomes: Recognition of the special role of Māori in biodiversity management; widespread establishment of effective co-management groups on Crown and Private land achieving national biodiversity and cultural goals.

Climate Change, Kyoto Protocol Implications:

The world's climate is warming due to rising greenhouse gases. Predictions are for more changeable weather patterns, more frequent and violent storms and rising sea levels. Greenhouse gas emissions need to be mitigated. Climate warming and climate change issues require large-scale human behavioural change, intervention, and land-use change.

Issues: Māori perspectives are not well represented in climate change research, management and policy and very few Māori are engaged in this work.

Research: Improve access to science information; collaborative research projects to underpin effective policy and management for human behavioural change; understand economic opportunities and barriers for Māori.

Outcome: Māori have both the capacity to engage in all areas of climate change research, planning, policy and implementation, and to understand the issues fully; involvement in decision-making; contribution nationally and internationally recognised.

Collaborative Research, Information Sharing, Co-Learning

Issues: Very few Māori are engaged in or participating in science and environmental projects as Māori have limited capacity to engage in or lead research.

Research: Identify barriers to, models and guidelines for effective collaboration and project partnerships; develop strategies for building Māori capacity to undertake research; improve networks; identify information needs; improve information flows, increase information sharing and co-learning with Māori groups to develop new projects that address biodiversity and biosecurity issues.

Outcomes: Māori researchers are integral part of a large number of environmental and biodiversity programmes, carrying out both Māori led and mainstream science research; Māori recognised as making a significant contribution to biodiversity management and to the achievement of biodiversity outcomes.

Māori Environmental Plans And Policy Development

Issues: Māori environmental planning and policy are not well recognised or implemented in mainstream and Crown planning and policy.

Research: Identify information needs and knowledge tools to develop quality iwi and hapū environmental management plans that can be implemented to achieve cultural and national biodiversity goals.

Outcomes: A large number of Māori involved in environmental planning and policy; iwi and hapū environmental plans and policy regularly used and implemented in mainstream planning and policy; plans provide an effective basis and framework for increasing representation of cultural values in biodiversity research, planning, projects, and management.

Māori Environmental Monitoring

Issues: Very few Māori are engaged in environmental monitoring and environmental reporting, and Māori have limited input into environmental decision-making.

Research: Define cultural and environmental goals; develop Māori environmental monitoring methods; develop tools and knowledge bases that help Māori restore or rehabilitate ecosystems, natural habitats and taonga.

Outcomes: Māori conducting regular environmental, cultural and biodiversity monitoring and reporting linked to measuring the success towards desired biodiversity and cultural goals.

Projects to Restore and Enhance Indigenous Ecosystems

Issues: There are relatively few Māori-led biodiversity restoration projects in New Zealand plus limited resources and capacity for Māori to engage in biodiversity enhancement.

Research: Develop research methods and knowledge to help Māori groups implement a range of programmes to achieve biodiversity and cultural goals; identify barriers and opportunities for Māori to engage in biodiversity projects; increase collaborative and integrated research and build capacity, e.g. through increased knowledge, training, employment, qualifications, economic opportunities.

Outcomes: A large number of Māori groups, e.g., kaitiaki groups, actively involved in restoring and enhancing indigenous and culturally significant sites and ecosystems and adequate capacity and resources to effectively engage in or leading these projects.

Future Vision for Managed Landscapes in Aotearoa-New Zealand

In the past, biodiversity was mainly an issue in parks and reserves. Now it needs to be addressed across all landscapes – private, Māori and Crown owned – not just those currently under native forest. Recommendations to integrate biodiversity management and conservation across all land tenures, landscapes, ecosystems, and environmental domains were made by Binning (2000). These included:

Improving management of fragmented ecosystems and vulnerable landscapes

Recognising the important functional role of biodiversity and the inter-dependence between human beings and the natural environment (e.g., ecosystem services)

Mitigating environmental pressures from human activities and other introduced animal and plant species
Engaging support from all the community, working together across different hierarchical tiers, clearly identifying roles for government agencies, community, tangata whenua, and researchers, and then managing biodiversity impacts using a value and risk assessment approach.

Binning (ibid.) also stated that, “Rather than focussing exclusively on land managers, it is necessary to understand the economic and social factors that are driving land uses and the management practices that are causing the continuing loss of biodiversity.” The special role of tangata whenua (Department of Conservation & Ministry for the Environment, 2000) needs to be clarified to encourage Māori to develop a cultural vision that achieves biodiversity management, conservation, and cultural goals across all landscapes.

Creating a Māori Vision for Human Landscapes

Within the traditional Māori landscape was a continuum of stories, metaphors, personified images, recollections, personal and collective tragedy, taonga, events, and a record of cultural activity that gave rise to te reo Māori and mātauranga Māori. For Māori, the indigenous flora and fauna that were once extensive provided a basis for cultural survival and tradition, nourishment, spiritual well-being, and economic prosperity. Present-day landscapes in New Zealand strongly reflect a colonial past where large-scale and rapid transformation changed a landscape – once dominated by indigenous flora and fauna and Māori heritage – into



one dominated by introduced species, exotic trees, extensive grasslands, surveyed property boundaries, streets, cities, towns, and architecture, all copying British colonial culture. A whole new language spread across the landscape replacing and diminishing Māori place names and relegating Māori culture into the background. The large tide of exotic animal and plant pests introduced to New Zealand greatly impacted on indigenous biodiversity, and as the new invaders became more and more established, fragile ecosystems became increasingly threatened and damaged. The new colonial landscape was planned from the onset by European migrants to be “a garden and pasture in which the best elements of British society might grow into an ideal nation” (Park, 1995), largely reflecting the European landscape left behind. Land-use planning in New Zealand has followed this vision to the present, with little or no Māori input.

The issues regarding biodiversity (Department of Conservation & Ministry for the Environment, 2000) provide an opportunity for increased contribution by Māori to ensure cultural values are retained and revitalised within the present human landscape for future generations. The last 100 years have seen an alarming rise in the destruction and degradation of cultural sites (wāhi taonga, wāhi tapu, wāhi tipuna), natural habitats (mahinga kai, culturally significant ecosystems), and other taonga (native flora and fauna species). All these reflect Māori cultural values, and all are physically disappearing from the New Zealand landscape. Māori input is required at all levels to preserve, protect, manage, and enhance such values for future generations, and this requires greater contribution in research, land-use planning, and biodiversity policy and management. The role of Māori in research, planning, and management will require greater acknowledgement and understanding by non-Māori and respective Crown agencies. In terms of land-use planning, and through a bi-cultural process, there is a need to decide what is significant and of cultural and environmental importance for Māori. Decisions must then be made on how to protect and enhance such landscapes, features, sites, ecosystems, and taonga resources, habitats and species, many of which are regarded as unique or outstanding. From this Māori vision, some of the constructive areas that could make a real contribution to protecting and managing indigenous biodiversity in New Zealand are:

- Māori involvement in research – a future research framework
- Kaitiakitanga
- Māori environmental projects on Māori and non-Māori owned land, reflecting Māori aspirations

- Greater participation in land-use planning (especially with local and regional government)
- Greater participation in environmentally and culturally aligned projects
- Greater participation in community biodiversity projects
- Māori led projects
- Greater participation in biodiversity management and policy
- Co-management of culturally and environmentally significant areas
- Advancement of the relationship between Māori art, culture and the environment
- Advancement of the relationship between te reo Māori and the environment
- Advancement of the education syllabus, kura, and the environment

Conclusions

The protection and enhancement of indigenous biodiversity can make a major contribution to Māori advancement and development, as long as Māori are active participants in achieving biodiversity outcomes. A number of key research themes are proposed to increase Māori participation and achieve cultural and biodiversity goals. The engagement of Māori in research themes is a positive way to build social capacity for Māori communities and organisations to improve their decision-making at all levels, and to achieve and fulfil national biodiversity goals and international obligations.

Kaitiaki Māori should be encouraged to develop their vision of managed landscapes – how they want those landscapes and associated flora and fauna to look in the future – and the role of the national biodiversity strategy (ibid.) in that vision. This cultural vision could comprise cultural goals in tribal-specific, geographic, catchment, ecosystem-based areas, or in specific Māori frameworks. This vision has already begun with the large number of iwi and hapū environmental projects, management plans, and tribal strategies developed to achieve environmental, cultural, social, and economic goals (Harmsworth, Barclay-Kerr, & Reedy, 2002). These planning documents and projects are essential to define and prioritise issues, and to target limited resources. Twelve key research themes have been suggested here to increase Māori involvement in research that contributes to biodiversity goals and Māori advancement. These themes help promote new systems of environmental management based on Māori and Pākehā concepts and knowledge. This is essential if Māori aspirations and values are to be effectively integrated into planning and policy to achieve

national and international biodiversity goals, and as part of a more bicultural approach to sustainable development.

Acknowledgements

Funding to write this paper came from the FRST programme (C09X0205): Restoring Indigenous Biodiversity in Human Landscapes – Te Whakaora ake i ngā Tini a Tāne i ngā Whenua kua Rawekehia e te Tangata.

References

- Binning C. (2000). *Conserving Biodiversity – Institutions, Policies and Incentives* (Treasury Working Paper 00/26). Wellington: Treasury Department.
- Buck, P. (1950). *The Coming of the Māori* (2nd ed.). Wellington: Māori Purposes Fund Board/Whitcombe & Tombs.
- Department of Conservation & Ministry for the Environment. (2000). *The New Zealand Biodiversity Strategy: Our Chance to Turn the Tide. Whakakohukihukitia te Tai Roroku ki te Tai Oranga*. February 2000. Wellington: Department of Conservation & Ministry for the Environment.
- Durie, M. (1998). *Te Mana, Te Kawanatanga: The Politics of Māori Self-determination*. Auckland: Oxford University Press.
- Harmsworth, G.R. (2002). *Māori Environmental Performance Indicators for Wetland Condition and Trend: Coordinated Monitoring of New Zealand Wetlands, Phase 2, Goal 2* (Landcare Research Report LC 0102/099). Palmerston North: Manaaki Whenua - Landcare Research.
- Harmsworth, G.R., Barclay-Kerr, K., & Reedy, T. (2002). Māori Sustainable Development in the 21st Century: The Importance of Māori Values, Strategic Planning, and Information Systems. *He Puna Kōrero: Journal of Māori and Pacific Development*, 3, 40–68.
- Park, G. (1995). *Ngā Uruora (The Groves of Life): Ecology and History in a New Zealand Landscape*. Wellington: Victoria University Press.
- Taiepa, T., Lyver, P., Horsley, P., Davis, J., Bragg, M., & Moller, H. (1997). Co-management of New Zealand's Conservation Estate by Māori and Pākehā: A Review. *Environmental Conservation* 24, 236–250.
- Taiepa, T. (1999a). Collaborative management: Enhancing Māori Participation in the Management of Natural Resources. *He Pukenga Kōrero: Journal of Māori Studies*, 4, 27–33.
- Taiepa, T. (1999b). Māori Participation in Environmental Planning: Institutional Reform and Collaborative Management. *He Pukenga Kōrero: Journal of Māori Studies*, 5, 34–39.
- Tipa, G., & Teirney, L. (2003). *A Cultural Health Index for Streams and Waterways: Indicators for Recognising and Expressing Māori Values*. Wellington: Ministry for the Environment.

