WEAVING RESILIENCE INTO OUR WORKING LANDS:

future roles for native plants on private land

The Parliamentary Commissioner for the Environment
Te Kaitaiki Taiao a Te Whare Pāremata

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Office of the
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PO Box 10-241, Wellington
June 2001

Preface

Over the last two decades there has been a rapidly growing focus on our indigenous heritage - the unique assemblages of plants and animals with whom we share these islands. There have been many stimulants to this focus, from both local and international sources. Central to them all has been the realisation that human demands for resources are increasingly affecting the 'health' of our atmosphere, waters and natural systems - the ecosystems that underpin our lifestyles. These demands have led to extinction or widespread loss of some of the species that make up New Zealand's natural capital. Two strands - the ecological sustainability of the way we use natural resources and ecosystems, and the loss of species from our biological 'library' - have led to a plethora of policy, legislative and institutional changes since the mid 1980s aimed at reducing the impacts of New Zealanders on the environment. These have culminated most recently in the production of a Biodiversity Strategy and major investment in its implementation, termination of the Crown's involvement in indigenous old growth forestry, and ongoing amendment of the Resource Management Act 1991.

Given this effort to protect and enhance New Zealand's indigenous species and ecosystems, what is there left to do? Surely the ecological sustainability of our land uses and security of our indigenous plants and animals are assured? If only it were that easy! New Zealand has gone through a period of reform premised on the belief that once you get the institutional arrangements, legislative frameworks and market mechanisms in place, appropriate outcomes will follow. Unfortunately that is not how late 20th century societies and economies appear to have worked. While New Zealand has seen an improvement in some important environmental parameters since the early 1980s, fundamental challenges remain. This is certainly the case on two fronts - improving the ecological sustainability of land uses and reducing our loss of indigenous species.

Successfully tackling big challenges such as these is highly dependent on accurately defining the issues, developing a widely supported vision of the needs, devising processes to address the needs, and sharing the opportunities and risks associated with achieving the vision. If the issues are poorly defined or there is not enough effort put into building a vision of the needs and pathways to the future, various sections of our society and institutional effort may diverge. The opportunities to meet a number of goals may be reduced or lost.

My concern is that our efforts to make necessary amends for the large loss of forest cover in New Zealand, and the rich diversity of species it supported, are not being integrated with our efforts to develop more sustainable land-based biotic industries. On the one hand we have a strong focus and commitment to the protection (the conservation) of native plants and animals, primarily on Crown-owned conservation lands. On the other hand we have the ongoing evolution of private land uses with trends in three directions; more intensive land uses, peri-urban lifestyle blocks and extensive uses such as forestry based on exotic species. Unfortunately this evolution makes little direct use of the native plants that are well adapted to our lands and climates. Why is this the case? In simplistic terms it appears to be the product of a series of legislative and institutional reorganisations that have led to a conservation focus for lands with native vegetation, and a sustainable management focus for lands where exotic species currently predominate. Overlaid on this is a growing societal concern at the loss of any remaining native forests - particularly old-growth forests - but also regenerating forests. These emphases and concerns have led to a series of major initiatives to improve the ecological health of our conservation lands, expand the extent of protected lands and, in doing so, improve the 'health' of our biological diversity. Concurrently there is ongoing pressure on landowners to improve the ecological sustainability of land uses, but limited potential to

do so by employing native species in ways that could directly contribute to farm income. This is not a satisfactory state of affairs; opportunities to improve the ecological sustainability of land uses are being lost.

I am well aware that there are those who will argue cogently that this is not the case. However, it appears to me - and this is one of the reasons I instigated the development of this discussion paper - that there are obvious and not so obvious barriers to increasing the roles of native plants on private lands. They include legislative, taxation, economic and importation policies, property rights issues, and tensions around what constitutes acceptable 'uses'. For a biotically-based economy it seems somewhat ironic that we are investing so little in researching the qualities and attributes of our natural capital while we invest tens of millions of dollars in some exotic species (e.g. *Pinus radiata*) and millions on a quest for new species via genetic engineering!

The objective of this discussion paper is simply to get past the polarised debates and to generate a renewed dialogue about the future place and roles of native plants on private lands. I believe we may have unwittingly boxed ourselves into corners that restrict opportunities to enhance our biodiversity and the ecological sustainability of land uses. My objective is based on the conviction that native plants can and must become a much more dominant component of our working lands.

Many people have contributed to our thinking on this important matter. I wish to acknowledge all the input into this project, and trust we have captured the range of views. I now look forward to your thoughts on the matters we have raised and your ideas for resolving the impediments to increasing native plants on private lands.

Dr J Morgan Williams
Parliamentary Commissioner for the Environment

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Section 1 Introduction

1.1 Project origins - how it began

Why has the Parliamentary Commissioner for the Environment (PCE) decided to explore the future roles, place and value of native plants on private land, particularly given the recent Biodiversity Strategy, the examination by a Ministerial Advisory Committee of the contribution private lands can make to biodiversity, and the sterling work of several agencies and trusts to protect land by Crown ownership or private covenant?

Native plants have spent 80 million years adapting to Aotearoa and are a key - if not the key - to maintaining the ecological health of New Zealand's lands and waters, which underpin New Zealand's social and economic well-being. To help support this outcome native plants have to be deeply rewoven back into the 70% of lands now held in private ownership and mostly dominated by exotic plant species. To contribute to the ecological sustainability of all lands, this reweaving cannot just occur in the form of reserves or protected areas, but must be an integral part of New Zealand's working landscapes and the biotic businesses of agriculture, horticulture, and forestry.

The Ministerial Advisory Committee (MAC) on Biodiversity and Private Land has extensively examined an ecosystem services component of conservation (biodiversity), and the protection of indigenous vegetation on private lands. However, MAC considered the issue of sustainable use of indigenous biodiversity (defined in this context as some form of extractive use) as beyond its terms of reference. Of note is its argument for the need "to hasten the transition from exploitative to sustainable land use".[1]

There are three strategic dimensions to the PCE's focus on native plants on private lands. The first is that New Zealand is highly dependent on biotic industries of agriculture, horticulture, forestry and

fishing. The viability of New Zealand as a nation is dependent on the sustainability of our land use ecologies.

World wide experience has shown that all attempts to manage ecological variables (to farm, grow fruit, harvest trees etc) have led to less resilient ecosystems, systems that are more prone to pest attack, and loss of nutrients, and erosion. Ecological systems with greater diversity are more resilient in a wide range of uses.[2] Most New Zealand land uses (with the exception of conservation and indigenous forestry) do not draw on the ecological resilience that could be gained from having a higher proportion of native plants in the environment as a practical functional part of production landscapes.

As a trading nation, it can be argued that New Zealand's future can be characterised as pampering the palates and the passions of the world's more financially prosperous. Whatever we do to earn our way as a nation - be it goods derived from agriculture, horticulture, forestry or fishing, or knowledge and other services from technological developments, the arts or tourism - we will need to meet the wants of the world's more affluent and more discerning. In global markets, ecological sustainability is a component of economic value for land and marine industries, tourism businesses and others who wish to strongly identify their product as from and of New Zealand. Delivering on these emerging market expectations will be, and is already, a tough task. It is essential that we fully understand these expectations, and address them, to ensure that we can truly substantiate and continue to promote New Zealand's 'clean, green' image.

The second dimension is that New Zealanders are becoming increasingly passionate about the ecological health of the Gondwanan[3] remnant we call home. Over the last three decades there has been a rapidly increasing focus on the impacts that land uses have on soil and water qualities, and on reversing the loss of indigenous ecosystems and protecting native species. The people of New Zealand are, in diverse ways, placing greater 'values' (as distinct from value) on indigenous natural heritage. An example of this 'greater value' is that it is generally accepted that the New Zealand Biodiversity Strategy and the subsequent initiatives should focus only on indigenous biodiversity rather than biodiversity *per se*.[4]

The third dimension is the legislative and institutional framework for planning and management of land use in New Zealand. There are two major strands to our efforts to improve ecological sustainability. One strand focuses on the sustainable management of a whole variety of land uses (e.g. Resource Management Act 1991, Biosecurity Act 1993, and Forests Amendment Act 1993).[5] The other strand focuses on protection and preservation of indigenous flora and fauna and thus primarily, though not exclusively, on the ongoing provision of ecosystem services[6] such as biodiversity (e.g. Conservation Act 1987). To date the legislative and policy thrust of these two streams of sustainability effort has tended to be parallel rather than integrated. This led the PCE, in his 1997 strategic plan, to identify as a critical issue "how to address conservation of natural resources on private land".[7]

This discussion paper explores the opportunities and barriers to the expansion of native plants on private lands, in the belief that their expansion and appropriate management are essential to improve the ecological sustainability of all land uses, and hence the economic viability of the biotic industries of New Zealand. In addition, reintroducing native plants into these landscapes will play a role in strengthening New Zealand's 'sense of place'.

As is already evident, sustaining and expanding New Zealand's native plant cover are major challenges. Making substantive progress in the coming decades will require some innovative thinking and actions.

1.2 PCE role & mandate

Role of PCE

The Environment Act 1986 empowers the PCE to, among other matters, "investigate any matter in respect of which, in the Commissioner's opinion, the environment may be or has been adversely affected".[8]

Mandate of PCE

During a 1999 Strategic Plan update, stakeholders examined the most effective ways that the PCE could operate, and recommended expansion of three roles: that of "pathfinder" identifying unexplained issues; "catalyst" to stimulate debate and identify where there are gaps; and that of "environmental defender" or public voice to ensure that environmental management and sustainability issues are kept to the forefront of debate and discussion.[9]

The future of native plants on private land is clearly covered by the Environment Act 1986[10] - our indigenous vegetation is a very important component of the ecological health of New Zealand. In addition, these issues fall within the three PCE roles specifically identified, clearly warranting application of the pathfinder, catalyst and defender roles.

1.3 Objectives

The task of this discussion paper is to articulate the issues around the potential role of native plants to contribute to the sustainability of land uses and to the unique sense of place of New Zealand's landscapes. The aim is to expand and enhance the dialogue about what New Zealand wants from, and how we should use indigenous plants and ecosystems. This dialogue needs to stimulate thinking about the tensions surrounding the current 'acceptable use' and potential uses of indigenous species, and how New Zealand might develop and determine ecologically sustainable uses. These issues need to be considered in the context of current land use trends, particularly more intensive agriculture, and the significance of global climate change.

This paper is an exercise in stimulating futures thinking, endeavouring to foster creative ideas about land use scenarios 50 - 100 years from now. Current environmental, trade and tourism initiatives suggest that both New Zealanders and our overseas visitors and customers are increasingly putting higher value on ecosystem services and ecological health.[11] Increasingly, mechanisms will be developed to better incorporate at least some of these values into mainstream economic systems. For New Zealand, this suggests much greater opportunity to enhance the contribution of native plant species to our ecological, economic and social well-being (see Figure 1).

This discussion paper therefore offers perspectives that are complementary to but wider than those generating the current debates on biodiversity enhancement. More importantly, the hope is that it will provide a basis for crafting a more holistic view of the place, and values, of native plants on New Zealand's private lands - urban, peri-urban and rural.

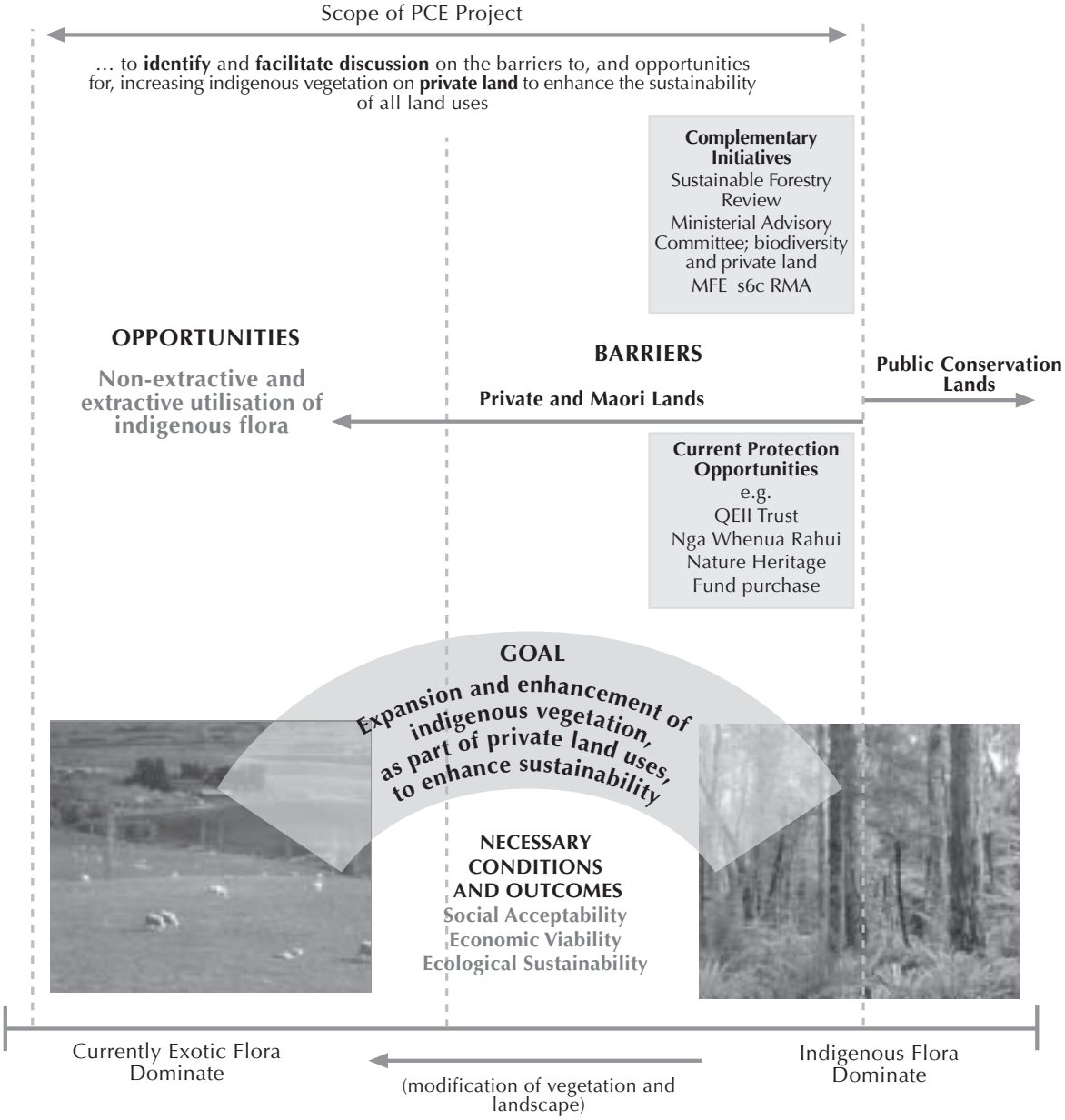
1.4 Outline of the project

Given the complexity of the issues, and the need for wide input from interested groups and stakeholders, the PCE decided to undertake the project in three stages:

Phase 1

The preparation of this discussion paper included a series of interviews with individuals and organisations involved with native plants on private land. Interviews were held with people representing rural landowners, environmental groups, business and local government groups, regional and local councils, Government Departments, Māori land managers, academics, and Crown Research Institutes. The interviews for this phase were not intended to be a fully comprehensive consultation process, and it was beyond the scope of this part of the exercise to

Figure 1 Schematic diagram of PCE project: Weaving Resilience into our Working Lands



Source: PCE 2001

canvass all the individuals and groups active in this area. The intention has been to identify the range of viewpoints, and the major issues and concerns surrounding the future roles of native plants on private land. Research was also undertaken through the available reference material and commentary on these issues, both in New Zealand and internationally.

To assist the PCE with the development of this discussion paper, a reference group was formed consisting of people from a diversity of backgrounds, including ecologists, landowners, Māori and experts in landscape and environmental advocacy. Membership of the reference group is listed on the inside cover of this publication.

The paper is intended for a wide range of audiences including secondary schools, universities, public agencies, and community and business interests. A glossary at the back defines

terms used (including acronyms) and endnotes have been included throughout for references and additional explanation. The aim is a comprehensible text for all readers and we would welcome feedback on our approach as well as on the topic.

Phase 2

The release of this discussion paper provides an opportunity for input, via submissions, by a wide range of New Zealanders. These submissions will then be summarised in a further report. If appropriate the submissions may also be used, as a basis for developing a recommendatory report.

Phase 3

After the summary is completed, options will be considered on the most appropriate and effective means by which the PCE and/or other agencies or groups might advance the priority issues. Possible ways of moving forward might include more targeted studies to address particular aspects of management or policy for indigenous biodiversity on private lands, or processes of dialogue and interaction between the various stakeholders.

1.5 Structure of this paper

It is intended that this paper be read in two parts. The first part comprises sections 2, 3 and 4.

Section 2 is a condensation of the scope of the dialogue and the debates surrounding the issue of native plants on private land. Section 3 outlines the barriers and opportunities to the expansion of native plants on private land. Section 4 provides an invitation to provide comment on the fundamental question "what are the future roles of native plants on private land?"

Section 5 extends the discussion of many of the issues in section 2 and is an additional resource that can be dipped into if expansion, clarification or further information of the issues in section 2 is required. It is hoped that this section will be both useful and interesting to the reader.

1.6 Other relevant PCE investigations

The PCE is also currently undertaking an investigation into the adequacy of the system of agencies and processes, at both the Government and local government levels, which have responsibility for promoting the sustainable development of peri-urban areas.[12]

Such areas form a transition from strictly rural to strictly urban. They are often subject to development pressures and may result in a change of land uses from rural to urban.

In some cases peri-urban pressures will have an impact on indigenous biodiversity and raise questions about the appropriate 'use' of native plants in these places. The issues concerning land use in the Waitakere Ranges are a prime example of these types of pressures.

The peri-urban report is due to be released during mid July 2001.

1.7 What this discussion document does NOT do

This discussion paper does NOT specifically address the following issues:

- The management of native plants and ecosystems on public lands managed by the Department of Conservation and local authorities;
- The management of native fauna - although it is recognised that native plants and ecosystems are critically important for habitat for these species;
- Specific local government policies, performance and approach in the initiatives and processes for Significant Natural Areas (SNAs) under the Resource Management Act (RMA); and
- Any land uses or roles for native plants that are not ecologically sustainable.

During the many discussions that contributed to the development of this paper it was evident that some stakeholders considered that this initiative was endeavouring to reopen the debates that took

place at the time the Government decided to terminate Timberlands West Coast Ltd's beech forest logging proposals and associated other cutting rights. That decision did not warrant reviewing, given that it was principally a landowner (the Crown) making a land use change from a management regime that included an extractive use to a regime that is focused on conservation use. At the time, the PCE received requests to examine the decision and declined to do so.

However, in considering these requests the PCE did note that elements of the debate surrounding the decision indicated a number of unresolved tensions about what constitutes 'use' of indigenous flora, including: whether any uses involving extraction can be ecologically sustainable; and what assemblages of indigenous flora, under what management, can contribute to the enhancement of indigenous biodiversity. The debates about such issues were very passionate, as appropriate, given their importance. However, neither the defenders of extraction, nor those who saw the need to add such forests to our public conservation lands, sufficiently expanded public understanding of the far more complex issues associated with the management approaches for native vegetation in New Zealand.

1 MAC 2000, pp 31 & 75.

2 DEST 1993.

3 Gondwana - original southern supercontinent from which New Zealand separated 80 million years ago.

4 DOC and MFE 2000, p 8.

5 Land uses: Housing, industry, roading, gardening, crop, animal and fruit production, water management, tree products production, tourism, recreation, conservation.

6 Ecosystem services: maintenance of biodiversity, water catchment and purification, waste decomposition, carbon sequestration, nitrogen fixation, weed suppression, soil generation and protection, pollination, nutrient cycling, existence values.

7 PCE 1997, p 26.

8 Environment Act 1986 s16(c)(i).

9 PCE 1999a.

10 Environment Act 1986 s17(a).

11 Buwalda 1997.

12 PCE 2001.

Section 2

Key Concepts

In any consideration of the roles of native plants on private land a wide range of people, groups, and sectors each bring their particular views, frameworks of value, assumptions and priorities to the dialogue. The following section gives a brief overview of some of the key concepts and ideas that underpin debates about the roles of native plants on private land, and have shaped and influenced the issues.

Language

Inevitably in the discourse around the roles of native plants on private land, and other environmental management issues, a number of terms and concepts are commonly employed. These terms often carry particular meanings or associations for different people, with different implications for the management of native plants on private land. These loaded meanings often result in people 'talking past each other' when trying to engage in debate on this subject.

One of the terms commonly confused by a multiplicity of meanings is the deceptively simple 'use'. 'Use' carries connotations of extraction, making an economic return, and exploiting the environment. Conceptually 'use' is much broader than this, and includes the various benefits that can be derived from a range of management options: including leaving the resource *in situ* for purely conservation reasons, the more traditional ideas of utilisation by the removal of the resource, and the wide range of potential approaches that combine a number of objectives.

Given the general difficulties surrounding the term 'use' and its association with controversial terms (such as 'harvesting' and 'logging') this discussion paper will use the term 'uses and services'. The PCE recognises that all management options have the objective of providing benefits to individuals and to society in the form of uses and services, and therefore it is considered that this

term more accurately reflects the scope of existing and potential relationships between people and native plants on private land.

2.1 Uses and services

In the discussions undertaken for this paper, the focus continually returned to questions about native trees and whether existing stands of native trees on private land should be harvested. These issues are urgent and important, but this study places trees within the broader context - the many roles that native plants can play in sustainable land management, and the ways in which social and economic objectives can be integrated with ecological sustainability. The various uses and services can be characterised as follows:

Uses and services with no direct or indirect economic value

- Intrinsic values - qualities and existence values
- Identity and sense of place
  - national (icon species e.g. cabbage tree, pohutukawa, silver fern)
  - regional and district (characteristic landscapes and vegetation patterns e.g. Northland's kauri forests, Otago's tussock grasslands)
  - local and personal (identification of communities, families and individuals with the special plants of their home environments)
- Habitat for both indigenous and exotic wildlife
- Aesthetic, amenity and landscape values
- Traditional and cultural values of taonga for tangata whenua

Uses and services with direct or indirect economic value

Non-extractive

- Ecosystem services - which include maintenance of biodiversity, water catchment and purification, waste decomposition, carbon sequestration, nitrogen fixation, weed suppression, soil generation and protection, riparian protection, pollination, and nutrient cycling
- Ecotourism, recreation services
- Real estate values

Extractive

- Timber sustainably harvested from existing or newly established forests
- Other products including honey, oils, resins, biological compounds, medicinal products, flax fibres, genetic resources
- Mahinga kai, rongoā resources
- Freshwater fisheries improved by riparian or wetland vegetation
- Grazing of indigenous grasslands

The contexts or broader ecosystems where native plants are found often determine perceptions about appropriate management approaches and the benefits that might be derived.

Type of ecosystems

Existing

- Existing forests that have never been deliberately modified by humans
- Regenerating cutover forests at various stages of succession
- Scrublands such as mānuka/kānuka systems
- Wetlands
- Tussocklands
- Coastal dunelands
- Remnant trees or small stands remaining in modified production landscapes - values can vary depending on whether stands have been fenced or undergrazing has occurred[1]

New establishments

- New forests that replicate natural forest ecosystems - for conservation benefits and/or a range of other benefits and purposes
- Adapted plantation forest systems - possibly including a mixture of native and exotic species
- Introduction of indigenous plants into pastoral landscapes dominated by exotic plant species - e.g. shelterbelts, woodlots, indigenous hedgerows, native grasses, flaxes and wetland plants, riparian corridors
- Wetland restoration - for conservation

benefits and/or a range of other benefits and purposes (e.g. water purification)

2.2 Biodiversity

Biological diversity, or biodiversity, describes the richness, diversity and variability among all living organisms and ecosystems. Biodiversity is commonly considered at three levels: genetic (diversity within species), species (diversity between species and within an ecosystem) and ecosystem (diversity between ecosystems).

To the public, biodiversity appears to be shorthand for our indigenous species and their protection. The media often use the term to suggest an entity, or end point in itself rather than a quality that ecological systems possess that provides benefits such as resilience to impacts like climate change or invasion by new pests.

Why is indigenous biodiversity important?

Much of New Zealand's indigenous flora and fauna is endemic - our ecosystems are unique in the world. Indigenous biodiversity is maintained and cherished as an integral part of our heritage and identity, as well as for its values as wildlife habitat, for traditional and cultural purposes, and for a range of economic benefits and ecosystem services. Because New Zealand's indigenous species and ecosystems have evolved to deal with the conditions and climate of these islands they are generally more resilient to perturbations than exotics.

In the 1997 State of the Environment report, [2] the decline in biological diversity was identified as New Zealand's most pervasive environmental issue. The principal threats to indigenous biodiversity were identified as:

- habitat destruction - deforestation, grazing, fires, development, wetland drainage, fragmentation and degradation of ecosystems, and unsustainable use of resources
- introduced pests and weeds - competing with and preying upon indigenous plants and animals.

The purpose of the New Zealand Biodiversity Strategy was to meet New Zealand's commitments under the Convention on Biological Diversity and in response to the decline in the nation's indigenous biodiversity as highlighted in the State of the Environment report. [3]

Native plants on private land and their value in enhancing biodiversity

For New Zealand to meet its goals to maintain and enhance indigenous biodiversity, focusing only on the plants, animals and ecosystems on publicly managed lands will not be enough. The biodiversity of privately owned lands will also play an important role, both in enhancing conservation goals and improving the sustainability of land uses.

Integrating private lands within New Zealand's efforts to enhance biodiversity will require collaborative approaches and new ways to encourage and involve landowners, tangata whenua, councils and other interested parties. The extent to which this could include sustainable use of indigenous plants was an issue identified for further debate by the Ministerial Advisory Committee on Biodiversity and Private Land.[4]

(See section 5.1)

2.3 Ecological significance

The Resource Management Act 1991 requires councils to protect areas of significant indigenous vegetation (s 6(c)). This is often referred to as the Significant Natural Area (SNA) process, however, the Act provides limited guidance on assessing significance. Much debate has ensued around various interpretations, criteria for classification of SNAs, and appropriate means to provide for protection. One way of defining significance in s6(c) has been to assess the ecological significance of areas of land.

There is general recognition that areas with high levels of ecological significance should be managed in ways that minimise any risk of damage to those values. However, there are

Case study: Introducing indigenous biodiversity into a cropping farm

Heinz Wattie's Organic Farm at Lincoln University ('Kowhai Farm') is a 57 ha[5] cropping farm operated for commercial, scientific investigation, and demonstration purposes. Farm operations include an initiative to demonstrate the important role that biodiversity, and more specifically indigenous biodiversity, can play in achieving more sustainable farming practices.

The farm consists of a rotation of six paddocks producing linseed, beans, peas, and buckwheat crops, green manures of oats, lupins and rye corn and two pasture paddocks. The introduction of indigenous biodiversity into these areas has been achieved by planting margins between paddocks using double fencing, and also the planting of road margins. These areas have been planted with native woody plants (*Coprosma spp, Corokia spp, Olearia spp, Sophora spp*), native grasses (*Carex spp, Poa cita, Anemanthele lessonia*) and flax. Some exotic species, such as tree lucerne, have also been planted.

By increasing biodiversity the project intends to assess both the direct and indirect benefits to the farming operation. The study also will assess the impact of the increased width of field margins on the overall economic performance of the unit.

The expected benefits include:

- pollination services
- biological pest control (through beetle banks[6])
- weed suppression
- nutrient retention
- enhancing land values
- providing demonstrable substance to New Zealand's 'clean green' marketing programme.

The farm is a possible model of how increased indigenous biodiversity in agricultural areas such as the Canterbury plains, where there is little indigenous ecology, can contribute to the sustainability of land uses.

differences over what people consider to be ecologically significant, leading to conflict and uncertainty. People can place different levels of importance on the same areas. Some consider that only pristine or nearly pristine areas of native forest or wetlands are ecologically significant; others consider that all areas of native plants have significant ecological value.

During discussions for this study the need for clarity and consistency in defining 'ecologically significant' areas was frequently raised as a critical issue for landowners and councils. In plans produced under the RMA, assessments of significance can determine the range of available management options for areas containing native plants.

(See section 5.2)

2.4 Preservation and conservation

Definitions

The terms 'preservation' and 'conservation' are closely related; both have the concept of keeping something safe from harm, decay or loss, and maintaining its state or condition. Despite their similarities in meaning there have been strong disagreements in New Zealand over 'conservation' and 'preservation', and polarised positions have developed. Section 5.3 looks at the evolution of these concepts' in the context of New Zealand's history of settlement, and how this has influenced current thinking.

The two currently predominant perspectives on conservation and preservation can be summarised as:

A perspective that conservation equals preservation

- Given New Zealand's history, the best way to prevent further losses of indigenous species and ecosystems is to prevent further use or exploitation.
- So much has already been lost from our native plant communities and forests that those that remain are now all significant and worthy of protection from any use.
- There should be no extractive use of areas of regenerating native forest plants as a means of increasing the abundance of native plant

species.

- The protection of native species should extend to trees and plants on private land.
- The motivations of landowners and others wanting to utilise native trees for timber are questionable; New Zealand's history of non-sustainable use of forests indicates that people seeking to use these resources cannot be trusted.
- Protection is best achieved through the purchase, acquisition or covenanting of areas containing native plants, or through regulation or other planning mechanisms.

A perspective that conservation includes preservation

- Conservation is a continuum that includes non-extractive uses, such as enjoyment of wilderness, through to ecologically sustainable use of natural resources.
- It is appropriate to designate some special areas as national parks, or under some other protected category, where indigenous biodiversity and landscape values are given prominence and protection.
- High value native plants have been used in New Zealand for centuries. Providing it is done in a way that sustains or increases the overall abundance of the species, extractive utilisation is a valid option.
- One way of increasing the abundance of native plants on private land is to encourage active planting for a wide range of values, including aesthetic values, ecosystem services, wildlife values and extractive uses.
- While the past record of exploitation of native forests and other indigenous ecosystems is dismal, important lessons have been learned from these experiences, and sustainable management in the future is possible.

The management imperative

Whether people agree or disagree with these different perspectives, one issue is common to both. Regardless of the status of the land, or the purposes for which it is being managed, valued native species may be vulnerable to a variety of pressures (e.g. weeds and pests, changes in climate, loss of pollinators and dispersers, changes in soil characteristics, and hydrological changes). Not to intervene in an attempt to control, for instance, pests and weeds is likely to risk a degradation of the biodiversity values.

(See section 5.3)

Case study: Hinewai Reserve - Eco-restoration and tourism

Hinewai Reserve on Banks Peninsula is a 1050 ha area of land owned by the Maurice White Native Forest Trust, to enable the natural regeneration of indigenous vegetation and ecosystems.

The management philosophy applied at Hinewai is one of minimum interference, a recognition that with the exclusion of fire and introduced animals the natural resilience of native species will allow for recolonisation of modified areas, without further human assistance. This approach requires patience and a willingness to try not to predetermine the long-term outcomes. Nurse crops for regenerating native plants include exotic species, such as gorse and broom, in addition to native kānuka. The trust is confident that exotic plant species will gradually be replaced as natural succession occurs; although this is aided with on sight removal of some exotics such as *Pinus radiata*, *Acer pseudoplataris* and *Clematis vitalba*.

At present approximately 40 percent of the reserve is in native vegetation consisting of red beech stands, kānuka, second growth mixed hardwoods and scattered podocarp (tōtara, mataī, kahikatea).

Hinewai Reserve is also part of the successful Banks Peninsula Track - an initiative of ten local landowning (mostly farming) families to diversify their income through tourism. The financial contributions from tourism and other visitors help to offset some of the costs of the conservation work.

Although the area has been managed for conservation purposes for not much more than a decade, regeneration has progressed at least as rapidly as was initially predicted. The ecological and financial benefits are already clearly apparent, including increased bird and invertebrate life, and returns from tourism.

2.5 Ecological sustainability

Ecological sustainability should be a fundamental requirement for all New Zealand's land use and for the roles of native plants in the country's social,

cultural, political and economic futures. To give a useful and practical definition to the concept of ecological sustainability, clear understanding is needed of the kinds of relationships New Zealanders want with their physical environment. Some contemporary discussions of sustainability focus on the 'triple bottom-line' - the incorporation of social (cultural), economic and environmental considerations in management systems and objectives. The three components are closely inter-related.

In this discussion paper the PCE has taken an ecological orientation in working towards a practical concept of sustainability, that:

- encompasses biodiversity, a core component of ecological services
- works within ecological limits and the carrying capacities of the biosphere
- recognises the importance of complex biophysical systems and processes
- means ecological services and natural processes are maintained into the future without them failing or being irreversibly compromised
- maintains natural capital
- enhances environmental quality
- enhances the resilience and robustness of the environment.

Sustainability is an ideal, like truth, justice, freedom, democracy and love. We never completely reach our ideals but we strive toward them...[7]

(See section 5.4)

2.6 Managing for change and resilience

There is increasing awareness of the complexity and inter-connectedness of natural systems, the unpredictability of ecosystems' responses to change, and the limits of our knowledge in many critical areas. It is now recognised thanks to ecological sciences, that natural systems are complex non-linear systems with different capacities to cope with natural and human impacts.

In the face of often daunting complexity, policy-makers and some science-based approaches seeking a sense of greater certainty, have tended to develop rigid policy and management structures that have a single target (e.g. enhancing biodiversity, or economic production), a single scale of focus (typically limited in space and time), and limited capacity for adaptation.

With better awareness of ecological principles, the varying capacity of systems to cope with impacts, and the resulting complexity of relationships, comes an appreciation that a reductionist approach, focusing down on isolated aspects of an issue or ecosystem, will not be enough to deliver ecologically sustainable management. The limitations of some narrowly specialised scientific frameworks, and the adversarial nature of some of the debates about different management models, have led to public scepticism and mistrust about science and its role in providing solutions for indigenous ecosystem management.

Environmental management needs to evolve to incorporate:

- integrated policies that are flexible and adaptive
- close monitoring to increase knowledge of trends in ecosystem health and improve responsiveness
- research that integrates a broad range of disciplines and perspectives
- active citizen involvement.

(See section 5.5)

2.7 Kaitiakitanga

This discussion aims at advancing understanding on matters of importance for tangata whenua in relation to native trees and plants. It does not have the status, nor should be taken in place of the statements of iwi, hapū and whanau on their own behalf concerning native trees and plants, traditional relationships with those taonga, their values and management, or any other issue.

Whakapapa

For tangata whenua, issues such as the place of trees and plants will be approached from the basis of whakapapa. All living things are originally descended from Ranginui and Papatuanuku, the sky and the earth; their son Tāne is the atua responsible for forests. After Tāne had brought all the trees, plants, birds and insects into the world, he created humans, making the form of a woman from the red earth of Hawaiki and breathing life into her.

Within the structures of whakapapa all the components of the natural world, including people, are connected back to the atua, and so linked together in the bonds and obligations of kinship. Metaphysical and ancestral dimensions are inherent in the landscape, in plants and animals, water and stone: "There is no distinction or break in... the whakapapa between supernatural and natural. Both are part of a unified whole."[8] The relationships between people and the other descendants of Tāne are especially close; as the junior member of this kin-group, humans have particular obligations to the older members, the trees, plants, birds and other forest creatures.

Tikanga

The responsibilities of humans to the rest of the natural world are determined within the systems of kaitiakitanga and tikanga. Tikanga can be described as the correct way of doing things, and is based in some of the essential principles that shape the Māori world:

- Mauri - the essential life force or distinctiveness that enables each thing to exist as itself
- Tapu - the particular sacredness of people, things and places for particular reasons
- Mana - the status and authority of tangata whenua
- Rangatiratanga - the right of iwi, hapū and whanau to make their own decisions about things that concern them
- Kaitiakitanga - the ongoing necessity for tangata whenua to look after the taonga, both physical and intangible, that are their heritage.

Te waonui a Tāne

Over the centuries, through a cumulative process of learning and adaptation, through abundance, scarcities and losses, tangata whenua developed close relationships with the trees and plants of Aotearoa. These islands' forests, wetlands, coastal vegetation and other ecosystems were the foundations on which survival depended, both as habitat for birds and other foods, and as rich resources to meet all kinds of practical needs.

Over the generations, an extensive body of knowledge has been brought together. Matauranga Māori is a storehouse of detail on the characteristics and qualities of native trees and plants, on ecosystem dynamics and relationships, and practical management methods and techniques. These methods aim to ensure ongoing sustainability, and take an integrated approach to all aspects of management and utilisation.

Kaupapa

Today, the practical aspects of Māori relationships with forest and plant resources continue, including:

- customary uses of traditional materials, often for special purposes such as waka construction, the restoration of wharenui, or other carving projects
- use of harakeke, pīngao and other materials for weaving work
- rongoā, to which increasing numbers of people are turning for natural health treatments.

The practical and the esoteric, the physical and the divine are inextricably intertwined. As taonga tuku iho, native trees and plants combine both tangible usefulness in the here and now, and elemental connections to the gods, the ancestors and the eternal universe.

Māori landowners

Māori own the majority of the remaining indigenous forest on private lands; this has been estimated at approximately 80%.[9] The extent of today's Māori-owned forests is due to a mix of inter-relating factors, including:

- economic constraints on the capacities of Māori landowners to develop their resources (for example, difficulties in raising finance where land has multiple owners)
- isolation and access (many Māori-owned blocks are in remoter areas).

Māori were not signatories to the 1991 Forest Accord between industry and environmental groups (see section 5.18). There are often concerns amongst iwi and hapū about the kaupapa and assumptions of some environmentalists, and about some of the formal and statutory frameworks established or proposed by government to secure the protection of forest areas. However, many Māori trusts and landowners have committed to protection of the forests on their lands through Nga Whenua Rahui kawenata (see section 5.16).

Many Māori landowners, incorporations and Trust Boards have undertaken commercial forestry projects with exotic species (primarily *Pinus radiata*), often in joint venture partnerships. Exotic species are seen as currently the most financially viable option. These initiatives are subject to the same imperatives as any other land use - the requirement to generate appropriate economic returns, to manage resources for the ongoing benefit of owners or shareholders, and to ensure the environmental sustainability of the operation.

However, Māori have an acute sense of longer-term timeframes, and acknowledge that, if the economic returns were similar to current ventures, working sustainably with indigenous trees and plants would generate a wider range of benefits for tangata whenua than projects with exotic species.

(See section 5.6)

2.8 Te Tiriti o Waitangi - the Treaty of Waitangi

Tangata whenua have a considerable range of interests in native trees and plants, and in issues of land use and the management of indigenous vegetation, in terms of the rights guaranteed under te Tiriti o Waitangi (the Treaty of Waitangi 1840).

The Treaty records the fundamental bargain between the Crown and Māori - the exchange of the right of the Crown to govern (Article I), in return for confirmation of the rangatiratanga of tangata whenua, and the obligation to protect Māori interests (Article II). The Treaty did not convey any special rights to tangata whenua - rather it confirmed and guaranteed their existing rights to land, forests and other natural resources, including rights in respect of intangible taonga.

Some of the principles of the Treaty, as established by the Courts and enunciated by the Waitangi Tribunal, that are relevant to the management of native plants include:

- partnership between the Crown and tangata whenua, to act in good faith and to accord each other reasonable co-operation on major issues of common concern
- active protection of the Māori interest in natural resources, species, places and other taonga, which will require more than passive recognition or processes of consultation with tangata whenua
- management of natural resources, species, places and other taonga according to tikanga
- recognition that taonga include both tangible and intangible dimensions and values.

Māori involvement in issues connected with the management of native trees and plants will also occur under the RMA, which requires councils to take into account the principles of the Treaty and to recognise and provide for the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu and other taonga. Councils must also have regard to iwi environmental management plans in formulating

plans and policy statements. Consultation also occurs in relation to resource consent processes. And many iwi proactively advocate the use of native species in a range of environmental contexts - for example, advising councils to use native plants rather than exotics for riparian restoration.

The WAI 262 claim

One claim currently being heard by the Waitangi Tribunal is the "indigenous flora and fauna claim", commonly referred to as WAI 262 (its number in the Tribunal's recording system). WAI 262 is a wide-ranging claim lodged with the Tribunal in 1991 by representatives of several iwi in regard to the "protection, control, conservation, management, treatment, propagation, sale, dispersal, utilisation, and restriction on the use" of native plants and animals, of the genetic resources inherent within these taonga, and the whakapapa, intellectual property and traditional knowledge associated with them. Clearly this claim and its eventual outcomes have enormous implications for the future roles and management of native trees and plants in the New Zealand landscape.

(See section 5.7)

2.9 Markets

During the interviews undertaken for this paper, the economic dimensions of native plants on private land were frequently raised. People's concerns centred on the relationships between ecological, social and economic sustainability. There is widespread concern that without economic viability over both the short and longer term, future management options and potential uses of native plants on private land will be constrained.

Economic considerations apply both to extractive benefits such as fibre, timber, honey, and oils, and non-extractive benefits such as ecosystem services (e.g. pollination, water and soil conservation, and biodiversity benefits), and recreation and tourism.

Case study: Gowan Hills - A managed native remnant

The Gowan Hills Trust currently manages a 600 ha silver beech (*Nothofagus menziesii*) forest in Southland under a Forests Act Sustainable Management Plan. The Trust is the only native forest manager currently operating under Forest Stewardship Council (FSC) certification in New Zealand.

The Gowan Hills forests are remnant areas located at about 300 - 500 metres altitude on what was, until the mid 1990s, a sheep farm. The land is now owned by a forestry company and is planted in Douglas fir. However, the original farming family, via the Gowan Hills Trust, has a 25-year forestry right to manage the silver beech remnants.

Prior to the introduction of the Forests Amendment Act (FAA) 1993, the trust decided not to accept offers to chip the forest (at $2 per tonne), believing that there was more value in retaining the forest within the landscape, and chose to invest in the longer term sustainable management of the forest. With the introduction of the FAA the trust spent four years getting approvals under both the FAA and RMA. As one of the first forest managers seeking approval under the new regime they found it to be largely uncharted waters. They also found themselves on a steep learning curve about the techniques necessary to endeavour to sustainably manage a native beech forest. The trust initially sought a permit in an attempt to better understand the implications of the FAA requirements. Today the trust operates under a fully registered Sustainable Management Plan (see section 5.11).

The trust found that the major limitation on the level of timber harvested, was not the amount permitted under the approvals, but the lack of a domestic market that realised the value of native timber sourced from a sustainably managed forest. In addition, the domestic market is open to imported wood and finishing timbers from forests that are not required to meet standards similar to those under the FAA 1993. Consequently the trust applied for Forest Stewardship Council certification in order to access more discerning 'green' overseas markets.

The Gowan Hills Trust and the School of Forestry at Canterbury University are jointly conducting long-term research assessing impacts of the management regime on the forest ecology. Two areas of primary concern are the impacts on native mistletoe and on rates of regeneration of beech seedlings.

The role of markets

There are a number of inter-related issues around determining acceptable management options for native trees and plants on private land. One area of debate is the extent to which allowing economic or market values to be attributed to and derived from these ecosystems can be environmentally beneficial.

It has been suggested that by allowing for some levels of economic return, through the creation of market mechanisms, landowners will have a financial incentive to sustainably manage native plants on their properties, and thereby contribute to environmental sustainability and to biodiversity and landscape values.

The limitations of markets

Discussions about market creation and the use of market mechanisms usually focus on questions about extractive uses, primarily of native timber. Views differ greatly over the future of the high quality timber market in New Zealand; native timber only contributed 0.4% of the total amount of roundwood produced in 2000.[10]

Many people consider that economic markets do not take account of the complex diversity of values inherent within ecosystems, and cannot accurately reflect these values. The conclusion is drawn that markets must inevitably fail to fully reflect the *in situ* ecosystem values of indigenous trees and plants. Therefore, it is argued that these ecosystems and the benefits they provide will be undervalued resulting in their over-utilisation and exploitation.

Other concerns around markets for native plants and products derived from them include perceived difficulties in determining whether or not products being sold are sourced from lands managed under an ecologically sustainable regime.

For landowners involved in native timber production under the Forests Act 1949, [11] New Zealand's current practice of importing timber and timber products without requiring that they be sourced from sustainably managed forests is unfair competition. This lack of discrimination is perceived as undermining the development of best practice in sustainable native forest management.

Forest certification

Forest certification, such as the international Forest Stewardship Council (FSC) system, is a means of ensuring recognition for sustainably derived timber products both in terms of product quality, and the reliability systems that provide consistency and certainty for markets to maintain economic values. Certification provides a guarantee to customers through mechanisms that trace the timber product from a specific forest through the production process to the retailer.

Markets for non-extractive uses

The markets for non-extractive products from native plants on private land also have the potential to provide economic incentives to sustainably manage indigenous vegetation, but these markets are not as well developed as those for extractive uses. Existing non-extractive markets are associated with tourism and recreation, the public funds provided for conservation (through the Nature Heritage Fund, Nga Whenua Rahui and the QEII National Trust), and private funding from organisations such as the New Zealand National Parks and Conservation Foundation.[12]

Alternative markets for the conservation and establishment of areas of native vegetation on private land have also been proposed, such as carbon sequestration systems, and tradeable habitat systems.

New establishments of native plants

In many respects the economic implications of establishing new areas of native plants are different from those for existing areas of native plants. In current commercial terms the establishment of new areas of indigenous vegetation is not as attractive as establishing exotic species. Many native tree species have

much longer rotation periods and higher establishment costs than *Pinus radiata* or even Douglas fir. Research similar to that undertaken on *Pinus radiata* could shorten rotation periods, but at present there appears to be little or no research effort in this area (see sections 2.14 & 5.15).

Case study: Planted Kauri in South Auckland

During the 1970s the Auckland Regional Authority forestry section undertook a series of trials in the planting and management of Kauri (*Agathis australis*).

The project aimed to identify the best and most economical way to establish kauri plantations by determining the factors that influence kauri growth (e.g. light and temperature requirements, effects of fertiliser and planting time). The lack of knowledge in this area was seen as a critical barrier to expanding the amount of kauri available for harvest.

The trials were established in the southern Hunua Ranges over 10 ha. Although the trial areas are not currently under any specific management regime they demonstrate techniques that will increase tree survival rates and growth rates. Trials showed that the primary determinant for survival and growth is soil quality, as kauri grows best in friable, reasonably well-drained soils. The use of a nurse crop and the use of releasing[13] and thinning were also assessed as being beneficial.

On good sites kauri has achieved significantly improved growth rates over those traditionally associated with the species, with 27 year-old specimens reaching heights of 15 metres. Based on this work kauri would seem to have good potential for use in riparian plantings, and for sustainable harvest on a 80-100 yr rotation. Currently there is a proposal to establish a trust that will use the existing trial sites to promote the planting of kauri through education and information sharing.

The prices currently received for native timbers do not provide a sufficient premium to offset the longer growing periods and establishment costs. This reason is often given as to why native trees will not be widely planted for timber, with the exception of the efforts of a limited number of individual enthusiasts.[14]

Differentiating exotic and native forestry

In New Zealand current perceptions of forestry are largely based on past unsustainable practices, and on current practices with *Pinus radiata*, a fast growing exotic species that produces, without additional processing, a relatively low value timber with relatively small profit margins. This type of forestry relies on the comparatively short rotation length and the production of large quantities of timber to be economic. Silviculture, harvesting, and processing of timber is characterised by uniform stands and large-scale, time-dependent, energy-intensive operations. This type of forestry can be termed 'industrial forestry'.

However, both ecological and economic factors mean that ecologically sustainable forestry with native species would have very different characteristics. Native tree species are relatively slow growing, but produce higher value timbers. Native species generally grow better, in terms of rates of growth and health, in association with other native plants, and not in monocultures (the possible exceptions being kauri and *Nothofagus spp*). Due to the longer rotations, planting and growing these species purely for timber is not as economically viable as working with pine.

Successful indigenous forestry is likely to be characterised by forestry practices that mimic natural ecosystems. Such forests will include a range of species, growing at different rates. To be economically viable they will need to provide returns in relation to a range of other uses and services (such as recreation, amenity, biodiversity and other ecosystem services, conservation, non-timber products, and biosecurity risk management). Therefore, harvesting practices based on clear felling will be neither economically or ecologically sustainable. Harvesting will need to be based on low-impact, low-cost, small-scale techniques that maximise the revenue derived from the relatively low volume of timber produced.[15]

Taxation regimes

The economic impacts of central and local government taxation (rates relief, income tax regimes) were identified, in the discussions undertaken for this paper, as disincentives both to the protection of existing indigenous vegetation and to the establishment of new native plants on private lands. These factors apply whether management is purely for protection purposes, or where there is an intention of deriving income in the future.

(See section 5.8)

2.10 Landowners' rights and responsibilities

The issue of property rights and their implications for regulatory and land use decisions are fundamental themes in relation to native plants on private land. Concepts of property rights are often based in strongly felt beliefs about the need for fairness and respect for individual freedoms when balanced against the interests of wider society.

The debates focus around some critical questions:

- the extent to which society can determine appropriate roles for native plants on privately owned property (whether for economic use, ecosystem services, biodiversity protection, amenity values, or some combination of values)
- the role and effectiveness of regulation
- who pays for and benefits from such decisions.

Many New Zealanders believe that an individual's ability or right to choose what to do with his or her own land is sacrosanct, and the expectation is that such rights should not be unfairly compromised. Consequently, there is the view that if landowners are required to give up certain land use choices for the public benefit, then they should be compensated, although there are different views as to what compensation might entail. However, others consider that it is appropriate for the State to purchase or negotiate agreements for protection of all areas of significant natural vegetation and habitat. If this is not possible, it is argued that the State should regulate or impose rules that prevent further loss from adverse human impacts.

Loss of trust

Many people hold the strong view that conflicts between landowners, environmental groups and local authorities are essentially about a lack of trust and respect, and people talking past each other.

Some landowners who have looked after a stand of bush or other indigenous vegetation on their properties for many years, perhaps over several generations in a family, are rightly proud of their achievements. There is often a deep sense of offence when regulators come in at a later date and impose a particular protection-oriented management approach, often, in the view of the landowner, without adequate understanding of the qualities of the property, or adequate consultation.

Concerned environmental groups often have similar feelings of distrust about the land management practices of landowners, and sometimes the activities of regulators. This distrust may be based in past negative experiences; the emphasis on regulation may not be due to any lack of respect for any individual landowner, but a more general lack of trust in human nature. The view is that regulation will always be necessary for the few 'cowboys' who would not otherwise act responsibly toward the environment.

The absence of certainty

There is a widespread view amongst landowners that the possibility of regulatory change to their rights in relation to native plants on their properties creates an environment of uncertainty.

There is concern that if landowners establish new areas of native plants on their land by planting or facilitating regeneration, with the objective of undertaking in the future some types of extractive

use, over time these areas would inevitably develop significant ecological values. Rather than seeing these ecological values as an asset, some landowners view this as a potential liability. There is an expectation that such new areas would in future be designated, via regulation, to be managed exclusively for conservation purposes.

Uncertainty, or even the perception of uncertainty, is often cited as a reason why landowners will not invest effort into the protection of existing native plants, and more specifically into establishing new native plants on their land for any number of potential uses and services.

(See section 5.9)

2.11 Central government: roles and approaches

Background to the government institutions

The government reforms of the late 1980s brought significant change to the structures of central government agencies with roles in relation to native plants on private land. The reforms were based on a number of general principles, including separating policy and operational functions, and reallocation of responsibilities across departments to locate similar functions within the same agency.

The restructuring appeared to reflect and affirm the separation of thinking between a protection ethic and the sustainable use of lands. A single agency, the Department of Conservation, was established to manage lands that were considered to have primarily conservation values. Those lands that were considered to have primarily production values were transferred to State Owned Enterprises (SOEs); Forest Corp (subsequently renamed Timberlands) received the Crown's production forests, both exotic and indigenous.

Consistent with the principle that policy making should be separated from the operational functions of government departments, two new policy agencies were created: the Ministry of Forestry (now part of the Ministry of Agriculture and Forestry) and the Ministry for the Environment.

The Ministry for the Environment

The Ministry for the Environment has a range of functions that directly or indirectly impact on native plants on private land, including providing advice on the application of environmental legislation (including the Resource Management Act (RMA) 1991, Forests Act 1949, Hazardous Substances and New Organisms Act 1996 and Conservation Act 1987) [16], and promoting environmental policies and effective public participation in planning.

The Ministry for the Environment has always been understood to have the role of mediation, working to manage the tensions arising from conflicts between protection and production, between the environment and development and social interests. As a consequence it was seen during its establishment phase as the "Ministry in the middle".[17]

One of the major roles of the Ministry for the Environment was in the development of the RMA, and the Ministry continues to be involved in ongoing oversight and policy direction of that Act. Local authorities have responsibilities to implement the RMA. How this is achieved will directly impact on the current and future role of native plants on private land.

The Department of Conservation

The primary functions of the Department of Conservation in relation to native plants on private land are:

- to manage for conservation purposes, all land, and all other natural and historic resources held by the department and any other land managed on behalf of the owner
- to advocate the conservation of natural and historic resources
- to advise the Minister on conservation matters.

In the Conservation Act 1987, conservation is defined as:

the preservation and protection of natural and historic resources for the purpose of maintaining their intrinsic values, [18] *providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations.*

It is within this statutory context that the department undertakes its advocacy, education and policy functions with respect to native plants on private land. The legislation requires that DOC advocates for conservation as it is defined. The department undertakes this role through:

- working with organisations such as local authorities, Forest & Bird, Federated Farmers, Fish and Game, Native Forests Restoration Trust, Landcare Trust and Ducks Unlimited
- providing support for private landowners who wish to protect land of conservation value through Nga Whenua Rahui, the Nature Heritage Fund, and the QEII National Trust
- providing input to statutory planning processes under the RMA.[19]

In the department's recent Statement of Intent it has redefined its strategic direction with respect to natural heritage that it does not hold or manage. It will now focus its effort to:

- work with landowners, communities and associate agencies to protect important natural ecosystems and habitats and indigenous flora and fauna
- use the best methods to achieve the desired outcomes in particular circumstances, drawing on a full range of methods including the encouragement of voluntary conservation endeavour, establishment of co-operative conservation programmes and through statutory advocacy. [20]

The Ministry of Agriculture and Forestry

The Ministry has responsibility for the Forests Act 1949 and administers, via the Indigenous Forestry Unit (IFU), the indigenous forest provisions as provided for under Part IIIA of the Act. Under this legislation, indigenous timber can only be produced from forests covered by that Act and that are managed in a way that maintains the ability of the forest growing on that land to continue to provide a full range of products and amenities in perpetuity while retaining the forest's natural values. The Indigenous Forestry Unit has the function of approving sustainable management plans and permits, as required by the Act, for indigenous production forests. Sawmills may only mill logs sourced from forests managed according to approved sustainable management plans or permits.[21]

Part IIIA of the Forests Act 1949 does not apply to:

- any Crown owned West Coast indigenous production forest
- any indigenous timber from or on any land permanently reserved under the South Island Landless Natives Act 1906 and having the status of Māori land or General land owned by Māori under Te Ture Whenua Māori Act 1993
- any indigenous timber from or on any land held, managed, or administered by the Crown under the Conservation Act 1987 or any of the Acts specified in the First Schedule to that Act
- any indigenous timber from any planted indigenous forest.

The Act also does not apply to native trees or vegetation that are not intended to be milled for timber, i.e. firewood or vegetation cleared as part of a change in land use.

(See sections 5.10 & 5.11)

2.12 Biodiversity policies and strategies

The Convention on Biological Diversity

In response to the global decline in biodiversity, the Convention on Biological Diversity (CBD), an international agreement on the conservation and sustainable use of biodiversity, was adopted at the 1992 Earth Summit in Rio de Janeiro. The objectives of the CBD are:

- the conservation of biological diversity
- the sustainable use of its components [22]

- the fair and equitable sharing of the benefits from the use of genetic resources.

The CBD was ratified by New Zealand in 1993 and a number of initiatives have been undertaken to give effect to its provisions, including a lengthy process of consultation to develop a New Zealand Biodiversity Strategy.

New Zealand Biodiversity Strategy

The New Zealand Biodiversity Strategy was announced in 2000 with the goals of:

- increasing community and individual awareness of biodiversity
- protecting iwi and hapū interests in indigenous biodiversity
- maintaining and restoring natural habitats and ecosystems to a healthy functioning state
- maintaining the genetic resources of those introduced species that are important to New Zealand for economic, biological and cultural reasons.

The strategy does acknowledge that, while conserving indigenous biodiversity is the priority, this objective does not preclude the use of the components of indigenous biodiversity where such use is ecologically sustainable and does not result in the long-term decline of biodiversity.[23] The strategy also recognises that the sustainable use of indigenous species within New Zealand's production and urban landscapes could assist in the mitigation of threats to biodiversity.[24]

The strategy includes considerable discussion of the sustainable and commercial use of genetic resources, and a policy is proposed for the management of indigenous genetic material in New Zealand, and for appropriate mechanisms to access those genetic resources.[25]

In the strategy's implementation plan there is, however, no reference to the various ecologically sustainable uses and services that might be derived from native trees and plants in the landscape. It is unclear what contributions, if any, management regimes for sustainable use of native vegetation on private land might be able to make in achieving the strategy's biodiversity goals.

In 2000 the Government allocated $187 million over five years for a package of measures to implement the strategy on both public and private lands.

Biodiversity on Private Land - Policy Package

In December 2000, following the Biodiversity on Private Land project undertaken by the Ministerial Advisory Committee, the Government announced a policy package to address the issues that had been raised. The policy package contained six initiatives:

- enhancing the capacity of local government to address biodiversity issues
- development of a National Policy Statement on Biodiversity to provide guidance for local government
- a biodiversity advisory service implemented by the Department of Conservation
- increased funding for existing protection mechanisms (QEII, Nga Whenua Rahui, Nature Heritage Fund)
- clarification of the role of regional councils as the lead agency for biodiversity and the important role of territorial authorities
- further work on a national governance structure.[26]

The package makes no mention of any measures aimed at improving current land use practices on private land so as to take better account of indigenous biodiversity, or the contributions that native plants could make to improve ecological and economic sustainability.

(See section 5.13)

2.13 The RMA and sustainable management

The RMA provides for the management of native plants on private land, through plans and policy statements produced and implemented by local authorities. Section 6(c) of the RMA requires that,

in achieving the purposes of the Act (i.e. in developing and implementing plans and policy statements), the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna shall be recognised and provided for as a matter of national importance.

The RMA, through plans and policy statements and the concept of integrated management, has an influence on the management of native trees and plants outside any areas that may be deemed to be significant under section 6(c). District and regional plans may set rules governing vegetation clearance, riparian management and water quality, soil quality and erosion, and landscape, or that impact on native vegetation.

It is also important to remember that the RMA does not preclude a range of alternative non-regulatory management approaches, such as education and public awareness programmes, or provision of financial or other support to facilitate the establishment and protection of native plants.

Section 6(c) RMA

There are two major issues of interpretation with respect to the implementation of this section.

First, what does significant mean, and how do you assess it? Nowhere in the Act is there guidance on how to assess significance. Consequently, there has been much debate about the various interpretations of what is significant in the context of section 6(c), and what ecological criteria should be applied in the classification of what are commonly referred to as significant natural areas (SNAs) (see sections 2.3 and 5.2).

Secondly, what does protection mean, and how do you provide for it? What kinds of rules and other measures are necessary, legally and practically, to provide for the protection of areas of significant indigenous vegetation? Are voluntary approaches acceptable?

The Department of Conservation has stated that:

Section 6(c) is not about obtaining more reserves, it is about sustainable management of natural resources. Protection of SNAs identified under the RMA does not preclude use of natural resources within an SNA, as long as that use does not impact adversely upon the values for which the area is considered significant. The issue is sustainable management, not reservation. Therefore there are a greater range of opportunities for protection, which may include reservation of parts or all of an area, if deemed desirable and agreement of all parties is reached, or use and management which provide for the avoidance, remedying or mitigating of potential adverse effects.[27]

However, there is a perception among landowners that the delineation of section 6(c) areas in district plans is being used as a default reserve making power, and that landowner's land use options are substantially restricted and compliance costs increased within those areas listed as SNAs. In some areas this has led to conflict and controversy.

In the absence to date of national RMA guidelines on assessing 'significance', many councils have developed their own approaches. The Ministry for the Environment did begin in 1997 to develop draft guidelines for councils on implementing section 6(c). However, work is now focusing on the development of a draft National Policy Statement for Biodiversity under the RMA, which could provide some assistance in this regard.

Local authorities and native plants outside significant natural areas

Regional councils and unitary authorities have responsibilities under the RMA for soil conservation and water quality.

Regional councils can set rules to prohibit or control the clearance of vegetation where this activity might have adverse impact on soil stability or water quality. Vegetation controlled by the regional plan is often on steep or poor quality soils and frequently consists of indigenous species. Regional councils can also undertake education and facilitation programmes to promote more ecologically sustainable land management

practices, and have responsibilities for the control of pests and weeds under the Biosecurity Act 1993. Often regional councils will consider the impact of introduced species on native species and habitats in their regions when determining priorities for pest and weed control.

Territorial local authorities (district, city councils) and unitary authorities are responsible under the RMA for control of land use. Territorial local authorities (TLAs) often set controls on the removal of indigenous vegetation through rules in district plans. These rules are often based on the maximum area and height of the native vegetation that can be cleared before the person undertaking the activity is required to obtain a resource consent from the council.

(See section 5.14)

2.14 Research and the provision of information

Focus of current research

A number of agencies are currently, or have been, involved in the management of native plants for non-conservation purposes.

In the past most of this research focused on indigenous forestry, and was undertaken by the Forest Research Institute (now called Forest Research). Forest Research currently concentrates on pine plantation forestry, although it still undertakes some research on native plant species as part of its "New Plantation Species for Future Forests" programme. This programme, however, also includes research into exotic species such as Douglas fir, Cypress species and Eucalyptus.

Case study: Riparian planting using native species to achieve more sustainable land use in Taranaki.

Through its Sustainable Land Management Programme the Taranaki Regional Council advocates the establishment of riparian margins that are protected from grazing by livestock, and are planted with suitable vegetation.

Whilst the council promotes the use of exotic or native species, the majority of plants recommended are natives as they are particularly effective species for stream protection and enhancement. For erosion control at the water's edge favoured plants include flax and toe toe with shrubs and trees such as karamū, cabbage tree, lemonwood, mahoe, five finger and kōwhai planted further up the bank. At the tops of banks commercial timber planting of either native or exotic species is often recommended. Native species such as kahikatea, rimu, miro, mataī and tōtara are slow to mature, but could eventually provide timber as well as providing food sources for native birds.

Increasing the amount of appropriate riparian plantings and improving management of riparian areas can result in the following benefits:

- improved water quality (reducing sedimentation, nutrient and fertiliser run off and animal defecation)
- reduction in stream bank erosion
- improved flood management (e.g. through replacement of inappropriate vegetation such as willows growing in water channel)
- habitats for native wildlife and freshwater fish
- cooler and more constant water temperatures
- enhancement of aesthetic and amenity values
- shelter
- plant products
- improved overall sustainable farm management.

The council has prepared about 300 riparian management plans that are being implemented along over 500km of waterways. Plans are supplied on a no-cost, no-obligation basis. In addition the TRC supplies locally sourced native trees at cost price where the landowner holds a riparian plan.

The plans contain:

- a brief description of the property
- the objectives of the plan including how it will contribute to regional water quality and farm management
- a riparian management proposal that covers the specific works required
- an estimate of costs
- a month-by-month schedule for each stage of implementation
- a form for monitoring the work completed
- information sheets with technical advice on the types of plants to choose, when and how to plant, ongoing maintenance, and weed and pest control.

There is some concern that with Forest Research's increasing emphasis on pine, the knowledge and skills in indigenous species gained over many decades will be lost with the transfer and retirement of staff.

Other research agencies have, to some degree, increased their research into the ecologically sustainable management of native plant species on private land, partly in response to these trends in Forest Research's work. Agencies involved include Landcare Research, the School of Forestry at Canterbury University, and the Centre of Continuing Education at the University of Waikato and Lincoln University.

Provision of information

Providing landowners with accessible information on native plants, their potential uses and services, and approaches for managing them in an ecologically sustainable manner, is a critical contribution to improving current land use practices.

Personnel from Forest Research, Landcare Research and the universities do undertake this function, but often these contributions must be undertaken in their own time and on a case-by-case basis. Personnel from these agencies also work with other organisations such as regional and district councils, the New Zealand Farm Forestry Association, Landcare Trust groups and other community groups to provide information to landowners. More detail on the current research being undertaken in these agencies and the current amount of public funding in this area is provided in section 5.15.

There are only a few businesses or individuals involved in providing information to landowners on the ecologically sustainable management of native plants for a range uses or services.[28]

(See section 5.15)

Case study: Forest Herbs ™ "Innovative health products from natural New Zealand"

Forest Herbs' products include herbal tea, creams, capsules and extracts from native plants, such as horopito (pepper tree), which has antifungal properties. The products are sold in New Zealand, Europe, Asia and North America.

The Forest Herbs research farm, situated beneath old growth and regenerating temperate rain forest at Kaituna, Golden Bay, is an experimental plot with a mix of regenerating and plantation forest that includes both exotic and native species. An adaptive management approach is taken, studying plant growth and replication of their requirements in a plantation setting. Trials are under way evaluating symbiotic relationships between canopy species and horopito. Additional values, including timber, are considered when choosing companion plantings.

Horopito is currently sourced from a 200 ha area of privately owned native forests. Forest Herbs use and grow horopito with the highest levels of anti-fungal properties, as there is at least a five-fold difference between plants with the highest and lowest levels.

Forest Herbs uses Australian tea tree oil as it is currently much cheaper than New Zealand mānuka and is effective against different strains of bacteria. In Australia tea tree is grown in intensive monoculture plantation forests, where the plants are coppiced.[29] Tea tree is also now being grown in developing countries and supplied to the market at lower prices. However, Peter Butler of Forest Herbs believes New Zealand products have a 'natural' competitive advantage based on perceptions of our 'clean green' environment.

2.15 Attitudes and relationships

During the discussions undertaken for this project, strong views and opinions were expressed about the roles of official agencies with responsibilities for policies and regulation in respect of native plants on private land, and about the ways in which some agencies have carried out their roles and functions.

The focus and scope of this project are qualitative rather than quantitative; the PCE investigation team met with individuals and groups that have a greater than average involvement with issues surrounding native plants on private land. They are not representative of all views on such issues.

The concerns and dissatisfactions raised were largely characterised by patterns of strongly held views, suspicions, communication failures and 'stand-off' situations. These patterns are a major impediment to achieving:

- practical working relationships between agencies, landowners, tangata whenua and other groups
- improved management for New Zealand's native trees and plants on private land.

These societal and attitudinal dimensions - along with appropriate and innovative means of improving communication and working partnerships between citizens, tangata whenua, groups and official agencies - will need ongoing proactive action in order for New Zealand to make progress on many of these issues.

Department of Conservation

There are mixed views in relation to the department - many landowners are supportive of DOC's conservation programmes on private land through such initiatives as the Nature Heritage Fund, other voluntary protection mechanisms, and ecological restoration projects. However, many landowners and landowner organisations interviewed expressed dissatisfaction with DOC's approaches to its advocacy responsibilities for conservation on private land.

These concerns include:

- some territorial local authorities, with limited resources and in-house expertise, opted to use DOC's information to identify significant indigenous vegetation on private land as part of the processes for section 6(c) of the RMA; there were concerns about the appropriateness of the use of information previously gathered for protection-oriented programmes such as the Protected Natural Areas Programme (PNAP)
- the department's use of the RMA to influence land use decisions that might impact on native plants on private lands
- the perception that the department is not effectively controlling the pests and weeds on all of the lands it manages; complaints of possums reinfesting properties from adjacent conservation lands affect the department's credibility and acceptance amongst rural communities.

There is also concern about the perceived dual role of DOC in the process for gaining approval of a sustainable management plan or permit under the FA. DOC is required to be consulted under the FA, but as a resource consent is also required under the RMA, DOC may provide a second phase of advocacy within that process. The view is that this creates uncertainty and additional costs for the landowner. In recognition of these concerns, DOC and MAF have developed a protocol to minimise difficulties.

Some of these tensions appear to have their origins in the early phases of the development of regional and district plans under the RMA and thus have a historical element. There are also differences in views about the department around New Zealand. These differences may be more of a reflection of the diverse relationship styles among department staff, community leaders and stakeholders.

The department fully recognises that it needs to continue to do more to build 'bridges' with landowners in order to reduce tensions, work towards common goals and increase trust. The Rural Advocate Programme, with funding of $1.022 million, is a major new initiative.[30] This programme will work with rural communities to raise conservation awareness and improve communications and relationships. The department also notes its statutory obligation under the Conservation Act to advocate for preservation and protection (see section 5.10). In some cases the statutory requirements force the department into processes that can result in adverse outcomes, rather than other less adversarial approaches.

Ministry for the Environment

The view was strongly expressed by local government that there has been a lack of guidance and support from central government - in particular from MFE, as the lead agency with responsibility for the RMA - in how best to interpret and implement the statutory provisions at regional and district levels. It is felt that this lack of guidance has placed immense pressure on individual councils, and has resulted in inconsistencies and confusion between the provisions of plans and policies of different councils.

As in the case of DOC these concerns appear to have a historical context and are reflective of former Government policies rather than the performance of MFE *per se*. The priorities of government ministries are largely dictated by the purchase contracts that they negotiate with their ministers.

The ministry is undertaking a range of initiatives in these areas to facilitate better practices and processes within local government. These include:

- draft guidelines for identifying good practice for SNAs (this has not been formally published but some councils have found it a useful resource)
- guidelines for ecological significance criteria for SNAs (see section 5.2)
- the NZ Biodiversity Strategy (with the Department of Conservation) [31] (see section 2.12)
- Sustainable Management Fund support for a pilot project to develop a cost effective approach to section 6(c) RMA responsibilities on the West Coast (see section 5.14)
- development of a draft National Policy Statement for Biodiversity.

Ministry of Agriculture and Forestry

Various groups expressed a range of views about the effectiveness of Part IIIA of the Forests Act 1949 and its implementation by the IFU of the Ministry of Agriculture and Forestry. One of the main concerns was that while on the whole the IFU does a good job, it has limited resources to carry out all the work necessary. Other concerns include:

- the IFU is often, by default, the source of expertise on native forest management, but its role does not formally include providing the assistance landowners require to attain best practice
- there is insufficient capacity within the IFU for monitoring of actual harvesting practice
- the exclusions of native trees cleared for other land uses, SILNA[32] forests and planted native forest from the provisions of the Forests Amendment Act 1993 (FAA) undermine the validity and effectiveness of the system
- there is an over-reliance on permits rather than the more environmentally robust management plans
- as the Act is too prescriptive in specifying sustainable forestry practices, the regime relies too heavily on the discretion of the IFU; however, standards and guidelines are currently being developed for managing indigenous forests and these could provide some definition of the unit's role in this regard
- only 4% of indigenous forests on private land are currently under a sustainable management plan or permit.

Local government

Many landowners spoken to reported less than satisfactory interactions and relationships with their regional councils or territorial authorities. One key factor seemed to be whether the basis of the landowner's encounters with the council was as part of a voluntary programme, or a regulatory requirement. Another key factor often was credibility and levels of experience of the council staff member.

Local government, especially territorial authorities, expressed the view that they have limited resources to undertake the complicated environmental assessment and evaluation programmes that are required to implement section 6(c) and other provisions of the RMA.

Wider issues of local government funding are relevant insofar as they impact upon the ways that councils fulfil their obligations in respect of native trees and plants on private lands, and the effects this has on the attitudes of landowners both to their local council and about the future of native vegetation on their properties.

Decision-making within agencies

Some landowners did recognise - whether in relation to DOC, MFE or councils - that the difficulties are often not with the staff with whom they have direct interaction e.g. field staff undertaking survey work, regional MFE staff, or council workers keeping in touch with local issues. Rather problems tend to arise with more senior or policy-oriented levels within the organisations. There are strong concerns amongst some landowners about the apparent remoteness of departmental systems and decision-makers from the 'real world'.

1 Damage from roaming livestock is one of the major negative impacts on native remnants on farms.

2 MFE 1997, p 10.6.

3 DOC and MFE 2000, Executive Summary.

4 MAC 2000, p 31.

5 ha - hectares

6 Shelters provided to house beetles and other beneficial insects.

7 AtKisson 2000, p 138.

8 Roberts et al. 1995, p 9.

9 Jacob Haronga FOMA, pers comm.

10 MAF 2000a, p 5 and MAF 2000b.

11 The Forests Act 1949 was amended by the Forests Amendment Act 1993 which introduced a new Part (Part IIIA) that deals with the sustainable harvesting of native trees on private land. The correct term for the legislation is the Forests Act 1949, but those involved with the industry usually refer it to as the Forest Amendment Act.

12 See section 5.18.

13 Releasing is the manual clearing of competing plants from around the seedlings.

14 Horgan 1999.

15 Drengson and Taylor 1997, MacGibbon 1999.

16 See s31(c)(i) and the Schedule of the Environment Act 1986.

17 Bührs and Bartlett 1993.

18 Intrinsic values are not defined in the Conservation Act; however the Resource Management Act defines them as:

"in relation to ecosystems, means those aspects of ecosystems and their constituent parts which have value in their own right, including -

(a) Their biological and genetic diversity; and

(b) The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience".

19 DOC 2001a.

20 DOC 2001b.

21 MAF 2001.

22 "Sustainable use", as defined in the Convention on Biological Diversity, means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

23 DOC and MFE 2000, p 13.

24 ibid p 33.

25 ibid pp 69 ff.

26 MFE 2000.

27 DOC 1999.

28 Roger MacGibbon 2001, pers comm.

29 This type of plant management is characterised by high productivity that involves regeneration of the new crop, from sprouts arising from stumps of felled trees.

30 DOC 2001c.

31 DOC and MFE 2000.

32 SILNA refers to those lands awarded to some South Island Māori under the South Island Landless Natives Act 1906 and are discussed in section 5.12.

Section 3

Barriers and Opportunities

3.1 Introduction

This discussion paper has attempted to canvass current attitudes and management practices with regard to native plants on private land, with the objective of stimulating and widening the debate over their future roles and place in New Zealand landscapes.

In assessing the current situation with regard to ecologically sustainable roles for native plants on private land, this section identifies various barriers, difficulties and gaps, and opportunities. A number of important issues are highlighted. These may not be the full range of relevant issues, and in the feedback process in response to this discussion paper, it is hoped that you will bring forward any other matters of concern, and identify additional opportunities for extending and diversifying native trees and plants on private lands (See section 4).

3.2 Barriers

Values and mindsets

Underpinning the debates about native plants is a fundamental difference of view about the appropriate types of relationships that New Zealanders can and should have with indigenous ecosystems and their constituent plant species. A major reason for the PCE investing in the development of this discussion paper is the belief that more open dialogue and debate about the fundamentally different views, is essential to the sustainable futures of New Zealand's native plants on private land.

A range of values underpinning different beliefs and points of view about ecological sustainability are explored in this discussion paper. The most commonly asserted ideas tend to fall into two basic areas.

The first generalised view is that New Zealand's indigenous species and habitats are now after 1000 years of exploitation of inherently high conservation value. There is a perception that any management of these species and ecosystems other than for protection purposes, would involve unacceptable levels of risk to their existence and their associated values. Therefore, it is believed that the only appropriate approach is to manage native plants and ecosystems for conservation outcomes; any other uses must be limited to those that present minimal or no risk to the primary conservation objective (for example, eco-tourism, recreational use) and ecosystem services such as the enhancement of biodiversity.

The second view is that native plant species occur in a range of contexts, and their management can and should reflect the diversity of values attributed to them (including existence values, ecosystem services including biodiversity and the various values that require extractive use to realise). In some cases it will be appropriate to manage native trees and plants solely for conservation purposes. In other cases it will be appropriate to manage for a range of uses including those that involve the removal of plant material or plant derived products (e.g. timber, fibre, oils, chemicals, honey). This view considers that conservation values can be safely provided for at the same time as other multiple uses and services of native plants and ecosystems.

These different opinions often depend on an individual's fundamental beliefs about human nature and human fallibility in the context of New Zealand's ecology and its management. They are often related to the extent to which people insist on a regulatory approach to environmental management, and the extent of trust in voluntary and flexible adaptive mechanisms.

Language

Discussions undertaken for the development of this paper have shown that differences of views over language and terminology are more than just a debate about semantics. Many of the words commonly used in the debate on the roles of native plants on private land have acquired powerful associations and implicit meanings, often negative or dismissive, often extreme. Many of these overtones reflect the difficulties and frustrations experienced by people attempting to advance their particular concepts or views about native plants and their roles on private land. Some of the loaded terms include: conservation, production, sustainability and sustainable use, harvest, logging, greenie, property rights and regulation. These words and others instantly raise hackles, making it very difficult to have further discussion and to progress understanding.

Mediation over issues relating to native plants on private land will often require a specific process to redefine and detoxify the connotations attached to language, and to clarify the actual issues and management options that are to be addressed.

Legislation and institutions

An important question for readers of this discussion paper to consider is whether the current legislative frameworks, and the agencies with responsibility for implementing that legislation, are adequately supporting and facilitating management frameworks to increase the occurrence and diversity of native plants on private land.

Currently one central government agency (MFE) has a mandate to consider the implications of the full spectrum of human interactions on the environment. The ministry is, however, primarily a policy agency, and the balancing of conservation and production goals in actual situations has been delegated to regional and local government. Local authorities have varying capacities, and have taken varying approaches in dealing with the complex issues surrounding native plants on private land.

At present, apart from MFE, New Zealand's central government agencies with responsibilities in relation to native plants are structured to focus on

promoting either conservation or production values. Official initiatives reflect this polarisation - for example the New Zealand Biodiversity Strategy and the Biodiversity on Private Land policy package are strongly oriented towards an ethic of protection, while the Primary Production Committee's inquiry into Sustainable Forestry Management is considering ways to improve production outcomes. There are few opportunities at central government levels to take an integrated approach that brings together both kinds of values.

The single-focus mandates of current institutional structures have resulted in agency cultures, mindsets, and skill sets that are not amenable to considering a wider range of values with respect to the future roles of native plants on private land. Attitudes and values within central government departments, and in some areas within councils, have impacted on the relationships between the various agencies and landowners, tangata whenua, communities and special interest groups with interests in native plants and ecosystems.

Economic constraints

Most native plant species are slow growing in comparison to exotic plant species. This fact is often used to justify the view that planting new areas in native species, especially timber species, will not be an economically viable land use option. This has resulted in the current emphasis on the sustainable harvesting of existing stands and remnants.

Many of the costs and silviculture requirements currently facing landowners considering establishing native plants are much higher than for establishment of monocultures of exotic species. Taxation at both national and local levels often does not take account of the different management requirements and cost structures required for native species.

Lack of markets

One of the major economic constraints is a lack of 'green' markets for ecologically sustainably managed native plant species or for the environmental services they provide.

At present there is no domestic market that places a premium on ecologically sustainably managed native timber. In addition, those domestic producers that are producing sustainably managed timber face competition from imported timbers and timber products derived from unsustainably managed forests. This indicates a significant difference between New Zealand's domestic policies and those applied to international trade, a difference that appears to limit and reduce the value of our indigenous plant products.

Except for New Zealand's fledgling ecotourism market, there are currently no market structures that recognise the substantial environmental benefits provided by having native plants and ecosystems *in situ* on private lands. These benefits include biodiversity maintenance and wildlife habitat, carbon sequestration in response to global climate change trends, and improved downstream water quality from native riparian strips. The lack, to date, of comprehensive markets, and of awareness of the economic values of such ecosystem services, limits the options for landowners to derive an income and to offset the costs involved in retaining or extending native plant coverage on their properties.

Limited knowledge and awareness

The majority of current research on native plants focuses on studying their ecology with the primary objective of supporting native species recovery, protection and biodiversity outcomes. Research programmes aimed at other management outcomes are a very small proportion of current efforts. The extent of knowledge regarding indigenous plants on private land in New Zealand is characterised by:

- minimal investment in exploring the economic potentials and capacities of New

Zealand's native plants

- little social and economic research into the full range of values associated with native plants and the acceptability of various uses and management approaches
- concern that much of the existing knowledge of the ecologically sustainable use of native plants is being lost as the personnel with expertise move on to other positions or retire.

Raising awareness amongst landowners about opportunities and alternative management approaches for native plants on private land is very limited. A few programmes are being undertaken by research and academic institutes, regional councils, and special interest groups.

Soured relationships

The strongly held, adversarial positions and passionate debates about native plants on private land have resulted, in some cases, in soured relationships between landowners, government agencies, and various special interest groups. Communications have become strained, or failed altogether. Opportunities for practical working partnerships - for example to undertake research or develop adaptive management models for native plants and ecosystems - have stagnated.

The lack of an open and informed debate, the tendency to focus on entrenched positions rather than to explore the issues, and the general unwillingness of some parties to consider alternatives, have perpetuated the view that there is limited potential for native plants within New Zealand's production landscapes.

3.3 Opportunities

This discussion paper seeks to move thinking about native plants on private land beyond the current polarised debates into a more constructive examination of the issues. New Zealand's capacity to maximise the many opportunities with native plants on private land will largely depend on first accepting the existence of and then overcoming the various barriers outlined above.

This discussion paper documents some of the potential uses and services of native plants and ecosystems. It is likely that other uses and services could be developed or recognised as New Zealand gains more practical experience with these species and ecosystems. Maintaining and increasing the occurrence and diversity of native plants on private land will present a range of new opportunities for landowners and communities.

The following benefits are by no means a comprehensive list. The PCE wants to hear your ideas about the opportunities with native trees and plants, and the kinds of benefits that could assist in achieving more sustainable future land management in New Zealand (see section 4). One fundamental assumption, however, is that all such opportunities need to be realised in an ecologically sustainable manner.

Diversification of production species

At present New Zealand's economy relies predominantly on a relatively small number of introduced plant species for production purposes. The contribution of indigenous species and ecosystems to the economy occurs primarily through tourism and the various poorly recognised ecosystem services discussed above. Diversifying the range of species the nation can utilise, within ecologically sustainable management frameworks, for economic returns would also provide a range of other benefits, many of them highly significant (see sections 2.1 & 2.9). An increased number of plant species, managed in an ecologically sustainable manner, has the potential to provide a greater range of products and services. A stronger presence of indigenous species in the productive landscape would also increase the resilience of these ecosystems to threats from any new biological or physical hazards.

It could be argued that extending the range of production species would be achieved with lower environmental risk by greater use of native plants than through the introduction of new exotic

species either from global sources or genetic modification. Most of New Zealand's current pests and weeds were introduced deliberately for what seemed, at the time, good economic or social reasons.

Increased use of native plant species presents the opportunity to change existing and potentially unsustainable land use practices. For example, there is currently considerable pressure to develop riparian strips on intensive pastoral farms with the objective of improving water quality. Native species offer an opportunity to achieve this primary objective and also provide a range of other uses and services as discussed above (see section 2.1). The returns from a 'mixed portfolio' of various benefits could present additional incentives for landowners to protect existing areas of native bush, wetlands and riparian areas, and to create new areas of native trees and plants on their properties.

Role of ecosystem services

Extending the native plants and plant associations on private land offers a unique opportunity to develop public understanding and awareness of the range and value of ecosystem services. At present many of New Zealand's programmes providing such services use a very small range of exotic species, such as the poplars and willows still commonly used for soil and water conservation.

There is also potential for native trees and plants to play a major role in the creation of carbon sinks, thereby assisting New Zealand in achieving its climate change commitments. In terms of carbon sequestration, the creation of new native forest areas has a number of advantages over using exotic species, including the ability to absorb more carbon per hectare over longer periods of time (see section 5.8). New native forests established as carbon sinks would also provide biodiversity and other conservation values. [1]

New markets

There is an opportunity to change the values of native plants on private land, from what many landowners now consider to be a financial liability to being an asset.

Creating new ecologically sustainable management options for native plants on private land implies that the landowner will be able to benefit financially from making these types of landuse changes. New market structures could evolve to recognise and maximise the benefits from currently undervalued uses and services of native trees and plants (see section 5.8). Beyond the direct returns to landowners, there could be valuable secondary markets in expertise and research, evaluation and certification, plant propagation and nurseries, ecosystem advice, pest and weed control, economic and marketing services for sustainably derived products and ecosystem services, and other support systems at the practical level.

The financial returns derived from a range of new markets for the various services and values of native plants on private land could usefully contribute to high-priority work for ecological sustainability. An obvious example would be the ongoing demands in most New Zealand landscapes for active management of pests and weeds.

Development of New Zealand's knowledge base

There is currently a strong emphasis on the importance for New Zealand's future of knowledge-based industries and the development of centres of intellectual excellence. Developing our understanding of ecologically sustainable land management, using native plant species, could offer a valuable knowledge resource for the future. Methods and techniques for practical application of the principles of sustainability, trialled and refined in New Zealand's production landscapes, could become highly marketable information, as global environmental stresses increase and climate

change intensifies demand for ecologically resilient land-based production methods.

Support for biodiversity

Increased occurrence of native plants on private land, either in near natural or modified assemblages, will help towards achieving the nation's biodiversity objectives. New farm management practices such as those being trialled at Kowhai Farm, Lincoln University, could provide significant benefits in terms of increasing indigenous biodiversity in areas where there are currently low biodiversity values (see section 2.2).

A range of private initiatives could be developed, extending networks of native trees and plants through the landscape to provide ecological corridors, wildlife habitats and food sources for all seasons. Locally or regionally distinctive species and associations could be featured, as appropriate for the particular birds and other species of each area. Increased community awareness of indigenous biodiversity, and appreciation of New Zealand's unique plants and animals, would be one important outcome of encouraging such programmes.

Facilitating Kaitiakitanga

The relationships of tangata whenua with native trees and plants, and the cultural, historical and spiritual significance of indigenous plants, are briefly outlined in this discussion document (see sections 2.7 & 5.6). There are potentially far-reaching implications for the future management and utilisation of native species from the eventual outcomes of the WAI 262 claim to the Waitangi Tribunal in respect of indigenous flora and fauna. The rights and interests of iwi and hapū in regard to indigenous species, and in relation to particular sites and landscapes featuring native trees and plants, are as yet poorly appreciated by many non-Māori. Working more widely and proactively with native plants within New Zealand's production landscapes could provide opportunities to increase understanding of the traditional and practical values of these taonga for tangata whenua.

Involvement of iwi and hapū in partnerships with landowners, local communities and councils could help to achieve a range of tangible and societal benefits.

For iwi and hapū, the extension of native plant species on their lands, and the opportunities for deriving income from the establishment of appropriate markets for the various uses and services indigenous species provide, could enable the development of land uses more directly supportive of tikanga and kaitiakitanga than the current reliance on exotic forestry and other production uses dependent on exotic species. Non-commercial purposes, such as the enhancement of rongoā resources and the provision of traditional materials for carving, wānanga and other cultural purposes, could also be strong opportunities.

A closer relationship with native plants and habitats

Increased occurrence of native plant species on private lands also presents opportunities for realising less tangible, less quantifiable values than those mentioned above. It can be difficult to define these other kinds of values with the same sort of precision that scientific or economic benefits can be assessed. But the various heritage and aesthetic values are no less powerful, and no less important to individuals' and societies' well-being and identity. A sense of place - the spontaneous human response to the unique qualities, moods and feelings associated with each district's hills, rivers, valley systems, coastal plains and bays - is a critical part of who we are as New Zealanders, and how we define ourselves and our nation relative to the rest of the world. Our native trees and plants are essential to this sense of belonging.

Native trees and plants, and the distinctive ecosystems they form, are too central to our heritage and identity to be encountered primarily only on conservation lands. Extending the range and diversity of native plants within landscapes

that at present are dominated by exotic species is an important opportunity for all New Zealanders.

The PCE's forthcoming study on the management of peri-urban lands [2] highlights how important native plants are, as one of the core values that New Zealanders place on their landscapes. The striking landscapes of the Waitakere ranges, the Coromandel Peninsula and Banks Peninsula may be seen as New Zealand's cathedrals - the natural equivalent of the built heritage that nations with much longer histories of human settlement possess.

[1] It is also likely that these forests would produce very little, or no, timber thus avoiding many of the carbon accounting problems faced by the owners of production forests.

[2] PCE 2001.

Section 4

Have Your Say

4.1 What are the key issues and what should we be doing?

To stimulate your thinking and help shape your responses to this discussion paper there is a list below of key issues and major areas of concern that have emerged from this study. You may, however, consider that there are other important points and views that have not been addressed and your thoughts on any such matters are welcomed.

The fundamental question is:

What are the future roles of indigenous vegetation on private land?

Addressing this question involves assessing the following:

- The implications of the divergent views about the values and uses of native plants
- The language we use to discuss the topic and its impact on communication processes
- The effects of current laws, policies and central and local government organisations
- Economic constraints, risks and opportunities
- Appropriate market structures and roles
- The scope and focus of current research and knowledge accumulation
- Overcoming soured relationships between landowners, public agencies and special interest groups
- The implications for New Zealand's biodiversity
- Traditional and practical values and taonga for tangata whenua
- Recognition of the value and potential of ecosystem services
- Our sense of place.

4.2 Developing a vision

To further assist the development of your thinking about these issues, two graphic representations of New Zealand are provided. Graphic 1 attempts to represent New Zealand current land uses practices

and vegetative cover on both conservation and private lands. Graphic 2 differs in that it treats the private land as a 'blank canvas' and there is an opportunity to develop your vision of the future of native plants on these lands using this resource.

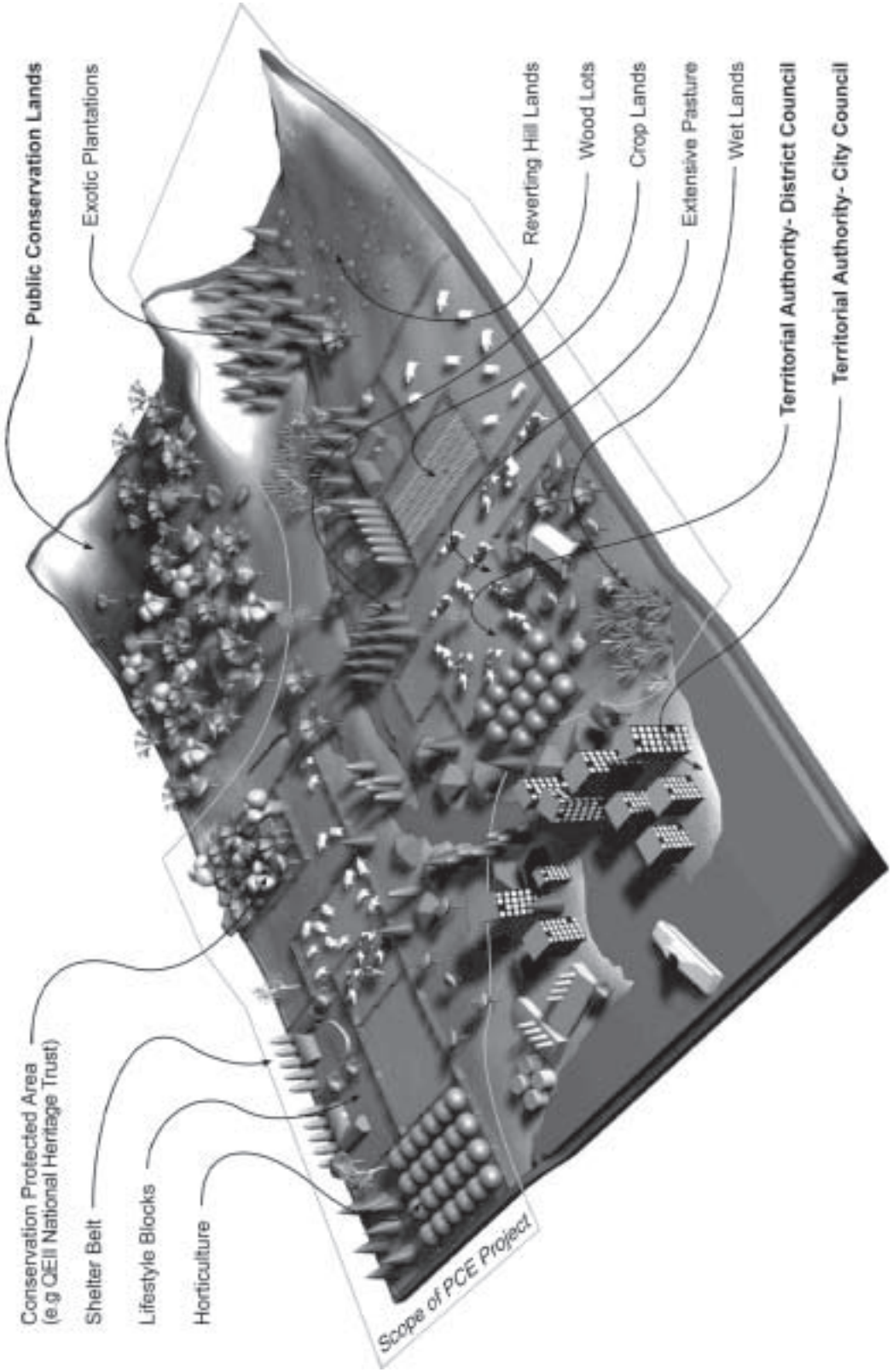
If you wish you may send a copy of this exercise as part of your submission.

4.3 Making a submission

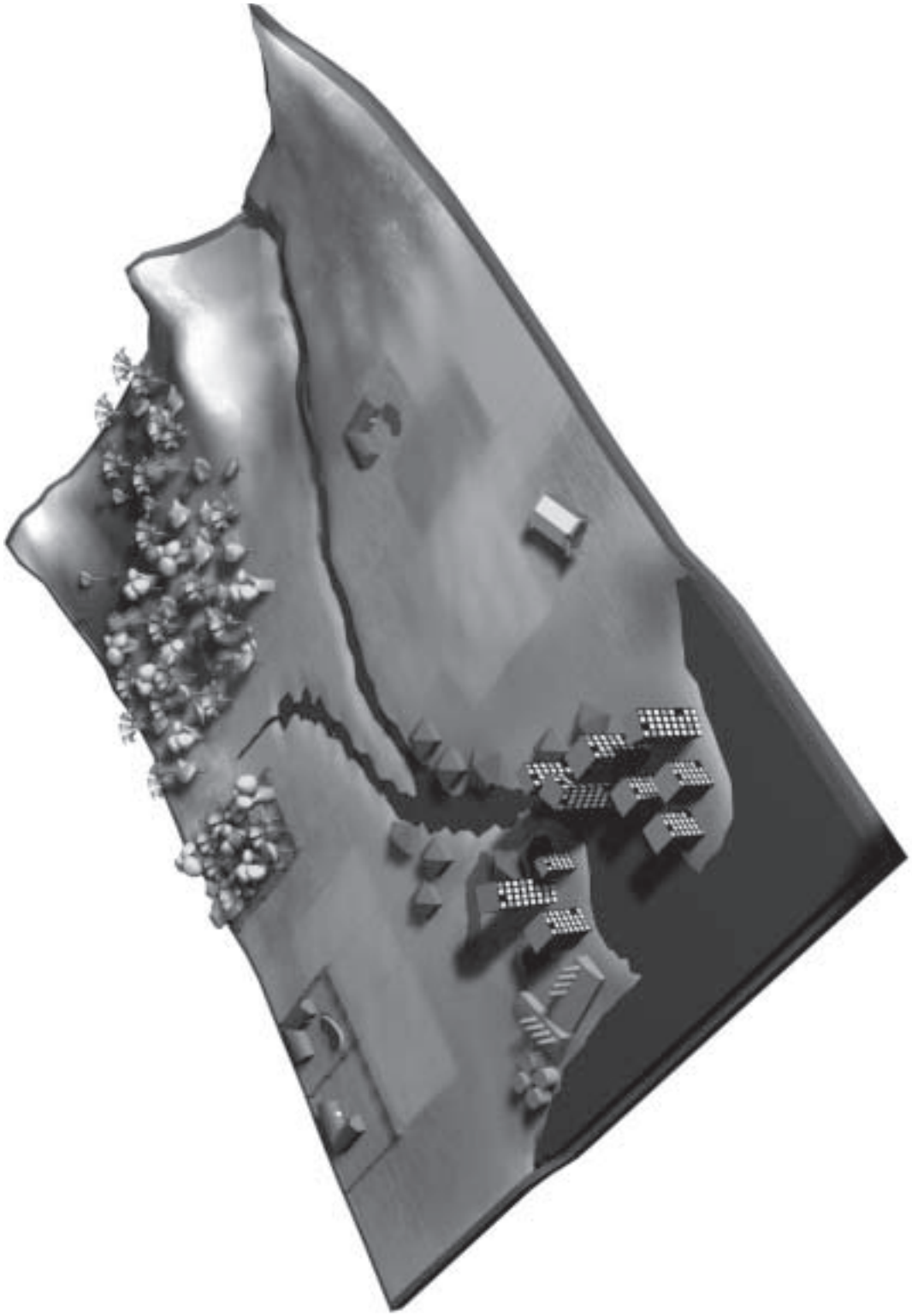
Responses to this discussion paper are invited. The responses should be marked "Weaving resilience into our working lands" and sent by **31 October 2001** to:

Dr Morgan Williams
Parliamentary Commissioner for the Environment
PO Box 10-241
Wellington
or pce@pce.govt.nz

A report summarising the responses to this paper will then be published and made available via the Parliamentary Commissioner for the Environment's website (http://www.pce.govt.nz). Any further contribution to advancing the role of native plants on private land, as part of New Zealand's sustainable development, will depend on the most appropriate and effective means by which the PCE and/or other agencies or groups might advance the priority issues.



Graphic 1 Representation of current New Zealand land use practices and vegetative cover on conservation and private lands



Graphic 2 Representation of New Zealand private land: a blank canvas resource

Section 5

Extended Discussion

This section provides more information on the topics covered in section 2 and is provided as an additional resource. Readers are encouraged to consider this material when thinking about the issues raised in section 4.

5.1 Biodiversity

Why is indigenous biodiversity important?

New Zealand's native plants and ecosystems have evolved over the last 80 million years in New Zealand and have developed a level of biological complexity and diversity that is not achieved by introduced exotic species. In general ecosystems native to their area are more resilient than introduced ecosystems and are known to be better at:

- providing protection of water resources
- formation and maintenance of soil structure
- nutrient storage and cycling
- the breakdown and absorption of many pollutants
- contributing to climate stability
- recovery from unpredictable catastrophic events.[1]

Biodiversity is also endorsed at political and official levels. As noted in the report of the Ministerial Advisory Committee, biodiversity is now regarded "in a similar way to human health or education... As a nation, we do not debate whether public health is important (although we have frequent debates about how it might be delivered most effectively and efficiently). So it is with ecological health".[2]

New Zealand has invested considerable resources in meeting its international obligations under the Convention on Biological Diversity, and undertook a lengthy process of consultation to develop the New Zealand Biodiversity Strategy.[3] Implementation of the strategy is influencing a wide range of environmental management areas, statutory developments and allocation of

significant additional resources for New Zealand's Oceans Policy Review process (revising marine management systems), the New Zealand Biodiversity on Private Land - the Policy Package[4], and the current development of a National Policy Statement on biodiversity.

In addition, the maintenance and enhancement of biodiversity can be seen as a key indicator for achieving sustainable land use.

Assessing biodiversity

As with any concept as broad as biodiversity, there are a range of approaches to assessing and measuring it. Different assumptions about the most critical indicators for assessing the extent and robustness of biodiversity have shaped and influenced scientific debates such as:

- the level at which biodiversity is evaluated - at the genetic level, the species level, or with wider ecosystems and catchments
- the priorities for New Zealand's indigenous species and ecosystems relative to exotic species
- the biodiversity values of modified ecosystems
- appropriate indicators, quantitative and qualitative approaches, and assessment criteria for such indicators as resilience, integrity or vitality.

The Department of Conservation is developing a methodology designed to measure conservation achievement and track changes to New Zealand's natural heritage.[5] The approach assesses the condition of natural habitats and ecosystems by estimating the level of impact on a site or ecosystem from a range of human activities and human-induced processes. These are:

- biomass removal from such activities as land clearance, hunting and fishing
- predation and competition from introduced animal pests
- competition from introduced plant pests
- light, nutrient, water and physical disturbance from land management and use
- isolation of indigenous flora and fauna caused by ecosystem fragmentation.

Biodiversity values

The values attributed to native plants on private land, and the judgements about what kinds of management might be appropriate, often depend on the perceived 'naturalness' of the vegetation. The common perception is that 'pristine' areas of native plants - areas that conform to a concept of the original ecological matrix, remnants of what was here before human arrival - have high values (intrinsic as well as other kinds of value) and contribute significantly to indigenous biodiversity. There is often a corresponding perception that areas that have been extensively modified, or include predominantly exotic species, will have little value now or in the future in supporting New Zealand's indigenous biodiversity goals.

Extending the occurrence of native plants beyond current distribution may not be given the same kind of priority or emphasis as maintaining examples of vegetation perceived to be 'original'. There is a need to explore the potential ecosystem service and ecological resilience gains that can be achieved by increasing biological diversity through the extension of native plants both in the form of natural associations (commonly referred to as restoration and enhancement) and in new associations within the contexts of forestry, farming, nurseries, and other productive sectors.

Biodiversity and native plants on private land

In order for New Zealand to meet its goals to maintain and enhance indigenous biodiversity, it is generally agreed that a focus only on the plants, animals and ecosystems on publicly managed lands will not be enough. The remaining 70% of New Zealand's landscapes - privately owned lands under a variety of management systems - will play an important role. Private lands often feature rare or high-value ecosystems (e.g. coastal wetlands and lowland podocarp forest) which are not represented adequately on Crown conservation lands. Furthermore, the viability of New Zealand's biodiversity will be increased by recognising and working towards a principle of ecological

connectedness that transcends the boundaries of ownership structures.

We need to move beyond a network of highly prioritised reserves and begin to look across the landscape to manage the ecosystems of which individual remnant vegetation is just a part.[6]

Integrating private lands within New Zealand's biodiversity efforts will require collaborative approaches and new ways to encourage and involve landowners, tangata whenua, councils and other interested parties. The Ministerial Advisory Committee considered that landowners are the "residential custodians of what we seek to protect," and therefore landholder "buy in" and participation will be necessary.[7] Understanding landowners' motivations and choices, and the values they place on native plants and habitats, must be the starting point for developing structures and incentives for retaining and enhancing indigenous biodiversity. The extent to which sustainable use of indigenous biodiversity should be part of such systems was an issue flagged for further debate by the Ministerial Advisory Committee,[8] and in relation to indigenous vegetation is central to this project.

5.2 Ecological significance

Processes for determining ecological significance require the development and use of appropriate evaluation methodologies. Different programmes for assessing ecological significance have worked with varying criteria, depending on their purposes and framing assumptions. For example the criteria used for DOC's Protected Natural Area Programme (PNAP) included representativeness, diversity and pattern, rarity and special features, naturalness, long-term ecological viability, size, shape and boundaries.

In terms of section 6(c) of the RMA, however, it has been asserted that the appropriate criteria are representativeness, rarity/distinctiveness, ecological context, and sustainability.[9]

- Representativeness - The area is representative of a full range of biological diversity present in an area (in terms of ecological district, local district or nationally). Generally this is considered to be the overriding criterion and is the first criterion for both the PNA programme and Nature Heritage Fund.
- Rarity/Distinctiveness - The presence of particular species or groups of species within a site. This criterion does not necessarily require that the area be predominantly an indigenous habitat and could even include the presence of exotic species (i.e. giant weta and gorse).
- Ecological Context - Any area of ecosystem or habitat does not occur in isolation, but is part of the larger landscape. This criterion recognises the importance of the interactions and connections that occur between areas involving the transfer of water, soil, genetic material and energy.
- Sustainability- A measure of the ecological health of an area and the extent to which the ecosystems, habitats or species the area supports are able to sustain themselves over the longer term. This term is often referred to as viability. This is generally considered a secondary criterion as it is more a measure of the priority for protection management and of the type of management required.[10]

Those advocating the use of these types of processes expressed a strong view that the ecological evaluation process will not in itself determine appropriate management strategies for areas identified as significant. These strategies can only be determined through landowner and community consultation and agreement.

5.3 Preservation and conservation

Despite their similarities in meaning there have been strong disagreements in New Zealand over the terms 'conservation' and 'preservation'. The polarised positions that have developed around these disagreements are fundamentally important in any consideration of native plants on private lands. It is useful to look briefly at these concepts' evolution in the context of New Zealand's history of settlement and how this has influenced current thinking.

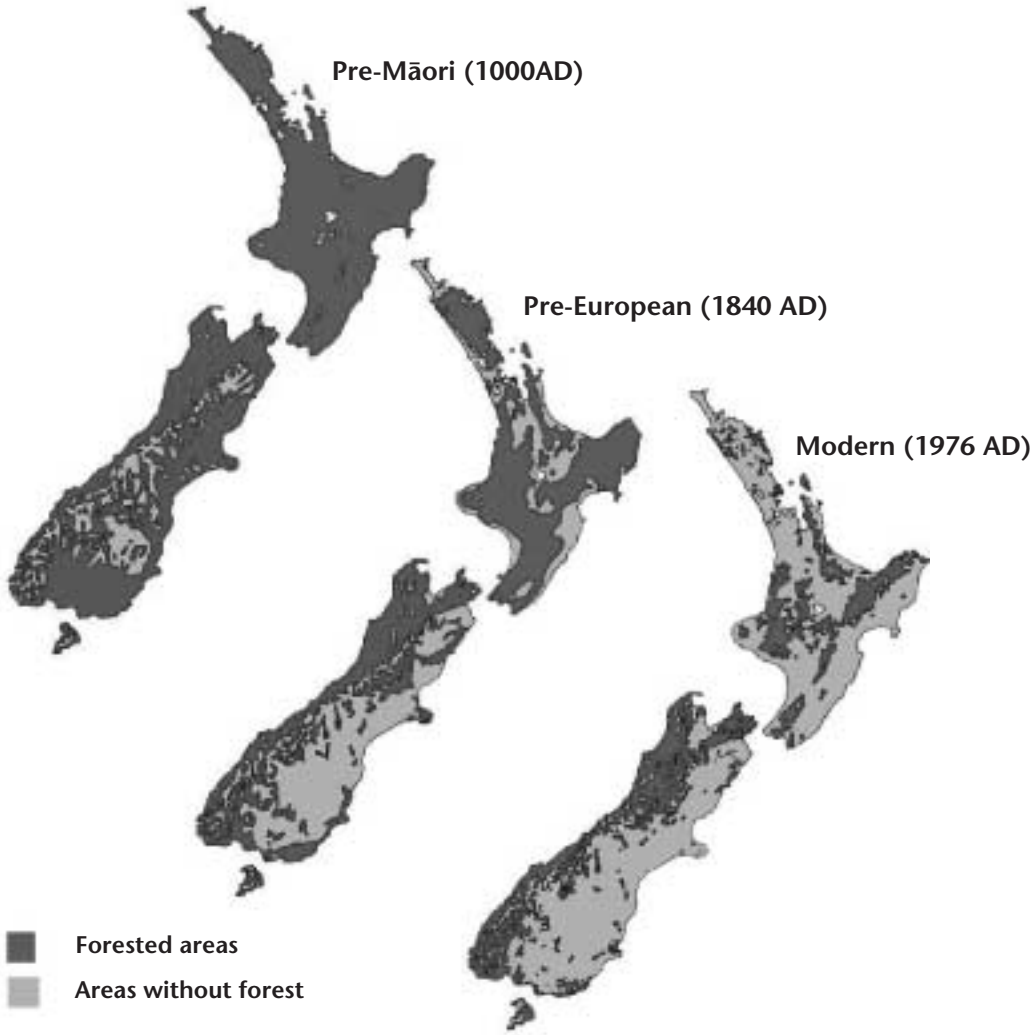
A history of arrivals

When people first settled the islands of the Pacific Ocean, including New Zealand, they were the first terrestrial mammal species to arrive (aside from a few species of bats). Nowhere else on earth were humans the first significant mammal to arrive on a major land mass. The impacts of people on the plants and animals, especially birds, that had evolved over millions of years with no need of defences against mammalian predators or competitors, was catastrophic. Fossil evidence indicates that hundreds of bird species became extinct over the centuries as different races established and expanded their cultures across the Pacific. Nevertheless the rich myths and legends that these cultures developed show that local animals, plants and sacred places came to have special values for each society and helped to define their relationships with the natural worlds on which they depended so intimately for survival.

Over the centuries, with increasing knowledge and understanding, a variety of mechanisms were developed to regulate the level of use of important species. The parent cultures of Polynesia became tangata whenua in Aotearoa, and over many generations of practical experience, adaptations and losses (up to forty bird species extinct from over-hunting, habitat loss and fire) they learned the ways of new lands, new plants and animals.

The arrival of European settlers in New Zealand marked the beginning of another and far more

Figure 2 Change in New Zealand forest cover



Source: M McGlone 2001

intensive period of environmental shocks and losses. For example, the early European settlers to New Zealand perceived the unfamiliar forests as gloomy fearful places, barriers to establishing farms, of value only for exploitation and clearing. Colonisation brought the destruction of the great northern kauri forests and the introduction of domestic animals, rats, and many exotic plants.[11]

The forests many New Zealanders now appreciate as magnificent remnants of the ancient super-continent of Gondwanaland were, to the settlers, diminished by the label 'bush', best suited for removal by axe and fire. And this they did. Forests covered about 78% of New Zealand when Polynesians arrived, including the entire coastline, and about 67% by 1800. Fires caused most of the estimated forest loss between 1000 and 1800. The loss of forest cover was more rapid during the 19th century. Forests were reduced to about 53% of the land area by the 1840s, following expansion of Māori agriculture and the activities of early European colonists. Widespread burnings during the 1850-1900 period destroyed a significant proportion of the remaining forests. Major losses occurred in lowland coastal forests, especially in the North Island. Today indigenous forests have been reduced to about 23% of the land area (see Figure 2).

As the ancient forests were reduced, so too were native animals, especially those bird species that had no defences against the introduced rat, stoat, weasel, ferret, cat and possum. About 42 species of New Zealand wildlife followed the moa to extinction in the nineteenth century, and others started declines that continue today.[12]

Changing views of 'nature'

The exploitation of natural places and the loss and diminishment of natural resources were also proceeding apace in other colonised countries during the second half of nineteenth century. In the United States there was increasing reaction against such processes, building the political climate that led to the creation of the world's first national park in Yellowstone, Wyoming, in 1872. At the time a novel concept, the Yellowstone National Park was both a response to threats of commercial development and exploitation of the area, and a romantic recognition of grand scenery and wildlife in an appeal to national pride.[13]

The aesthetic and practical arguments for national parks as a device to protect special places had significant repercussions in New Zealand. In 1887 Ngati Tuwharetoa rangatira Te Heuheu Tukino formally offered the peaks of Tongariro, Ngāuruhoe and part of Ruapehu as a national park to be preserved under the mana of Queen Victoria. The sacred peaks, plus surrounding areas, were finally gazetted as the Tongariro National Park in 1907.

To a large extent the century-old history of national parks in New Zealand is the history of conservation, and the history of conservation is the history of the forests.[14]

Conflicts amongst Europeans in New Zealand over 'setting aside' land from development, even with an eye to some future extractive activity, can be traced back to 1840. In that year the Royal Navy proposed reserving areas of kauri forest that it might use later for ship spars. One reason for the proposal was the threat to the kauri forests of wasteful use and burning. But the Royal Navy lost out to the prevailing official view that reserves would 'lock up the land' and hinder the spread of settlement.[15]

The predominant attitude of settlers and administrators to 'unoccupied Crown land' can be seen in the use of the term 'waste land' in the Waste Land Act 1854. These unoccupied Crown lands included forests and the motivation behind the Act was to freehold the lands so they could be put to 'productive' use. Despite changes to legislation with the objective of maintaining trees on steep erosion prone land the Department of Lands continued to consider it improper to leave trees standing on any land that might be farmable.[16]

During the second half of the 19th century, native plants in non-forest ecosystems were also badly affected by settlement practices. The more easily accessible coastal wetlands were filled in or drained as surrounding forests were converted to pasture. New Zealand now has less than 15% of its original area in wetlands; many of those remaining have been degraded by pollution, grazing and draining. Meanwhile, large flocks of sheep were grazing the delicate alpine and tussock communities of the South Island at intensities that these lands were unable to sustain. At least 1.5 million ha of tussock-dominated grassland have been degraded by sheep, rabbits and invasive weeds.[17] During the last third of the nineteenth century an increasing number of amateur and professional naturalists noted with regret the decline in indigenous biota as landscapes became fragmented and the effects of colonisation more pervasive.

During the 1860s and 1870s there was a popular view, shared by government officials, that introduced species, both plants and animals, were stronger and more vigorous than the inherently 'weaker' native species and would inevitably displace them. Proponents appealed to Darwin's theory of evolution to provide a rationale for the rapid loss of unique native habitats and species, and the belief that eventual extinction would be inevitable. Darwin's views reflected and supported the moral and cultural superiority that many European settlers felt towards 'inferior' native species.

However, early during European settlement concerns were raised in some quarters that forest destruction was excessive. In 1859 the geologist Ferdinand von Hochstetter was complaining that the northern kauri forests were being "ransacked and ravaged with fire and sword".[18] Concerns over the impacts of settlement on the land and the rate of forest loss were expressed in the New Zealand Parliament in the 1870s and were influenced by a developing conservation ethic in New Zealand. The Government did have timber regulations in place over Crown land from the mid-1840s until the abolition of Provincial Governments in 1876, but given that the dominant social goal was to expand agricultural lands, the regulations protected the rights of the timber cutters rather than focusing on conserving forest resources.[19] The forest regulations on Crown land did little to actually control the rate of deforestation. Prime Minister Julius Vogel attempted to slow the pace of forest loss with the Forests Act 1874, but the Act was widely seen as an obstacle to development and was repealed. Ironically, given the dominant use of fire over the axe, the products of the forests provided European settlers with important income before farming became self-sustaining in those early precarious years.

Government involvement

After 1876 the Government had little direct involvement in forestry until 1897 when a Forestry Branch of the Department of Lands and Survey was set up. In 1904, the Scenery Preservation Commission was established to recommend areas of scenic or historic interest for protection as permanent reserves as "an inalienable patrimony of the people of New Zealand".[20] In 1906 a Scenery Preservation Board replaced the commission. The work of this board was extensive; by 1920 it had, through scenery reservations, laid the groundwork for the national parks system and many more nationally significant reserves that remain today. But the focus was on scenery, not on protecting areas representing the ecosystems that were under most severe threat, such as lowland coastal forests. If the land suited settlement, then scenery preservation was not a sufficient priority. "The bias towards scenery and land [for parks] that was not useful for anything else shows today".[21]

A State Forest Service was established in 1919 with responsibilities for managing what remained of the loggable public forests as well as to protect four to five million hectares of steepland forest for erosion and flood control. These protection forests

account for much of the native forest area remaining today. The Forests Act 1921 attempted to place indigenous forest management in particular on a sound footing. Only later in the mid 1920s did heightened concern about an impending timber famine cause the dramatic switch to extensive exotic plantation forestry by the State.[22] With the switch to an emphasis on exotics went much of the subsequent focus on the efforts in silviculture, management and related research compared with similar efforts for indigenous species.

During the first two decades of the twentieth century, botanist Leonard Cockayne wrote a number of government reports documenting the decline of indigenous vegetation and wildlife habitat.

The conservation movement

In 1923, the New Zealand Native Bird Protection Society was founded, later to become the Royal Forest and Bird Protection Society. Its original objectives were to advocate "unity of control in all matters affecting wildlife".[23] If special places were to be protected from use or exploitation, the Forest & Bird approach was to seek their 'preservation' as a national park or scenic reserve. About 1930 the Native Plant Protection Society was set up, their efforts resulting in the first Threatened Plant Lists and the passing of the Native Plants Protection Act 1934 (see section 5.10).

Over the ensuing decades the national park system was extended to include many of New Zealand's finest natural landscapes. From one perspective 'conservation' became synonymous with 'setting aside' places for national parks or special reserves. In such places native plants and animals would be safe from exploitation. But some people viewed parks as areas that were not only 'set aside', but also effectively 'locked up' with negative connotations - the land and its resources no longer available for extractive use.[24]

Yet in both ecological and economic terms national parks and other protected areas make positive contributions which belies the lock-up perspective. For example, the World Heritage site, Te Wahipounamu, in south-west New Zealand has transformed the economy at Haast from dependence on logging and fishing to a growing economy centred on tourism activities. Protected areas are also providing vital ecosystem functions, from soil retention to water storage and purification.

While the 'fortress park' concept, where parks were sometimes imposed on local people, may have applied in past decades it is not the situation today. Over the past 30 years international attitudes towards parks and protected areas have evolved alongside the development of more sophisticated and integrated approaches to management and conservation. The issues now for protected area agencies include: building awareness; capacity-building and resources; the role of science in management; demonstrating the benefits of protected areas; and governance. Pressures on protected areas have increased, but at the same time there is recognition of their extra values as providing important ecosystem functions for people and as a form of 'insurance' against threats to biodiversity from global change. For example, they may be able to provide corridors for some species of wildlife and plants to shift or expand their range as the effects of climate change alter conditions for their survival.

While the protected areas system in New Zealand was expanding, tensions were also growing in the 1970s between a well-organised environmental movement and New Zealand Forest Service policy towards logging of native forests. There was wide public opposition over controversial plans to clearfell some 340,000 ha of beech-podocarp forest in the South Island, and the scheme was shelved in 1975. This was followed by other confrontations over Forest Service logging plans for individual forests, notably Okarito, Pureora, Waihaha, Whirinaki, Paparoa and Waitutu. The public imagination was captured by TV showing protestors perched high in the trees in Pureora

Forest, defying the bulldozers and chainsaws.

In more recent decades other options and pressures for protection of native plants have emerged. In addition to the public conservation lands managed by DOC there are now a range of other mechanisms whereby private landowners can opt to legally protect land and native plants, especially trees. These include the Queen Elizabeth II National Trust, Nga Whenua Rahui and Nature Heritage Fund (see section 5.16). In addition, concern that the existing protected area system did not represent the full range of ecosystems in New Zealand led to the establishment of the Protected Natural Area Programme and subsequent efforts to identify significant areas that were felt should be protected through acquisition or planning mechanisms.

5.4 Ecological sustainability

Ecological sustainability provides a context of environmental parameters within which the values, needs and goals of society and communities may be fulfilled.

Definitions of sustainability

Ecological sustainability encapsulates:

- managing resources so that they are not depleted
- maintaining ecosystems and natural processes over prolonged periods without them failing or being irreversibly compromised
- ensuring their character is not lost
- keeping them functioning continuously.

Sustainability is simply a property of any activity, practice, process or institution that has the capacity to continue or be continued indefinitely.[25]

The World Commission on Environment and Development chaired by Gro Harlem Brundtland shaped the idea of sustainability within a development framework, on the principle that in order to alleviate poverty, economic growth would need to continue:

Humanity has the ability to make development sustainable - to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.[26]

The commission recognised the biosphere as limited in its ability to absorb the effects of human activities, and included notions of inter- and intra-generational equity of choices and opportunities.[27]

The Brundtland definition, and societies' attempts to work towards sustainability, have been questioned. Some see the concept of management as anthropocentric, "sustaining the human environment in order to meet human preferences".[28] However, for many people, sustainability also requires the maintenance and enhancement of indigenous biodiversity for its own sake.

The word 'sustainability' can elicit sceptical responses. For some people it is an empty concept, over-used and overloaded with different interpretations and meanings. Such disenchantment with the term seems often to reflect confusion about its meaning in particular circumstances: *Sustainability is a deceptively simple word for an extremely complex idea. Complexity... often gets mistaken for vagueness.*[29]

What is to be sustained? Why should it be sustained? Concepts of sustainability change over time with different social expectations, economic conditions, and increased knowledge of ecosystems and environmental processes.

Some contemporary discussions of sustainability focus on the 'triple bottom-line' - the incorporation of social (cultural), economic and environmental considerations in management systems and objectives. The three components are closely inter-related.

Recent commentary on 'triple bottom-line' frameworks has focused on concepts of 'weak sustainability' as opposed to some other form of sustainability that is said to be 'strong'. 'Weak' sustainability begins with economics, which

shapes the evaluation of ecological and environmental concerns.[30] Whilst some people judge as 'weak' the trade-offs that are often required to balance environmental, social and economic choices, others see this as a realistically achievable and acceptable goal. 'Strong sustainability' has at its starting point ecological imperatives such as ecosystem health, resilience and biodiversity, which dictate the parameters of economic and social considerations.

Different interpretations and applications of the concept of sustainability have tended to focus on the tensions between its components. Sustainable development is often seen as harbouring an internal conflict between values of utilisation and protection, or between economic and social returns and ecological constraints. In the context of New Zealand land uses, this is most often seen in the application of different assumptions and management ideals, to the lands used for primary production (pastoral, forestry, horticulture etc), as distinct from 'protected' lands used for the conservation of indigenous flora and fauna.

Development requires change through time: *sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs*.[31] Sustainability can be seen as a journey, as well as the destination societies and communities are working towards.

Sustainable development is about the processes of management. It is not static, but responsive to new knowledge, values, methods and technologies. This type of approach is often referred to as adaptive management. At its core is acknowledgement of the levels of uncertainty and risk involved in land use and native plant management (see sections 2.5 & 5.4). Effective monitoring and tight feedback of information enables management that minimises risk and allows for creativity and innovation.

Intergenerational equity

Economic literature examining the needs of future generations and intergenerational equity is rather theoretical, lacking in general consensus and provides little information on implementation. There is general agreement that humans' responsibilities to the near future are strong, but debate exists over obligations to far future generations. This distinction may however be academic. Being concerned for future generations will require the development of decision-making horizons that extend far beyond current political and economic frameworks.

What are the 'needs' of future generations? Whilst specific future preferences or wants (as opposed to needs) may be hard to determine, it is reasonable to assume that basic goods such as food, clean water and energy will be future needs. Internationally, reasonably foreseeable needs have been recognised as including the right to life, property, culture, and health.[32]

5.5 Managing for change and resilience

Dealing with complexity and uncertainty

In dealing with the natural environment and its management, the issues are often seen as dauntingly confusing. Environmental managers, policy-makers and the general public are increasingly aware of the complexity and inter-connectedness of natural systems, the unpredictability of systems' responses to change, and the limits of our knowledge in many critical areas.

In dealing with this complexity and uncertainty, policies and approaches have been developed that tend to have the following characteristics:

- single target or piecemeal policy (e.g. biodiversity, conservation, economic production)
- a single scale of focus, typically limited in space and time (e.g. the three year election cycle)

- no realisation that all policies are experimental (limited monitoring of policies and mechanisms to subsequently adapt management practices)
- rigid management with no priority to design interventions as ways to test hypotheses underlying the policies.[33]

There may be difficulties in risk assessment when information is incomplete. However, it has been noted that where society is successful in managing a target variable, for example maximising the growth of certain types of crops, grasses or tree species, this invariably leads to less resilient and more vulnerable ecosystems. Other consequences include more rigid and unresponsive management agencies and more dependent societies.[34] As a result of this narrow focus in problem definition, changes in ecological variability, or an impending ecological crisis are often not noticed.

The PCE's report "Setting Course For A Sustainable Future" (1999) considered the implications of oversimplifying the management of natural systems in regard to the marine environment. Some approaches to fisheries management reduce the natural world to simple linear relationships. However, natural systems consist of more complex non-linear systems that have a tendency to move away from equilibrium into chaos.

Ecosystems and change

Ecosystems never stay still, and are always in a state of flux. Biodiversity within an ecosystem is constantly undergoing its own processes of change, such as regeneration, succession, and the inevitable ageing of a forest or individual plants. Concepts such as 'the balance of nature' have been replaced by an appreciation of change, perturbation and chaos, as normal aspects of ecosystem functioning.

Ecosystem resilience is the speed with which ecosystem properties recover to their more usual values after disturbance. In combination with resistance, i.e. the degree to which ecosystem properties are affected by disturbance, resilience can be used to represent ecosystem stability. The concept is intuitively attractive to ecologists and conservation managers because it establishes a reference point from which to assess change in ecosystems.[35]

All ecosystems are continually subject to a range of processes of disturbance at different scales. These can include both 'natural' disruptions (weather and climatic conditions, earthquakes, predation) and human-induced disturbances (vegetation clearance fragmentation, fire, harvesting). Disturbance can result in the loss of individuals or species; disturbances can alter the structure of the ecological community, by influencing the space or food resources available, or by changing the physical environment.[36]

Science and complexity

Faced by complexity and uncertainty, decision-makers often turn to science for answers to these problems. In some environmental debates, it can seem that science is not so much a means of assisting in the management of uncertainties, but rather has been captured by those seeking certainty and solidly factual answers. However, science derived knowledge may not always provide solutions. Indeed, the questions themselves may not be able to be answered by science. Resolution of ethical or political questions - for example, whether a particular course of action should be taken, or whether a particular resource should be protected or utilised - will depend on values, ethics, principles, perceptions, policies and a range of other considerations. Even within science, there may be different modes of inquiry and criteria - for example, a reductionist[37] approach, or an integrated systems approach.

With increased appreciation of the principles of complexity and chaos it is becoming more evident that scientific approaches to environmental systems will frequently be incomplete. There will be gaps in knowledge, and consequentially, surprises. Faced with incomplete understanding, and the adversarial nature of many of the resulting debates, there has been some public concern and

mistrust over the 'science' of environmental issues.[38]

Managing for stability and change

A number of approaches have been proposed to overcome the limitations of current reductionist approaches to environmental policy.

It has been advocated that management needs to evolve to incorporate a number of integrated policies that are both flexible and adaptive rather than a single focused policy.[39] Management and planning need to be oriented as much to learning as to economic and social outcomes. Monitoring regimes are needed that facilitate interventions, improve understanding and help identify remedies. Investment is required in science that integrates a broad range of disciplines and viewpoints, rather than more traditional scientific approaches based on narrow areas of specialisation. Finally there must be citizen involvement in the form of active partnerships, not just in the role of passive information receivers.

Other commentary has developed ideas of environmental management regimes as a durable symbiosis between economic production and ecological reproduction. Management would focus on investing in reproduction, renewal of habitats and the life-support systems that underpin economic activity. These habitats and systems are also invested with social and community significance.[40]

In the agricultural region of Gatinais Nord Occidental in France there is a small forest of 50 hectares. The forest is highly modified, but has considerable biodiversity values; current management practices maximise this feature. Key factors in the management of this forest are:

- the importance of direct community involvement by the landowners (with various types of use rights), farmers on adjacent land, user groups who have access rights (hunters and walkers) and various local community groups
- an informal longer-term management vision based on the cultural traditions and the knowledge base within the community. This vision is evolving with the changing composition of the community as new people move into the area. Attitudes and expectations are expected to change reflecting the changing values of the community.

Extrapolating management regimes from landscapes with much longer histories of relatively unbroken human interaction can be risky. These landscapes are highly modified and these models may not be appropriate for areas in New Zealand that remain largely unmodified. However, they can demonstrate some of the successful features that could be adapted for areas in New Zealand that are already intensively managed.

5.6 Kaitiakitanga

The following discussion is offered as a contribution to advancing understanding on matters of importance for tangata whenua in relation to native trees and plants. This discussion does not have the status, nor should it be taken in place of, the statements of iwi, hapū and whanau on their own behalf concerning native trees and plants, traditional relationships with those taonga, their values and management, or any other issue.

Whakapapa

In the Māori world, issues such as the place of trees and plants will be approached from the basis of whakapapa, the framework for all existence. All living things are originally descended from the primal atua-ancestors, Ranginui and Papatuanuku, the sky and the earth. Their son Tāne is the atua responsible for forests, trees and plants. According to the stories of the evolution of te ao marama, Tāne was the only one of the children of Rangi and Papa with the determination and strength to separate his parents from their original clinging embrace. Thus the earliest stories recognise that the energies of trees and growing plants are critical to maintaining light, air and spaciousness in the world, and to the correct relationships and functioning of the elements.

Tāne went on to create many life-forms with various female supernatural forces: *...he had the tōtara with Mumuwhango, the rata and other climbing plants with Rere-noa, the tui with Para-uri... He also met Punga, the parent of ugly creatures, and with her he had the insects.* [41] Finally, after Tāne had brought all the trees, plants, birds and insects into the world, he created humans, making the form of a woman from the red earth of Hawaiki and breathing life into her.

Within the structures of whakapapa all the components of the natural world, including people, are connected back to the atua, and so linked together in the bonds and obligations of kinship.

Tikanga

The responsibilities of humans to the rest of the natural world are determined within the systems of kaitiakitanga and tikanga. Tikanga can be described as the correct way of doing things, and is based in the essential principles of mauri, tapu, mana and rangatiratanga.

Everything in te ao marama - including people, forests and plants, rivers and water, insects and fish, stones and birds - has its own mauri, the essential life force or distinctiveness that enables each thing to exist as itself, "the power that binds the spiritual and the physical".[42] For the survival and well-being of each taonga, its mauri must be respected, healthy and strong. Mauri can be diminished or destroyed when a resource is damaged, corrupted or lost; it can also be restored and enhanced, through improved management and appropriate ritual.

Tapu is another elemental force on which the structures of reality depend. Tapu extends widely in many contexts, and can apply to people, places, forests, plants, resources and processes. It governs the propriety and dynamics of the relationships of people with each other and with things: *tapu [is] the power that preserved order in the community, and took the place of civil law. Tapu implies a prohibition which if violated would have calamitous consequences; quite possibly, death...*[43] The converse quality to tapu is noa, or ordinariness. These aspects are an integral part of practical interactions with the environment:

The appropriate spiritual dimensions were crucial - for example the elaborate ceremonies performed when a large tree was to be felled, with the necessary rituals, fasting [and] karakia ... to ensure that the tapu was removed and that the work could be completed successfully. [44]

Rangatiratanga, confirmed and guaranteed under Article II of the Treaty of Waitangi, is often defined as self-management or self-determination - the right of iwi, hapū and whanau to make their own decisions about things that concern them:

It is a dynamic not static concept, emphasising the reciprocity between the human, material and non-material worlds. In pragmatic terms, it means the wise administration of all the assets [of] a group for that group's benefit: in a word, trusteeship.[45]

Mana is closely linked with the practical expression of rangatiratanga. It is, like mauri, a gift from the atua - the status and authority enabling the necessary work to be done for the satisfactory fulfilment of kaitiaki responsibilities: *The imposition of European title, for example, cannot remove mana whenua from a tribe.*[46] The exercise of mana includes the principle that taonga should be managed in ways that are consistent with tikanga:

Māori people [are] to be protected not only in the possession of their [taonga], but in the mana to control them in accordance with their own customs and having regard to their own cultural preferences.[47]

Kaitiakitanga is the ongoing necessity for tangata whenua to look after the taonga, both physical and intangible, that are their heritage. There are responsibilities to te taiao, the environment and natural resources, to ensure that they are managed sustainably, sensitively and wisely. There are obligations also to the continuum of past and future generations, to the ancestors, to present-day whanau, and to those who will follow and look back to us. Although based in ancient tradition,

kaitiakitanga is not static - it is continually evolving to provide solutions for contemporary environmental management challenges.

Te waonui a Tāne

Over the centuries, tangata whenua developed close multi-faceted relationships with the trees and plants of Aotearoa. These islands' forests, wetlands, coastal vegetation and other ecosystems were the foundations on which survival depended, both as rich resources themselves, and as habitat for birds, fish and eels.

Like any human society in any lands, Māori learned the capacities and thresholds of environmental sustainability through an ongoing cumulative process of learning, experimentation, and adaptation, through abundance, scarcities and losses. Many species, such as the moa, were taken to extinction. Fire had drastic impacts on vegetation patterns - whether accidental, or deliberately set for swidden gardens [48] or to encourage the growth of bracken fern, a food staple. Between ca 1350 and 1600 major changes were wrought to the original forest cover, especially in the drier eastern areas of both islands, the central South Island high country and Central Otago (see Figure 2).

However forests and the resources they offered were vital: *the natural forest cover of plains country, with slow-growing fruit-bearing trees like kahikatea, mataī and hinau, was kept intact because these rainforests were often a better source of food than cultivated land.*[49]

All kinds of practical needs were met. Plant foods included berries, fernroot, kiekie fruit, nikau hearts, and the shoots and stems of cabbage trees. There was timber for buildings and other constructions, waka, tools and weapons. Fibre from flax, pīngao, raupō, cabbage trees and other plants went into sails, mats, clothing, kete and other containers, fishing nets, traps for eels and birds, roof thatching, and the intricate tukutuku panelling in the wharenui. Barks and mosses provided dyes; speargrass and other plants gave scents and oils. Rongoā plants provided treatments for a wide range of ailments. And plants also served important symbolic and spiritual functions - the parekawakawa or wreaths of greenery worn as a sign of mourning, the boundary marker trees that established the territories of iwi, hapū and whanau, the delicate vegetation patterns decorating the kōwhaiwhai beams in the wharenui, and the trees planted to mark the burial-place of the afterbirth or whenua, connecting the newborn baby with his or her tūrangawaewae or ancestral landscape.

Over the generations, an extensive body of knowledge has been accumulated from the collective observations and experience of hapū and whanau. Matauranga Māori is a storehouse of detail on the characteristics and qualities of native trees and plants, and ecosystem dynamics and relationships. Matauranga also includes tribally and regionally distinctive information, and often interweaves 'hands-on' utilitarian knowledge with history, whakapapa and spiritual matters. Thus many aspects may be tapu, confidential or otherwise sensitive. There may be a reluctance amongst tangata whenua to reveal or share some information relating to native trees and plants and their uses and significance.

Practical management methods and techniques were also developed through time, based in the close familiarity of hapū and whanau with the resources of their rohe. These methods aimed to ensure ongoing sustainability, and took an integrated approach to all aspects of management and utilisation.

Seasonal cycles, the annual and lunar shifts in ecosystem dynamics, and behavioural patterns of birds and other species were carefully observed. Management could involve manipulating habitat for maximum productivity of a particular resource - for example, enhancing a wetland for its eels - or imposing a rāhui to restrict access or harvesting:

Rāhui are used for various reasons, including the conservation of a resource to be used for a specific

purpose or occasion, [or] the cyclical spelling of a resource so that numbers or vitality can be built up again after heavy or prolonged use... the objective is to ensure the long-term viability of the resource for future use and harvesting.[50]

Kaupapa

For tangata whenua, the trees and plants of Tāne, and the diversity of birds and other life that shared these habitats, have both practical utilitarian values and a wide range of other kinds of value.

Today, the practical aspects of Māori relationships with forest and plant resources continue, including:

- customary uses of traditional materials, often for special purposes such as waka construction, the restoration of wharenui, or other carving projects
- use of harakeke, pīngao and other raranga materials for weaving work
- sustaining Māori culture and identity
- rongoā, to which increasing numbers of people are turning for natural health treatments.

One fundamental principle is the pragmatic expectation that nothing should be wasted - the usefulness of every component of the resource is assessed. Another core concept is that utilisation should be for the benefit of the community, shared amongst the whanau or hapū for the welfare and improvement of all. Decision-making is also a collective and consensual process, with accountability structures of trustees or representatives back to the hapū, whanau or multiple owners of a particular area (see section 2.7). The business of management is undertaken by the people and families of the area, living within the landscapes alongside the natural taonga.

For tangata whenua, the traditional values of native trees and plants continue in the present day and into the future. The other descendants of Tāne Mahuta are essential to sustaining Māori culture and identity (see section 2.7). The practical and the esoteric, the physical and the divine are inextricably intertwined. As taonga tuku iho, native trees and plants combine both tangible usefulness in the here and now, and elemental connections to the gods, the ancestors and the eternal universe.

Māori landowners and trusts

Māori own the majority of the remaining indigenous forest on private lands; this has been estimated at approximately 80%.[51] In the North Island, of the remaining 1,163,541 ha of privately-owned indigenous forest, 421,638 ha are owned by Māori.[52]

Māori have cause to feel caught in a double jeopardy. Land once left to them as having little productive worth includes some of the few remaining repositories of native vegetation now seen as being too valuable for commercial exploitation.[53]

There are also enormous areas of Māori-owned land with development potential: *Of 600,000 ha of undeveloped Māori land, more than two thirds is steep and therefore more suited for forestry than pastoral development.*[54]

Many Māori landowners, incorporations and Trust Boards have undertaken commercial forestry projects with exotic species (primarily *Pinus radiata*), often in joint venture partnerships with large forestry companies and overseas investors. This is seen as the most financially viable option. Considerable efforts have been made to foster Māori involvement in exotic forestry.

Māori landowners are subject to the same imperatives as any other landowners or managers - the requirement to generate appropriate economic returns, to manage resources for the ongoing benefit of owners or shareholders, and to ensure the environmental sustainability of their operations. The expectation that Māori resources must be maximised to provide a viable economic base for hapū, whanau and shareholders is a particularly strong obligation. The priority to deliver economic returns from Māori lands and

investments is based in the duties of rangatiratanga and whanaungatanga, to provide for the needs and wellbeing of Māori communities, and "lift the living standards of our people".[55] For Māori, the economic and social dimensions are closely integrated.

Environmental considerations are also critically important for Māori landowners and trustees (see section 2.7). Forest and land management is undertaken within a kaupapa of ecological and cultural sensitivity - for example, ensuring appropriate management for wāhi tapu or other important areas within a forest block; setting aside significant proportions of the overall land area for retention or regeneration of native vegetation; providing access for hapū and whanau for hunting or other purposes; providing for rongoā and traditional materials for carving or weaving work; and protecting wildlife such as kiwi and kereru/kukupa, which often necessitates intensive pest control projects such as the possum eradication work undertaken at Motatau Forest in the Taitokerau. And the Lake Taupo Forest Trust, which manages extensive forests in the central North Island, is currently seeking FSC certification (see section 5.8), acknowledging the advantages of such formal recognition of their sustainability kaupapa in marketing their product.

The idea of sustainably utilising native trees and plant species is not a new concept for tangata whenua. In discussions undertaken for this study, such a kaupapa was however, considered from the pragmatic perspective of contemporary economic realities. It was felt that opportunities for the sustainable harvest of existing native trees and other resources, and for purposefully planting native species for future harvest, would be enthusiastically embraced by many Māori landowners as an alternative to exotic forestry - but only on condition that there would be similar levels of economic return to current commercial ventures.

Constraints may also be imposed on Māori Trust Boards or incorporations by the structures under which they operate. One proposal to develop a trial area of tōtara, to assess growth rates for prospective future planting over a wider scale, has not yet proceeded. The trustees for that area felt they were unable, under their formal mandate, to approve investment in such experimental initiatives where there could be no guarantee of a reasonable economic return from that use of the land to the tribal shareholders.

Māori are accustomed to thinking far ahead into the future, and a number of people acknowledge that working sustainably with indigenous trees and plant species would generate a wider range of benefits for tangata whenua than projects with exotic species, including:

- restoring landscapes and areas of traditional and cultural significance
- providing materials for rongoā and cultural purposes
- restoring and enhancing mahinga kai areas
- providing opportunities for educational and training programmes for rangatahi, and wānanga to sustain culture and matauranga
- encouraging bird life and helping the breeding and condition of nga manu with natural food sources
- eco-tourism potentials for Māori families and communities
- providing flexibility for owners and the increased security over the longer term of a more diverse portfolio.

5.7 Te Tiriti o Waitangi - the Treaty of Waitangi

The Treaty may be considered the founding document of New Zealand as a nation. It records the fundamental bargain between the Crown and Māori, seen in the relationship between the provisions of Article I and those of Article II of the Treaty - the exchange of the right of the Crown to govern (Article I), in return for confirmation of the rangatiratanga of tangata whenua, and the obligation to protect Māori interests (Article II). The Treaty did not convey any special rights to tangata whenua - rather it confirmed and

guaranteed their existing rights to land, forests and other natural resources, including rights in respect of intangible taonga. The Treaty has affinities with the Common Law doctrine of aboriginal title.

It is generally accepted that our understanding of the Treaty, and its implications for contemporary management of natural taonga and resources, is continually evolving. There is a constantly expanding body of case law on a range of environmental issues under the RMA and other statutes. The work and findings of the Waitangi Tribunal - established in 1975 to inquire into and make recommendations in respect of claims relating to the principles of the Treaty - also provide valuable interpretation on a wide range of matters, including specific recommendations for environmental management.

Some of the principles of the Treaty, as established by the Courts and enunciated by the Tribunal, that are relevant for issues relating to native plants on private lands (including Māori-owned lands) have been outlined in section 2.8.

Māori involvement in issues to do with the management of native trees and plants will also occur under the provisions of the RMA.

The RMA requires consultation to be undertaken with tangata whenua in the development of councils' plans and policy statements, and in fulfilment of the obligations of sections 6(e), 7(a) and 8.[56] It has been recognised by the Environment Court that it is good practice for applicants for resource consents to consult with tangata whenua if the proposed activity may affect the matters provided for in sections 6(e) and 7(a), ie. traditional relationships of Māori with taonga, and kaitiakitanga.[57] Iwi and hapū environmental management plans (which local authorities must have regard to in the formulation of their plans and policy statements) often outline a kaupapa for native trees, plant resources and habitats in the rohe, with recommendations to councils and other agencies for appropriate management of such vegetation in the landscape. The new RMA Bill, reported back from the Select Committee to Parliament on 8 May 2001, strengthens the regard that must be had to iwi management plans. Many iwi proactively advocate the use of native species in a range of environmental contexts - for example, advising councils to use native plants rather than exotics for riparian restoration.

The WAI 262 claim

One claim currently being heard by the Waitangi Tribunal is the "indigenous flora and fauna claim", commonly referred to as WAI 262 (its number in the Tribunal's recording system). WAI 262 is a wide-ranging claim lodged with the Tribunal in 1991 by representatives of several iwi in regard to the "protection, control, conservation, management, treatment, propagation, sale, dispersal, utilisation, and restriction on the use" of native plants and animals, of the genetic resources inherent within these taonga, and the whakapapa, intellectual property and traditional knowledge associated with them. It is claimed that:

te tino rangatiratanga o te iwi Māori (the unqualified exercise of their chieftainship) was and is an absolute authority which incorporated and incorporates the right to determine intellectual and property rights in the knowledge and use of indigenous flora and fauna, in the preservation of biodiversity, and the ongoing development of a philosophy of eco-ethnic ethics...(Statement of Claim)

The claimants, who include practitioners of traditional rongoā, were concerned at a number of developments that were affecting natural taonga, including:

- multinational bioprospectors' and pharmaceutical companies' efforts to establish international property rights over New Zealand plants with traditional medicinal values (poroporo, mānuka and other species)
- New Zealand becoming a signatory to international agreements such as the GATT - TRIPs agreement - arrangements which give other nations rights of access to New Zealand

flora and fauna, and rights to commercial development of those resources

- the practices of some academic and scientific research projects in the treatment of taonga species (e.g. tuatara).

The Tribunal has given urgency to WAI 262 and has been conducting hearings on the claim since 1997. However, given the complexity and sensitivity of the issues involved, and the Tribunal's resourcing constraints, it is expected the process will take some years yet.

Clearly this claim, and its eventual outcomes - the report and recommendations of the Tribunal, associated material and reports commissioned by the Tribunal, commentary from iwi and others, and the Crown's subsequent response(s) to the Tribunal's recommendations - have enormous implications for the future roles and management of native trees and plants in the New Zealand landscape:

The claim is... massive in its scope and includes... all indigenous plants, animals, algae, fungi, lichens, bacteria and other organisms, and the knowledge of Māori associated with them. [58]

Whatever the outcomes of WAI 262 might be, it has been suggested that New Zealand's forest managers, landowners, official agencies and others involved with native plants and resources should take a proactive approach to this claim to "positively explore ways of addressing the issues raised... To wait until we are compelled by legislation to do this would inhibit the flexibility which may be essential to make progress". [59]

The Mataatua Declaration

In 1993 the iwi of Mataatua in the Bay of Plenty brought together over 150 representatives of indigenous peoples from around the world for a Conference on the Cultural and Intellectual Property Rights of Indigenous Peoples. The Mataatua Declaration arising from that hui was subsequently tabled in the United Nations (Working Group on Indigenous Peoples), but has yet to be formally recognised by the New Zealand government.

The Mataatua Declaration advances a number of important principles in relation to the management and use of natural resources such as native trees and plants:

- Indigenous flora and fauna is [sic] inextricably bound to the territories of indigenous communities and any property right claims must recognise their traditional guardianship (Recommendation 2.6)
- Commercialisation of any traditional plants and medicines of Indigenous Peoples must be managed by the Indigenous Peoples who have inherited such knowledge (Recommendation 2.7)
- A moratorium on any further commercialisation of indigenous medicinal plants... must be declared until indigenous communities have developed appropriate protection mechanisms (Recommendation 2.8)
- Companies [and] institutions both governmental and private must not undertake experiments or commercialisation of any biogenetic resources without the consent of the appropriate indigenous peoples (Recommendation 2.9)
- Ensure current scientific environmental research is strengthened by increasing the involvement of indigenous communities and of customary environmental knowledge (Recommendation 2.11).

5.8 Markets

Funding of biodiversity on private land

There is a perception that constraints on public funding mean only those forest remnants on private land with high conservation values will be eligible for funding for protection; therefore areas with lower ecological values may not receive adequate protection. The concern of some people and groups that such remnants or other areas have little commercial value, and if the landowner is not personally interested in their conservation, they may be at risk. For such areas it has been suggested that by allowing for some type of economic return, through the creation of market

mechanisms, landowners will have a financial incentive to sustainably manage these native remnants and thereby contribute to environmental sustainability and to biodiversity and landscape values.

These issues can be understood in the context of New Zealand's resources to publicly fund conservation of indigenous biodiversity and landscapes. Factors that are seen as impacting on conservation resources include:

- New Zealand's complex ecology and ecosystem dynamics
- proportionally large areas of reserves for a relatively small population
- hospitable environments for a large and increasing number of weeds, pests, and predators to become established
- prohibition of communities from living in reserved areas, and thereby delivering day-to-day management services.[60]

There is a general perception that there will always be a gap between the funding available for establishing and maintaining reserves or covenanted areas on private land, and the demand for such support. The Ministerial Advisory Committee (2000) called this the 'gap of frustration' - the difference between what funding sources, both public and private, can provide for conserving native plants on private land, and desired levels of biodiversity-oriented work.

At present the Nature Heritage Fund has applications for acquisition of land to the value of approximately $2,000,000. Its funding is currently $600,000 per annum. The Nature Heritage Fund, Nga Whenua Rahui and QEII National Trust will over the next five years receive increased funding of $37 million.[61] Some of this funding will be directed into maintenance, restoration and pest and weed management of existing protected areas.

The limitations of markets

Some environmental groups argue that the existence of markets for products derived from native plants presents a risk in two ways. First, there might be no guarantee that the products being sold are sourced from lands managed under an ecologically sustainable regime. Secondly, it is feared that such markets might provide an incentive to illegally obtain native trees or plants from conservation lands.

Many people consider that economic markets do not take account of the complex diversity of values inherent within ecosystems, and cannot accurately reflect these values. The conclusion is drawn that markets must inevitably fail to fully reflect the in situ ecosystem values of indigenous trees and plants. Therefore, it is argued that these ecosystems and the benefits they provide will be undervalued resulting in their over-utilisation and exploitation.

Some individuals and conservation groups have suggested that the most appropriate response to the inherent limitations of markets would be to replace any utilisation of native timber with alternative products such as *Pinus radiata*, other exotic timber species, or synthetics such as plastic or carbon fibre. It is considered that such substitutions will reduce any economic incentive for landowners to adversely affect native ecosystems through unsustainable extraction practices.

Demand for high quality timber

In terms of demand the future price of native timber is the most important economic factor. Rimu provides interesting data on price changes as timber production between 1991 and 1999 dropped by more than 50 % from 100,000 m^3 to 49,000 m^3, and over the same period the price at the sawmill door of rimu increased from $116 per m^3 to $317 per m^3 (a 273% increase). It is uncertain how much further the price of rimu will increase as timber is a world commodity and prices are set on the international market. [62]

The degree to which New Zealand will import high quality timber to replace domestic quality timber will also significantly impact on the price of native timbers. Import data of tropical timbers do not show an increase in volumes corresponding to the decline in native timber production. However, since 1993 the value of imports of wooden furniture has increased from $30 million to $80 million in 1999. There are no formal controls on where such products are sourced and it is likely that much of this furniture is derived from unsustainably managed forests. [63]

Forest certification

Forest certification has been proposed as a means of ensuring recognition for sustainably derived timber products - in terms of product quality, and the reliability of systems that provide consistency and certainty for markets to maintain economic values. Certification is intended to provide a guarantee to customers that the timber was harvested in a sustainable fashion by providing a mechanism to trace the timber product from a specific certified forest right through the production process to the retailer.

There are a number of certification processes but that of the Forest Stewardship Council (FSC) is the most well known and generally considered to be one of the most ecologically robust systems. The FSC is an independent, non-profit, non-governmental organisation that assesses the environmental, social and economic dimensions of a forest's management. [64]

As certification requires an intensive assessment process followed by regular performance audits, the costs of compliance, especially for small forest managers, are high. The benefits include access to 'green' markets and the knowledge that a landowner's forests are meeting set standards in sustainable management. At present there is one FSC-certified, privately managed native forest in New Zealand. FSC certification can also be given to exotic plantation forests; one New Zealand pine forest company has certification and others are currently working to become certified.

Markets for non-extractive uses

Alternative markets for the conservation and establishment of areas of native vegetation on private land have also been proposed.

Landcare Research is exploring the potential of a brokerage service, the "Emissions/Biodiversity Exchange (EBEX) 21 Project". The EBEX 21 project is based on models developed by Landcare Research to estimate the amount of carbon sequestration that can occur on specific sites with different species. Carbon emitters who wish to negate their carbon 'footprint' can use the exchange to:

- assess their greenhouse gas emissions
- assist in reducing their operational emissions.

EBEX21 will work with landowners who are prepared to allow their marginal land to revert to native ecosystems to absorb carbon. The project will also assist in the restoration of native ecosystems using a range of management techniques and strategies can be developed to achieve zero net carbon emissions. [65]

Another market concept is to create a tradeable habitat protection system, providing a credit to landowners who want to 'grow' biodiversity conservation and indigenous wildlife habitat on all or part of their land. Details of such models vary and are not without practical difficulties. The principle, however, is that if land uses or management choices result in the degradation of an area of native habitat, the landowner would be required to acquire an existing credit from another landowner, or create a new credit through the development of a new habitat on a different piece of land. Creation of a credit can be undertaken by another landowner, or the landowner responsible for the habitat deficit. [66]

New establishments of native plants

In many respects the economic implications of establishing new areas of native plants are

different from those for existing areas of native plants.

Unlike ecologically sustainably managed existing forests the commercial viability of establishing a native forest will be determined by the discounted revenue arising from the first rotation. The longer the time before income is received the more this income is discounted. The shorter rotation period of *Pinus radiata* provides better returns as it reaches an age suitable for harvesting between 22 and 30 years. Other exotics such as Douglas fir take 45 - 50 years. Depending on site and silviculture practices, native species can range from 50 years (beech), 80 years (ricker kauri[67]), 120 years (tōtara) and even longer (rimu).

The establishment costs for native trees is currently around $15,000 per ha as compared to $2,000 per ha for *Pinus radiata*.[68]

It has been observed that the costs of establishment can be reduced and, while native timber species do grow more slowly than most exotics, current estimates are based on data gathered from a range of sites of varying quality in terms of such factors as soil, water, and protection from climatic extremes. These growth figures do not take into account the potential gains arising from good site selection, and the development and implementation of alternative silvicultural techniques. [69]

Kauri planted on a sufficient scale can start to be harvested at 80 years and thereafter on 25 to 35 yearly intervals. The return on the 80-year rotation will be in the order of 3 to 4 percent per annum but subsequently the return will be as high as 17 percent per annum. [70]

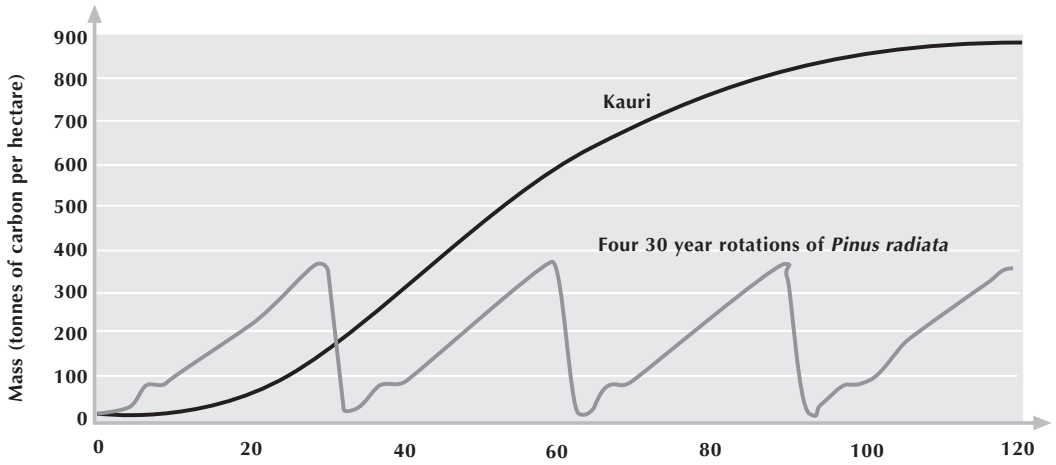
The conventional economic analysis is based on applying the silvicultural model used for *Pinus radiata* to native plants on private land. This model is based on typically large-scale forests and woodlots where economies of scale in establishment, silviculture and harvesting compensate for a relatively low quality product. Such forests only have one commercial value, the timber.

Economic benefits of other uses and services

The potential benefits of the combination of some or all of a diverse range of uses and services will influence landowners' decisions whether to plant native trees or exotic species. Some of these services, such as honey, tourism and recreation, can provide income within the longer rotation periods for native timber species, significantly changing the discounted return on the investment.

Determining the economic benefits derived from non-extractive uses of native plants, such as

Figure 3 Time Profile: carbon sequestration over 120 years



Source: Horgan 1999

ecosystem services and carbon sequestration, are difficult to calculate. Environment Waikato has estimated the annual value of unharvested indigenous flora in the Waikato region at around $1.8 billion for the soil and water benefits that it provides. [71]

Estimating the economic benefits of carbon sequestration is also difficult, and will largely depend on the international market 'cost of carbon'. Native ecosystems generally sequester much larger amounts of carbon than pine forests, but this occurs at a slower rate. Pine absorbs on average between 10 and 15 tonnes of carbon per ha per annum accumulating over a 28-year cycle.[72] A kauri forest averages around 7 tonnes per ha per annum accumulating over at least a 120-year cycle (Figure 3).

Using reasonably conservative figures for native forests of between 2 to 5 tonnes per hectare per annum and carbon values of $30 to $100 per tonne of carbon will give annual returns of between $60 and $500 per annum per hectare. Landcare Research estimates that there are between 4 and 5 million hectares of marginal land that would be suitable for reversion to native forest ecosystems.

Honey production from native plant species is already an important part of New Zealand's honey industry. Popular sources of honey include rewarewa, kāmahi, pohutukawa, rātā, tawari, and mānuka; honeydew honey from southern beech forests is also important. [73]

In terms of value, honey sourced from native plants presents a significant opportunity for higher returns for apiarists. For example, Canterbury mānuka honey is currently returning around $5.50 kg and Canterbury honeydew around $3.00 kg. East Coast mānuka, which has proven antibiotic properties, is returning around $15.00 kg. In comparison clover honey currently returns around $2.50 per kg.[74]

However, there is some international concern at the effects of honeybees on indigenous insect systems and their role in pollination.[75]

Taxation regimes

The economic impact of central and local government taxation (e.g. rating, income tax) was often raised as a disincentive to both the protection of existing remnants and stands of indigenous vegetation and the establishment of new native plants on private lands. These issues apply whether native plant management is for purely protection conservation purposes with no expectation of future income, or where there is an intention of deriving income in the future.

Rates Relief

There is a range of views on the economic importance of rates relief for land that is committed to conservation through covenants or other means. Rating policy varies from council to council, and even where there was rates relief it was often considered by landowners to be an inadequate incentive. However, there has been acknowledgement that even the gesture of rates relief recognises landowners' efforts and was enough to encourage the protection of native remnants. [76]

The issue of the affordability of rate relief was raised as a concern for some councils. Districts that contain many significant areas of native remnants are often those that also have a small rating base.

Income Tax Treatment

The impact of the current income tax treatment on activities and initiatives to promote native plants on private land was also identified as a disincentive. In this context the concern is that:

- Section DO7 of the Income Tax Act 1994 (ITA) places a $7,500 limit on the tax deduction on expenditure by a farmer, or agricultural business, for tree planting or tree maintenance that is not for the purpose of forestry or horticulture
- The successful establishment of native trees

often requires the prior establishment of a nurse crop (e.g. mānuka), but it is uncertain whether the ITA treats such expenditure as a land improvement (these costs can only be deducted over a number of years) or as a planting cost, which can be deducted against other income in the year it was incurred.

5.9 Landowners' rights and responsibilities

In recent times, conflicts arising from the different views about rights and duties of landowners with respect to native plants on private land have largely occurred under the umbrella of the RMA, but these tensions existed prior to this legislation. People's concerns are often expressed in terms of the need for fairness and respect for individual freedoms when these have to be balanced against the interests of wider society.

Property and regulation

Property is often referred to as a 'bundle of rights' including the right to possess, enjoy, use and dispose of a particular piece of land, object, or intangibles. These rights are capable of being used or exchanged separately or as a whole. Fundamentally, property defines relationships between people, things and places.

Many questions arising in the current debates about property rights are about the appropriate extent of the regulation of private property. Laws are built on fundamental social norms, setting out the boundaries of what society determines to be acceptable. However, society's values are not homogeneous and there will always be a range of different views about what levels of individual choice and regulation are appropriate. In addition, societal values and laws are not constant and will change over time.

Many New Zealanders believe that an individual's ability or right to choose what to do with his or her own land is sacrosanct. The expectation is that such rights cannot be unfairly compromised. Consequently, there is the view that if landowners are required to give up certain land use choices for the public benefit then they should be compensated.

There are different views as to what compensation might entail. Some believe that compensation should be paid for the lost opportunity cost caused by relegating land to a particular use or by prohibiting some land use choices. Others believe that payment should only be made for the additional costs of land management that arise from the imposition of the regulation. This view stems from the idea that landowners are often willing to forgo land use choices for the good of wider environmental values, but feel that they simply cannot afford to provide a free land and pest management service. It was also suggested that compensation laws should be stringent enough so as to reduce any incentive for official agencies to overuse the regulatory approach.

However, other parties in these debates consider that it is an appropriate role for the State to purchase or negotiate agreements for all areas of significant natural habitat and vegetation. Where this is not possible, then it is argued that the State should regulate to prevent further loss from the adverse impacts of human activities.

It has also been argued by some members of environmental groups that landowners have a responsibility to protect any remaining native vegetation on their properties on the grounds that they or their predecessors have derived a benefit, either directly or indirectly, from any removal of native plants that has occurred in the past. It is suggested that these benefits should be weighed against any costs imposed on the landowner by the regulation of natural areas, and there is therefore no need for compensation.

However, it has been pointed out that most of New Zealand's infrastructure was built on revenues raised from land use, often not ecologically sustainable, but considered within the value frameworks of earlier times to be appropriate and necessary for achieving progress and improved social welfare. Within this context many consider

that expecting that the descendants of these individuals should accept such concepts of 'debt' is neither just, nor an effective way of improving current management practices.

The legal context [77]

Private ownership of land does not give the landowner a right to unrestrained use of the land. The common law doctrine, that ownership of property carries with it absolute rights to use and enjoyment, has always been subject to limitations; most notably the equally revered maxim that an individual cannot use his or her land in a way that injures or harms another.[78] The latter maxim is considered to be the beginnings of the law of nuisance from which modern environmental law is said to have stemmed.[79]

The Crown has always had the power to take private citizens' property for public purposes (this is a prerogative power of the Crown called eminent domain). However, in New Zealand the right to acquire land for public purposes has usually been regarded as deriving from statute (for example the Public Works Act 1981) and not the exercise of prerogative power. In the planning area, arguments about property rights have largely centred not on what has been termed 'compulsory acquisition', but on the extent to which regulation constitutes a 'taking' of private property (termed a regulatory taking) and the extent to which compensation is available.

In New Zealand the right to compensation for these takings is not given any explicit constitutional recognition; therefore Parliament has the ability to legislate to take private land for public use without compensation. However, there is a well-established legal principle that if the State exercises this power then it ought to fairly compensate the landowner. [80]

At common law, landowners have no right to compensation when the Government imposes planning restrictions on their land. The RMA, by virtue of section 85(1), expressly recognises the concept of a regulatory taking but excludes the possibility of it occurring as a result of the operation of the Act.

While the short answer to the question "can Parliament take away my property rights without compensation?" is yes, there are a number of possible qualifications to this power. First, while Parliament is supreme, there are arguments that the principles of equity, fairness and liberty dictate that Parliament ought to provide compensation for takings. Secondly, if Parliament can acquire land or regulate without cost then there are strong concerns that there will be a tendency for Parliament (and local authorities) to regulate excessively. Finally, there is the argument that some constitutional common law rights, such as the right to fair compensation for takings, lie so deep that even Parliament cannot override them.

5.10 Central Government

Background to the government institutions

To understand the roles of central government agencies with respect to native plants on private land it is helpful to go back to the circumstances surrounding their establishment during the government reforms of the late 1980s. Before 1987 government functions affecting native plants on private land were spread across a number of large government agencies that had also had responsibilities for resource development. The main agencies were:

- Department of Lands and Survey (National Parks and Crown Pastoral Leases)
- Department of Internal Affairs (Wildlife Service, Wildlife Reserves and Acclimatisation Societies)
- Ministry of Agriculture and Fisheries
- Ministry of Transport (Coastal reclamations)
- New Zealand Forest Service (Forest Parks, plantations, and the Forest Research Institute)
- Department of Works and Development (lands managed under Water and Soil conservation legislation). [81]

The government reforms of the late 1980s were

based on a desire to make government processes more effective, promote economic growth and reduce the role of government in economic activities. Those agencies undertaking environmental management were not the primary focus for the reforms, but the general principles of the reforms also applied to them. These principles can be summarised as:

- separation between policy and operational functions
- separation between funding, purchasing and provision of service
- reallocation of responsibilities across departments so as to:
  - ensure that similar functions were collected within the same agency
  - avoid conflicts of interest within an agency
  - disassemble conglomerate organisations seen as being difficult to manage, lacking focus and given to concealing information internally. [82]

Prior to the reforms, the environmental NGOs and other groups saw the government agencies with environmental responsibilities as having conflicting objectives and unclear decision-making processes. [83]

The agencies that were of most concern were the Department of Lands and Survey and New Zealand Forest Service. These agencies were very involved in land development, for pastoralism and plantation forestry respectively, while also having responsibility for the management of large areas containing native species. Both agencies were perceived by environmental groups as being primarily development oriented organisations with only a limited commitment to conservation.

The reforms resulted in the creation of a number of new agencies. The restructuring reflected and affirmed the polarisation of thinking between a protection ethic and the sustainable use of lands. A single new agency, the Department of Conservation, became the manager of lands that were considered to have primarily conservation values. These lands were transferred from the Department of Lands and Survey, the Department of Internal Affairs, and the New Zealand Forest Service.

Those lands that were considered to have primarily productive values were transferred to two new State Owned Enterprises (SOEs). Landcorp received the Crown's pastoral lands, and Forest Corp (subsequently renamed Timberlands) received the Crown's production forests, both exotic and indigenous.

However, this reallocation of land was not straightforward where the land had either no predominant conservation or production function. In some cases this conflict was resolved only because the new SOEs had no purpose for marginal lands that had limited financial viability.[84]

Consistent with the principle that policy making should be separated from the operational functions of Government departments, two new policy agencies were created: the Ministry of Forestry (now part of the Ministry of Agriculture and Forestry) and the Ministry for the Environment.

The Ministry for the Environment

The Ministry for the Environment was established by the Environment Act 1986. The long title states that the objective of the Act is to:

Ensure that, in the management of natural and physical resources, full and balanced account is taken of:

(i) The intrinsic values of ecosystems

(ii) All values which are placed by individuals and groups on the quality of the environment

(iii) The principles of the Treaty of Waitangi

(iv) The sustainability of natural and physical resources

(v) The needs of future generations

The Ministry for the Environment has a range of functions that directly or indirectly impact on native plants on private land, such as to: [85]

- advise the Minister on matters concerning environmental administration
- obtain information, conduct and supervise research, so as advise the Government on environmental policies
- provide the Government, its agencies, and other public authorities with advice on the application, operation and effectiveness of those Acts that impact on the environment in relation to the achievement of the objectives of the Environment Act 1986 (the list of Acts includes the RMA 1991, Forests Act 1949, and Conservation Act 1987)
- facilitate and encourage the resolution of conflict in relation to the environment
- provide information and services to promote environmental policies, environmental education and mechanisms for promoting effective public participation in environmental planning.

The Department of Conservation

The Department of Conservation was established by the Conservation Act 1987 (CA). The primary functions of the department which are most relevant in relation to native plants on private land are: [86]

- to manage for conservation purposes, all land, and all other natural and historic resources held by the department and any other land managed on behalf of the owner
- to advocate the conservation of natural and historic resources
- to advise the Minister of Conservation on matters relating to DOC's functions and to conservation generally.

It should be noted that conservation is defined in the Act to be: [87]

the preservation and protection of natural and historic resources for the purpose of maintaining their intrinsic values, [88] *providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations.*

Early versions of the Conservation Bill included the term utilisation, but this was considered confusing because it merged protection with utilisation, and thus it was removed from the final version. [89] Utilisation functions in the CA are, therefore, limited to appreciation and recreation.[90]

It is within this statutory context that the department undertakes its advocacy, education and policy functions with respect to native plants on private land. The legislation requires that DOC advocates for conservation in the sense of the above definition.

Native Plants Protection Act 1934

This Act makes it an offence to take protected native plants from Crown land, state forest land, public reserve land, or from private land without the consent of the owner or occupier. [91] All native plants are protected under this Act with the exception of a list of plants including piripiri, kānuka, mānuka and all mosses, fungi and lichen.[92]

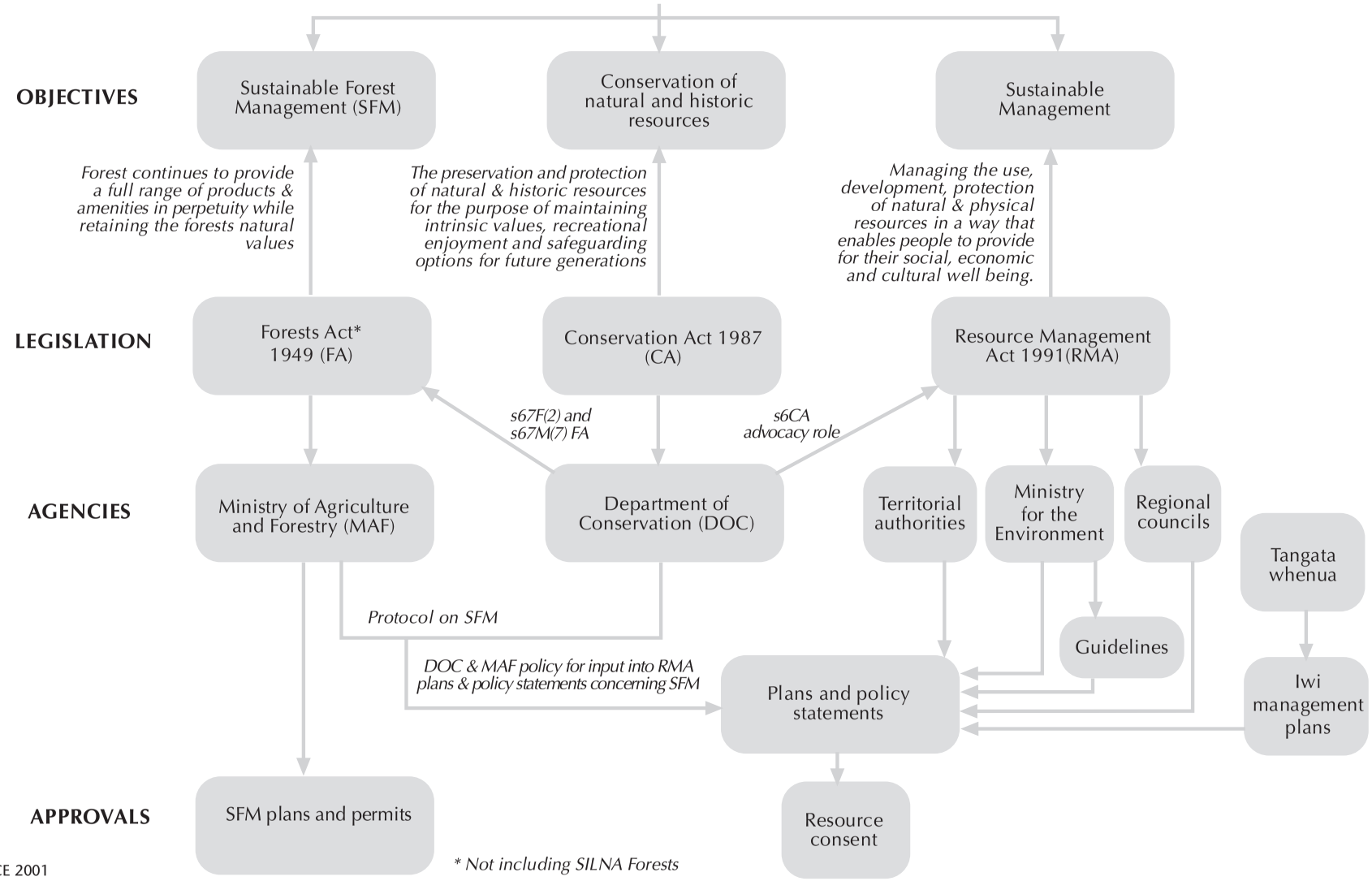
The Act is considered largely inadequate as a protection mechanism because it does not specify fruit, seeds or trees and it does not prevent a landowner from taking native plants from their own land. Enforcement is extremely difficult and if caught the penalties under the Act are limited to a fine of not more than $40. [93]

5.11 Operation of Part IIIA of the Forests Act 1949

Figure 4 sets out the legislative framework for the management of non-plantation indigenous forestry.

The Indigenous Forestry Unit of the Ministry of Agriculture and Forestry is responsible for the administration of Part IIIA of the Forests Act 1949 (FA). Part IIIA allows for a number of management options so as to achieve the objective of sustainable timber production from private forests.

Figure 4 Framework for the management of non-plantation indigenous forestry on private land



Source: PCE 2001

Option 1: Salvaged Timber, Windthrown and Dead Standing Timber and Landowner's Personal Use (Up to a total of 50 cubic metres in any 10 year period) [94]

A written statement is required from the Chief Executive of MAF, confirming that the timber falls into one of these categories, before the timber can be milled.

Option 2: Sustainable Management Permits

A permit requires less information than a plan for approval and is suitable for smaller forest areas. It allows the landowner to harvest, within a ten-year period, up to 250 cubic metres of podocarp or kauri or shade tolerant, exposure sensitive, broadleaved species and up to 500 cubic metres of beech or other light demanding hardwood species, as long as the amount harvested is less than 10 percent of the timber standing on the landholding. [95] A subsequent permit for podocarp or kauri or shade tolerant exposure-sensitive broadleaved hardwood species may be issued after 10 years provided forest growth in that time has replaced the timber harvested during that time. [96]

Option 3: Sustainable Management Plans

Sustainable Management Plans have comprehensive information requirements and require an understanding of the forest's growth and regeneration characteristics. Plans place more emphasis than permits on factors other than the management of sustainable timber yield. The information provided must include:

- land ownership
- land description
- forest description
- forest inventory and proposed harvest volume
- forest management system(s)
- protection measures
- any measures to protect soil, water, flora and fauna and to retain and enhance these values
- relevant requirements under the RMA, e.g. relevant details of applicable district and regional plans
- the plan's term.

MAF may require landowners to set up representative areas that protect flora and fauna and other conservation values in an unmodified part of a forest. This will occur where flora and fauna or other conservation values in the forest are considered to be of regional or national importance. The representative area must be of an adequate size and location to protect the identified values, and those values must be adequately protected. [97]

Monitoring of compliance with the conditions in the plan is achieved by the requirement that landowners maintain comprehensive forest inventories and records of forest operations, so as to determine the ongoing stand characteristics and current management practices (e.g. standing volumes, regeneration, silviculture activities). It has been proposed that sustainable management plans under the Forests Act should be more closely aligned with Forest Stewardship Council (FSC) certification standards to allow for mutual recognition and reduce compliance costs.

MAF must also consult with the Director General of the Department of Conservation and Chief Executive of the Ministry of Māori Development if the area includes any Māori land. [98]

In addition, before undertaking any forestry activities the owner must obtain the necessary consents under the RMA. [99]

There are around 1.3 million hectares of privately owned indigenous forest that fall under the ambit of Part IIIA of the FA. As of 30 June 2000 there were:

	Number	Area (ha)	Volume of timber approved (m^3)
Plans	19	23 309	51 234 (annual)
Permits	232	29 592	65 732 (over 10 yrs)
Total	251	52901 (4% of all private forest)	

(MAF, 2000 [100].)

Select Committee inquiry into indigenous forest management

The Primary Production Committee of the House of Representatives is currently undertaking a review of the indigenous forest management regime under the FA. The select committee expects to complete its enquiries in 2002.

While there are some areas of common interest between this discussion paper and the select committee's review, that review is focused only on assessing the efficacy of the sustainable forest management regime. In contrast this discussion paper has a much broader objective with respect to the future role of native plants on private land. Nevertheless, this study is interested in how the FA and its implementation affects attitudes and perceptions about the role of native plants on private land and the credibility of sustainable land management. The terms of reference for the select committee's inquiry are:

1. To examine the sustainable management of privately owned indigenous forests and within this examination to consider:
   a) The scope and range of sustainable management plans.
   b) The processes and procedures for developing sustainable management plans.
   c) The relationship between sustainable management plans and sustainable management permits.
   d) The inter-relationship between sustainable management plans, the RMA and local government.
   e) The international credibility of sustainable management plans for privately owned indigenous forests in New Zealand.
   f) The conditions or requirements placed on those wishing to harvest or market timber from native forests.
2. To examine what restrictions, if any, should be placed on those wishing to completely remove native forests in favour of other land uses.
3. To examine whether indigenous forest managers regardless of whether they are producing timber, should be required to demonstrate that they are managing their forests in a sustainable manner.
4. To examine what the future role of the State should be in relation to indigenous forest management and research, given the potentially wide role of native forest management (including planting) in relation to such objectives as landscape protection, erosion prevention, biodiversity conservation and timber production.
5. To consider what policy or legislative mechanisms should be used to give effect to any findings of the inquiry. [101]

5.12 The South Island Landless Natives Act 1906

The term SILNA is an acronym of the South Island Landless Natives Act 1906. In 1906, 57,498 ha of land in Marlborough, Northwest Nelson, South Westland, Southland and Rakiura (Stewart Island) was awarded to various South Island Māori who had been made landless by the land acquisition processes of the Crown. The Crown intended at that time that the new owners would clear the land for farming purposes, but this did not happen, as the land was economically marginal and very inaccessible. [102]

As with many of the uneconomic and inaccessible parts of New Zealand, the SILNA lands remained in the original indigenous plant cover. Over time access improved and the owners of the SILNA land in Southland began to harvest the timber. This was primarily beech, but also included rimu forests.

One of the key debates surrounding the SILNA lands is that they are excluded from the scope of the sustainable management regime of the FA and may therefore be clear felled, subject to the rules in the relevant district plan and regional plan under the RMA. When the new Forests Act regime was introduced in 1993 the SILNA owners resisted it as they saw it as compromising tino rangatiratanga. The owners also strongly believe

that the original grant of land was in compensation for land unlawfully taken in the late 1800s. Therefore, the owners feel that any law passed that results in a foregone economic benefit, because of the move from clear felling to sustainable harvesting, should be compensated. At the time of the introduction of the Forests Amendment Act 1993 Hon Denis Marshall, then Minister of Conservation, stated:

Of course, those people have rights under the Treaty, but they also have rights under a specific Act of Parliament (SILNA). It would not be at all appropriate to override those rights in this measure, it would be proper to identify first the areas affected by the legislation... It would also be appropriate to negotiate with them in a proper manner on the future of their forests. [103]

In 1996 Waitutu Incorporation reached a settlement with the Crown and surrendered its cutting rights over areas of virgin rimu forest in return for cutting rights over regrowth beech forest, plus a cash payment.

The SILNA owners, based on the same arguments, have also argued that their lands are exempt from any regulations under the RMA that adversely impact on their activities. A recent decision by the Environment Court determined that under the Southland District Plan, the Council had the authority to regulate the clearance of indigenous vegetation under the RMA on SILNA lands. [104]

5.13 International agreements

This section provides information on two international agreements that have a close relationship with the Convention on Biological Diversity (see section 2.12).

The Montreal Process

The Montreal Process is the name commonly used to refer to the Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests. It was formed in Geneva, Switzerland, in June 1994 to develop and implement internationally agreed criteria and indicators for the conservation and sustainable management of temperate and boreal forests.

Membership of the working group is voluntary and currently includes 12 countries including New Zealand, Australia, Chile, Japan and the United States of America. The member countries represent about 90 per cent of the world's temperate and boreal forests in the northern and southern hemispheres. This amounts to 60 per cent of all of the forests of the world and 45% of world trade in wood and wood products.[105]

Santiago declaration

The Santiago Declaration was issued in February 1995 at the sixth meeting of the Montreal Process countries in Santiago, Chile. The Declaration contains a set of seven criteria and 67 indicators to guide policymakers, forest managers and the general public in the conservation and sustainable management of temperate and boreal forests. The Montreal Process countries agreed to use these criteria and indicators as assessment and monitoring tools at the national level.[106]

The criteria:

1. Conservation of biological diversity
2. Maintenance of productive capacity of forest ecosystems
3. Maintenance of forest ecosystem health and vitality
4. Conservation and maintenance of soil and water resources
5. Maintenance of forest contribution to global carbon cycles
6. Maintenance and enhancement of long-term multiple socio-economic benefits
7. Legal, institutional and economic framework for forest conservation and sustainable management.

The Montreal Process criteria and indicators are not static and will be continually reviewed and refined to reflect new research findings, advances in technology and an increased capability to measure indicators.

5.14 The RMA and sustainable management

Sustainable management

The overarching purpose of the RMA is set out in section 5 and is to promote the sustainable management of natural and physical resources.[107] Section 6 sets out matters of national importance, section 7 sets out other matters to be given particular regard, and section 8 directs persons with functions and powers under the Act to take into account the principles of the Treaty of Waitangi. These sections provide additional guidance on how to achieve the purpose in section 5, and use words and expressions that are meant to be broad and are intended to enable the application of policy in a general way. [108] Essentially, they are principles to guide sustainable management. Section 6(c) states that the protection of areas of significant vegetation and significant habitats of indigenous fauna is a matter of national importance.

Case law

The considerable uncertainty that surrounds the terms 'significance' and 'protection' used in section 6(c) has resulted in some decisions of councils being referred to the Courts. The Courts have not extensively considered what 'significance' means in the context of section 6(c) and how it should be assessed. However, the Courts have heard and taken into consideration evidence pertaining to criteria such as rarity, representativeness, diversity, connectivity, buffering and variability.[109] The issue of what is significant in terms of section 6(c) is still a contentious one with different local authorities and sectors of the community proposing many different views.

The Court of Appeal has considered the meaning of the word 'protection' and held that it did not have as strong a meaning as the words 'prevention or prohibition' and that it meant 'keeping safe from injury'.[110] The Courts have also consistently held that 'protection' in the context of section 6 does not mean 'absolute protection', but is tempered by the purpose of sustainable management.[111] This means that when deciding what methods to use to 'protect' areas of significant indigenous vegetation, local authorities must take into account factors such as whether the method or rule enables individual people and whole communities to provide for their social, economic and cultural well being. The question remains as to how to design such methods.

Much of the tension surrounding section 6(c) arises in rural areas where some local authorities have run into opposition from landowners when proposed plans were notified with schedules containing a list of specific sites identified on private land as Significant Natural Areas (SNAs). However, some local authorities have contended that they are legally required to identify and delineate areas that require protection in terms of section 6(c), and to provide for a different management regime within these areas. This may have some legal foundation. In Wakatipu Environmental Society Inc v Queenstown-Lakes District Council, a case concerning landscape and primarily section 6(b), the Environment Court stated:[112]

In respect of a district council's functions, including integrated management of land, the starting point for the first stage must be to identify the facts and the appropriate matters to be considered. In particular it is fundamental to consider Part II of the Act. That means it is mandatory to identify the matters of national importance. ***We do not see how this can be achieved without identifying (necessarily with a broad pencil, but with as much accuracy as possible) the boundaries of the areas concerned.*** *Once the coastal environment...significant vegetation, significant habitats of indigenous fauna...have been identified the general issues tend to be self generating: how can these resources be protected from inappropriate use or development or have access to them maintained and enhanced, or be recognised and provided for, as the case may be? Only then should the Council turn to*

the next stages in the process: considering the appropriate objectives, policies and methods of implementation. [PCE's emphasis.]

From this decision it can be argued that local authorities are required to identify significant areas of indigenous vegetation in their district or region first, and then consider what methods they can use to protect them. However, the Environment Court has also stated that the fact that the area has been identified as 'significant indigenous vegetation' in a proposed district plan does not mean that the Court should necessarily conclude that it was 'significant indigenous vegetation' for the purposes of s6(c) RMA.[113]

Section 32 of the RMA requires local authorities to consider the extent to which a particular method is necessary and likely to be effective in achieving the objective of the Act including in relation to section 6(c).[114] Local authorities must also consider other means of achieving objectives, including the provision of information services and incentives.[115] There is a range of opportunities for protection under the RMA and other legislation. These include the reservation or covenanting of parts or all of an area, if it is desirable and agreement of all parties is reached; or allowing for the use and management of the area, provided any potential adverse effects on the environment are avoided, remedied or mitigated.[116]

It has been stated that section 6(c) is not about obtaining more reserves, and protection of SNAs identified under the RMA does not preclude use of natural resources within an SNA, as long as that use does not impact adversely upon the values for which the area is considered significant. [117] However, there is a perception that section 6(c) is being used as a default reserve-making power and that a landowner's land use options are unreasonably restricted within those areas listed as SNAs. There is a also the view that having to apply for resource consent to carry out work in these areas is costly and time-consuming with no guarantee of success, especially if the application is publicly notified. As a result, many landowners have called for voluntary initiatives as a replacement for, rather than in addition to, regulation (see sections 2.10 and 5.9).

The Ministry for the Environment (MFE), in recognition that councils require some guidance, began developing guidelines, for councils on implementing section 6(c) of the RMA in 1997; however, work is now focusing on the development of a draft National Policy Statement for Biodiversity under the RMA.

Councils' approaches to 'significance'

Environment Waikato has released a regional policy guide for applying significance criteria with regards to section 6(c) (1999). The Waikato process addresses a range of questions, including:

- whether the site provides habitat for indigenous species that are uncommon, threatened or endemic to the Waikato region
- whether the site forms an ecological buffer, linkage or corridor that protects other areas from external adverse effects
- the site's significance at international, national, regional or district levels.

Local authorities and native plants outside significant natural areas

Both regional councils and territorial authorities can include in their polices and plans rules about the management of native plants on all areas of private land, even where the area has not been identified and provided for as an SNA.

Local authorities vary in their approaches for protecting areas of native vegetation not specifically identified as SNAs.

Regional councils

Regional councils (and unitary authorities) have a responsibility under the RMA for the integrated management of the natural and physical resources of the region, and more specific responsibilities for soil conservation and water quality. [119] Consequently, many of the objectives, policies and methods in regional plans that impact on

Case Study: West Coast Significant Natural Areas Programme

The Buller, Grey and Westland District Councils and the West Coast Regional Council are currently implementing a joint process to identify and to provide for the protection of significant areas of indigenous vegetation under section 6(c) of the RMA.

Concerned about the experiences of other councils when undertaking this process the West Coast councils decided to combine their resources and implement a different approach. With funding assistance from the Sustainable Management Fund the councils have established a core group of council staff to oversee a two-stage process. The first stage is the identification of areas of significance and the second stage will be the development of mechanisms to provide for the protection of these areas.

A reference group was established with representation from DOC, environmental NGOs, landowner groups and local iwi. However, the control of the project remains clearly with the councils. It was considered essential that the process be seen to be inclusive but independent of any particular interest group.

Early on it was decided not to undertake an 'identification' process to define areas of significance, based on DOC's Protected Natural Area Programme methodology. The PNAP system was considered by the core group to have been developed for conservation purposes under the Conservation and Reserves Acts, whereas implementing section 6(c) of the RMA was seen to have a different objective of sustainable management as defined by section 5. Furthermore the PNAP approach requires detailed field based surveys that are expensive. The councils were keen to develop a new approach using material that could be manipulated by information technology systems such as Geographical Information Systems (GIS).

Information was collected from a range of sources, including new national databases that had recently become available, such as MAF's land cover database and Landcare's environmental domains database. Some DOC data on species distributions and status were also used. Applying information technology this data became a first order 'desktop' survey that identified the 'possible' sites.

Approaching landowners of 'possible' sites was undertaken carefully with councillors and council staff often making the first approach. These meetings would involve outlining the process and talking to the landowners about their needs, concerns, and expectations. It was made clear that the process was not about 'locking up' significant areas and that there would be a range of mechanisms developed within the scope of the RMA.

Once approval for access was gained an ecologist undertook actual surveys on the land. The councils have found that engaging an ecologist who can work well with landowners is critically important to the success of the whole process.

The identification process has been underway for nine months and given the area to be covered, is expected to take another two years. This gradual approach, and taking the time to consult, has managed to reduce (but not totally eliminate) concerns or resistance. The development of mechanisms to provide for the protection of confirmed sites is still proceeding, but it is already apparent that a 'suite' of mechanisms will be required. The timeframe for the completion of this next stage of the project has not been finalised, but in the interim there are some indigenous vegetation rules in place in the district plans to prevent pre-emptive clearances before the completion of the process.

Recently, landowners and some local politicians have raised concerns about the longer-term consequences of the SNA process. This increase in concern was influenced by the Government's recent decision to transfer the Timberland's beech forests into DOC management, and the perception that similar management philosophies might be applied to the West Coast SNAs in the future.[118]

native plants are targeted at managing the impact of vegetation clearance on soil and water values. These are usually defined in terms of factors such as the plants location with respect to watercourses, the severity of the slopes and the propensity for erosion of the land on which the plants are located. In this regard some regional councils make no distinction between the clearance and disturbance of exotic or indigenous vegetation.

Regional councils also undertake a range of programmes to promote soil and water conservation through the fencing off and planting of riparian areas, unstable slopes, sand dunes and other marginal lands. Recently regional councils have started to emphasise the use of native plant species in such projects in recognition of the additional benefits to indigenous biodiversity.

Case Study: Environmental Fund

The Northland Regional Council has set up an Environmental Fund to help people improve and protect Northland's natural environment. The Environmental Fund provides up to 50% of the total costs of projects that meet the funding criteria.

Every year $100,000 is available to fund environmental work. Funding for past projects has ranged from $200 to $28,000; a maximum of $30,000 is available for any one project.

The types of projects that are suitable for funding by the Fund include:

- fencing of native or regenerating forest, streamside areas, edges of lakes, wetlands and coastal areas, where
  - native plants are predominant
  - erosion will be prevented or reduced
  - stock will be excluded from water bodies; and/or
  - water quality is likely to be improved.
- restoration, retirement, and revegetation of land, including areas of the following significant indigenous habitat:
  - freshwater wetlands
  - remnant forest
  - scrubland
  - coastal wetland, including mangroves and salt marsh
  - eel grass
  - sand dune vegetation
  - other significant habitats of native animals.

Regional councils also have responsibilities for the management of pests (including weeds) under the Biosecurity Act 1993, [120] and this responsibility often acts as the impetus for regional councils to consider measures that address indigenous biodiversity and native plants.

The Wellington Regional Council has the Key Native Ecosystem programme (KNE). This determines priorities for the council's possum control. KNE is designed to control introduced pest species so as to reduce pressure on remnant native habitats, and allow natural ecosystem processes to thrive.

Under the latest version of the RMA Amendment Bill 1999, reported back to Parliament by the Local Government and Environment Committee on 8 May 2001, both regional councils and territorial authorities will have responsibilities for the maintenance of biological diversity.[121]

Territorial authorities

Section 31(a) of the RMA gives territorial authorities responsibility for the:

establishment, implementation, and review of objectives, policies, and methods to achieve integrated management of the effects of the use, development, or protection of land and associated natural and physical resources of the district.

Therefore, the RMA requires territorial authorities in executing their powers and functions under the Act, to take account of land use changes and the potential impact on native plants.

As with regional plans, district plans can specify the rules to apply to particular activities. For example, how land uses of areas of indigenous vegetation are managed in district plans depends on whether the particular activity is determined to be a:

- permitted activity (does not require resource consent) or
- controlled activity (resource consent is required but must be granted by the consent authority which can impose conditions in respect of those matters over which it has retained control in the plan) or
- discretionary or restricted discretionary activity (resource consent is required and can be issued with conditions, in the case of a restricted discretionary activity conditions can only be imposed in respect of matters to which the consent authority has restricted its discretion) or
- non-complying activity (the activity contravenes a rule in the plan, therefore resource consent is required and can be issued with conditions) or
- prohibited activity (no resource consent will be granted).

Distinguishing what approval is required for an activity on land with native plants is dependent on how native vegetation is defined, and the scope of activities defined in the relevant provisions in district plans. These can vary but the important factors are the plants included in the definitions of 'indigenous vegetation', 'native bush', 'indigenous forest' or 'indigenous tree'. Plans usually define 'indigenous vegetation' in terms of areas where there is a predominance of naturally occurring native vegetation, although it is uncertain how 'predominance' is determined. In addition, there are often exclusions to these definitions. For example, in some instances native vegetation that occurs under the canopy of a plantation forest can be excluded from the definition of indigenous vegetation. Other exclusions included in plans are often those species that are considered to be of limited ecological value, such as mānuka and kānuka, unless areas of these plants are considered to have additional ecological values.

These definitions are then used in conjunction with vegetation clearance rules to determine the type of approval, if any, required. Clearance rules can be used in plans to prevent the removal or disturbance of an area before it can be assessed under section 6(c), as part of the controls for SNAs, or to control vegetation clearance in areas outside SNAs.

The criteria used in vegetation clearance rules vary but they are often based around the following parameters:

- the area of clearance that is to occur
- the period of time that the area of clearance can occur (e.g. 500 m^2 in any 12 month period)
- whether the area contains native vegetation that has, or has the potential to form, a closed canopy above a certain height (height criteria vary but are usually between 3 and 6 metres)
- additional significance criteria, such as the presence of rare or threatened species.

There have been some concerns expressed about the development of rules based on area, time period and height criteria and these types of rules result in unintended outcomes such as:

- vegetation clearance still occurring but in small increments
- a focus of protection efforts on areas that contain stands of tall trees irrespective of the actual environmental value of these areas; and
- landowners who want to retain control of those areas considering native regeneration as a liability and ensuring that it does not reach the height limits.

5.15 Research agencies

This section describes some of the current research activities concerning the management of native plants. It is not a full survey of all research underway in these areas, but gives an indication of the range of topics being studied.

Forest Research (FRI)

In 1992 the Forest Research Institute (FRI), previously the research facility of the New Zealand Forest Service, became a Crown Research Institute (CRI). Despite the change in structure the strong focus on production-forestry research continued. However, there had long been an active research effort within FRI into indigenous plant species, with respect both to their ecology and management. Although the forest ecologists in FRI were transferred to the Landcare Research CRI, research continued into silviculture of native species.

FRI has also responded to the growing interest in developing sustainable management systems for planted indigenous tree species for both market and non-market benefits. The limited amount of management-oriented research in this area had been seen as an impediment to employing plantation-grown indigenous timber for high quality end uses, rather than trees from naturally occurring forests. Current management-focused research on native species includes: establishment, pruning and thinning trials; genetic variation; growth database and growth models; natural

regeneration on new sites; market and non-market values. FRI has also evaluated the growth rates of many native tree species that were planted on over 50 disturbed sites during the 1960s, and followed up with silviculture trials and ecological studies of several species.

In 1989 Forest Research started a duneland research programme aimed at evaluating the role that indigenous species play in stabilising and protecting coastal sand dunes. Research trials on spinifex, [122] sand tussock and pīngao have developed practical methods for the successful rehabilitation of dunes. In 1997, the Coastal Dune Vegetation Network was established as an independent forum to help in the technology transfer of research results to managers, iwi, nurseries and user groups. 'How To' guidelines have been published and the outcome is not only active management by a number of communities to rehabilitate eroded dunes, but also projects for the sustainable harvesting of pīngao fibre for weaving and other cultural purposes.

2000/01 year PGSF total funding for Forest Research was $23.8 million. Funding to develop management techniques for species other than *Pinus radiata* (including both native and other exotic species) is $1.35 million. [123]

Landcare Research - Manaaki Whenua

Landcare Research is the CRI most closely involved in research on terrestrial native plants and animals as well as invasive species. It has a number of research programmes aimed at research of pests and weeds of native species and ecosystems, ranging from the weed *Hieracium* that threatens South Island high country plant communities to research for control of possums. It also has programmes looking at much broader levels of biodiversity and ecosystem processes. Such work recognises the importance of understanding how healthy ecosystems function and their roles in maintaining clean air, water and soils as well as mitigating the effects of pollution.

Research on harakeke (New Zealand flax) is looking at over 70 different cultivars to examine the genetic and environmental components of cultivar variation. The objective is to make the best selections for particular uses in different locations. Other research with a Waikato region focus is assessing forest fragments - what remains, how the species respond to the effects of isolation and small size, and what influences their survival (e.g. management practices, or the impacts of surrounding land uses). This is relevant to issues such as the importance of corridors for wildlife species in fragmented landscapes. It is also contributing to the development of ecological assessment methodologies appropriate for fragments of indigenous vegetation. The results should be useful to assist in local planning decisions and inform landowners about how different farming practices can help or hinder forest fragments to survive.

The survival of forests in the dairy farm landscapes of the Waikato has been examined by comparing stands of kahikatea identified in 1977 with 1997 measurements. Results show a small decline in the number of stands, but the stands where cattle browsing was allowed had become threatened, and the environmental benefits of these stands (e.g. conservation, surface and ground water purification, reducing impacts of floods) were poorly recognised.

2000/01 year PGSF total funding for Landcare Research was $25.7 million. There was $9.4 million for indigenous species most of which was for protecting biodiversity and pest management. However, $2.34 million is for study into indigenous plant species and ecosystems for carbon sequestration. [124]

National Institute of Water & Atmospheric Research (NIWA)

NIWA has a research programme on the management of aquatic plants that covers four linked objectives: aquatic plant biodiversity and ecology; identifying and predicting threats from

invasive weed species; restoration of freshwater ecosystems; and development of protection, mitigation and restoration strategies. Several parts of this programme involve native plants:

- identifying the characteristics of plant communities in freshwater ecosystems
- determining the barriers to restoring native plants in water bodies
- evaluating the risks to water bodies of invasive species and ways to control them
- identifying the conditions for restoring submerged native vegetation and using the results of the research in protection
- mitigation and restoration strategies developed by agencies such as regional councils and DOC.

Useful freshwater native plants that are good 'indicators' of lake health and of increases in sediment or nutrient levels will be identified. The results of this and similar research will be helpful for restoring degraded habitats and in better managing riparian areas. As the vital roles that native plants play - regulating runoff, helping with soil and water conservation and improving freshwater habitat for many native animal species - become better appreciated, interest in using them more widely for conservation and utilitarian reasons will increase.

AgResearch

One of the three key areas for research promotes a healthy, safe environment. A project within that area is to develop cost effective technologies for using native plants to restore native biodiversity in degraded habitats. Also included is research on the ecology of native grasslands and their management to maintain biodiversity and integrate them with sustainable farm management systems.

2000/01 year PGSF total funding for Agresearch was $57.5 million. Of this amount $2.6 million is for pest management. The description of the work being undertaken recognises that there would be some benefits for indigenous flora and fauna species. [125]

Institute for Crop & Food Research

There is a strong commercial focus to the work of this CRI. Its research extracts and identifies natural plant products such as bioactive compounds, pigments and essential oils from native and introduced plants. Another area of research is based on the expansion of New Zealand's live plant and floriculture exports using, in part, native plants that fetch high prices on international markets. Research is focused on the development of flowering, propagation and post-harvest treatment for exported native plants.

Hort Research

Other CRIs, such as HortResearch, have research programmes that focus on the use and improvement of imported species, such as poplars and willows, rather than native plants in connection with erosion control and other land use management.

Department of Conservation (DOC)

DOC has management responsibilities for extensive public conservation lands, including the management of pests and weeds that threaten native species and ecosystems. To assist regional field managers and staff the department has an in-house research capacity to investigate a wide range of management-related issues. This includes research into the ecology of a range of native plants and ecosystems, the effects on them of weed and animal pests, and measures that can be taken to reduce the impacts of pests and restore degraded habitats. This research effort extends from coastal situations, freshwater and forests to South Island high country environments. DOC also contracts CRIs to undertake research as required.

As a rule DOC does not distinguish between research and management expenditures.

There is an extensive range of publications available to the public from its research and advocacy programmes that deal with practical aspects of managing weeds and pests as well as the promotion and management of native plants.

Some of these assist private landowners interested in managing native plants on their land.

Regional councils

Some councils contract for research to be undertaken relating to the conservation and management of native plants. This tends to have a strong management focus to meet the management responsibilities councils have under the RMA.

University research

The School of Forestry is located within the University of Canterbury and its courses and research are weighted to the use and management of introduced species. Some faculty pursue research interests into native plants and ecosystems. Research topics covered include: fragmentation and restoration ecology; conservation management; design of reserves; effectiveness of restoration plantings; indigenous forest ecology; and silviculture of indigenous species.

In the 2000/01 year PGSF provided $179,000 for research at the Forestry School to assess the sustainability of Māori-owned Indigenous Forests, so as to increase self-sufficiency and prosperity of Māori. It is recognised that much of research also relates to forest owners in general through the improved performance of sustainable forest management in social, economic, and ecological terms. [126]

In October 1999, a forum was held at the University of Waikato on "Native Trees for the Future". [127] It brought together researchers, managers and landowners concerned about the future of indigenous forest species and the tendencies to fund less and less research focused on indigenous tree species. The proceedings include papers on propagation, management of different species, ecology and management options and legal issues. The focus was not on utilising old-growth forests, but on the potential of plantation native trees in agricultural landscapes.

The PGSF has provided $197,000 to a University of Waikato project that is researching Māori sustainable development. While not specifically targeted at native plants it is intended to enhance Māori social and economic development by assisting tribal authorities and their memberships to define their own resources and taonga, and plan for the sustainable use and development of those resources. [128]

The University of Lincoln is also active in the area of the ecologically sustainable use of native plants. It hosted a symposium in conjunction with the Ministry of Agriculture and Forestry and Landcare Research in January 2000 on Sustainable Management of Indigenous Forest. [129] The International Centre for Nature Conservation at Lincoln University is also active is this area organising workshops to facilitate debate on issues surrounding ecologically sustainable use of native plants.

In addition, Lincoln University has incorporated indigenous biodiversity into its demonstration organic farm project.

All Universities in New Zealand are actively involved in research on aspects of indigenous plant ecology. One of the most active is this area, however, is Otago University as it has specifically identified as an emerging area the need to undertake research on ecological, conservation and biodiversity issues. Over the last three years the university has won research funding of $3.5 million. The scope of the work is broad, but does include research that assesses the patterns and processes in New Zealand plant communities; plant community and physiological ecology; and human impacts on soil and vegetation processes and patterns.

5.16 Publicly funded conservation and sustainable land management organisations

In New Zealand a number of organisations either entirely or mainly funded by the taxpayer are active in supporting the place of native plants on private land enhancing the conservation of indigenous species and habitats, and encouraging more sustainable land management.

These organisations can be described as either having a protection conservation focus, or working for conservation goals as part of broader sustainable management objectives over a range of land uses.

Conservation organisations

Nature Heritage Fund

The Nature Heritage Fund (NHF) is a contestable fund administered by an independent committee and serviced by the Department of Conservation. Originally called the Forest Heritage Fund, its focus was on indigenous forests, but in 1998 this scope was widened to include non-forest ecosystems. At present there are approximately 100,000 hectares under conservation management through the provisions of the fund. Landowners who wish to set aside areas for conservation can be supported through direct purchase, covenanting of land where the owner wishes to retain title, or by assisting with management costs.

Criteria developed by the fund as a basis for allocations are representativeness, sustainability, landscape integrity, and amenity and utility. [130]

Nga Whenua Rahui

Nga Whenua Rahui is also a contestable fund with a similar structure to the Nature Heritage Fund. The Nga Whenua Rahui committee is appointed by the Minister of Conservation and administers the fund, which is also serviced by the Department of Conservation. However, the kaupapa takes a different approach to the NHF with mechanisms that focus on Māori landowners retaining tino rangatiratanga. Agreements are subject to review, usually over a 25-year period.

At present there are about 112,000 hectares under Nga Whenua Rahui protection. There is a range of protection methods, including covenanting under a Nga Whenua Rahui kawenata. This allows for consideration of Māori values in terms of spiritually and tikanga. Cultural use of these natural areas is blended with the acceptance of public access within the agreements.

Māori reservations are another mechanism that can be used to protect places of cultural, historic or scenic interest in accordance with Part XVII of Te Ture Whenua Act 1993. This involves the setting aside of areas as Māori reservations. [131]

Queen Elizabeth II National Trust

The National Trust is an independent trust established by the Queen Elizabeth the Second National Trust Act 1977, and administered by a board of directors. The objective of the Trust is to encourage and promote the provision, protection and enhancement of open space for the benefit and enjoyment of the people of New Zealand. [132] The objective is to be pursued without jeopardising the rights of ownership.

A Queen Elizabeth II National Trust Open Space Covenant is a legal agreement between the National Trust and a landowner to protect a special open space feature in perpetuity (or, occasionally, for a specified time). Landowners often initiate contact with the National Trust, as it is seen to be independent. The Trust's approach relies on landowners' goodwill and commitment for the ongoing care and management of the covenanted area over the longer term.

To date, over 1,400 Open Space Covenants covering in excess of 50,000 hectares have been registered. These covenants protect a variety of open space, including forest and forest remnants, wetlands, lakes, peat lakes, coastline, tussock grasslands, tracts of rural landscape, archaeological sites, and geological formations. [133]

Sustainable land management organisations

New Zealand Landcare Trust

The New Zealand Landcare Trust was established in 1996 to promote sustainable land management practices and help communities become more involved in land management issues. It is largely funded by central Government and is a component of its Sustainable Land Management Strategy. The funding level from Government is $450,000 per year, and this commitment was confirmed in the 2001 Budget.

Landcare Trust also receives funding from private sources, including support announced in May 2001 by the Transpower - Landcare Trust Grants Programme.

The first priority of the trust is to inform the public about sustainable land management issues and practices and to promote, monitor and achieve improved land management performance in the community. The trust has no regulatory powers but operates as a facilitator for the initiatives of various landcare groups by providing help, information and technical advice. Landcare groups have been established in all regions, but their roles vary depending on local needs, which can include native plants on private land under more general concerns such as 'nature conservation', 'waterways protection', and 're-vegetation and replanting'.

5.17 Private organisations

This section gives a brief account of some of the private, often volunteer organisations that are actively involved at a national level in promoting the cause of native plants on private land. This can occur through:

- proactive liaison with key decision-makers in central and local government
- contributing to agencies' consultation rounds and to RMA consent processes
- providing information about the group's particular perspectives both on specific issues and at broader policy levels.

In addition there are numerous community-based groups that are active at local levels with a wide range of initiatives for the propagation, planting and maintenance of native plants in habitats ranging from sand dunes and stream margins to hillsides and urban landscapes.

Royal Forest and Bird Protection Society

New Zealand's largest conservation society, Forest and Bird was formed in 1923 as the New Zealand Native Bird Protection Society (see section 5.3). From its beginnings the society has been involved in issues well beyond its core interests in the protection of native birds. The society's current objectives are to preserve and protect the indigenous flora and fauna and natural features and landscapes of New Zealand for their intrinsic worth and for the benefit of all people. The society and its many branch members have long taken an interest in the protection of native plants, advocating for their protection through the creation of national parks or other categories of protected areas. The society owns a number of forest reserves throughout the country where members actively control animal pests and weeds. Members are involved in restoration schemes and plant nurseries, such as the restoration and interpretation work, underway since 1985, at the Pauatahanui Reserve, a tidal marshland north of Wellington.[134]

Fish and Game New Zealand

Fish and Game New Zealand is mandated under the CA to manage freshwater sports fishing and game bird hunting on behalf of anglers and hunters. One of its primary roles is conservation of habitat, specifically the places where sports fish (trout) and game birds (e.g. ducks, pheasant) live. The major interest is in protection of natural waterways and protection of wetlands. Fish and Game New Zealand operates through making submissions during planning processes under the RMA and through political and community advocacy. It gets directly involved with the

purchase and management of wetlands and with assisting landowners to create, enhance and manage wetlands. Planting advice stresses the importance of using native plants if a natural wetland is the goal, although introduced plants also feature on 'suitable species' lists for purposes such as amenity and food. [135]

Ducks Unlimited New Zealand Inc.

Ducks Unlimited New Zealand has similar interests to Fish and Game in ensuring there is quality habitat for New Zealand game birds. A membership-based society, it is dedicated to the conservation of New Zealand wetlands through: wetland restoration and development, conservation programmes for threatened waterfowl, and advocacy and education of wetland values. Ducks Unlimited has purchased a number of significant wetlands throughout the country and run campaigns aimed at increasing the numbers of the threatened native brown teal (pateke) and blue duck (whio). Tips are given on which native species to plant to encourage native birdlife in general as well as game birds. Both Ducks Unlimited and Fish and Game New Zealand have a national structure and regional field staff.[136]

New Zealand Native Forest Restoration Trust

The trust was founded in 1980 as an outcome of the 'tree top protests' that ended the logging of podocarps in Pureora Forest. The objects of the trust are to encourage and undertake the restoration of degraded or destroyed New Zealand indigenous habitats and plant communities. The trustees have raised money and purchased for restoration over 4,000 ha, all of which is now under covenant. The trust has been particularly active in Northland where purchases adjacent to the Waipoua Forest and extensive replanting aim to improve the integrity of the forest ecosystem and provide links between separate areas of forest. Purchase, followed by active restoration work, has also occurred in the King Country, around the Waitomo Caves, the Wairarapa and in a number of other areas. The Trust works with the Royal Forest and Bird Protection Society, DOC, the Queen Elizabeth the Second National Trust and other conservation organisations.[137]

NZ Farm Forestry Association

Formed in 1957, the NZFFA has over 4,000 members throughout New Zealand in over 30 branches. Their focus is strongly oriented towards the planting and management of exotic timber species, but the association does have an indigenous forest section. This section of NZFFA promotes indigenous forestry (including timber production), and the "ecologically sustainable management of indigenous forests so that they retain their unique characteristics for the benefit of future generations". Members share information and experience on the management of native plants and many are actively involved in planting programmes with native species for conservation, amenity or long-term use objectives.[138]

New Zealand Institute of Forestry [139]

Founded in 1927, the New Zealand Institute of Forestry has as members people who are currently studying, working in, or have an interest in forestry. There were around 800 members (in five categories) in 2000, representing disciplines such as economics, law, engineering and resource management as well as forestry. From 1996 full members of NZIF wishing to provide forestry consulting services to the public could become registered forestry consultants and obtain an annual practising certificate. The institute enables members to exchange ideas and information on forest management, utilisation, research and consulting. While its focus is largely on exotic timber species, the growth in farm forestry is increasing landowner interest in the use and management of native species.

The institute has developed an indigenous forest policy which states that it believes that New Zealand's indigenous forests have important ecological, cultural, production and scientific

values that contribute to the economic and social well-being of the nation. The policy also states that the institute advocates and supports a range of goals. The first of these is:

a forest ecosystem management approach to manage New Zealand's indigenous forests sustainably and, in particular, to sustain forest productivity, health, biodiversity, soil quality, water quality, natural landscapes, and the full range of natural forest ecological processes [140]

New Zealand Ecological Society

The New Zealand Ecological Society was formed in 1951 to promote the study of ecology and the application of ecological knowledge in all its aspects. The society attempts to encourage ecological research, increase awareness and understanding of ecological principles, promote sound ecological planning and management of the natural and human environment and promote high standards both within the profession of ecology by those practising it, and by those bodies employing ecologists.

Activities include an annual conference, a biannual publication of a scientific journal, New Zealand Journal of Ecology, a regular newsletter, with one objective of fostering debate on current ecological issues in New Zealand and also the provision of special purpose publications.[141]

5.18 Corporate involvement with native plants on private land

Corporate landowners

Forestry corporations own a significant proportion of land in pine plantations that also include remnants of indigenous vegetation. In 1999 corporations owned 47% (805,000 ha) of planted production forests. A further 44% (770,000 ha) were privately owned (including privately owned companies, partnerships, trusts and Māori trusts).[142] There is also a corporate presence in farming activities and this seems to be especially true for larger sized properties.

There is a perception that there is an increasing corporate ownership of farms. The concern expressed in discussions for this project was that corporate landowners are less likely to have a commitment to the protection of native plant remnants on the lands they manage. This view is based on the perception that corporate farms, being answerable to shareholders, are managed principally to maximise profit. Therefore, the managers of these farms will have only a limited ability to make decisions that trade-off those activities that provide an economic return for those that provide other sorts of benefits, such as conservation and amenity values. There was also a perception that the corporate farming model is not conducive to the development of a stewardship ethic, unlike the intergenerational family farm model.

Corporate conservation efforts

Some corporations have initiated and sponsored projects for the benefits of native plants in the landscape.

Project Crimson, established by NZ Forest Products (now Carter Holt Harvey) in 1989, is one such scheme that has been taken up by the broader community. Initially focusing its efforts on pohutukawa restoration in the North, the Project Crimson Trust extended its work in 1996 to include the three species of New Zealand tree rātā. The trust is involved with a range of community-based projects, including conserving existing stands, research, advocacy, plant nurseries, and restoration plantings. Over the last ten years the trust has established 200,000 pohutukawa trees.

Another organisation is the recently founded New Zealand National Parks and Conservation Foundation, an independent charitable trust. It was established to promote and support the conservation and protection of New Zealand's unique natural heritage.

The foundation's current aim is to build an endowment to fund $2 million over the next three years using corporate and private support. From

this fund, grants will be made to a range of conservation projects, particularly those supporting projects in and around national parks.[143]

New Zealand Forest Accord

In 1991, the New Zealand Forest Owners' Association (representing a number of the major forestry companies), the New Zealand Timber Industry Federation, the New Zealand Farm Forestry Association and the New Zealand Wood Panels Manufacturers' Association signed an agreement with a number of environmental organisations. [144]

This agreement was the 'New Zealand Forest Accord' and it had a range of objectives intended to protect naturally occurring areas of native plants within land owned or managed by the companies.

The accord defines naturally occurring indigenous vegetation to include:

- any emerging area of tree species of 5 hectares or greater
- any area between 1 and 5 hectares where the native vegetation has an average canopy height of at least six metres
- any area recommended for protection under the Protected Natural Area Programme, or classified as a Site of Special Wildlife Interest or would qualify as a Recommended Area for Protection.

The accord does recognise that production management and the harvesting of naturally occurring indigenous forest can occur, but this can only happen where such an activity is conducted on a sustainable basis taking account of the rate and method of extraction. The forest ecosystem in the area must be maintained in perpetuity.

The accord did not apply to those forests referred to under the West Coast Accord and the transitional arrangements in Southland. [145]

The Principles of Commercial Plantation Forest Management in New Zealand

The Principles of Commercial Plantation Forest Management in New Zealand are an attempt to build on the Forest Accord. The principles are an agreement made in 1995 between the New Zealand Forest Owners Association and New Zealand Farm Forestry Association and the Royal Forest and Bird Protection Society, World Wide Fund for Nature - New Zealand, Federated Mountain Clubs and the Maruia Society (now the Ecologic Foundation).

The agreement attempts to address some of the environmental concerns with respect to issues relating to the management of plantation forestry. The objective of the agreement is:

To promote understanding between the signatory parties with a view to New Zealand achieving environmental excellence in plantation forest management and participating as an effective advocate internationally for the sustainable management of plantation forests and the protection, preservation, and sustainable management of natural forests. These principles are complementary to the New Zealand Forest Accord. (August 1991)

In the agreement consideration is made of the impact of plantation management on:

- threatened wildlife habitat within plantation forests
- indigenous biodiversity in plantation forests
- prevention of the spread of exotic wildings species
- water, soil and ecosystem values
- risks associated with the use of agrichemicals, biological controls and pests
- social factors such as public access, tenure and rights use, landscape values and community consultation.

During discussions for this paper some concerns have been raised about the Forest Accord and the Principles of Commercial Plantation Management In New Zealand. These concerns include:

- the number of major forestry companies that have entered New Zealand and that are not bound by the accord
- that while the companies are required under the principles agreement to undertake restoration of natural areas many of these are often not well maintained
- that the companies have sold lands including natural areas in them to non-signatory third parties
- that there is inadequate recognition of the provision in the accord that allows for the sustainable management of natural areas for production by some of the environmental group signatories.[146]

1 DEST 1993
2 MAC 2000, p 21.
3 MFE and DOC 2000.
4 MFE 2000.
5 Stephens 1999.
6 MAC 2000, p 31.
7 MAC 2000, p 21.
8 MAC 2000, p 31.
9 Norton and Roper-Lindsay 1999.
10 ibid.
11 Shepard 1969 & Park 1995.
12 MFE 1997, p 9.30.
13 Dunlap 1999.
14 Thom 1987.
15 Roche 1987.
16 MFE 1997, p 8.31.
17 MFE 1997, p 8.6.
18 NZCA 1997, p 113.
19 Roche 1987.
20 Thom 1997, p 120.
21 Thom 1987, p 126.
22 Roche 1987, p 17.
23 NZCA 1997, p 115.
24 This is consistent with the definition of 'conservation' in the Conservation Act 1987. The Act defines conservation as meaning "the preservation and protection of natural and historic resources for the purpose of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options of future generations".
25 Leist and Holland 2000.
26 WCED 1987, p 8.
27 ibid p 8.
28 Leist and Holland 2000.
29 AtKisson 1999, p 145.
30 Hamilton et al. 1998, p 96.
31 AtKisson 1999, p 9.
32 United Nations International Covenant on Economic, Social and Cultural Rights and United Nations International Covenant on Civil and Political Rights.
33 Holling 1995, p 9.
34 Holling 1995, p 6.
35 Allen 1999.
36 Begon et al. 1996.
37 Reducing complex issues or scientific problems to their basic component parts; the expectation that a system can be understood in terms of its isolated parts (Concise Oxford Dictionary).
38 Holling 1995, p 13.
39 Holling 1995, p 9.
40 O'Connor 1998, p 17.
41 Orbell 1985, p 167.
42 Barlow 1991, p 148.
43 Manatu Māori 1991, pp 2-3.
44 NZCA 1997, p 92.
45 Waitangi Tribunal 1993, p 18 (quoting the NZ Māori Council 1983, from Kaupapa: Te Wahanga Tuatahi).
46 NZCA 1997, p 88 (quoting Margaret Mutu 1994, from The use and meaning of Māori words borrowed into English for discussing Resource Management and Conservation in Aotearoa/New Zealand).
47 Waitangi Tribunal 1983.
48 Swidden garden - a gardening method that uses slash and burn techniques to clear the land.
49 Park 1995, p 47.
50 NZCA 1997, p 94.
51 Jacob Haronga FOMA, pers comm.
52 McGowan 1999.
53 Interview with Te Taru White, Māori Forestry Association, NZ Forest Industries 29(4), April 1998, p 11.
54 ibid p 11.
55 ibid p 12.
56 PCE 1998, pp 16-26.
57 *Paihia and District Citizens Assn Inc v Northland Regional Council* (unreported, Environment Court A77/95, 10 August 1995, Judge Sheppard), 10/8/95.
58 Contemporary press item quoted in Murray Parsons' Introduction to the Biodiversity Ethics Symposium, Lincoln University, July 1996.
59 McGowan 1999.
60 Kel Sanderson, Director, Business and Economic Research Limited, Wellington, 2001, pers comm.
61 See section 5.16 for a description of the functions these organisations.
62 MAF 2000.
63 Tim Thorpe, Forestry Consultant, 2001, pers comm.
64 FSC 2001.
65 Landcare Research - Manaaki Whenua 2001.
66 Livesey 1999 and Merrifield 1996.
67 Ricker kauri - young kauri.
68 Roger MacGibbon, Environmental Consultant, Managing Director, Natural Logic Limited, Taupo, 2001 pers comm.
69 Bergin 1999.
70 Barton 1999.
71 Stephenson 1999.
72 Horgan 1999.
73 Wallingford 2001.
74 Don Bell, Vice President of the New Zealand Beekeepers Association (Inc), Sheffield, New Zealand, 2001, pers comm.
75 David Given, Manager, International Centre for Nature Conservation, Lincoln University, New Zealand, 2001, pers comm.
76 MAC 2000, p 56.
77 This section is indebted to a report by Philip A Joseph, commissioned by the Ministry for the Environment; Property Rights and Environmental Regulation under the Resource Management Act 1991, December 1999.
78 Williams 1997, p 9.

[79] ibid p 10.

[80] This principle can be traced back to statutes of the English Parliament dating from the early 15th century and is believed to have its origins in the Magna Carta 1215, although the Magna Carta does not explicitly mention compensation. See Joseph 1999, p 10-11.

[81] Memon 1993.

[82] Scott 1996.

[83] Memon 1993.

[84] ibid.

[85] Environment Act 1986 s31(a) - (e).

[86] Conservation Act s6(a), (b) and (f).

[87] ibid s2.

[88] Intrinsic values are not defined in the Conservation Act; however the Resource Management Act defines them as:

in relation to ecosystems, means those aspects of ecosystems and their constituent parts which have value in their own right, including:

(a) Their biological and genetic diversity

(b) The essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience.

[89] Memon 1993.

[90] There is also provision for Māori customary use and the New Zealand Conservation Authority is currently working on this issue, NZCA 1997.

[91] Native Plants Protection Act 1934 (NPPA) s4(1) with certain exceptions e.g. reasonable quantities taken for scientific research.

[92] Specified by Warrant of the Governor General, 17 April 1935.

[93] Native Plants Protection Act 1934 s8.

[94] FA s67D(i)(b)(iii) and (vi) and s67D(3).

[95] FA s67M (2)(a).

[96] Ministry of Forestry 1997, FA s67M(3).

[97] ibid, FA s67N and 2nd Schedule clause 10(2)(a).

[98] FA 67F(2).

[99] FA s67V.

[100] Information in the document brought up to date by personal communication with MAF officials.

[101] Primary Production Committee 2000.

[102] The South Island Landless Natives Act 1906 was repealed by the Native Lands Act 1909, before all of the grants were implemented, and further implementation was barred. Ngai Tahu Deed of Settlement s15D 1997.

[103] Hansard, 11 March 1993.

[104] *Minister of Conservation v Southland District Council* (Unreported, Environment Court A039/01, 19 April 2001, Sheppard J).

[105] See < http://www.mpci.org/meetings/future/broch_e.html#2>

[106] See < http://www.mpci.org/meetings/future/broch_e.html#4>

[107] Section 5. Purpose-

(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.

(2) In this Act "sustainable management" means managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables peoples and communities to provide for their social and economic and cultural well being and for their health and safety while-

(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations

(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems

(c) Avoiding, remedying or mitigating any adverse effects of activities on the environment.

[108] *NZ Rail Ltd v Marlborough District Council* [1994] NZRMA 70, 85.

[109] See for example *Waitakere Ranges Protection Society Inc v Waitakere City Council* (Unreported, Environment Court A89/00, 19 July 2000, Whiting J), paragraphs [54] to [72].

[110] *Environmental Defence Society v Mangonui County Council* [1989] 3 NZLR 257, 262 [EDS]. This case considered section 3(1)(c) of the Town and Country Planning Act 1977 (TCPA) which, slightly modified, became RMA s6(a).

[111] See for example Waitakere (endnote 109).

[112] *Wakatipu Environmental Society Inc v Queenstown Lakes District Council* [2000] NZRMA 59,82.

[113] *Waitakere Ranges Protection Society Inc v Waitakere City Council* (Unreported, Environment Court A89/00, 19 July 2000, Whiting J) paragraph [53].

[114] See *Nugent Consultants Ltd v Auckland City Council* [1996] NZRMA 481.

[115] RMA s32(1)(a)(ii).

[116] DOC 1999.

[117] ibid.

[118] Article by David Norton entitled *Coast fears private land grab,* The Press, 11 June 2001.

[119] RMA s30(1)(a) and (c).

[120] Regional Pest Management Strategies s71 Biosecurity Act 1993.

[121] RMA Amendment Bill 1999 clauses 10A and 10B.

[122] Spinifex - coastal dune plant, *Spinifex sericeus*

[123] Foundation for Research, Science and Technology, 2001.

[124] ibid.

[125] ibid.

[126] ibid.

[127] Silvester and McGowan 1999.

[128] Foundation for Research, Science and Technology 2001.

[129] Stewart et al. 2000.

[130] www.doc.govt.nz/commu/priv/fhf.htm

[131] www.doc.govt.nz/commu/priv/ngawhen.htm

[132] Queen Elizabeth the Second National Trust Act 1977.

[133] www.nationaltrust.org.nz/about/index.html

[134] www.forest-bird.org.nz/index.asp

[135] www.fishandgame.org.nz/

[136] www.ducks.org/conservation/newzealand.asp

[137] www.geocities.com/RainForest/6581/

[138] www.nzffa.org.nz/main.html

[139] www.fore.canterbury.ac.nz/nzif/home.html

[140] www.fore.canterbury.ac.nz/nzif/indigens.htm, 9 June 2001.

[141] www.nzes.org.nz/

[142] www.maf.govt.nz/MAFnet/publications/nefd99/nefd9915.htm

[143] www.nationalparks.org.nz/

[144] The Royal Forest and Bird Protection Society of New Zealand (Inc.) together with the following environmental or recreational organisations which collectively comprise the New Zealand Rainforest Coalition:

- Environment & Conservation Organisations of N.Z. Inc.
- Federated Mountain Clubs
- Friends of the Earth
- Beech Action Committee
- Pacific Institute of Resource Management
- World Wide Fund for Nature (N.Z.)
- Japan Tropical Forest Action Network
- Tropical Rainforests Action Group

  and
- Maruia Society.

[145] http://homepages.caverock.net.nz/~bj/beech/other/nzaccord.htm

[146] http://nzfoa.nzforestry.co.nz/pfm_principles.asp

Glossary - Nga Kupu Māori

Aotearoa	New Zealand
atua	gods
hapū	family or district groups, communities
harakeke	flax, used in weaving, *Phormium tenax*
Hawaiki	original Pacific homeland of Māori
hui	gatherings, discussions, meetings, usually on marae
iwi	tribal groups
kaitiaki	iwi, hapū or whanau group with the responsibilities of kaitiakitanga
kaitiakitanga	the ongoing necessity for tangata whenua to look after the taonga, both physical and intangible, that are their heritage
karakia	prayer, incantation, expression of respect
kaumātua	elder, decision-maker for the iwi or hapū
kaupapa	plan, strategy, tactics, methods, fundamental principles
kawanatanga	government, the right of the Crown under the Treaty of Waitangi to govern and make laws
kawenata	covenant, mechanism established under the Nga Whenua Rāhui programme
kereru	wood pigeon
kōwhaiwhai	painted scroll ornamentation
kukupa	wood pigeon
mahinga kai	places where food and other resources are traditionally gathered, and the gathering and management of those resources
mana	the status and authority of tangata whenua
mana whenua	traditional status, rights and responsibilities of hapū as residents in their rohe
marae	local community and its meeting places and buildings
matauranga	traditional knowledge
mauri	essential life force or distinctiveness that enables each thing to exist as itself
pīngao	coastal dune plant valued for weaving, *Desmoschoenus spiralis*
rāhui	protection of a place or resources by forbidding access or harvest
rangatahi	younger generations
rangatiratanga	the right of iwi, hapū and whanau to make their own decisions about things that concern them
raranga	weaving
rohe	geographical territory of an iwi or hapū
rongoā	plants traditionally used for medicinal purposes
runanga	committee of senior decision-makers of an iwi or hapū
tangata whenua	people of the land, Māori people
taonga	valued resources, assets, prized possessions both material and non-material
tapu	the particular sacredness of people, things and places for particular reasons
te ao marama	the world of light
te reo	the Māori language
Te waonui a Tāne	the great forests of Tāne
tikanga	customary correct ways of doing things

tuku iho	passed down from the ancestors
wāhi tapu	special and sacred places
waka	canoe
wānanga	place of education, university
whakapapa	genealogy, ancestry, identity with place, hapū and iwi
whanau	family groups
whanaungatanga	relationship, kinship, bonds
wharenui	meeting house on the marae

Acronyms

CA	Conservation Act 1987
CBD	Convention on Biological Diversity
CRI	Crown Research Institute
DOC	Department of Conservation
DEST	Commonwealth of Australia Department of the Environment, Sport and Territories
EA	Environment Act 1986
EC	Environment Court
FA	Forests Act 1949
FAA	Forests Amendment Act 1993
FOMA	Federation of Māori Authorities
FSC	Forest Stewardship Council
FRI	Forest Research Institute
IFU	Indigenous Forestry Unit
ITA	Income Tax Act 1994
KNE	Key Native Ecosystem programme of Wellington Regional Council
MAC	Ministerial Advisory Committee on Biodiversity and Private Land
MFE	Ministry for the Environment
NGO	Non Governmental Organisation
NHF	Nature Heritage Fund
NZCA	New Zealand Conservation Authority
PCE	Parliamentary Commissioner for the Environment
PNAP	Protected Natural Area Programme
RMA	Resource Management Act 1991
SILNA	South Island Landless Natives Act 1906 (repealed)
SNA	Significant Natural Area
SOE	State Owned Enterprise
TLA	Territorial Local Authority

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