

# Protecting habitats on private land

Perspectives from Northland, New Zealand

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Peter Davis and Chris Cocklin

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# Protecting habitats on private land:

## Perspectives from Northland, New Zealand

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### ABSTRACT

The cumulative impact of the habitat loss that occurred in the process of 'developing' New Zealand has led to the need to conserve and protect much of the habitat remaining on private land. A range of mechanisms has been produced to reduce habitat losses and to provide some level of protection. Although the benefits of retaining habitats are mostly public, the costs incurred (opportunity costs, rates, fencing, pest control, etc.) in retaining and maintaining them are less evenly distributed. This report considers the causes of habitat loss, the approaches to habitat protection, and the implications of these in terms of the distribution of the costs and benefits resulting from them. It argues that, while habitat clearance needs to be addressed through regulation, to require habitat owners to bear much of the cost associated with retaining those habitats penalises those who provide the public good. In addition, the uneven distribution of habitats means that protecting them has spatial and social implications. The findings are based on a case study of the Northland region, involving extensive surveys of farmers, intensive studies of rural residents, and a detailed examination of the extent of habitats and the policies affecting them at district and regional levels of local government.

Keywords: habitat protection, distributive issues, protective mechanisms, regulation, Northland, New Zealand.

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# 1. Introduction

During the millennium or so of human colonisation of New Zealand, 70% of its forest cover and 90% of its wetlands have been lost (Ogle 1994, MfE and MFAT 1995). Clearance of habitat (in this report applied to natural habitats of native species), hunting, and the impact of introduced pest and weed species have contributed to the extinction of over 50 endemic species, including over half the endemic bird species (Molloy & Davis 1994). Currently over 400 species of plants and animals are listed as threatened with extinction, including the kiwi, a national symbol (MfE 1995). In 1995, a goal of 'maintaining and enhancing the net area of New Zealand's remaining indigenous forests and enhancing the ecological integrity of other remaining indigenous ecosystems' was adopted (MfE 1995). Achieving this would conclude the chapter of New Zealand's history in which its unique indigenous habitats and biodiversity have been severely damaged largely as a result of human activity.

There have been significant attitudinal and legislative changes regarding native habitats since the pioneering days, when bush clearance was virtually an obligation. These changes accelerated in the last decade; most public indigenous forests are now under the protection of the Department of Conservation, there have been significant increases in public funding for protecting private habitats, and most corporate felling of indigenous forests has ceased. Over 8 million ha (30%) of land are now under legal protection for conservation purposes, most of it in public ownership. However, the public conservation estate is seriously unrepresentative in terms of indigenous ecosystems, particularly the lowland forests typical of the more accessible and fertile lands (Molloy 1980; MfE 1995). Twenty percent of the area of remaining habitats are on private land, and these are of critical importance for biodiversity conservation, as they are rich in these rare habitat types and many threatened species rely largely or solely on them. Only a small proportion of such habitats have any formal protection, and while some landowners provide intentional, though informal, protection, there is an urgent need to increase the level of legal, permanent protection to assist in the conservation of the nation's threatened species and ecosystems (Cutting & Cocklin 1992).

Landowners who have native habitats on their land are faced with the 'eternal conflict' over using and conserving (Park 1990). The conflict occurs at both personal and social scales. At the personal level, landowners and their families have to reconcile their own environmental and economic goals within constraints determined by remote processes and structures: agricultural policy, land use regulation, the internationalisation of the market place, global agreements, consumer demands for inexpensive food and fibre. Any environmental concerns have to be balanced by landowners' need to survive economically in a competitive market place, or risk losing their land. At the social level, conservation and production interests are contesting the rights to private (economic) benefits or public (environmental) benefits (Bromley & Hodge 1990). While the push to secure environmental goods is perceived by landowners as a threat, the principle of internalising environmental costs so that those who generate them pay for them has gained wide support. However,

making landowners pay for environmental 'bads' generated in their activities raises the question of whether they should also be recompensed for providing environmental good (Munton 1995).

As well as the conservation benefits, retaining and protecting habitats has benefits in terms of water and soil factors, social, spiritual and cultural values, tourism and recreational opportunities, and, in some cases, property resale values. While some portion of these benefits may accrue to the landowner, much is shared by the wider community, other land users and even future generations. There are also costs involved in habitat protection: those incurred in achieving protection, maintenance costs, and foregone economic opportunities. How these costs are distributed is determined by the approaches taken to achieving habitat protection.

Other distributional concerns arise because habitats are not evenly distributed socially or spatially. Over half of the native forests on private land in New Zealand are on Maori land—a situation that has arisen through a combination of factors: attitudes to land management (James 1993), economic and political marginalisation (Asher & Naulls 1987), and institutional resistance to accepting communally owned land as collateral for capital to finance land development (O'Regan 1994). In addition, the occurrence of habitats is, in general, inversely related to population intensity and, hence, the economic strength of regions. This raises questions over the jurisdictional scale at which habitat protection mechanisms and policies are implemented if consideration is to be given to the ability of communities to fund the protection. Habitats are also unevenly distributed among landowners, which raises important issues given that the ecological value of the remaining habitats has increased due to the cumulative effect of previous clearances. How the responsibility for provision of habitat should be shared between those with habitats on their land and those who do not also requires some consideration. Such distributional issues are critical to the effectiveness and fairness of approaches to achieving New Zealand's conservation goals.

## 1.1 OBJECTIVES

As a result of the unrepresentative nature of the Crown's conservation estate, many threatened habitats and species occur largely or solely on private land. While the management of natural habitat on private land is not explicitly the responsibility of DOC, but rather regional and local territorial authorities, DOC does have an interest in promoting protection on private land as part of its wider advocacy role and as part of its strategic approach to conservation management.

The primary objective of this report, therefore, is to provide DOC with information regarding the costs and benefits associated with protecting habitats on private land and the distribution of these in order that the Department might more effectively fulfil its advocacy role. This requires a thorough contextual understanding of the social, economic and regulatory factors that contribute to habitat loss and protection, the social implications of the approaches taken to protecting the current conservation resource, and the social, political and

economic forces which influence or determine landowners' decisions regarding habitats on their properties (Pierce 1996). The research therefore has the following objectives:

- outline the regulatory framework that influences habitat protection;
- review the various economic and regulatory instruments for habitat protection;
- identify the benefits and costs that accrue from habitat protection on private land and consider the distributional implications of these;
- consider the role of local communities in the protection of ecological assets on private land.

## 1.2 METHODOLOGY

The research took a multifaceted approach to data collection. It incorporates findings from two postal surveys of Federated Farmers members undertaken as part of a project on sustainable land-based production in Northland (FRST Contract UOA 509). The questionnaires contained a mix of discrete and open-ended questions and the responses provided substantial qualitative and quantitative data on land use and approaches to sustainable management (for more details refer to Section 5, and to Blunden & Cocklin (1995) and Blunden et al. (1997)). A more in-depth analysis of landowners' perspectives on the question of habitat protection was gained through a series of case studies of landowners in the Mangakahia area of Northland (for more details refer to Section 5 and Davis (1997)). In addition to these two primary sources of data, various secondary sources of data were used. These include: data from Valuation New Zealand on land values, Statistics New Zealand data on land use, rating information from district councils, and figures on protection costs from the QEII Trust and the Northland Regional Council. In the process of obtaining the data there were numerous interviews with the staff of many agencies (see Acknowledgements).

# 2. Natural habitats: threats and responses

## 2.1 CAUSES OF BIODIVERSITY AND HABITAT LOSS

In the global context, human destruction of habitat through burning, logging, clearance, and drainage has occurred primarily as a result of developing food, fibre and timber resources (McNeely et al. 1990; WCMC 1992; Saunders et al. 1987). The loss of habitats impacts directly on the species which rely on them. The impact depends on factors such as mobility, population numbers and adaptability of the species concerned. Reductions in the size of habitats also reduces their carrying capacity, limiting the number of species that can survive

in the reduced area (Norton 1991). It also increases the 'edge effect', facilitating the spread of weed and pest species (Hobbs & Saunders 1993). Additionally, habitat clearance affects ecosystem processes, such as the physical and chemical fluxes of radiation, wind, water and nutrients, which can result in secondary habitat decline and species loss (Hobbs & Saunders 1993). Changes to habitats can create environments that are better suited to introduced species (intended or otherwise), further increasing pressure on indigenous species (Anderson et al. 1984).

Fragmentation of habitats, which is particularly common in the agricultural landscape due to the multitude of owners and uncoordinated nature of decision making regarding environmental protection, is of particular concern, as many species require significant areas of undisturbed habitat or close proximity of remnants for their survival (Ogle 1982; Potter 1990). Habitat remnants are more prone to invasion by pests and weeds, to grazing and trampling by stock or humans, and microclimatic and hydrological changes. Protection of remnants can be decisive in maintaining the viability of some species by acting as stepping stones between larger 'self-perpetuating' habitats. However, they require more intensive management to ensure their survival (Hobbs & Saunders 1993).

Underlying the decisions and activities of those engaged in transforming habitats are economic, socio-cultural, and political factors (Barbier et al. 1994; Moser 1996). Commonly identified causes include: population changes, market forces, property rights, and political and institutional factors (see for example Dunlap & Catton 1979; Moser 1996; Pierce 1996; Young et al. 1996). In addition, the unknown impact of current resource management practices and the paucity of knowledge about many species or their susceptibility to threatening factors means that knowledge deficiency is a critical factor (Young et al. 1996).

### **2.1.1 Market factors**

Many of the negative environmental consequences of human actions are not captured in the prices of the goods and services produced as there are no direct financial costs incurred by those responsible. Instead of being paid for directly by the consumers, these environmental costs are externalised. Until these environmental costs of production are 'internalised', those producers who reduce their environmental impacts do not benefit from associated reductions in their production costs and so gain no economic advantage unless they can capture premium prices from environmentally committed customers. Furthermore, if those who reduce their environmental impacts incur additional costs (or reduced outputs) with no compensating rise in income, they risk being outbid for land or capital by those who continue to externalise their environmental costs (Hodge 1991; Rees 1992; Pearce & Moran 1994).

In applying the internalisation principle to conservation-related issues there is an additional dimension to be considered: when landowners clear habitats do they generate a cost (the loss of ecological services) or are they ceasing to provide a benefit? If it is the former, it could be argued that they should have to pay an equivalent charge when the habitat is cleared; on the other hand,

retaining the habitat could be seen as providing a service for which they should receive a payment that they forego if they clear the habitat (Hodge 1991).

While some degree of internalisation of the environmental costs (or benefits) of habitat loss (or retention) can be achieved through taxes, fees, tradeable quotas and permits, or by creating or assigning property rights to otherwise unowned resources, the 'public good' attributes of habitat protection mean that the provision of habitats through the market is likely to remain sub-optimal, and other mechanisms will be required to stimulate their supply or retention, including the use of regulations, public or private, such as setting standards or limits or enforcing bans (Hodge 1991, 1994; Pierce 1996).

In addition, where financial incentives exist to clear or degrade habitats, such as tax regimes, rates and input subsidies, it may be necessary to remove these, though the withdrawal of these can have negative motivational outcomes (Young et al. 1996). Price-based instruments may also involve cross-compliance, whereby subsidies and financial support programmes or rates relief are only available to those who undertake specified environmental actions. These are more common in the highly subsidised agricultural contexts of Europe and the USA, where their use has signalled a shift in agricultural policy towards ensuring that public interests are incorporated in farm management (Bishop & Phillips 1993). However, the concern remains that by subsidising agriculture, such environmental compensation inflates the price of conservation as an alternative land use (Marsden et al. 1993).

### **2.1.2 Policy pitfalls**

Since the late 1940s, agricultural policy in most developed nations has focussed on increasing production and productivity through both public and private sectors, while endeavouring to maintain rural communities by improving the stability and income of the farming population (Pierce 1992). Policies have included trade controls, such as tariffs to protect domestic producers, grants, subsidies and low interest loans to subsidise the price of inputs, and price supports for commodities. The results have been increased farm income, increased productivity, increased downstream processing, increased exports and subsidised food for consumers. There have also been costs: loss of biodiversity and habitat, loss of landscape or amenity values and loss of recreational and hunting opportunity, ecosystem damage and erosion and flooding problems (Pierce 1992).

There have been two general policy mechanisms involved, internationally. One set comprises those that seek to actively encourage the development of land-based industries through the direct conversion of habitats, such as land clearance grants, drainage subsidies or forestry tax incentives. Secondly, there are policies that indirectly make converting habitats more profitable. These include price support schemes, fertiliser subsidies, tariffs, and exchange controls. There are also secondary effects which make the task of habitat protection more difficult. For example, subsidies that maintain farmers' return on production have a positive effect on land prices and, as a consequence, increase the cost of conservation (Marsden et al. 1993).

### 2.1.3 Property rights

Property, it should be reemphasised, is a claim to a benefit stream, and rights to such resources give the right holder an expectation that the state will support their interests (Bromley 1996). This power has been gained through political contestations, and rights therefore express and protect values determined at the time of the contestation (Munton 1995). Renegotiation of property rights is part of the social process involved in pursuing collectively determined and evolving goals.

Property rights related to habitat are based on two fundamental concepts of property, the first being the conception that property includes exclusive rights of possession, use, and disposition, and the second being that its use does not cause nuisance or harm to others. Legislative curtailment of rights for reasons other than causing nuisance or harm usually warrants compensation (Epstein 1985; Radin 1993; Varner 1994). However, the notion of harm is also a social construction and hence is subject to contestation and redefinition, as happened in the case of slavery or the use of chlorinated fluorocarbons. In such cases, the loss of previously recognised or presumed property rights does not require compensation (Varner 1994). The question of what constitutes harm is, therefore, critical to the issue of habitat protection (Sax 1971; Epstein 1985; Varner 1994). In addition to the more obvious concepts of harm, the term covers instances where one is deprived of a benefit that was previously enjoyed and to which one had rights (Sax 1971). Wildlife and ecological processes, such as those performed by wetlands or other natural habitats,

‘are paradigm cases of things that, if they can be said to be owned at all, are inherently public property. [Ecological processes] cannot be captured or reduced to possessions; they can only be used. As no individual can own them, they are by right available to all.’ (Varner 1994: 157)

The explicit right of landowners to clear habitats has generally been established at a time when habitats and species were in abundance, and while the interdependent nature of species and habitats and their function in ecological processes were poorly understood. Greater environmental knowledge combined with increasing scarcity of ‘natural’ environments has led to growing demand for recognition that the public has rights to environmental goods, such as biodiversity protection, and amenity and recreational opportunities. As a result previously held or presumed rights to convert habitats for ‘productive’ uses are being challenged and constrained through political processes. Landowners have sought to protect their perceived entitlement to undertake environmentally damaging land production or receive compensation.

## 2.2 APPROACHES TO HABITAT PROTECTION

The nature of the factors contributing to habitat loss means there are no simple solutions to preventing habitat and biodiversity loss or ensuring their protection. Table 1 summarises the approaches identified by four authors considering environmental regulation and conservation in a variety of locations.

TABLE 1. REGULATORY AND OTHER MECHANISMS FOR ATTAINING HABITAT PROTECTION.

BRUCKMEIER & TEHERANI-KRÖNNER (1992) GERMANY	BISHOP & PHILLIPS (1993) UNITED KINGDOM	PIERCE (1996) INTERNATIONAL	YOUNG ET AL. (1996) AUSTRALIA
<b><i>Farmers and environmental regulation</i></b>	<b><i>Agriculture and conservation</i></b>	<b><i>Conservation of rural environments</i></b>	<b><i>Biodiversity conservation</i></b>
<i>Regulative policy</i> - decrees - bans - standards	<i>Regulation</i> - planning controls - pseudo planning controls - pollution controls	<i>Regulation</i> - statutes - directives - zoning or growth management - protocols	<i>Regulatory instruments</i> - zoning - land-use restrictions - standards - bans - compulsory acquisition
<i>Financial incentives</i> - grants - compensation - incentives	<i>Financial instruments</i> - grants - compensation - cross compliance - incentives	<i>Economic / trade controls</i> - cross-compliance - trade controls  <i>Incentives</i> - grants - subsidies - management agreements - tax and rate rebates - tradeable permits	<i>Price-based instruments</i> - performance bonds - charges, levies, use fees - hypothecation - tax instruments - removing perverse incentives - land tax or rate rebates - cross-compliance - conditional funding
<i>Voluntary</i> - organic farming standards		<i>Voluntary</i> - stewardship agreements	<i>Voluntary</i> - management agreements - conservation covenants
		<i>Ownership/management</i> - trusts - purchase of land or development rights - transfer of development or other property rights	<i>Property-right instruments</i> - exclusive use rights - bioprospecting contracts - transferable rights - covenants - management agreements - offset arrangements - leasing and licensing
<i>Consultation, information and education</i>	<i>Advice and information</i>	<i>Education and persuasion</i>	<i>Motivation, information, and education</i>

There are five main instruments used in habitat protection; regulations, price-based mechanisms and property rights-based mechanisms, voluntary approaches, and motivation instruments that can be integrated with all other approaches (Young et al. 1996). Debate about the advantages of the various mechanisms has primarily centred around the use of economic instruments and regulatory approaches. The advantages claimed for the former are that they are more economically efficient and, supposedly, impartial and value-free (Rees 1992). Proponents argue that using market forces, such as introducing incentives or charges, allows producers to choose between production methods, supports innovation, and rewards those who exceed the standard. On the other hand, the regulatory approach is considered proven and predictable, and, provided it is enforced, can help prevent clearance by those who are not persuaded by financial or motivational approaches (Young et al. 1996). Two issues are overlooked in this argument. First, advocacy of market mechanisms is not necessarily a call for a free market, as market processes can be used to achieve politically determined goals. Secondly, the use of market mechanisms requires some political and regulatory support (Hodge 1991; Rees 1992).

Regulatory approaches are also considered to be blunt instruments, reliant on the expertise of bureaucrats to determine the correct level of provision, and they provide no economic incentive for people to better the standard. They can create resentment and therefore detract from motivational approaches, and they may be actively or passively resisted. So, while they can provide the safety net necessary in circumstances where species or ecosystems are in danger of crossing their survival threshold, they may not be effective in achieving the maintenance of the status quo if the active support of landowners is necessary for habitat maintenance.

Regulatory instruments can take various forms: compulsory acquisition or pre-emption rights, protection of endangered species, and controls on vegetation clearance. The latter has been used extensively in New Zealand (discussed in Section 3). In Western Australia, a reference level of 20% indigenous vegetation cover has been established. If less than this remains at either property or shire level, the developer must prove that further clearance will not be a threat to biodiversity (Young et al. 1996). Such approaches are strengthened if they have community support. However it has also been shown that enactment has an educational role which can lead to greater community respect and support for the goals (Young et al. 1996). Regulatory approaches also more commonly allow non-resource users or owners to challenge intended developments through the political process involved in regulatory development and implementation.

Property rights-based approaches to redressing habitat loss have involved the creation of transferable development rights or transferable conservation obligations (Craighill & Goldsmith 1994; Young et al. 1996). These permit habitat clearance that would otherwise be prevented in return for which rights to clear other habitat are foregone (usually in exchange for payment by the developer) or an 'equivalent' habitat reclamation or restoration project is undertaken. Alternatively, subdivision rights can be granted to property owners who would not otherwise have the right, in return for the voluntary protection of habitats as part of the development (Cocklin & Doorman 1994). Such development rights can also be transferable, whereby habitat protection on one property is undertaken in return for subdivision rights that can then be transferred to another property development (Boucher & Whatmore 1993).

Covenants, or easements, and management agreements can also be used to restrict or specify certain land uses or management practices through the transfer of development rights to a public agency without a change of ownership. For example, covenants transfer the property rights, but not the ownership of the land, to an appropriate agency, generally under the auspices of national or regional government (Edwards & Sharp 1990). They may be established for fixed terms or for perpetuity and involve registration of the conditions on the title, therefore binding future owners of the property. The costs of establishment or compensation for loss of earnings may be met by outside agencies, borne by the landowner, or shared by both parties. Conservation covenants may also be linked to one-off or periodic financial incentives such as fencing grants or rating remission. Property rights can also be transferred through voluntary or compulsory purchase of properties, or development rights, by environmental groups using donations or state

institutions using public funds, or by the donation of land to environmental organisations or a statutory agency (Edwards & Sharp 1990; Cutting & Cocklin 1992; Cocklin & Doorman 1994)).

The importance of involving stakeholders, thereby inculcating a conservation ethic and increasing environmental awareness, is frequently cited as critical to the success of conservation programmes (Potter & Gasson 1988; Hodge 1991; Morris & Potter 1995; Pierce 1996; Young et al. 1996). The benefits gained from changing attitudes and increasing stakeholders' knowledge that arise when motivational approaches are integrated with incentive or regulatory approaches, can exceed the environmental gains achieved from schemes themselves and are likely to outlast them (Potter & Gasson 1988; Morris & Potter 1995). It is generally agreed that the more stakeholders are involved in the process of habitat protection and biodiversity conservation, rather than merely responding to price signals or rules, the more effective the approach is and the less enforcement will be required. Motivational approaches generally involve education, information and participation, such as the development of community-based monitoring schemes, which can also have the advantage that those involved get immediate and usable feedback. Prizes and awards are another mechanism from which the benefits largely derive from the free publicity and goodwill which motivates others (Young et al. 1996). Although motivational approaches have much to offer, they are not usually relied on exclusively because of the considerable gap that can exist between people's attitudes and behaviours.

Voluntary approaches work by harnessing altruistic behaviour, and therefore require that the private interests of resource users coincide with the public demand for biodiversity conservation. The potential for a voluntary approach to succeed increases when resource users are made aware of the conservation consequences of their actions (Young et al. 1996). Voluntarism includes self-regulation by commercial agents (usually for the marketing advantages that may arise), donations of money or land to government or non-government agencies for protection or restoration, and the use of covenants to restrict land use options. Voluntary incorporation of biodiversity considerations into property management plans may be undertaken to qualify for government assistance (Young et al. 1996). Voluntarism will not prevent recalcitrant or irrational behaviour, however, and there may be the need for some form of regulatory 'safety net'.

### 2.3 DISTRIBUTIONAL ISSUES

Central to the issue of biodiversity conservation and the conflict over property rights that has resulted from growing habitat scarcity is the question of how the responsibilities for the provision of habitats are distributed. The principle of cost internalisation would suggest that those who receive the benefits should bear the costs. However, the issue is not so straightforward. While there are economic benefits from habitat clearance which largely go to the landowner or developer, numerous benefits from the retention, maintenance or protection of habitats are more widely shared, and this is discussed more in Section 6.

One key to unravelling the problem of the incidence of the costs and benefits of habitat protection is determining where the responsibility for the need for protection lies. The high conservation value of remaining habitats arises from the cumulative effect of all previous habitat clearance. Thus, while reducing further ecological damage requires action at the margin, it is the cumulative clearance that has led to the current scarcity, and hence responsibility for the biodiversity crisis lies with the beneficiaries of land clearance, both producers and consumers (including the state to the extent that it has facilitated habitat clearance through policies such as agricultural subsidies) rather than with those who are habitat providers.

This brings the discussion back to the question of property rights (Hodge 1991, 1994). Do landowners have a right to clear habitats or do they have a duty to provide them, or both? If landowners do have the right to clear habitats, public provision of financial incentives will be necessary to achieve greater habitat provision. On the other hand, annulling landowners' rights to clear land places the onus for habitat provision on those who have, by intent or otherwise, retained habitats on their property, and it may discourage landowners from undertaking the active management needed to ensure the continued integrity of remaining habitats, or engender passive resistance or active indifference such as allowing stock to damage habitats. Those with cleared land, meanwhile, continue to capture the benefits arising from previous habitat loss. If landowners do have a duty to provide habitats it would seem necessary for these to be shared equitably among landowners. This could involve the establishment of reference levels for habitat provision (Hodge 1994, Young et al. 1996) or conservation obligations (Craighill & Goldsmith 1994). The former operates by establishing what proportion of land needs to be retained in natural habitat to achieve conservation and other ecological goals. Landowners who provide less than the reference level can then be charged a levy while those who over-supply are paid a provision fee, or some transfer system could be established whereby those who under-supply can bid for the habitat quotas of those who over-supply. Conservation obligations operate in situations where habitat clearance that would otherwise be prevented is permitted in exchange for the protection of other habitat which could be cleared—this involving a financial exchange between landowners—or an 'equivalent' habitat reclamation or restoration project be funded by the 'developer'.

There is also a spatial dynamic involved in habitat protection. Biodiversity conservation occurs mostly in rural areas, and mechanisms which operate at the local or regional level will, therefore, place the financial burden largely on rural residents. Ironically, the political pressure for conservation of species and wildlands is often dominated by urban residents, if only due to the dominance of urban votes in most developed countries. To avoid spatial inequities, the costs of habitat protection need to be distributed across society with some degree of relation to the distribution of the benefits.

### 3. State of native habitats in New Zealand

The clearance of native habitats in New Zealand's short human history has been rapid and extensive (Fig. 1). In pre-settlement times forests covered around 80% of New Zealand. By the time of European colonisation forests accounted for only 53% of land cover, Maori having removed about 6.7 million ha (Molloy 1980). More rapid depletion occurred following European settlement as state policies aimed at developing a pastoral-based rural economy accelerated the conversion of large swaths of native forest into pasture. About 70% of the original forest cover and 90% of wetlands have been destroyed since human settlement of New Zealand (MfE 1989).

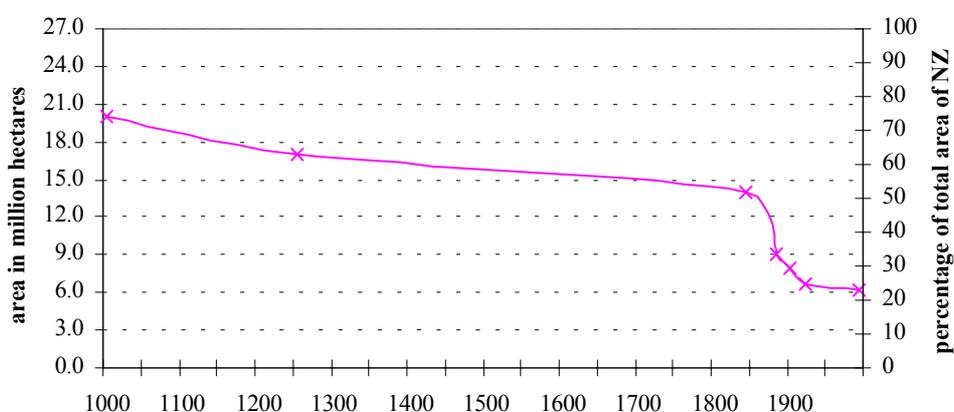


Figure 1. Changing extent of indigenous forest cover in New Zealand.

Sources: Molloy 1980; Memon & Wilson 1993a; Bührs & Bartlett 1993; Wilson 1994.

TABLE 2. ESTIMATE OF THE INDIGENOUS FOREST RESOURCE (AT 1989).

	AREA (000 ha)	TOTAL INDIGENOUS FOREST %
<i>Public forest</i>		
National parks, reserves etc	4919	77
State forest allocated for timber production	142	2
<b>Total public forest</b>	<b>5061</b>	<b>79</b>
<i>Private indigenous forest</i>		
Protection forest	654	10
Currently uncommercial	545	9
Potentially commercial (require RMA and FAA approval)	124	2
<b>Total private forest</b>	<b>1323</b>	<b>21</b>
<b>Total forest area</b>	<b>6384</b>	<b>100</b>

Source: MoF 1996. The figures are based on the 1974 revision of the 1955 and 1963 National Forest Surveys. Adjustments have been made for roundwood removal and changes in status for state-owned forest.

The current extent of indigenous habitats is not accurately known. A figure of 6.2 million ha for area of native forests is frequently cited (e.g. MfE 1989, MoF 1996), but no quantitative survey of indigenous forests has been undertaken since the National Forest Survey (1945 to 1953) was updated in 1974. More recent figures, such as those in Table 2, have been achieved through estimating the amount cleared using data on roundwood removal, an approach that ignores areas that have been cleared for other land uses and not logged, or areas that have regenerated after logging (MoF 1996).

Estimates of the extent of habitat on private land are at least as problematic and many of these are also based on the 1974 survey. Wilson (1994), for example, estimated that farms had 7% of their area in natural ecosystem (4.0% indigenous forest, 2.0% secondary regrowth, 1.1% other, including wetlands, flax swamps, alpine). Data collected by Statistics New Zealand (*Agriculture Statistics*) provides other insights. Figures for 1994 show 9% (1.5 million ha) of all occupied land (all productive or potentially productive land used by persons registered for goods and services tax (GST)) was classed as 'other' (non-productive, previously termed 'unimproved') land, much of which would be native bush and scrub. While there is no breakdown for 'other' land in the 1994 data, 1970 figures show that 34% of such land in Northland was standing native bush, and 49% was flax, fern, scrub and second growth.

Idle farms (i.e. those potentially usable for agriculture, horticulture or exotic forestry, but not used for any of these in the year under survey) have the highest proportion in 'other' (46%), followed by beef farms (33%), forestry units (25%), sheep farms (16%) and then dairy farms (12%). However, most 'other' is on forestry units (33%) and sheep farms (31%). The remaining third is divided between beef farms (17%), dairy farms (6%) and idle farms (4%). Prior to 1994 a far higher proportion of 'other' (14% in 1993) was on idle farms, but the decision to survey only GST-registered land-based producers, which removed approximately 800 000 ha (approximately half 'other' and half pasture) from the statistics, also led to the exclusion of seven thousand idle farms. Between them, these farms, which were not economic enough to warrant registering for GST, constituted just under half of the total 'lost' area, including half the lost 'other'.

The distribution of bush is clearly linked strongly to productivity factors; the more productive land (e.g. dairy farms) has less uncleared land remaining. However, beyond such basic interpretations, there has been little analysis of the distribution of habitats among landowners in terms of farm type, farm size or other factors. The survey of Federated Farmers in Northland (discussed in Section 5.1) provides further data at a regional scale.

### 3.1 REGULATIONS AND MECHANISMS FOR HABITATS ON PRIVATE LAND

The regulatory environment in which landowners make decisions regarding habitat and the mechanisms that are currently available for protection of habitats on private land are major influences on the extent of habitat protection and the distribution of the associated costs and benefits.

Historically, there has been little regulation of vegetation clearance in New Zealand. Measures to control erosion and flooding problems under the Soil Conservation and Rivers Control Act 1941 and the Water and Soil Conservation Act 1967 were rarely enforced, and restraints on felling native forests were politically unacceptable and an undesirable constraint in an expansionary phase of development (Memon & Wilson 1993b). However, as the area of habitat has decreased, demand for its retention for amenity, recreational and biodiversity conservation purposes has increased. The introduction of sustainable management principles into legislation as part of the overhauling of resource management in the late eighties brought about significant reform of landowners' rights with respect to the clearance of habitats on their land (Memon 1993).

### **3.1.1 The Resource Management Act 1990**

The Resource Management Act transformed the regulation of resource use, from an approach based predominantly on directing the spatial pattern of land use through prescriptive zoning schemes, to one that regulates the environmental effects of human activities rather than the activities themselves (Memon & Gleeson 1995). The Act inscribes 'sustainable management' as the guiding principle for decisions over the allocation and use of natural and physical resources, creating an externalities-based regime that upholds the rights of individuals to do as they choose, provided that it does not reduce the welfare of others or undermine the ability of the environment and resources to be managed on a sustainable basis.

The RMA delegates powers to the lowest administrative level at which matters can be properly addressed (Roberston 1993) 'on the assumption that decisions should be made as close as possible to the appropriate level of community of interest where the effects and benefits accrue' (Memon & Gleeson 1995: 117). The accompanying reform of the local government structures, both administratively and spatially, facilitated this devolution and also resulted in greater integration of rural and urban areas at both district and regional levels, reducing the dominance that the farming lobby had previously held over rural local bodies (Moran 1992; Bührs & Bartlett 1993).

For the purposes of the Act sustainable management is defined as:

managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing 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; and
- (b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
- (c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment (s.5(2) RMA 1991).

In keeping with the devolutionary principle of the Act, interpretation of 'sustainable management' is determined through the judicial-political processes

at the regional and local level, involving negotiation and contestation through council hearings and the Environment Court (Cocklin 1996).

In regard to biodiversity and habitat protection the 'natural and physical resources' to be managed under the Act include all forms of plants and animals (s.2(1)). All persons exercising power under the Act are also required to have particular regard to intrinsic values (s.7), defined as those aspects of ecosystems and their constituent parts which have value in their own rights, including (a) their biological and genetic diversity; and (b) the essential characteristics that determine an ecosystem's integrity, form, functioning, and resilience (s.2(1)). The RMA also requires protection of significant areas of indigenous vegetation and habitats of fauna (s.6(c)) and specifies that land may not be 'used' in a manner that contravenes district or regional plans (or proposed plans) unless a resource consent is granted by the appropriate authority, with the term 'use' covering the destruction of, damage to, or disturbance of, the habitats of plants or animals in, on, or under the land (s.9(4c)).

Regional councils have primary responsibility to control the use of land for the purposes of soil conservation, and water quality and quantity (s.30(1)) while district councils have primary responsibility for land use management. The rules contained in regional and district plans define what activities can or cannot occur, the determination of which should depend on the effects of the activity. Regional councils may include rules in their plans to protect habitats that are regionally significant, but should otherwise only apply rules to control land use for the purposes stated in s.30 of the Act, including soil conservation, the maintenance and enhancement of water quality, and maintenance of water quantity. They cannot use rules solely for the protection of indigenous habitats whereas district councils may.

The degree to which clearance of bush is controlled or permitted is determined at the council level through a process involving public participation, including submissions to draft plans or policy statements, with elected councillors being the arbiters of what goes into the plans and policies. Applications for consents are initially dealt with by council officers under the authority and direction of local politicians. Planning disputes that cannot be settled through negotiation are resolved through the Environment Court (previously the Planning Tribunal) and, hence, involve the judiciary and case law.

Rules are not the only method of achieving the purposes of the RMA, and Ministers and local authorities are required to consider alternatives including the provision of information, services, or incentives, and the levying of charges (s.32). The Minister for the Environment also has the right to consider and investigate the use of economic instruments (including charges, levies, other fiscal measures, and incentives) to achieve the purpose of the RMA (s.24(h)) on the basis that the use of charges and levies can help internalise environmental costs that would otherwise not be borne by the beneficiary of the resource use, and may achieve this more effectively than regulatory mechanisms.

Local authorities can protect habitats by establishing conservation covenants under the Reserves Act (s.77). Most councils also operate programmes for purchasing land for reserve purposes and they can apply to the Forest Heritage Fund to facilitate this (Bellingham 1992). Local authorities can also operate or assist with educational and motivational programmes, and provide grants for

environmental projects such as the fencing and restoration of habitats. Plans may include mechanisms such as transferable development rights or non-transferable subdivision permits, rates relief, or annual grants as incentives to undertake habitat protection. Some councils have published schedules of significant habitats in their plans, determined on internationally accepted criteria, with rules governing the use of such areas (Froude 1995).

Councils can reduce the financial disincentive that rates impose, through granting rating remission. The Rating Amendment Act 1992 provides for rate remission of at least 50% for land owned for conservation purposes by a society or association of people and for land protected under the Conservation Act, the Reserves Act, QEII National Trust Act, Historic Places Trust, Te Ture Whenua Maori (Maori Land Act). Remission can be for 100% of the rates, and councils may also remit or postpone rates on land that is not formally protected (Bellingham 1992; DOC 1995). The Valuation of Land Act 1951 also provides for the rateable value of land protected for conservation purposes to be reduced (Bellingham 1992).

Habitats can also be protected through Heritage Orders which, if granted, are incorporated into district plans. Ministers of the Crown and local authorities are automatically Heritage Protection Authorities (HPAs), but others, such as environmental and iwi groups, may apply to the Minister for the Environment to become HPAs, and, if approved, can apply for Heritage Orders to protect significant habitats. If a Heritage Order is granted and the owner can show the Order has rendered the land either incapable of reasonable use or unsaleable at the price that could be achieved without the Heritage Order, then compensation or purchase by the HPA may be required (Milne 1992).

### **3.1.2 The Indigenous Forest Policy and the Forest Amendment Act**

The Indigenous Forest Policy was the first step in redefining the property rights of private owners of native forest, changing them from absolute rights to harvest native timber to conditional rights to harvest timber only under a sustainable management regime. In doing so it annulled landowners' right to create public harm through unsustainable logging. As partial compensation, the Government provided \$60 million of Adjustment Assistance for those landowners whose claims for commercial losses due to foregone logging opportunities were approved, and established the Forest Heritage Fund and Nga Whenua Rahui in 1990 as contestable funds to assist the protection of remaining indigenous forests through acquisition or agreements such as covenanting, leasing, accords and management agreements such as fencing.

The objectives of the Indigenous Forest Policy were enacted in the Forest Amendment Act 1993. The Act's main purpose is 'sustainable forest management of indigenous forest land' (s.67B) and, with the exception of some excluded areas, requires that timber be harvested under an approved sustainable management system. Milling of indigenous timber, other than through registered mills, is prohibited and there is an export ban on most indigenous forest products. The Act is not prescriptive in terms of land use, though, and it does not prevent landowners from clearing forests for other land uses, though such clearances may be covered under the RMA. Nor does the Act

place any obligation on forest owners to maintain their forests other than those with logging permits.

The Act defines sustainable management as 'the management of an area of indigenous forest land 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'. By incorporating the ecological dimension of sustainability and requiring the continued integrity of the forest ecosystem, the Act internalises many of the environmental costs involved in harvesting native timbers that had previously been borne by others (I. Platt pers. comm. 1996). It is expected that the additional production costs incurred under sustainable forest management will be balanced by the increased price of timber resulting from a decreased supply (I. Platt pers. comm. 1996).

Permitting sustainable forest management, as opposed to prohibiting logging completely, provides some financial incentive for some landowners to maintain their forest, and may remove the costs of protection and maintenance from the public purse. However, the ongoing export ban means native timber prices remain below the world market price, undermining the economic viability of sustainable forest management (G. Salmon pers. comm. 1996). If sustainable forest management is not an economic option, then either the forests will be converted to other uses, allowed to degrade, or the costs of habitat maintenance might be met by the landowner or conservation groups.

As the RMA takes precedence over the Forest Amendment Act, landowners who get FAA approval may also require resource consents, and there have been concerns that consents to log areas that have been approved under the FAA may be refused by local councils (Rawlings 1996). The intersection of these two different pieces of legislation, both of which are ostensibly aimed at promoting sustainable management, has the potential to create some anomalous situations. This can be demonstrated through a hypothetical example involving three landowners with a native forest crossing their boundaries. One can continue to allow stock access to the bush even though this will result in its eventual destruction, another may be permitted under the Resource Management Act to bulldoze or roller crush the forest to establish pasture or plantation forestry, while the third, who wishes to undertake sustainable logging, may be required to erect fences to exclude stock, undertake pest control and undertake restoration of the damage that results from logging. There is clearly some difficulty in applying the principles of sustainable management consistently.

### **3.1.3 Sustainable agriculture and habitat protection**

Given that much of the habitat loss has resulted from agricultural expansion, and that many habitat remnants are located in agricultural landscapes, the question of habitats in the context of agriculture deserves consideration. MAF's Policy Position Paper on Sustainable Agriculture identifies eight desired outcomes of Government policy, the last of which refers to the 'maintenance of aesthetic, ecological and conservation values related to land and water' (MAF 1993: 4). However, the role of agriculture in habitat loss is largely absent in MAF's analysis, demonstrating a failure to integrate conservation issues with agricultural production. Poor linkages between biodiversity issues and

sustainable land management are also demonstrated in other publications (Basher et al. 1993, MfE 1996). The need for agriculture to internalise the environmental costs of production is, however, acknowledged by MAF Policy, who recommend that landowners' failure to fulfil the duties and obligations deemed to be necessary for responsible land management be dealt with through regulation, education and charges. They suggest identifying 'the level or amount of an environmental good which society expects or requires to be provided without compensation' (Sinner 1996:6) and argue, for reasons of equity, that providing environmental goods above that required should be rewarded. Hence, requiring landowners to protect small areas of habitats as part of their obligations under the RMA is justifiable, but if protection of large or economically significant areas is necessary, compensation is deserved (Sinner 1996).

#### **3.1.4 Department of Conservation**

DOC is New Zealand's primary agency with responsibility for the conservation of biodiversity. Its statutory role, established principally under the Conservation Act 1987, gave it primary responsibility for the Crown conservation estate. It also has an important advocacy role for conservation beyond the Crown estate. DOC has four distinct roles during the various stages of policy plan preparation: provider of information (upon request of a council), provider of advice (upon request of a council), protector of Crown property rights, and advocate for the conservation of natural and historic resources generally (LGNZ & DOC 1996). DOC also has various mechanisms for protecting habitats on private land (Bellingham 1992; DOC 1995). Conservation Covenants (under the Conservation Act (s.27) and Reserves Act (s.77)) are binding agreements between private landowners and DOC that protect natural values without necessitating acquisition of the land. The covenant is registered on the title and can permit some limited use of land. Protected Private Land agreements under the Reserves Act (s.76) are designed for landowners who are willing to have DOC take over management of the site through a binding agreement, but do not wish to give up ownership. The terms of the agreement can be registered against the title, binding future owners (Bellingham 1992). Management Agreements, under both the Conservation Act (s.29) and the Reserves Act (s.38) are legal agreements to manage sites according to agreed conservation criteria but are not registered on titles and, therefore, require renegotiation with new owners. They can be used to enable DOC to provide management assistance to the landowner and can be used as temporary controls until a more formal agreement can be reached.

DOC also accepts gifts of land, undertakes leasing arrangements for areas that have features that deserve protection, and purchases and exchanges land. DOC can bid for Forest Heritage Fund and Nga Whenua Rahui funds to help protect forested areas, and it has its own Land Acquisition Fund, which it uses to purchase significant properties that cannot be protected through other means, in particular non-forested habitats. The income for this fund comes from the sale of low conservation value DOC lands.

### **3.1.5 Queen Elizabeth II Trust**

The QEII National Trust, established by legislation in 1977, is an independent organisation that grew out of landowners' concerns that habitats they were intentionally retaining were being cleared by subsequent owners. Protection is achieved through the Open Space Covenant, a voluntary statutory covenant stipulating particular management practices that are registered on the title. Land ownership does not change, but instead the development rights to the land are voluntarily transferred to the QEII National Trust (QEII 1994). The covenant agreement usually requires that fencing and pest and weed control be undertaken. The Trust generally contributes half the fencing costs and pays the legal expenses involved (except where covenants are helping landowners gain subdivision rights), but it does not contribute to ongoing maintenance costs. When landowners are unable or unwilling to cover their share of the costs, other funding may be sought from voluntary organisations or the Forest Heritage Fund.

Just over a thousand covenants had been established by 1996, protecting some 41 000 ha of native habitats; applications for a further 58 500 ha were awaiting approval, surveying or funding (QEII 1996). Covenants typically cover small portions of farms (average size 35 ha) (Saunders 1996) and habitats are poorly represented in the public conservation estate (Sage 1992). Despite farm incomes having dropped, demand for the QEII Trust has continued to rise, reflecting both growing public awareness of the need for conservation and the existence of the Trust, and the decreasing tendency for family farms to be handed down to the next generation, prompting owners to seek public protection for habitats which might otherwise have remained under the personal protection of the landowners (Sage 1992).

### **3.1.6 Forest Heritage Fund**

The Forest Heritage Fund is a contestable, criteria-based fund established to help protect, maintain and enhance the current area of indigenous forests in perpetuity. It receives annual Crown funding of around \$4 million for land purchases, exchanges, agreements and covenants. Most of this goes to support proposals from two bodies: DOC, generally for land purchases, and the QEII Trust, mostly for covenants on native forests. Applications also come from individuals, local authorities, environmental groups and private trusts. In its first four years just over half of the 85 000 ha of indigenous forest protected by the Fund were purchases, while the remainder were covenants (Harding 1994). By mid-1996 the Trust had committed a total of \$26 million to protect just under 100 000 ha (A. McKenzie pers. comm. 1996).

In seeking to achieve the most cost effective protection, priority is given for covenants rather than purchases, and preference is given to applications where some funding is forthcoming from other organisations (Sage 1992). Applications for funding are prioritised using ecological criteria, but caution is exercised in targeting high-priority ecosystems to avoid increasing the asking price for prioritised habitats, or being blackmailed by owners threatening to clear such habitats. Until the end of the Forest Amendment Act transition period, the prices sought by landowners tended to reflect the potential income from clearfelling their forests. It is anticipated that following the transition

period the asking price will reduce to reflect the potential income from sustainable forest management.

### **3.1.7 Nga Whenua Rahui**

Nga Whenua Rahui was a response to Maori concerns that the costs of conserving native forests (rates, fencing, and pest control) put economic pressures on Maori owners to sell or develop the land at a time when demand for conservation was increasing (K. Prime pers. comm. 1996). Existing mechanisms had not been popular with Maori landowners for several reasons: the mechanisms were not suited to dealing with multiple ownership; they did not provide for rights to traditional harvesting and access; they required protection in perpetuity, foreclosing options for future generations; and Maori conservation and spiritual values were constrained by the more prescriptive, ecology-based, European, scientific approach (Piripi 1991). A separate Maori institution that would uphold tikanga Maori (traditional practices) was therefore important. Nga Whenua Rahui operates a contestable, criteria based pool with annual funding from the Crown. By August 1996, Nga Whenua Rahui had funded the protection of around 75 000 ha at a cost of just over \$12 million (A. McKenzie pers. comm. 1996).

Nga Whenua Rahui differs from the Forest Heritage Fund in several important respects. It accommodates the often slow and complicated process of gaining approval from large numbers of dispersed owners. Kawenata (covenants) rather than purchases are used to uphold tino rangatiratanga (sovereignty). Review options can be incorporated into these so that future generations can make their own decisions regarding the resource (Young 1991). Given the poor financial situation of many Maori landowners, Nga Whenua Rahui is also prepared to provide funding over and above the costs of protection in consideration of foregone income opportunities and public utilisation of forests for recreation and hunting (A. McKenzie pers. comm. 1996).

### **3.1.8 Non-governmental approaches and regional initiatives**

There are many non-governmental organisations that are assisting with the conservation of habitats. They range from environmental groups with a specific focus of habitat protection, such as the New Zealand Forest Restoration Trust, through cross-sector organisations with a wider focus of sustainable land management (e.g. Landcare Trust), to industry-related initiatives such as those groups promoting the sustainable management of native forests (e.g. Indigenous Forests Section of the New Zealand Farm Forestry Association). There are also locally based initiatives that facilitate habitat protection, such as the Taranaki Tree Trust and the Northland Regional Council's Northland Environmental Fund, which is discussed below.

## **3.2 OPTIONS AND CONSTRAINTS**

The approaches to habitat protection described above exhibit diversity in terms of their operation, intention, scale and funding sources. Many of these approaches involve a combination of policy instruments. For example, the

Forest Amendment Act is voluntary in as much as it does not apply to forest owners unless they wish to extract native timbers, but those who do wish to log must meet statutory requirements. The QEII Trust is primarily a mechanism designed to formalise voluntary protection provided by landowners, but the introduction of subdivision rights by some councils means it is increasingly being used as a tool to gain the financial advantages afforded by subdividing properties. The NZFRT mixes voluntarism with market approaches, acquiring donations of money and then engaging in land purchase. The mechanisms are summarised in Table 3, together with the instruments involved.

While most of the approaches referred to are directed at protecting habitats from active destruction, it must be emphasised that the conservation of biodiversity and habitats in New Zealand requires more than just the prevention of further clearance of native habitat. Virtually all native ecosystems in New Zealand need some form of ongoing active management for their maintenance, such as fencing out stock and controlling pests (MacGibbon 1996). For many remnants, particularly those in agricultural landscapes, the full range of species for all stages of succession are rarely present and some are only represented by immature or aged plants. Stock exclusion and pest eradication may not be sufficient for regeneration to a composition matching that which occurred prior to human intervention without active restoration practices. Where regeneration is prevented or severely modified, forest remnants are effectively on 'death row', continuing in their current form only while the standing canopy survives (MacGibbon 1996: 20).

'For many of the more isolated forest remnants and most degraded areas of native bush the construction of a stock-proof fence and even the eradication of animal pests will do very little, if nothing else is done, to prolong the life or improve the health of that forest. These forests no longer retain sufficient biological diversity or natural ability to regenerate to allow them to perpetuate themselves. Unfortunately, much of the native bush remaining on farm land falls into the category of being highly degraded and isolated and as such will require considerable active assistance, over and above fencing and pest control, before the semblance of a natural indigenous forest can be re-created' (MacGibbon 1996: 21).

### **3.2.1 Current level of protection**

The various forms of protection mean that no simple figure for the area of protected habitat on private land exists. The public estate is more easily defined. Nearly 30% of New Zealand's total land area (8 million ha) is under the administration of the Department of Conservation, including over 2 million ha in national parks, 1.8 million in forest parks, and 1.5 million in reserves (Statistics New Zealand 1996). Figures from QEII Trust, Forest Heritage Fund, Nga Whenua Rahui and Statistics New Zealand (1996) indicate that between 200 000 and 240 000 ha of habitats on private land have been protected, some through acquisition, others through covenants and management agreements. Many other habitats will have or will be getting some protection through Regional and District Plans. There are also 17 200 ha of forests covered by approved plans or permits under the FAA, with applications for a further 29 000 ha being processed (as at 31 May 1997, I. Platt pers. comm. 1997). Of the habitats that have no formal protection, some will have the intentional but

TABLE 3. MECHANISMS FOR PROTECTING HABITATS ON PRIVATE LAND IN NEW ZEALAND.  
 Source: Various including Bellingham 1992. **Bold** indicates primary instruments.

MECHANISM	FEATURES					
	M= Motivational, V= Voluntary, P= Property-based, \$= Financial, R= Regulatory					
<b>Conservation Act</b> <ul style="list-style-type: none"> <li>• Conservation Covenants</li> <li>• Management Agreements</li> <li>• Land Acquisition Fund</li> </ul>	M	V	P	\$	R	Mechanism for covenanting habitats. Usually binding on future owners. DOC involved in management. Not usually binding on future owners. Funding for purchase of habitats.
<b>Reserves Act</b> <ul style="list-style-type: none"> <li>• Protected private land agreements</li> <li>• Conservation Covenants</li> <li>• Management Agreements</li> </ul>		V	P			Confers reserve status on covenanted habitats. Can bind future owners. Mechanism for covenanting habitats, usually binding on future owners. DOC involved in management. Usually non-binding on future owners.
<b>Resource Management Act</b> <ul style="list-style-type: none"> <li>• Rules</li> <li>• Alternatives</li> <li>• Subdivision Rights</li> <li>• Heritage Protection Orders</li> </ul>					R	Controls for significant habitats, erosion and water quality. Councils to consider alternatives; education, incentives and charges. Allows landowners to undertake subdivision that would not otherwise be granted provided habitat is protected in perpetuity. Requires councils to protect habitats. May necessitate Heritage Protection Authority to purchase or compensate.
<b>Forest Amendment Act</b>		V	P	\$	R	Regulatory requirement for those who want to log. Does not control clearance. Removes right to log unsustainably. Export controls reduce demand and limit market price, sustainable management requirements reduce supply, increase production costs so increase market price.
<b>Rating Powers Act</b>	M	V		\$	R	Requires councils to grant at least 50 percent remission on rates for land owned or formally protected for conservation purposes. Allows for rate remission or postponement for informal protection.
<b>QEII National Trust</b> <ul style="list-style-type: none"> <li>• Open Space Covenants</li> </ul>	M	V	P	\$		Mechanism for covenanting habitats. Some funding available towards costs of fencing. Usually covers legal costs. Binding on future owners.
<b>Forest Heritage Fund</b>		V	P	\$		Fund for purchasing or covenanting habitats.
<b>Nga Whenua Rahui</b>	M	V	P	\$		Fund for covenanting habitats. Can provide for limited term agreements.
<b>Taranaki Tree Trust</b>	M	V	P	\$		Uses donations and sponsorship to assist with habitat protection.
<b>NRC Environmental Fund</b>	M	V		\$		Funds environmental projects including fencing and restoring habitats.
<b>NZ Forest Restoration Trust</b>	M	V	P	\$		Raises donations to purchase and restore habitats.
<b>NZ Landcare Trust</b>	M	V				Facilitates community involvement in sustainable land management.

informal protection of current landowners, while others are 'safe' from development because of economic factors; returns not justifying development, lack of (access to) capital for development. However, some habitats will continue to be susceptible to landowners choosing to undertake clearance in order to develop the land for other purposes.

The extent to which the current mix of policies and mechanisms will succeed in reducing habitat loss and ensuring the maintenance and health of existing remnants will become clearer once all District Plans are fully operationalised and as the state of the environment reporting required under the RMA generates information on qualitative and quantitative changes to habitats within their jurisdiction. There are certainly few data on the extent of habitat clearance that has occurred recently. Data for sawmill returns for indigenous timber from 1993 to 1996 show just under half a million cubic metres of timber were milled at registered mills (I. Platt pers. comm. 1996) much of which would have come from land excluded from the FAA. However, all of these clearances were covered by and presumably permitted under the RMA. In addition, wetlands continue to be drained and native forests cleared (as opposed to logged) for forestry and farm development. While the rate of habitat loss has undoubtedly reduced, the government's goal of no net loss of native habitats (MfE 1995) is still some way off and the picture portrayed by the relevant Ministries at the time in the New Zealand report to the OECD Committee for Agriculture is simply misleading:

'In the past, there was loss of biodiversity because of: clearances of natural forest to establish pasture and plant introduced tree species; habitat destruction; and the introduction of predators and competitors to which natural ecosystems were not adapted. Attitudes have changed, and today there are no clearances of natural forest in New Zealand.' (MoF, MAF and MfE 1994:11)

### **3.2.2 Conflicts between ecology and economy**

Landowners are faced with various choices and constraints with regard to what happens to habitats on their properties. These range from total destruction of the habitat to protection in perpetuity. The latter may involve transfer of ownership, with associated purchase costs. Other options include neglect and long-term degradation, at no economic cost to the landowner, and informal protection, which may incur fencing and pest and weed control costs. The factors that influence a landowner's behaviour are diverse, including their economic situation and expectations, and their personal and cultural commitment to environmental protection, as well as more distant economic factors such as commodity prices, exchange rates and access to capital. The economic and environmental implications of these options are summarised in Table 4.

TABLE 4. ECONOMIC AND ENVIRONMENTAL IMPLICATIONS FOR HABITATS OF LAND USE DECISIONS.

ACTION	ECONOMIC IMPLICATIONS Costs (normal), Benefits ( <i>italics</i> )	ENVIRONMENTAL IMPLICATIONS
Formal protection * (covenant, purchase)	- - Fencing, surveying, legal, purchase and maintenance costs.	+ + Long-term protection (provided agreement adhered to).
Informal protection	- Fencing, maintenance costs.	+ Indeterminate length and quality of protection.
Retention (no stock, no maintenance)	No economic costs or benefits.	+/- Long-term decline probable.
Sustainable forest management (Forest Amendment Act)	-/+ Costs of gaining Plan or Permit, fencing, maintenance. <i>Long-term revenue source.</i>	+ Long-term protection, slight damage to habitat.
Retention (stock access)	+ <i>Minor benefits of fodder/ shelter.</i>	- Long-term decline.
Firewood (RMA)	+ <i>Short- or long-term revenue base.</i>	- Significant damage to habitat.
Clear/drain (RMA)	+ + <i>Long-term revenue source</i>	- - Total loss of habitat.

\* Note these costs are not necessarily incurred by the owner.

### 3.3 DISTRIBUTIONAL CONSIDERATIONS

Protecting New Zealand’s biodiversity will require many of the remaining unprotected habitats be protected from clearance, drainage or other forms of degradation. Most will also require maintenance, and some need restoring. Other areas that have already been cleared may need to be retired from current productive uses to reduce erosion and stock may need to be excluded from riparian areas in order to protect the aquatic habitats. Existing legislative mechanisms generally place the onus for protection on those who have habitats remaining on their land. However, the need to conserve much of the remaining habitat on private land has arisen due to the extent of habitat clearance, much of which was supported by the public purse. The benefits from habitat clearance have not just accrued to those who developed the land and those in the associated commodity systems—consumers have also benefited from timber, food and fibre products at prices that have not internalised their true costs. While society expects that further clearances need to be prevented, placing the bulk of the costs of protection on those who still have habitats, whether intentionally or otherwise, is unjust.

#### 3.3.1 Habitat protection and Maori

The issue of habitats on private Maori land needs specific consideration for several reasons. The Treaty of Waitangi guarantees Maori ‘the full, exclusive and undisturbed possession of ... their forests’ (Stokes 1992). Some Maori consider, therefore, that decisions to protect, conserve or utilise indigenous forestry

resources on Maori land should remain entirely and exclusively with the owners or iwi involved (Asher, cited in Salmon 1992). A claim has been lodged with the Waitangi Tribunal (Wai 262) by a pan-tribal group in relation to biodiversity issues, which seeks to clarify the rights of Maori to determine protection, management, use and property rights regarding New Zealand's indigenous flora and fauna (Te Puni Kokiri 1994). There has also been considerable debate about customary uses of increasingly scarce native species (New Zealand Conservation Authority 1994). Although conservationists and some Maori have argued that such customary use should cease (Barrington 1996), others have argued that the problem of falling numbers is primarily due to unsustainable use of resources and the introduction of pest species which compete for the declining food source, and these are the issues that require addressing (DOC 1995).

About 50% of the indigenous forests remaining on private land are on Maori-owned land—a disproportionately high figure given that Maori own only 7% of the land under general or Maori title (Asher & Naulls 1987). Policies affecting habitats on private land are, therefore, likely to have a disproportionate impact on Maori. Several factors have contributed to this situation. The social and political marginalisation which Maori experienced as their Treaty partners became numerically, economically and politically stronger, resulted in the sale, acquisition and confiscation of much of their most fertile land (Asher & Naulls 1987). The remaining Maori land was less productive and so less economic to develop. Also, access to capital for development purposes was restricted due to the communal ownership of the majority of Maori land, creating the 'idle Maori land' syndrome (Walker 1981). The issue of rating on unproductive land is also of particular concern to many Maori because of the disproportionate amount of their land that is undeveloped. Charging rates for such land, purportedly for services provided by local bodies, puts pressure on the owners to sell or to undertake some development in order to defray the costs (Spencer 1993, Mutu 1993). It is widely felt that land which is unlikely to be developed, particularly tupuna (ancestral) land, with deep cultural spiritual and conservation values, should be exempt from rates (Samuels, cited in Dick 1993).

### **3.3.2 Spatial considerations**

Given the principle of the RMA to devolve decision-making, much responsibility for habitat protection rests at the district level of government. The ability of districts to afford the levels of habitat protection deemed necessary is an important issue. However, the lack of data makes this hard to analyse. A rather crude picture is provided by correlating the area of undeveloped land on private properties ('other' land used here as a proxy for habitats on private land) per capita with the income per capita at district level (Fig. 2). When ranked by the amount of 'habitat' per capita there is a clear trend that the higher the per capita income, the less habitat on private land that may require funding to ensure its protection.

Approaches that put the onus on landowners to undertake habitat protection inevitably affect rural populations more than urban ones. Yet, it should be noted that much support for conservation issues has come from urban voters.

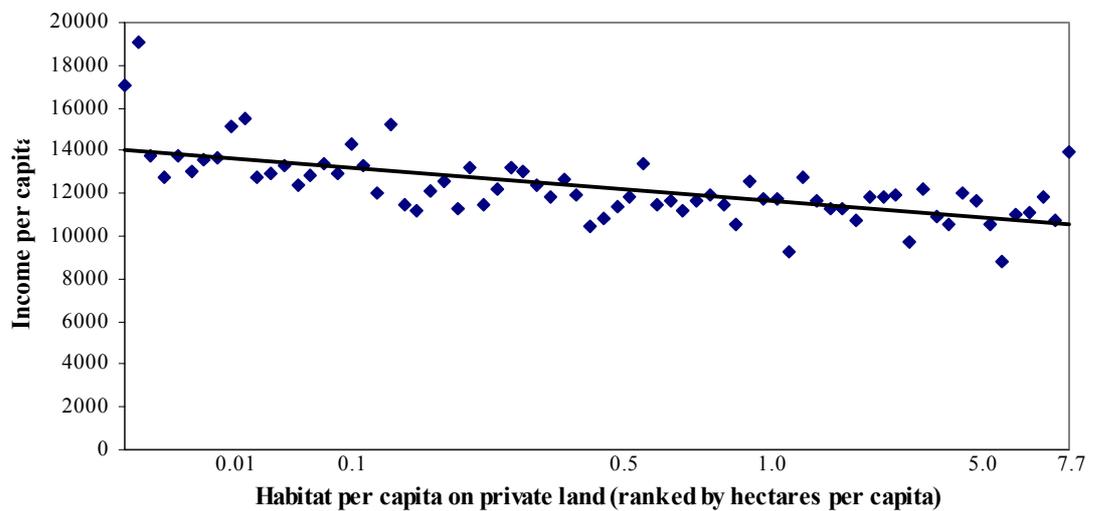


Figure 2. Correlation of income per capita and habitat per capita for TLAs.

Area of 'other' land, from *Agriculture Statistics* for 1994 (Statistics NZ 1997) has been used as a proxy for unprotected habitat. Income data is the aggregated per capita income by TLA from 1991 Census.

## 4. Habitat protection—a Northland case study

The Northland region of New Zealand covers some 1 260 000 ha, of which 59% is pasture, 14% scrub, shrubland and dune vegetation, 13% indigenous forest, 10% exotic plantations, and 1.8% is wetlands, lakes and rivers (NRC 1993). A small proportion of the area is in horticulture, unvegetated dunes and urban land use. The region's population of around 132 000 is divided almost equally between urban and rural, and has a relatively high Maori population—27% at the 1991 Census. Over a quarter of the region has some form of indigenous habitat on it, less than half of which is managed by DOC.

The regional economy is predominantly land-based, and farming contributes some \$1 billion to the region's economy (dairy \$630 million, sheep and beef \$370 million) (NRC 1993) and employs around 20% of the workforce. Dairying has expanded most in recent years, increasing from 123 000 ha to just under 131 000 ha between 1992 and 1995 (Macmillan 1995). Plantation forestry is another major activity which has grown steadily, with over 20 000 ha of plantation forest, mainly radiata pine, established in the three years to 1995 (Macmillan 1995). The tourism industry also makes a significant contribution to the regional economy, with over one million, mostly domestic, visitors spending around \$230 million each year (NRC 1993).

Despite the importance of farming in the region, Northland is not a 'rich' farming area compared to other regions. The 1991 Census data shows 63% of Northlanders occupied in agriculture and fisheries earned under \$20,000 per annum compared to the national average of 56%. So, while Northland has the third highest proportion of its population dependent on farming, it has the third

lowest farming income. The low incomes are not confined to the agricultural sector; Northland had the lowest regional per capita average income at the 1991 Census.

#### 4.1 BIODIVERSITY AND LAND USE CHANGE IN NORTHLAND

Northland has a high diversity of endemic species and is home to around 100 rare or endangered native plant species and over 40 bird and animal species (NRC 1993; DOC 1995). It has the highest number of species in the highest priority threatened species category (Category A) other than birds, and the highest total number of threatened species. Much of the pressure on biodiversity has resulted from habitat clearance for pastoral and forestry developments.

The area of occupied land (based on *Agriculture Statistics* [Statistics NZ/ Department of Statistics various years] which covers all land-based enterprises with land that is used or potentially usable for farming and exotic forestry) in Northland generally increased until the mid-eighties when it accounted for just over one million ha in 1985 (80% of the total land area). Since then the area has declined slightly, some of which occurred as a result of government administrative restructuring and some from economic factors (Fig. 3). (Note that government restructuring in 1987 resulted in around 40 000 ha of NZ Forest Service and Department of Lands and Survey holdings, which had been included in the survey, being transferred to the Department of Conservation and therefore excluded from the survey as they were no longer potentially productive areas.) The rate of habitat loss from logging and land clearance has been more constant, as indicated by the increasing area of 'improved' land.

As shown in Table 5, in the last 20 years there has been little change in occupied area other than as a result of the government restructuring, but there has been a steady increase in 'improved' land, amounting in total to some

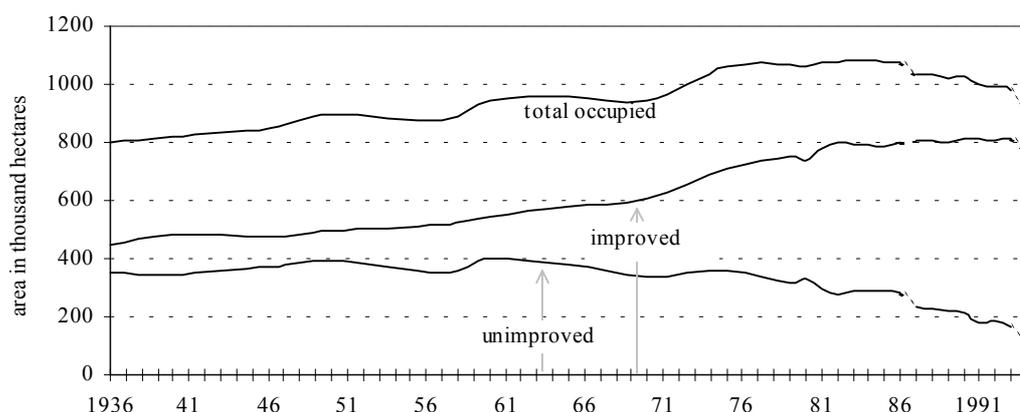


Figure 3. Changes in occupied, unimproved and improved land (1936-94).

Data source: Department of Statistics/Statistics New Zealand, various years; MAF Policy 1994.

Broken line 1986/87 indicates transfer of land to DOC, 1993/94 indicates loss of non-GST-registered holdings from survey.

TABLE 5. LAND USE CHANGES IN NORTHLAND 1973-93.

YEAR	UNIM- PROVED	IMPROVED			OCCUPIED TOTAL
		Grass	Forests	Total	
1973 (ha)	334	608	21.4	694	1028
1993 (ha)	164	680	132	817	981
1973-93 (ha)	- 170	72	111	123	- 47
1973-93 (% '73)	- 51%	12%	517%	17.7%	- 5%

In 1987 some 40 000 ha of unimproved land was removed from the statistics due to transfer to DOC.

123 000 ha. About 44% of 'unimproved' land has been cleared, the majority of which was probably bush, scrub and secondary growth (Table 5).

Some of this clearance was encouraged by Government subsidies designed to increase stock numbers and the area in pasture. The Land Development Encouragement Loans alone resulted in the clearance of over 45 000 ha of 'scrub and brushweed', as well as some native forest in Northland (McSweeney 1984). Following the removal of state support for agriculture, the area in pasture has declined slightly (Fig. 4).

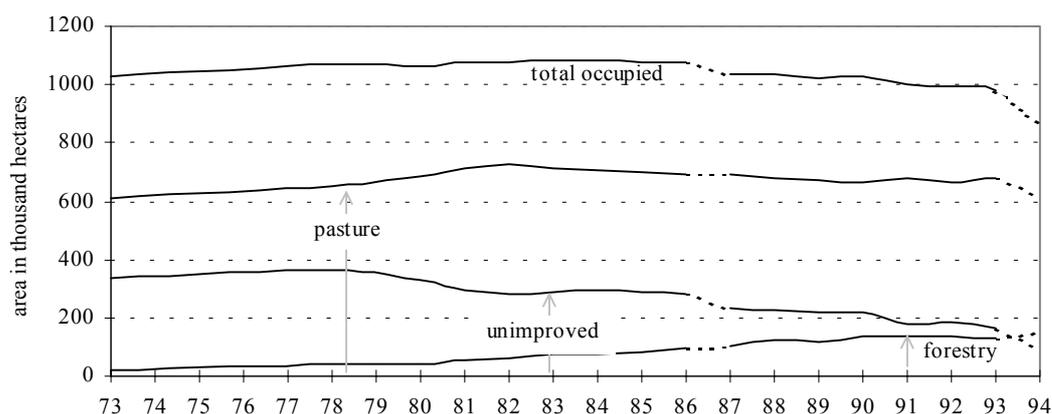


Figure 4. Land use changes in Northland (1973-94).

Data source: Agricultural Statistics, Department of Statistics and Statistics New Zealand, various years. Broken lines indicate in 1986/87 transfer of land to DOC, and in 1993/94 loss of non-GST-registered from survey.

Over the same period, regulatory and taxation changes, government support and increasing returns have encouraged a major expansion of forestry in the area, with just over 100 000 ha of plantation established over the last 20 years, much of it by farmers and small investors (Blunden et al. 1995). This has involved both conversion of bush and scrub and afforestation of pasture. Future estimates are for around 7500 ha of plantings in Northland annually.

While pastoral and forestry developments are the major causes of habitat loss, other land uses such as firewood harvesting also impact on biodiversity. A 1994 survey showed 200-300 ha of manuka was used for firewood, just under half Northland's firewood supply. Manuka functions as a nursery for regenerating forests and is an important habitat for native species including the kiwi (Davis 1995).

The impact of habitat clearance on biodiversity during the last 20 years can be gauged from an analysis of changes to sites of special wildlife interest in Northland undertaken in the early eighties (Anderson et al. 1984). A 1978 survey identified 325 000 ha (26% of Northland's total area) of such sites. A 1983 re-survey of these sites showed that 43% had been lost or reduced in size, with over 13 000 ha of significant forest/scrub (7.5%) and 3200 ha (14.4%) of wetlands lost completely. The survey excluded most areas of forest under 10 ha and wetlands under 0.5 ha, so the total loss is certainly an underestimate.

#### 4.2 WEEDS, PESTS AND OTHER THREATS TO HABITATS

Weeds and pests are a major problem in the region, altering habitats of rare and endangered species, preventing regeneration, and taking over productive land. Their impact is described in detail by DOC (1995) and the Northland Regional Council (NRC 1995a). The estimated 15 million possums are the most significant pests in terms of numbers, extent, spread and damage. The foraging needs of these possums is equivalent to 1.5 million stock units (a standardised measure of annual pasture requirements of grazing animals), just under a quarter of the 6.3 million stock unit equivalents of the entire Northland grazing industry, which uses 660 000 ha of pasture (MAF Policy 1994). Possum browsing causes major damage to native vegetation, pushing some species in particular areas to the verge of extinction. Feral goats also cause major damage to native flora and fauna, while weasels and other mustelids, wasps, cats, dogs, and rats place further pressure on several native species (DOC 1995, Hutching 1995).

Grazing and trampling of habitats by domestic cattle and sheep is also a problem, as it inhibits regeneration and damages existing plants (MacGibbon 1996). Preference for palatable species means that forests which survive grazing undergo changes in composition. Where grazing prevents regeneration, the remnants survive only until those species which form the canopy die out. The shallow rooting of many native species also means that even mature species can have their lives foreshortened by trampling. Stock also introduce weed species to areas of native habitats. Quantifying stock damage to habitats is impossible as there are no figures for the proportion of native habitats that stock have access to. However, fencing stock out of habitats is an essential component of habitat protection and a significant issue in terms of the costs involved.

#### 4.3 HABITATS ON PRIVATE LAND IN NORTHLAND — REGULATORY CONSIDERATIONS

Around 30% of Northland still has indigenous habitats on it, with just under a half of this managed by DOC. Although extensive, the Department's network of protected areas, covering some 150 000 ha, does not adequately represent the natural values of Northland. Most of the other 200 000 ha or so of habitats are

on private land, few of which have protection beyond that afforded by the RMA. There are just over 100 sites with QEII Covenants, covering an area of 3500 ha, and there are also a few areas protected under Conservation Covenants or other mechanisms. Six sustainable forest management permits approved under the FAA cover an area of 254 ha, but there are no areas of native forest covered by sustainable forest management plans and no further applications are being processed (I. Platt pers. comm. 1997). Just over 50 applications have been made by native forests owners to extract timber for personal use (P. Anderson pers. comm. 1997).

#### 4.3.1 Habitats and the Northland Regional Council

The Northland Regional Council (NRC) has made provisions for protecting outstanding natural features, significant areas of indigenous vegetation, and significant habitats of indigenous fauna, as required under Sections 6(b) and (c) of the Act(s.6(c)). Despite the vulnerability of many habitats on private land, NRC acknowledges that active protection of all habitats is not feasible and has therefore established policies for the protection of significant habitats, being those habitats ranked as Moderate-High or above using SSBI (Sites of Special Biological Interest) and PNA (Protected Natural Area) criteria (Table 6) (NRC 1996d).

TABLE 6. OBJECTIVES FOR ECOSYSTEMS AND BIODIVERSITY, NORTHLAND REGIONAL COUNCIL.

<ol style="list-style-type: none"> <li>1. Maintenance of the biodiversity of the Northland region.</li> <li>2. Protection of the life-supporting capacity of ecosystems through avoiding, remedying or mitigating (in that order of priority) the adverse effects of activities, substances and introduced species on the functioning of natural ecosystems.</li> <li>3. Protection of areas of significant indigenous vegetation and the significant habitats of indigenous fauna.</li> </ol>
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Source: NRC 1993: 152.

NRC also has responsibilities to control the use of land for, among other reasons, maintaining water quality and quantity, and preventing soil erosion. To fulfil this responsibility, NRC has developed a regional water and soil plan, with rules controlling the environmental impacts of land disturbance and streamside management (Tables 7 and 8).

Under the Biosecurity Act 1993, NRC also has statutory responsibility to manage pests and weeds, and can make land occupiers responsible for pest management on their properties (NRC 1995a). However, an underlying tenet of this Act is that those who benefit from pest management, and those responsible for spreading pests and weeds, should fund control programmes (NRC 1995a). The Council has therefore taken the approach that, since the benefits of pest

TABLE 7. PROPOSED RULES FOR LAND DISTURBANCE ACTIVITIES IN NORTHLAND REGION.

Permitted	Vegetation clearance <sup>a</sup> on Land Use Capability Classes I-VI (excepting VIe16-19) provided sediment run-off caused by it does not exceed specified water quality standards, and provided that if the area to be cleared in any one year is over 2 ha, the Council is informed at least 15 days prior. Clearance on LUC Classes VIe16-19 and VIIe. Consents must be obtained. Clearance on LUC Classes VIII. Applications for consents will be publicly notified.
Controlled	
Discretionary	

Source: NRC 1995b: s.21-23.

<sup>a</sup> Vegetation clearance excludes, among other things, "scattered trees, shrubs, or regenerating bush amongst pasture" (NRC 1995b: 180).

TABLE 8. PROPOSED RULES FOR STREAMSIDE MANAGEMENT AREAS <sup>a</sup> IN NORTHLAND REGION.

Permitted	Grazing or stock watering – provided it does not exceed specified water quality standards or result in vegetation loss which provides shading of the water or habitat or food source or reduction of water quality beyond permitted levels as this can affect aquatic habitats. Land preparation – provided stream bank vegetation is not removed where it; contributes to shading of the water, provides a food source or habitat site, or is necessary to prevent stream bank erosion.
Discretionary	Vegetation clearance if dominant slope less than 20° or to first reduction of slope if greater than 20°. Resource consent applications will be generally be publicly notified.

Source: NRC 1995b: s.21-23.

<sup>a</sup> defined as 10 metres from the edge of the water body.

and weed management are shared by the community and individual landowners, both are required to contribute to the costs. In the case of possums, the initial control funding is drawn from the community as part of their rates while landowners are responsible for ongoing control (NRC 1996b).

NRC also considers that the public share the environmental benefits from habitat protection and therefore established an Environmental Fund in 1996 to redistribute ratepayers money to ‘encourage and assist the voluntary implementation of measures to achieve environmental protection or enhancement’ (NRC 1996a). In proposing the Fund, NRC noted that habitat protection benefits future generations as well as the current one. Landowners who protect habitats sacrifice their short-term benefits for longer-term community benefits. The funding is looked upon as partial compensation for the development options landowners forego. In addition, it is recognised that regulatory approaches are unlikely to ensure the positive management, for example excluding stock, that is necessary to protect the integrity of habitats (NRC 1995c).

The fund provides financial assistance to those willing to undertake environmental projects that provide public benefits, such as fencing habitats and gaining legal protection through the QEII or NWR (NRC 1995c). The NEF provides no more than 50% of the costs of a project. Applicants’ contributions can be in cash or kind (labour or materials) and can include funding from other organisations. Allowing applicants to include the cost of their labour in their contribution reduces the financial barrier that the requirement for landowners to contribute to the costs of the projects would otherwise impose. To ensure that the funding achieves long-term environmental benefits, NRC may require applicants to enter into legal agreements. The first round of funding drew 76 applications, requesting a total of just over \$500,000 towards projects costing nearly \$1,500,000. The Council approved 34 applications and contributed just under \$100,000.

#### 4.3.2 Habitats and district councils

As part of fulfilling their requirements under the RMA, district councils are required to identify and protect areas of significant habitat within their jurisdiction. The interpretation of this and the approaches adopted vary among

councils. Those employed by the three Northland councils and the significant habitats in their jurisdictions are discussed in the following section.

### ***Far North District Council***

The Far North District Council (FNDC) has the largest total and proportional area of indigenous habitats of the three district councils. There are 112 500 ha (17% of its area) under DOC stewardship and a further 1130 ha are protected as reserves by the FNDC.

There are 884 significant natural areas (sna) in the district, identified for the Council in 1996. Excluding estuaries, they cover a total area of 242 000 ha, 35% of the District land area. Forests are most extensive, contributing 52% of significant habitat area, while shrubland accounts for a further 31%. Dunes (5%), wetlands (4%) and estuaries (8%) make up most of the rest. (Note: estuaries have been excluded from subsequent calculations as they are not part of a district's land area.) Nearly two-thirds of these habitats (63%) are in private ownership, 23% is part of the national conservation estate, 6% is Crown land and 7% is owned by FNDC.

FNDC published its proposed plan in October 1996 and a variation to that in March 1997 (FNDC 1996, 1997). The variation made substantial changes to the proposed plan regarding habitats, summarised in Table 9, mainly in response to public submissions. In general, clearances within 'sna' (there is no differentiation in terms of the level of significance of different habitats) require consents, as do activities affecting habitats in Significant and Outstanding landscape units. Grazing is a controlled activity in 'sna', but in most cases landowners are able to continue grazing stock in them, as existing use rights apply. Some incentives are available to encourage landowners to undertake permanent protection of habitats in significant ecological or landscape areas. These take the form of development bonuses which, for example, allow owners to increase the area that they develop on a site by up to 20% in return for protecting habitat on the site.

TABLE 9. VEGETATION CLEARANCE CONTROLS FOR FAR NORTH DISTRICT COUNCIL.

	PROPOSED PLAN	VARIATION NO. 1
Outstanding landscape unit	<i>Discretionary</i>	<i>Discretionary</i> unless under 1000 m <sup>2</sup> for building site, access, etc.
Significant landscape unit	<i>Discretionary</i> if over 1 ha	<i>Restricted discretionary</i> unless under 1000 m <sup>2</sup> for building site, access, etc.
Significant natural area	<i>Non-complying</i>	<i>Discretionary</i> if over 500 m <sup>2</sup> and for any activity that might affect a scheduled wetland
Not in significant natural areas	<i>Restricted discretionary</i> if over 300 m <sup>2</sup> or 30% net site area.	<i>Permitted</i>

Source: FNDC 1996 and FNDC 1997

### ***Whangarei District Council***

The Whangarei District Council (WDC) expected to complete its Draft Plan in late 1997. In it, it has identified all habitats with ecological significance and ranked these accordingly: Outstanding, High, Moderate/High, Moderate, Potential. The 319 Sites of Ecological Significance (SES) cover just under 60 000

ha, or 22% of the District (Boffa Miskell 1995). The vast majority (94%) of this area is of High or Outstanding ecological significance (Table 10). Forests and shrublands make up 80% of the total area, and over 90% of this has High or Outstanding significance. Around one-third of the area of High and Outstanding sites are under DOC or Council protection (L. Chester pers. comm. 1997).

TABLE 10. SITES OF ECOLOGICAL SIGNIFICANCE FOR WHANGAREI DISTRICT COUNCIL.

	TOTAL				FOREST/ SHRUBLAND		WETLAND		COASTAL/ ESTUARINE	
	No.	%no.	Area	%area	No.	%total	No.	%total	No.	%total
Outstanding	13	4%	2110	4%	3	23%	4	31%	6	46%
High	126	38%	53378	90%	102	81%	14	11%	10	8%
Mod/High	70	21%	1534	3%	41	59%	28	40%	1	1%
Moderate	72	22%	1947	3%	37	51%	35	49%	0	0%
Potential	38	12%	585	1%	13	34%	25	66%	0	0%
Total	319		59593		196	61%	106	33%	17	5%

Data source: Boffa Miskell 1995.

WDC also commissioned a landscape survey to identify outstanding natural features and their vulnerability and sensitivity to change. Landscape units were ranked in terms of sensitivity ratings, with ratings of 6 and 7 considered 'outstanding', while a rating of 5 is 'significant'. Around 17.5% of the District has Outstanding landscape values and a further 16% is Significant. It was recommended that these landscape values be protected through restrictions on land use activities (LA4 1995).

While the final rules had not been agreed to, WDC decided (June 1997) that all Outstanding SES (4% of significant habitats) as well as those High SES owned by DOC or the Council, would be considered significant and will therefore require consents for vegetation clearance, or destruction of wetlands or estuarine areas. Private landowners with High SES will be able to choose whether to have their habitats covered by the regulations, providing a sort of 'poor man's covenant'. However, consents for clearance could be sought in the future by the same or subsequent owner. The conditions that will apply to consents have yet to be determined (L. Chester pers. comm. 1997).

### ***Kaipara District Council***

Kaipara District Council (KDC) originally included in its proposed Plan a register of areas for which consents under the RMA would be needed for any activities that would adversely affect the ecological or scenic values of those natural features (KDC 1997a, P. Anderson pers. comm. 1997). The register was based on an assessment of important wildlife sites undertaken by the Wildlife Service in 1978/79, the use of which created several problems in terms of the sites identified; many habitats had since been cleared or drained, the boundaries of others were now inaccurate, and many other areas of significant vegetation were not included. The register was not included in the Operative Plan (KDC 1997a) due to concerns regarding its accuracy; instead a revised

register that took into account habitat loss and boundary adjustments was published as Proposed Change No. 1 to the Operative District Plan (KDC 1997b). In the interim, the Operative Plan treated clearances of indigenous vegetation of over 5 ha in any one year as a discretionary activity under the RMA. The revised register includes 180 sites ranked according to their significance. KDC proposes that activities likely to adversely affect sites of High and Outstanding significance will be non-complying and those affecting sites of regional and district significance will be discretionary. Sites of local significance are included in the register for educational purposes. The register, however, lacked many sites which a more up-to-date survey would include; the number could double as a result of a prospective Significant Natural Area survey (P. Anderson pers. comm. 1997).

According to the register of 176 SSBIs, there are just under 40 000 ha of significant bush and wetlands in Kaipara, covering around 13% of the District. Approximately 15 000 ha (39%) of this is on private properties. Most of the rest is part of the 20 000 ha of DOC stewardship estate. Less than 700 ha of the habitats on private land have formal protection (covenants). The 11 300 ha of significant forest is shared among some 350–400 landowners, which averages around 30 ha per landowner (M. Vincent pers. comm. 1997).

TABLE 11. SUMMARY OF SSBIS LISTED ON KAIPARA DISTRICT COUNCIL REGISTER.

	NO. OF SITES	TOTAL AREA (ha)	PRIVATE LAND (ha)	PRIVATE LAND (%)
<b>Forest and shrublands</b>				
Outstanding	3	6,005	688	11
High	56	21,257	9,287	44
Moderate High	28	1,111	825	74
Moderate	14	405	236	58
Potential	15	292	292	100
Total	116	29,070 <sup>a</sup>	11,328 <sup>b</sup>	39
<b>Freshwater wetlands</b>				
Outstanding	3	8,000	2,500	31
High	41	1,650	1,005	61
Moderate High	5	65	65	100
Moderate	6	150	100	66
Potential	5	20	20	100
Total	60	9,890	3,690	37
<b>Estuarine coastal</b>				
Outstanding	2	84,850	n/a	n/a
High	2	650	112 <sup>c</sup>	17
Total	4	85,500	n/a	n/a

According to KDC [1997b] figure for <sup>a</sup> is 29195, <sup>b</sup> is 11450, and <sup>c</sup> is 535, but these are not supported by the register.

### ***Habitat protection and rate remission***

Under the Rating Powers Act 1988, district councils are required to provide at least 50% rates relief for land owned for conservation purposes. However, all three district councils provide more than this, giving 100% relief for areas with QEII Covenants, and other formal protection mechanisms that fulfil their criteria. FNDC also provides rate relief for properties that are 90% or more native habitat, postponing rates for a period of 10 years and then remitting them. Should there be a subsequent change in land use, the most recent 10 years of rates then fall due.

## 4.4 DISCUSSION

The patchwork of data provided above (summarised in Table 12) gives a strong indication as to the important role that the habitats remaining on private land play in the conservation of biodiversity in Northland and also of the variation between the districts. Just over a quarter of the land area has been identified as being ecologically significant, with a slightly larger area having significant landscape values. Around 60% of these significant habitats are on private land.

FNDC has proposed much stronger protection for significant habitats in its jurisdiction than has the WDC. KDC has proposed protection for most significant habitats in the District, but their register is thought to miss many habitats that should be included. WDC is providing the least protection, leaving decisions about protection of around 90% of significant habitats in the hands of the landowners; using the Northland Regional Council's objective of protecting habitats ranked of 'moderate' significance or higher, around 99% of significant habitats on private land, covering 12% of the District, are worthy of protection.

TABLE 12. SUMMARY OF SIGNIFICANT HABITAT AND LANDSCAPES IN NORTHLAND (BY TOTAL LAND AREA).

	FNDC	WDC	KDC	NORTHLAND
Total area (ha)	684 100	272 000	303 000	1 260 000
Pasture, exotic forestry, horticulture, etc (% total area)	56%	71%	80%	65%
Land managed by DOC (% total area)	17%	5%	7%	12%
Area of district with significant <sup>a</sup> habitats (%)	35%	22%	13% <sup>b</sup>	27%
No. of significant habitats	884	319	180	1383
Approx. no. of landowners with significant habitats	2200	1000	450	3650
Area of district with significant <sup>c</sup> landscapes (%)	37%	33%	n/a	
Total significant forest, shrublands, wetlands (SFSW)	242 000	48 000	40 000	330 000
SFSW on private land (ha)	147 000	32 000	15 000	194 000
Private SFSW as % of total no. SFSW	61%	66% <sup>d</sup>	39%	59%
Private SFSW as % total area of territory	21%	12%	5% <sup>b</sup>	15%
Private SFSW requiring consents, %	> 95%	> 4% <sup>e</sup>	> 95%	

<sup>a</sup> Moderate or higher as per NRC. <sup>b</sup> The use of an old SSBI database means that many areas of indigenous vegetation may be missing.

<sup>c</sup> Ranking of 5 or higher. <sup>d</sup> Estimate provided by WDC. <sup>e</sup> Optional for further 90%.

The dynamic nature of resource management as the planning process evolves is evident. None of the councils had completed the process in respect of rules governing habitats, and the protection that would eventually be afforded might change as a result of public submissions. Even if rules had been established, it would be too early to tell how effective they would be in retaining habitats, as this would depend on various factors: the interpretation and understanding of the rules by the landowners (whether they actually know what they can and cannot do), the policing and enforcement by council (whether they know if habitat is being lost and what their response would be), and the interpretation of the RMA by the council, or if appealed, by the Environment Court. Future analysis of the outcomes of consent applications and hearings concerning the clearance of habitats will provide some understanding of this. However, even when the rules are eventually notified they will be liable to future contestation and further litigation as public opinions and political representation change.

## 5. Landowners and habitat protection

Private rural landowners are very much at the cutting edge of conservation issues. Those with habitats on their properties are faced with reconciling their environmental and economic needs in the management of their properties. Rural landowners are not homogeneous in their characteristics, attitudes and behaviour; they exhibit wide disparities in income levels, in environmental and economic motivations, and personal attitudes and behaviour, for example. Also, the degree to which their management decisions impact on habitats varies with factors such as previous land history, type of land-based enterprise and approaches used.

This section integrates findings from two research projects, both of which were aimed at expanding our understanding of landowners' approaches and attitudes to sustainability in the context of land management. First, the issues faced by landowners in regard to habitat protection are described, based on a regional survey of members of Federated Farmers. This description looks at the distribution of habitats among landowners by farm type and farm size, examines past and potential future development activities of the farmers and the consequences for habitats, identifies the barriers farmers believe prevent them from undertaking projects such as fencing of habitats, and reviews the potential for financial incentives to overcome these barriers. The second section is based on case studies of eight landowners in the Mangakahia area of Northland and considers their experiences in regard to habitat loss and protection, their views on the current threats to habitats, what can be done to improve habitat protection, and how the costs of protection should be distributed. The two approaches have distinct, yet complementary advantages. The former is extensive, providing a regional overview of attitudes and management practices; the latter is intensive, providing a more detailed profile of attitudes, behaviour and management practices in relation to indigenous habitat.

## 5.1 FEDERATED FARMERS SURVEY

Some insight into the distribution of bush among landowners and the financial implications of habitat protection can be gained from analysis of data collected from two surveys of members of Northland Federated Farmers (NFF). The postal surveys were conducted in collaboration with the NFF executive as part of a four year project on the sustainability of land-based production and rural communities in Northland (Blunden & Cocklin 1995). The 1530 members of NFF make up 27% of land-based producers in the region. The membership is not representative of all Northland landowners as it is predominantly those who engage in pastoral farming who join. It is necessary, therefore, to exercise some caution in interpreting the results across the region since they are not representative of all rural landowners (e.g. horticulturalists, foresters).

The first survey, conducted in June 1995, sought to 'elicit some first order information with regard to the perceptions, attitudes and practices of landowners under the general rubric of sustainability' and dealt with definitions of sustainability, on-farm management practices, farmers' experience with the RMA, and sustainable communities (Blunden & Cocklin 1995:2). A follow-up survey was undertaken in December 1996 focussing more specifically on the effect the RMA has had on farmers (Blunden et al. 1997). The survey included questions on the amount of habitat clearance undertaken since 1991, farmers' views on how the costs of habitat protection should be distributed, and whether they had applied to the Northland Regional Council's environmental fund, or whether they were likely to in the future.

There were 318 responses to the first survey (20% response rate), representing 6% of Northland farms and covering 69 000 ha, or 8% of the occupied land in Northland. The second survey drew 161 responses, covering 34 288 ha. The detailed land use data collected in the first survey showed the sample to be over-represented in terms of pasture and under-represented in forestry compared to region-wide land use. This is to be expected given that the agriculture statistics also cover all forestry operators (refer Table 13). In the second survey there was also a bias towards dairying as primary income source (66% as opposed to 50% in the earlier survey), probably from a combination of reduced numbers of beef/sheep farmers maintaining membership of Federated Farmers and the greater interest for dairy farmers in a survey about the RMA, given the greater implications it has for dairy farm practices.

TABLE 13. LAND USAGE—COMPARISON OF SURVEY SAMPLE AND NORTHLAND REGION DATA.

FEDERATED FARMERS SURVEY 1996		AGRICULTURE STATISTICS 1994	
Pasture	83%	Pasture	71%
Forestry	3%	Forestry	17%
Bush	7%	Other (bush, scrub idle, barren)	11%
Scrub	5%	Horticulture	1%
Hort/Idle/Crops	1%		

Source: Federated Farmers Survey 1996 (Blunden et al. 1997); Statistics New Zealand 1997.

### 5.1.1 The distribution of bush on Northland farms

The first survey showed that around 70% of farmers had bush (222 of the 318) on their property. The average area of bush for these farmers was 25 ha, or 10% of their farm area. There was a slightly smaller area of scrub, and most of those with bush also had areas of scrub. Landowners were not asked to differentiate between gorse or regenerating native species and the following analysis, therefore is restricted to those with bush on their properties.

TABLE 14. PRESENCE OF BUSH AND SCRUB ON PROPERTY.

	BUSH (covenanted)	BUSH (not covenanted)	TOTAL BUSH	SCRUB	SCRUB AND BUSH	TOTAL LAND
Area (ha)	192	4662	4854	3568	8422	69 196
Percentage of total area	0.3	6.7	7.0	5.2	12.2	
No. of properties	20	186	195	133	233	313
Percentage of properties	6.4	59.4	62.3	42.5	74.4	
Average area (ha)	10	25	25	27	36	221

Data source: Federated Farmers Survey, 1995 (313 respondents; Blunden & Cocklin 1995).

Twenty respondents (9% of those with bush) had covenanted bush on their property, covering a total of 192 ha of bush. The covenanted areas ranged from 0.4 ha to 36 ha, and averaged 9.6 ha. Nine farmers had all of their bush protected. In terms of farm type, beef farms (defined as 75% or more of income from beef or sheep) were more likely to have covenants on them than other farm types, even taking into account the higher probability of beef farms having bush on them (refer Table 15).

TABLE 15. COVENANTING BY FARM TYPE.

	No. with covenants	% of total covenants	FARM TYPE	
			(% of total)	(% with bush)
Beef	12	60	37.1	43.7
Mixed	2	10	13.5	13.5
Dairy	6	30	40.6	33.8
Total	20	100	100	100

Farm type was defined by the proportion of income attributed to each activity: beef farms 75% or more of income from beef or sheep; dairy farms 75% or more of income from dairy; mixed farms between 50% and 75% income from either beef or dairy. (Note: the drop in sheep returns means that, though sheep are often carried on grazing units, they contribute little in the way of income but they still perform an important weed control and pasture maintenance role.)

Data source: Federated Farmers Survey, 1995 (313 respondents; Blunden & Cocklin 1995).

Proportionately more beef farms (80%) had bush on their land than dairy farms (58%) or mixed farms (70%) (refer Table 16). The average area of bush and the average proportion of the property in bush are also greater on beef farms. This is to be expected given the strong correlation between farm type and farm size. The lower returns for beef/sheep farming mean it can be outbid for more productive land by dairying and other more profitable activities. Beef and sheep

TABLE 16. AREA OF FARM IN BUSH BY FARM TYPE.

	No. of farms	% total farms	Av. size (ha)	No. farms with bush	% with bush	Bush (ha) (average all farms)	Bush (%)	Bush (ha) (only farms with bush)	Bush (%)
Beef	118	37.1	299	97	82.2	26	8.7	32	10.6
Mixed	43	13.5	298	30	69.8	17	5.8	25	8.3
Dairy	129	40.6	138	75	58.1	7	4.9	12	8.4
Other	28	8.8	115	20	71.4	5	4.7	8	6.6
<b>Total</b>	<b>318</b>		<b>221</b>	<b>222</b>	<b>69.8</b>	<b>16</b>	<b>7.0</b>	<b>22</b>	<b>10.0</b>

Data source: Federated Farmers Survey, 1995. NB Some figures are based on 313 farms as not all specified land area.

operations therefore require more of the less fertile land to be economically viable, while dairying concentrates on the flatter, more fertile lowlands where bush clearance has been more extensive.

The proportion of bush on a farm increases with farm size, ranging from just under 3% on farms under 50 ha to over 10% on larger farms (refer Table 17). The probability of a farm having bush on it also increases with size.

TABLE 17. AREA OF FARM IN BUSH BY FARM SIZE.

Size of farm (ha)	No. of farms	% farms with bush	% area in bush (all farms)	% area in bush (farms with bush)
< 50	25	48.0	2.9	6.2
< 100	62	48.4	3.6	7.7
< 150	52	61.5	5.1	8.1
< 200	49	53.1	4.6	8.7
< 300	53	73.6	6.5	8.7
< 500	50	74.0	7.4	9.9
> 500	22	86.4	10.3	11.8

Data source: Federated Farmers Survey, 1995.

The uneven distribution of the bush means that a small group of landowners have a very high proportion of the total bush area. At one end of the spectrum eleven farms shared approximately one-third of the bush, while at the other extreme one-third of the bush was shared among 150 landowners.

### 5.1.2 Farm management and habitats

There is very little information on the extent of habitat clearance undertaken by farmers in the last few years, or planned for the near future. To help overcome this the second questionnaire asked farmers how much bush or scrub they had cleared in the last five years, or expected to in the next five years. Of the 161 respondents, 40 (25%) had undertaken some clearance. The total area cleared by the survey respondents amounted to 399 ha, which averages 10 ha per farm. More beef farmers had undertaken clearance than dairy farmers (31% compared to 26%) and they had cleared slightly more (average 12 ha) than dairy farmers

(average 8 ha). The second survey did not request detailed land cover data, but the proportion that had been cleared can be estimated based on the figures provided for the area of effective pasture. Using the reported average figure for effective pasture of 78%, the loss of 399 ha represents 5.2% of the remaining area. However, not all of the non-pasture area would be bush or scrub. In the first survey, bush and scrub made up 70% of the non-pasture area. If this proportion is applied to the second survey, 7.5% of the area of bush and scrub has been cleared in the last five years.

A second estimate can be made using the more detailed land use data requested in the first survey. The average area of bush and scrub per farm was 27 ha, of which 58% was bush. The area of bush and scrub that was reported to have been cleared in the second survey averaged 2.5 ha across all the farms. Combining these figures suggests 8.5% of remaining bush and scrub has been cleared from the farms of Federated Farmer members in the previous five years. While these figures are speculative, the fact that a higher proportion of dairy farmers responded to the second survey, and that dairy farms have a lower proportion of their area in bush or scrub and cleared less bush, suggests both calculations are likely to understate rather than overstate the proportion of habitat lost. It is worth recalling that the study of sites of special wildlife interest in Northland discussed earlier showed a loss of 7.5% of area in significant forest/scrub between 1978 and 1983. That survey would also have underestimated habitat loss, as it excluded most areas of forest under 10 ha (Anderson et al. 1984). While not definitive, the data are indicative of the pressure that habitats have been under in the recent past.

Further insight is provided by considering the development activities engaged in by landowners. The first survey asked whether farmers had developed more pasture or had planted trees for income in the past five years, or expected to do so in the next five (Table 18). In the last five years 35% had developed more pasture, while 33% had undertaken some forestry or agroforestry development. About one-third of these had done both. Expectations of future development decreased overall, largely due to a drop in pasture development. Dairy farmers were more likely to be engaged in developing more pasture, while beef farmers were more involved in forestry developments. Mixed farms had greater expectations of developing more pasture in the future than in the past (up from 30 to 40%) and also showed a slight increase in expected forestry activities.

The first survey also asked if any bush had been (39%) or would be fenced (45%) (refer Table 19). Fencing bush, past and future, was reported more often

TABLE 18. PAST AND FUTURE DEVELOPMENT BY FARM TYPE.

	ON-FARM DEVELOPMENT IN PAST 5 YEARS				ON-FARM DEVELOPMENT IN NEXT 5 YEARS			
	Pasture only	Pasture + forestry	Forestry only	Neither	Pasture only	Pasture + forestry	Forestry only	Neither
Beef	19	13	25	43	11	12	32	45
Mixed	21	9	28	42	19	21	19	42
Dairy	31	13	16	40	26	12	17	46
Total	24	11	22	42	18	13	23	47

Data source: Federated Farmers Survey, 1995.

TABLE 19. CORRELATION OF FENCING BUSH WITH FARM DEVELOPMENT AND WITH FARM TYPE.

	PAST			FUTURE		
	No. with bush	No. have fenced bush	% have fenced bush	No. with bush	No. will fence bush	% will fence bush
<b>Type of development</b>						
More pasture only	52	15	29%	37	16	43%
Pasture and forestry	30	18	60%	34	21	62%
More forestry only	59	32	54%	59	33	56%
No pasture or forestry	81	22	27%	92	31	34%
<b>Total</b>	<b>222</b>	<b>87</b>	<b>39%</b>	<b>222</b>	<b>101</b>	<b>45%</b>
<b>Type of farm</b>						
Beef	97	35	36%	97	40	41%
Mixed	30	7	23%	30	19	63%
Dairy	75	38	51%	75	36	48%
<b>Total</b>	<b>222</b>	<b>87</b>	<b>39%</b>	<b>222</b>	<b>93</b>	<b>45%</b>

Data source: Federated Farmers Survey, 1995.

amongst those engaging in forestry development than those developing more pasture; it was least reported on properties where no pasture or forestry development was occurring. This suggests that a more integrated and diverse approach to land use might have some conservation benefits provided that the development is not resulting in habitat loss.

Comparing farm types, bush fencing in the past was more likely to have occurred on dairy farms, while expectations of future fencing of bush were very high (63%) on mixed farms. This last result is presumably linked to their higher expectation of engaging in pasture and forestry development. Most mixed farms (95%) gain some income from dairying, and given that dairying is expanding in the area, many may be anticipating further developing their dairying operations, which will require additional fencing for stock management purposes such as paddock subdivision or fencing dairy stock out of bush areas or gullies.

### 5.1.3 Economic factors and habitat protection

To gauge farmers' perceptions of the major barriers to undertaking environmental projects on their land, the first questionnaire asked the following:

How important are the following barriers to your undertaking environmental projects on your farm such as the fencing and/or planting of water-ways, fencing of native bush or the retirement and revegetation of erosion-prone land? (See Table 20 for the suggested barriers.)

Financial cost was the most important barrier, with 70% of farmers (who had 81% of the unprotected bush between them) ranking cost as very important, while a further 23% considered it slightly important (Table 20). Lack of time was also a major barrier, though of somewhat less importance. Lack of desire

TABLE 20. BARRIERS TO UNDERTAKING ENVIRONMENTAL PROJECTS.

	Financial cost		Lack of time		Lack of info		No desire to do		No need for them	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Very important	195	70	124	48	34	16	28	15	45	21
Slightly important	62	22	101	39	66	30	41	22	55	26
Not important	20	7	32	12	117	54	114	62	110	52
No. of responses	277		99		257		99		217	

Data source: Federated Farmers Survey, 1995.

was the least significant barrier, with only 28 respondents (15%) considering it very important. In the judgement of these landowners, failure to undertake environmental projects is rarely due to indifference or ignorance. However, it should be noted that there is a problem with asking people to judge the extent to which lack of information or desire contributes to their own particular action or inaction, or whether the need to act even exists, because such judgements are themselves dependent on information and motivation.

Comparing the responses by farm type reveals that cost is a more important barrier to beef farmers (85%) undertaking environmental projects than dairy farmers (55%) or mixed farmers (73%), and, not surprisingly, those with higher debt loads were more likely to see cost as a barrier.

In the first survey, the potential for financial incentives to encourage farmers to undertake environmental projects was canvassed by asking to what extent a hypothetical regional fund that contributed 50% of costs would encourage projects such as fencing of waterways or bush, or the retirement and revegetation of erosion-prone land. Of the 307 who responded to this question, 30% said that it would help a great deal, 23% thought it would help a lot, 28% a little, and 19% that it would not help at all. Cross-tabulating the cost and funding questions shows that 34% (65) of those who saw cost as a very important barrier thought a 50% contribution would help only a little or not at all (Table 21). It is also significant that the 65 farmers (24% of those responding

TABLE 21. COST AS A BARRIER TO ENVIRONMENTAL PROJECTS.

		Importance of cost as a barrier			Total
		Very important	Slightly important	Not important	
Extent to which a 50 % grant would encourage environmental projects to be undertaken	A great deal	78	10	1	89 (32%)
	A lot	50	18	1	69 (25%)
	Little	40	29	8	77 (28%)
	Not at all	25	5	10	40 (15%)
Total		193 (70%)	62 (23%)	20 (7%)	275

Data source: Federated Farmers Survey, 1995.

to the question) who appeared least able financially to undertake habitat protection had a large proportion (42%) of the bush under their management.

In terms of farm type, 41% of those beef farmers for whom cost was a very important barrier would find a 50% grant to be of little or no help, much higher than the figures for dairy (26%) or mixed farms (27%).

#### **5.1.4 Funding habitat protection**

Given the economic constraints that many farmers face with respect to protecting habitats on their land, and the approaches taken by the district councils in Northland to habitat protection, the second survey asked farmers how the costs of protecting the habitats identified by councils as significant should be shared. The overwhelming response was that the costs of habitat protection should not be borne by the owners of the habitats. While around 20% of those who responded indicated that some of the costs might rest with them, 77% considered that the landowners should incur no additional costs, and many of these specified the need for rate relief for such habitats. Roughly equal numbers stipulated that the costs should be met at the national level and at the regional level. Just over 5% argued that areas of habitats should be purchased if their protection was necessary, and a similar proportion called for compensation if such protection prevented the development of potentially productive land.

Farmers were also asked whether they had applied to the Northland Regional Council for a grant towards the cost of environmental projects from the Environmental Fund it had set up in the time between the two surveys. While only four had done so, 36 (23%) indicated they would apply if it was offered again. Of these, 23 (64%) specified they would seek financial assistance for fencing bush or waterways.

## **5.2 CONSERVATION IN A LOCAL CONTEXT — THE MANGAKAHIA CASE STUDIES**

The second component of this study involved a series of case studies of residents in the Mangakahia area of Northland. They were selected to cover a range of categories reflective of the broad trends apparent within the locality: length of residence, reliance on farming income, ethnicity, age and gender, and type of farming enterprise. This selective approach was taken in order to incorporate perspectives beyond those of people engaged primarily in primary production. The eight case studies are summarised in Table 22.

The case study interviews were conducted during August 1996. The interviews were semi-structured in order that the particular issues that were pertinent to each individual could be explored more fully, rather than being confined by a formal interview schedule. This approach also allowed issues raised in one interview to be carried over to subsequent ones. A questionnaire was used in conjunction with the interviews to allow comparisons of 'standardised' responses. The questionnaire covered issues of property rights, compensation, protection mechanisms, barriers to habitat protection, habitats and regulations, and costs of protection. The questionnaire also asked for selected personal

TABLE 22. MANGAKAHIA RESIDENTS USED IN CASE STUDIES.

- |  |
|--|
| <ol style="list-style-type: none"> <li>1. Newly arrived lifestylers with some forestry plans, little bush on property.</li> <li>2. Kaumatua with 160 ha of family land, mostly in bush.</li> <li>3. Retired Maori farmer with 120 ha retirement unit and some significant habitat.</li> <li>4. Second-generation dairy farmer with very little habitat.</li> <li>5. Beef/agroforestry farmer, with lots of bush including some significant habitat.</li> <li>6. New-entrant dairy farmer, farm adjoining DOC land, little bush on property.</li> <li>7. Long-time mixed farming family (beef/sheep/horticulture/forestry), lots of bush and scrub.</li> <li>8. Established lifestyle property owners with very little land, no habitat.</li> </ol> |
|--|

information and for information on land use and past or intended clearance or protection of habitats.

### 5.2.1 Mangakahia profile

The Mangakahia area, about 60 km north-west of Whangarei, was chosen for the case studies for several reasons. It fulfilled the criteria of having a mixture of land uses (dairying, pasture, forestry, agroforestry), it has a range of habitat remnants under a variety of ownership arrangements, and the Auckland University Geography Department's Regional Resource Evaluation Project on sustainable land-based production has focused on the same locality, providing opportunities for the efficient exchange of information.

Land use in the Mangakahia area is diverse, with dairying concentrated on the alluvial flats of the valley, while beef/sheep farms and plantation forestry are predominant in the steeper hill country. The major land use developments in recent times have been an increase in dairying, and an increase in exotic forest plantations by large forestry companies, small forestry investors and farmers. There are remnants of native bush throughout the valley and several larger areas of bush, some of which are owned by DOC and others by Carter Holt Harvey.

In terms of landscape values, all the bush-clad hill country in the Mangakahia area has been ranked as 'outstanding' due to their 'rich diverse composition of indigenous forest cover, the high degree of continuity and coherence ..... (and the) strong atmosphere of naturalness and wilderness' (LA4 1995:30), while some of the rolling to steep country with pockets of scrub and bush is 'significant'. In terms of ecological values, there are 22 Sites of Ecological Significance (SES), covering about 9% of the area (5600 ha). Although the study area has no 'outstanding' sites, 14 of the 22 sites, accounting for 98% of the area covered by SES, were ranked 'high'. Five of the sites contain only wetlands (18.5 ha in area), three consist of both wetlands and forest habitats, and the remainder are forest habitats.

### 5.2.2 Land use and habitat protection—the landowners' perspective

Loss of habitat in the Mangakahia area was a concern to all those interviewed. Only one considered that sufficient habitat remained in the area, while all others considered that too much had been lost already. There was a general expectation that the extent of habitat would decrease in the future, particularly in the next 10 years.

In terms of their own situations, the case studies exhibited a wide range of experiences regarding habitat loss and protection. Some had taken on farms that had already been extensively cleared, whereas others had actively engaged in habitat clearance for pasture or forestry development. Of the latter, all had chosen to leave areas of habitat intentionally. However, without legal sanction, such personal initiatives provide no protection against clearance by future owners. This was evidenced by one landowner who had intentionally retained bush on his previous property only to see it cleared by the new owners. As a consequence he anticipated protecting the bush on his new property with a covenant. Another had sought QEII assistance to protect habitat, prompted by his son's suggestion that more bush should be cleared. However, he was discouraged by the financial contribution expected of him. The landowner was subsequently informed by the District Council that the habitat was significant and a consent would have to be gained before any activities could be undertaken that might damage it. While there were no requirements to fence the habitat, rate relief would only be available if the area was protected by a covenant. The landowner had no argument with the need for protection but was adamant that having 'given it away' he should not have to meet the costs of protecting it, especially as he had already fenced half of it.

'Well it actually needs protecting - like that patch of bush out there is the head of (a stream) - it is a mass of springs - it needs protecting from stock and from someone else chopping it down - my son once got on to me about chopping it down and planting pines - that is what first got me on to (the QEII Trust) - cause I wouldn't like to see that - it needs protecting from animals and possums and sawing down. I have already fenced half of it.' (Beef/agroforestry with significant habitat)

The landowner was not happy with the idea that he was expected to provide at least half the funds:

'No, I think that is right off - if I am going to give it away I don't want to be ... you know I don't mind giving it away but I am not going to be inconvenienced by giving it away.... The costs (including the labour for fencing it) should be met by the community as that is where the benefits are going.' (Beef/agroforestry with significant habitat)

Some other landowners had sought to protect a neighbouring piece of bush by purchasing it, but had baulked at the asking price, accepting instead the assurances of the forestry company owners that it would not be cleared. The kaumatua demonstrated a different approach to conservation. He wants the bush on his property to be retained, but intends doing so by fostering a conservation ethic in future generations rather than taking the decision away from them by using a covenant.

As well as habitat retention, fencing, and pest control that had occurred for conservation purposes, the retention and protection of some habitats had been a consequence of pursuing other goals—fencing areas to keep stock out of gullies or swamps, and pest control for recreational hunting purposes, for example. Active habitat clearance had effectively ceased, and though four of the landowners expected to undertake further land development, mostly exotic plantation or agroforestry, none expected to clear or drain any more native habitats. Under the present ownership and in the current economic and

regulatory environment, active destruction of habitats had effectively come to an end on these properties. However, many of the properties had bush remnants, streams and wetlands that are degrading due to stock and possum damage. The importance of fencing habitats to prevent stock damage was evident to all of the people interviewed. Those with habitats on their properties all identified areas they would like to fence to allow regeneration, but had not done so due to the costs. Concerns about the costs of protection were not confined to those dependent on the land for their incomes:

‘I understand the predicament of the cockies [farmers] – it is all right saying “you should protect this and protect that” but I think people should put their money where their mouth is and help them.... You can’t expect the cockie to foot the bill.’ (Kaumatua with 160 ha of family land)

While there was some willingness by landowners to contribute their time to undertake fencing or pest control, the overwhelming response was that the benefits of habitat protection belonged to the wider community, and, at the minimum, materials should be supplied, although it was widely felt that the landowners should not have to provide more than the land itself:

‘The community should pay because the community is going to get the benefit from it. Everyone says “Oh the farmers should be paying for everything” but it is the community that gets the benefit from it, not the individual.’ (New-entrant dairy farmer adjoining DOC land)

‘If the community as a whole wants the resources protected then they have to contribute to the protection in the way of rates or that sort of thing overall, rather than the individuals having to bear the brunt of protecting the land.’ (Long-time mixed farmers with lots of bush/scrub)

If more habitat protection was to occur it would require some expression of support for landowners:

‘Farmers will only move if they get some sort of assistance. The whole community, starting from the Government level down ... should put their money where their mouth is and help (the cow cockies).’ (Kaumatua with 160 ha of family land mostly in bush)

‘I think the only way to (get bush protected) is for someone to come along and (say) “here is the money to fence it off”.’ (Lifestyle property owner)

While there was solid support for the suggestion that habitat protection would be greatly encouraged if all the costs were subsidised, there was mixed support for a 50% subsidy, a result commensurate with the findings of the Federated Farmers survey that many farmers were not willing or able to meet the other half of protection costs.

There was a unanimous feeling that landowners should not be paying rates for land that was providing conservation benefits, as it was contradictory for councils to require landowners to protect habitats, reduce soil erosion and maintain water quality on the one hand, while charging rates for undeveloped land which would only encourage habitat loss.

‘They shouldn’t be paying rates on something that has no economic value to them – they have foregone any income they could ever get off it – no, I think there should be rate relief.’ (New-entrant dairy farmer adjoining DOC land)

The suggestion that giving rate relief for habitats from which stock were excluded would provide significant encouragement to landowners to fence more habitats was strongly agreed with. Habitat protection, it was agreed, involved more than preventing clearance; maintaining the health of the remaining habitats through pest and weed control, in particular possums, was a major concern. Three respondents emphasised that protection from possums and goats was best carried out on a regular basis by those in the vicinity, but that cost was a major constraint. It was suggested that if DOC supplied the ammunition and bait for bait stations, some landowners would willingly undertake some possum control on neighbouring DOC land where they felt not enough pest control was being done.

It was emphasised in the interviews that preventing habitat clearance would not in itself ensure the survival of habitats, as the need for pest and weed control meant landowners' support for habitat protection was crucial. Landowners should be encouraged to retain or develop a commitment to habitat protection, as this was more likely to result in habitats being maintained than could be achieved through regulation. Compulsion was seen as shifting the responsibility for ongoing maintenance away from landowners and increased expectations for compensation. It was also pointed out that rules would not discourage farmers from slipping cattle in to fenced-off bush for a good feed during a drought.

The general opinion was that most of the benefits of protecting habitats were gained by the wider community. However, having habitats in the area clearly had amenity value to the landowners, with most expressing a preference to have some habitats in their immediate vicinity. Opinion was divided as to whether the presence of natural habitat would increase the resale value of a property because of an increasing awareness of environmental and aesthetic concerns on the part of purchasers.

## 6. Natural heritage: values, benefits and costs

In its most general sense, managing natural heritage is about protecting life and the many systems which support life. The actions and interactions of species and ecosystems contribute to the cycling of water, gases and nutrients, and to the stability, resilience and robustness of the biosphere on which all species ultimately depend. Species and habitats have intrinsic or inherent values, in that they are important regardless of any benefits humans may derive from them. Natural heritage also provides more defined benefits to humanity including aesthetic, therapeutic, educational, symbolic, cultural, ethical, religious or moral values that people derive from the living world around them, as well as those which have more specific economic value (Norton 1988; Ewert 1990; Ehrlich & Ehrlich 1992). These economic benefits can be divided between those involving actual and potential uses and those arising without any actual

use. Figure 5 provides a representation of the economic values derived from biodiversity and habitats.

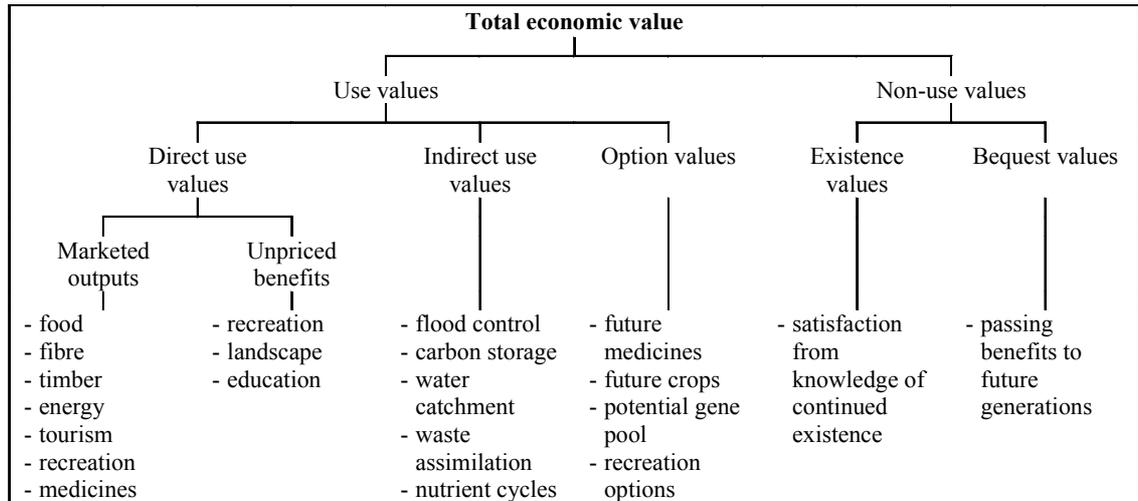


Figure 5. Economic values derived from biodiversity and habitats. Adapted from Hodge (1994) and Pearce & Moran (1994).

*Direct use values* include those for which markets and prices exist (such as food and fibre, medicines, and some aspects of recreation and tourism), and some that are used without being priced (recreational uses, tourism, and landscape values—though these can be partly internalised in property prices). *Indirect values* derive largely from the biological services performed by species and ecosystems, such as the flood control functions of forests and wetlands. *Option values* are those economic benefits that may arise from uses or species that have not yet been discovered, such as undiscovered cures for diseases, the value being the amount that the public is willing to pay at the present time to preserve the option of gaining a benefit in the future (Hodge 1991). *Non-use values* include *existence* and *bequest values*. The former include the values people attach to ensuring that habitats and species exist regardless of any expected use people may make of them, while the latter are the values ascribed to ensuring species, habitats or ecological processes are maintained for future generations.

## 6.1 VALUING HABITATS AND BIODIVERSITY

There is a wealth of literature relating to the concerns, rationales, ethics and methods of valuing biodiversity (for example Norton 1988; Pearce & Moran 1994; Ehrenfeld 1988; Ehrlich & Ehrlich 1992; Spash & Hanley 1994). It is not the intention of this study to delve extensively into these issues, as the objectives do not include determining how much biodiversity should be protected or whether a particular habitat is worth conserving. Rather the focus is on discussing how protection of habitats should, in general, be approached, bearing in mind the incidence of the costs and benefits of such protection. However, a brief consideration of issues related to valuing biodiversity is appropriate.

The main issues concerning the valuation of biodiversity and habitats revolve around three areas: economic concerns (how to determine the correct prices), ecological problems (the ecological values of particular species or habitats) and ethical issues (our moral obligations to other species). The debate is largely between utilitarian, anthropocentric and instrumental approaches (habitats and biodiversity need to be valued with reference to the purposes they serve for humans) and ecocentric and moral-based arguments (assigning values to habitats and biodiversity legitimises our use and destruction of it, whereas our moral duty is to allow other species to co-exist).

However, decisions that affect habitats and species are made in light of economic information, and some attention needs to be given to how the market factors that contribute to habitat loss (discussed in Section 2) can be mitigated. While many of the products and services derived from natural habitats and particular species are traded in markets, their prices do not necessarily internalise all the benefits and costs associated with their production and consumption, and these externalities distort the market signals, resulting in poor resource decisions (Aylward 1992). The more diffuse benefits, such as existence and option values, are not tradeable and are, therefore, without prices. Several methodologies have been developed to establish hypothetical prices to help overcome these problems, and these can be incorporated in cost-benefit determinations of policies or projects that impact on biodiversity. Cost-benefit analysis operates with the utilitarian principle that resource allocations are determined to be efficient if they permit the gainers to compensate the losers and still be better off, whether or not the compensation then takes place (Hanley et al. 1994).

The principle methods of determining the hypothetical prices necessary for such trade-offs are: travel cost method, hedonic pricing, avoided cost, and contingent valuation, which is perhaps the most applicable method for biodiversity conservation (refer Table 23).

Determining the benefits of biodiversity conservation is complicated by several factors. Habitat protection delivers non-biodiversity benefits, such as recreation and amenity benefits, or watershed protection, while the provision of other

TABLE 23. HYPOTHETICAL PRICING METHODS FOR ASSESSING NON-TRADEABLE VALUES OF HABITATS.

<p><b>Contingent valuation</b> involves directly questioning affected parties in order to determine the amount they would be willing to pay (accept) for an increase (decrease) in environmental quality. The mean 'bids' can then be used to estimate aggregate totals. This approach can be used to estimate the values for both current (option value) and future users (existence value).</p>
<p><b>Avoided cost</b> approach is used in situations where 'the environment is an input to the production process for a marketed good', wherein the social benefits of a reduction in environmental costs can be found from the resulting changes in producer and consumer surplus.</p>
<p><b>Travel cost method</b> has been used mostly to estimate consumer surplus for recreation sites (using travel costs as a proxy for price).</p>
<p><b>Hedonic pricing</b> finds the relationship between a good and the value of its attributes, e.g. the value of a house site incorporates the value of environmental qualities attributable to its location.</p>

Based on Hanley (1992).

goods and services, such as recreational opportunities, can have conservation benefits (Spash & Hanley 1994). It can be difficult, therefore, to determine whether the economic values attributed to habitat protection are specifically related to biodiversity values or to associated benefits.

Some of the attributes of biodiversity are intrinsic values. By definition, these are independent of the utility of the object and their values are therefore unquantifiable. Hypothetical pricing methods such as contingent valuation cannot easily accommodate such notions. Problems arise if some bidders consider that species and ecosystems have intrinsic rights, and should therefore be protected regardless of the level of costs involved. The 'willingness to accept' of these bidders will be very large or even infinite if they believe that no amount of compensation will recompense the loss. Incorporating such 'protest' bids is difficult as they will override others' bids, while excluding them disenfranchises part of the population. Several studies have found that such bids often amount to between 20% and 25% of all bids (Hanley et al. 1994).

Another problem with establishing hypothetical prices is that the accuracy of contingent valuation increases with respondents' familiarity with the 'commodity' and with their experience in estimating a value for it, both of which are rarely the case with biodiversity (Stevens et al. 1991). Underlying these problems is that compressing the complexity inherent in environmental issues into a simple metric of monetary values results in the loss of essential information, diminishing the legitimacy of the resulting information and any subsequent decisions regarding efficient use of resources (Vatn & Bromley 1994).

Problems such as protest bids point to a significant flaw in applying rational economic theory to environmental issues. Sagoff (1988) contends these problems arise in part because individuals function both as citizens and consumers. While private economic preferences may be hypothesised, people are also motivated by social norms and commitments to moral duties. Their choices, as determined in a market, do not necessarily coincide with their social choices as determined through political mechanisms. For this reason 'neoclassic economic theory often fails to adequately explain individual choices about public goods' (Stevens et al. 1991: 392). This is amply demonstrated by the many landowners who have retained and even fenced off habitats in order to protect the ecological values when it would have been economically rational to develop the land.

While hypothetical pricing and cost-benefit analyses have roles to play in decision making in regard to environmental factors such as biodiversity, they are tools, the use of which is determined by the decision makers, who can, by establishing the parameters of the study, delineate the potential outcomes. Such tools need to be used judiciously in light of the concerns outlined above, rather than being used to determine outcomes based purely on whether the benefits exceed the costs.

## 6.2 COSTS AND BENEFITS OF HABITAT PROTECTION IN NORTHLAND

One of the few studies of the distributional implications of habitat protection (Wells 1992) notes that, in an international context, the distribution of the costs and benefits associated with protected areas exhibit opposing trends, in that more of the benefits of habitat protection accrue to those at some distance from the site, while the costs are predominantly borne by those at the local level.

The public good nature of habitat and biodiversity conservation means the benefits of retaining habitats (or the losses from clearing them) are rarely limited to the site or owner in question. Erosion control and flood protection resulting from habitat retention may be of some benefit to the landowner, depending on the topography and location, but much of the benefit is likely to be downstream. Having some bush on a piece of land may add to the amenity value of that land, but may also add value to the 'neighbourhood'.

It will rarely be in the economic interest of landowners to protect or maintain their habitats, unless there are penalties to enforce protection, or unless they can capture some economic benefits through ecotourism, real estate values or other exclusive uses. Often habitat retention occurs as a consequence of other goals (keeping stock from dangerous gullies), or factors such as lack of 'development' capital, or because landowners are motivated by environmental, amenity or other considerations such as cultural or family tradition.

### 6.2.1 Land values

Rural land values are linked to their productive potential and fluctuate in relation to such factors as commodity prices, exchange rates and government policy. Values rose in the seventies when agricultural subsidies were increased to help secure farmers' incomes against the fiscal problems that followed the oil crises and the entry of the UK into the Common Market (Reynolds et al. 1993; Willis 1991). Increasing land values resulting from government policies rebound on conservation, making it a more expensive alternative land use.

The value of land is an important factor in habitat protection for other reasons as well. Land values are usually a determinant of the amount of rates payable for areas of habitats. The value of the land with habitat on it is also embodied in the purchase price, and will reflect its development potential, i.e. a dairy farm with 100 ha of pasture and 20 ha of bush will cost more than an equivalent one with just the 100 ha of pasture. The additional purchase cost involves an additional outlay of capital, which incurs foregone opportunities costs.

Valuation New Zealand (VNZ) figures for Northland show good farming land costs around \$6,000-\$8,000/ha while land values for steep poor quality land can be as low as \$400-\$500/ha (G. Eady pers. comm. 1997). Typical figures for bush covered land in Northland ranges from \$800 to \$1,200, though in highly productive areas they can rise to \$1,500. Northland properties with QEII covenants, which include both high-value coastal properties and marginal farming land, average \$1,330/ha (VNZ data). Ministry of Forestry estimates of prices for cleared or uncleared land in Northland suitable for forestry range from \$900/ha for land with low potential productivity, through an average \$1,500/ha, to \$2,400/ha for high-productivity land (MoF 1994).

The growing interest in residing close to areas of high landscape and ecological values means that properties with some bush on them can, such as in locations close to towns or in coastal areas, have higher values than cleared blocks. An Institute of Valuers' member in Whangarei considered that properties within 20 km of Whangarei with a small proportion of bush (preferably between 5 and 15%) would be preferred by potential purchasers to properties with no bush or with too great a proportion of bush (V. Winiata pers. comm. 1996). Similar anecdotal evidence comes from other parts of New Zealand (Young 1996). Members of the Institute of Valuers stated that attractive habitats on properties add to the saleability if not the price of properties. The latter largely depends on the values of the purchaser. Rural landowners who are willing and able to subdivide off bush areas can secure higher economic returns by making the block available to lifestyle buyers than from other potential uses. Covenanted properties that are for sale are having their environmental and amenity benefits proudly advertised. For areas of unique habitats there is also the potential (or concern) that scarcity value will bring above market prices if conservation interests show keenness in purchasing them.

Future land values for habitats are likely to reflect the changing development options resulting from the introduction of sustainable management criteria through District and Regional Plans and the FAA. While habitat clearance is becoming more restricted, subdivision that results in the protection of such habitats is, in some cases, becoming easier, particularly if the habitats are protected by covenants.

### **6.2.2 Foregone development opportunities**

The major development options for habitats in Northland are conversion for agricultural or forestry production, though clearances also occur for residential purposes, particularly in high-amenity areas such as coastal environments. Returns for developing habitat areas for productive purposes vary according to the productive potential of the land due to climate, topography, soil, existing land cover and locational factors. Regulatory factors also impact. Most habitat remnants are on less productive land, and potential returns will consequently be lower. Retaining habitats on more potentially productive land, such as lowland forests and wetlands, has higher opportunity costs, and the habitats, being scarcer, are likely to be more ecologically significant.

Forestry figures for better production sites in Northland (based on 1993 costs and revenues) show net harvest revenue of between \$40,000 and \$120,000/ha at 28 years, giving a pre-tax internal rate of return of between 7% and 13% per annum (MoF 1994). Returns on agriculture have fluctuated significantly over the last two decades, largely as a result of commodity price fluctuation and policy changes. The current low returns for sheep and beef, and the recent drop in dairy prices mean that developing more land for agriculture is not very profitable, and this is reflected in the fact that forestry is successfully competing for marginal cleared land and uncleared land.

Returns for joint ventures or other collaborative arrangements are lower than those quoted above, but are options for many landowners, in particular Maori, who have large areas of habitat that are suited to forestry but who do not have the necessary capital for development. For example, in a joint venture

arrangement with Carter Holt Harvey, Ngati Hine receive an annual lease payment of 7% of land value (about ten times the rate costs) and 9% of stumpage (K. Prime pers. comm. 1996). In another 'forest right' arrangement with Tai Tokerau Forest (TTF), Ngati Hine get \$56/ha annually and TTF undertake all the developmental work. At felling, TTF take 5% of gross income, Ngati Hine get what remains after the accumulated costs (rent, interest, development costs, pruning, thinning) are taken out.

### **6.2.3 Fencing**

There appears to be little in the way of studies of the impact of stock on bush or wetland habitats in terms of speed of decline or tolerance levels. Habitat damage will clearly vary according to habitat type, intensity of grazing and other factors such as incidence of diseases. However, stock access does result in habitat degradation through factors including root trampling, soil compaction, crushing, rubbing, eating and breaking branches. Such effects will also increase the incidence of pest and disease attack. Stock access also results in changed structure of regenerating bush, with hardier and less palatable species becoming predominant (MacGibbon 1996).

Actual costs of fencing (quoted by two contract fencers) are \$10-11/m, with labour making up 40% of the costs and materials 60%. The cost of fencing any particular habitat will depend on its location relative to boundary and internal fences, access, terrain, ground structure, and shape of the habitat (a square-shaped hectare of bush would cost \$4,000 to fence, a 35 ha square would cost \$680/ha assuming all new fencing is required). The average cost for establishing a new covenant is estimated at \$13,600 (QEII 1996), and about one-third of QEII National Trust's costs of implementing legal protection on private land is for fencing (QEII 1994). The QEII National Trust fencing costs are therefore about \$4,500 per site, which, given this is only their half share of the fencing bill, gives total fencing costs of around \$9,000 per site (average area 35-40 ha).

### **6.2.4 Pest and weed control**

Pest and weeds are a major threat to the remaining habitats in Northland. Possums are a particular problem and the Northland Regional Council is undertaking a control programme to reduce their numbers by 80%. The Council's approach is that, since the benefits of pest control are shared by both landowners and the wider community, so should be the costs. Ratepayers therefore fund the initial knockdown of possum numbers (to 20% of pre-treatment levels), after which it becomes the landowner's responsibility to maintain possum numbers at below 40% of the pre-knockdown level. Costs for such ongoing maintenance will vary according to habitat, proximity to other pest populations, and level of maintenance undertaken by others in the area. General figures quoted by pest control contractors in Northland show costs for 10-30 ha of bush of around \$10 per hectare per year to maintain possums at target levels. Landowners could do it for less but they would still incur costs in time, ammunition, poisons and traps.

## 6.2.5 Rates

The issue of paying rates on habitats that councils have identified as deserving protection has become a heated public issue in recent years (e.g. Malcolm Bailey, President of Federated Farmers, National Radio News 23 June 1997). It is also of concern to DOC, as landowners use the fact that they are having to pay rates on such areas to support their applications for consents to clear them. Landowners are asking why should they be paying rates for ‘babysitting’ the nation’s environmental treasures (P. Anderson pers. comm. 1997).

Rates are the main source of revenue for councils and are collected on the basis that landowners should pay for the provision of certain public services. All three Northland councils base their rates on a property’s unimproved land value (i.e. excluding fencing and other improvements). These are determined by Valuation New Zealand based on the sale price of similar properties in the area. Using Kaipara District as an example, the general rate in the dollar for rural land is 0.005968, so landowners pay 0.6 of a cent in rates on every dollar of land value. Using land values for forest remnants of \$800–\$1,000 per hectare, a landowner with 30 ha of significant bush pays around \$150 per year in rates on the land with bush on it.

All three district councils offer 100% relief for areas with formal protection. The \$150 of rates paid in the example above is, consequently, the amount of rate relief they would ‘gain’ if they were to covenant their 30 ha of bush. However, establishing a covenant involves additional costs. In most cases landowners have to contribute 50% of the fencing costs and undertake weed and pest control, while the covenanting authority, such as the QEII National Trust usually pay the remainder of the fencing costs and all legal and survey costs (these costs are discussed later). While rate relief is promoted as an economic incentive to undertake habitat protection, it is more of a token reward for those who undertake habitat protection for other reasons such as personal commitment or to secure subdivision options.

The rating issue also needs to be considered at the district and regional scales. The figures for areas of regionally significant habitats on private land, land values and rates for the three district councils are summarised in Table 24.

TABLE 24 LAND VALUES AND RATES FOR SIGNIFICANT HABITATS ON PRIVATE LAND IN NORTHLAND (BY TERRITORIAL LOCAL AUTHORITY).

	FAR NORTH	WHANGAREI	KAIPARA	NORTHLAND
Significant forest, shrubland or wetland (SFSW) on private land	147,000 ha	32,000 ha	15,000 ha <sup>a</sup>	194,000 ha
Approximate land value (\$/ha)	\$500–800	\$1000–1200	\$800–1000	-
Total land value (TLV) of SFSW	\$74–118 m	\$32–38 m	\$12–15 m	\$118–171
Rate in dollar <sup>b</sup> (land value)	0.0079	0.0062	0.0060	-
Rates for SFSW on private land <sup>c</sup>	\$580–920 k	\$200–240 k	\$72–90 k	\$852–1250 k
Rate strike (1995/95) <sup>d</sup>	\$22 m	\$25 m	\$6 m	\$53 m
Rates on private SFSW as % of total rate strike	2.5–4.1%	0.8–1.0%	1.2–1.5%	1.6–2.4%

<sup>a</sup> Based on old SSBI database, therefore many habitats may be missing. <sup>b</sup> KDC and WDC have a single general rate for rural land. FNDC has several rates; the Kaikohe rate has been used as a median. <sup>c</sup> A small amount of rate relief is already provided for protected areas so these figures would be slightly lower, e.g. by under \$40,000 in FNDC.

At a regional scale there are around 200 000 ha of indigenous habitats on private land of regional significance (of moderate significance or above). Presuming the assumptions made are valid, the calculations indicate substantial sums being collected from land that the Regional Council wants protected, in a range of 1.6 to 2.4% of the total rate take for the region.

The incongruity in charging rates for land that provides significant ecological benefits could be partly resolved if the revenue was used to achieve more effective protection through grants for fencing or covenants. Alternatively, if some level of rate remission were granted on those habitats in recognition of the public benefits provided by them, an equal amount would be needed to be redistributed either within the districts (which has significant implications in terms of spatial equity, given the uneven distribution of habitats across New Zealand) or partly from a national level.

### **6.2.6 Formal protection**

Achieving permanent protection for habitats has the advantage of securing conservation benefits but incurs legal costs, and acquisition costs if ownership needs to be bought. QEII National Trust figures show the cost of establishing a new covenant is around \$13,600 (QEII 1996). In addition most landowners have to contribute at least 50% of total fencing costs, taking the total cost of creating a QEII covenant to around \$18,000 for an average 35–40 ha site. This figure, of \$450–\$500/ha, assumes one-third of the QEII costs are fencing and includes the value of any labour component that landowners might contribute towards their share of the fencing costs.

To put these figures in context, in its first six years of operations the Forest Heritage Fund protected, through both purchases and covenants, just under 100 000 ha at an average cost to them of \$277 a hectare. This is not the full cost, as some properties were protected under the QEII Trust, and the landowners' contributions would not have been included. Nga Whenua Rahui has protected 75 000 ha for just over \$12 million, i.e. \$183/ha (A. McKenzie pers. comm. 1996). Most of these involved kawenata rather than purchases. These lower costs largely result from economies of scale due to protecting larger areas of habitats.

Covenants also have ongoing costs to ensure that pest and weed control is undertaken, fencing maintained, etc. In 1993/94 the QEII spent \$176,000 to fulfil their obligations as covenantors in 1993/94. These figures do not include pest control, as this is done by the landowner. It does, however, include a cost for some fencing replacement, as the QEII used to agree to assist with future maintenance of fences. Estimating the area of covenants at that time to be around 35 000 ha gives a per hectare management cost of around \$5.

### **6.2.7 Summary of protection costs**

The costs discussed above are summarised for a hypothetical 30 ha area of bush in Northland in Table 25. The costs are not accurate estimates but are indicative; no attempt has been made to include interest costs on capital costs of land or fencing.

TABLE 25. APPROXIMATE COSTS INVOLVED IN PROTECTING A 30 HA BUSH AREA IN NORTHLAND.

Land value	\$30,000	Ranges from \$15,000 to much higher on coast.
Fencing	\$9,000	Lasts 20–30 years, based on QEII data.
Pest control	\$300 p.a.	Based on contractor costs for possum control only.
Rates	\$200 p.a.	Based on land value using rate of 0.007.
QEII admin and management	\$150 p.a.	Based on \$176,000 fully allocated maintenance costs incurred by QEII National Trust over 35 000 ha.
DOC management	-	Includes pest control; details not available.

Sources: QEII 1994, 1996.

The relevant costs are assigned to a variety of habitat protection mechanisms in Table 26 to assist with comparison. The allocation of the costs between landowner and different levels of the community are also indicated. Costs increase as more secure protection is achieved and they shift from the landowner to the taxpayer.

Given the constraints on government funding for conservation, the need to achieve greater protection means more innovative approaches such as supporting landowners to provide better protection for the habitats under their care rather than relying mostly on acquisition and regulatory approaches or seeking to protect them through acquisition. The QEII Covenant provides an intermediary step, but is still a barrier to many landowners, suggesting a need for a more easily accessed level of active protection.

TABLE 26. COSTS OF VARIOUS APPROACHES TO PROTECTING A 30 HA BUSH AREA IN NORTHLAND.

	INFORMAL PROTECTION		QEII COVENANT		FOREST HERITAGE FUND	
Costs	opp. costs <sup>a</sup>	\$1,500–2,000	opp. costs	\$1,500–2,000	purchase	\$30,000
	fencing	\$9,000	covenant	\$9,000	fencing	\$9,000
	pest control	p.a. \$300	fencing	\$9,000	management	
	rates	p.a. \$150	management	p.a. \$150	(inc. pest control)	not available
			pest control	p.a. \$300	rates	\$0
			rates	\$0		
Landowner's share of cost	100% (unless grants)		100% opportunity costs		0–50% survey	
			100% pest control		0–50% fencing	
			50% fencing			
			–100% rates			
Community's share of costs	0% (unless grants from local, regional or national level)		100% covenant (national)		100% purchase (national)	
			50% fencing (national)		0–50% survey (national)	
			100% management (national)		50–100% fencing (national)	
			100% rates (local)		100% management (national)	
					100% rates (local)	

<sup>a</sup> Opportunity costs estimated using figures for joint venture forestry by Ngati Hine

## 7. Conclusions and recommendations

This research has revealed several important issues that deserve consideration by those engaged in conservation advocacy and policy development.

Habitats are not evenly distributed—neither spatially nor socially—and this has implications for the effectiveness of protection mechanisms. In Northland, the farmers who have the greatest proportion of habitat on their land, typically beef farmers, generally find cost to be a greater impediment to protecting habitats than do other farmers. They are also less likely to engage in fencing for stock management purposes and are less able to afford to take up grants designed to assist with such protection. There would therefore appear to be greater need for assistance with habitat protection on such properties. However, rare habitats with higher ecological values, such as lowland forests and wetlands, may be more likely to be found on terrain that suits dairy farming.

Results from the questionnaires show 60% of farmers engaged in some pastoral or forestry development between 1990 and 1995, and just over 50% intended doing so in the next five years. The level of clearance of bush and scrub resulting from such activities over the previous five years was in the order of 7-8%. This rate of loss is similar to that identified in an earlier survey of habitat loss and one that undoubtedly poses a threat to natural heritage in the region. The future intentions of landowners to undertake farm development would be of concern if it resulted in similar levels of habitat loss. However, many such plans may be constrained under the conditions imposed within regional and district plans, some of which have yet to be determined.

These examples of active destruction can be conceptualised as one end of a continuum ranging from active destruction and active protection, depicted in Fig. 6. Northland habitats are also threatened by passive destruction. Possums and other pests and weeds pose significant threats. Many habitats are unfenced, resulting in degradation from grazing and trampling. Habitat protection can also be seen to exhibit both passive and active forms. Passive protection can result from the fencing of habitats to keep stock out of gullies or swamps, or pest control undertaken for recreational purposes (e.g. goat hunting), while habitat retention may be a consequence of financial constraints on development. Other

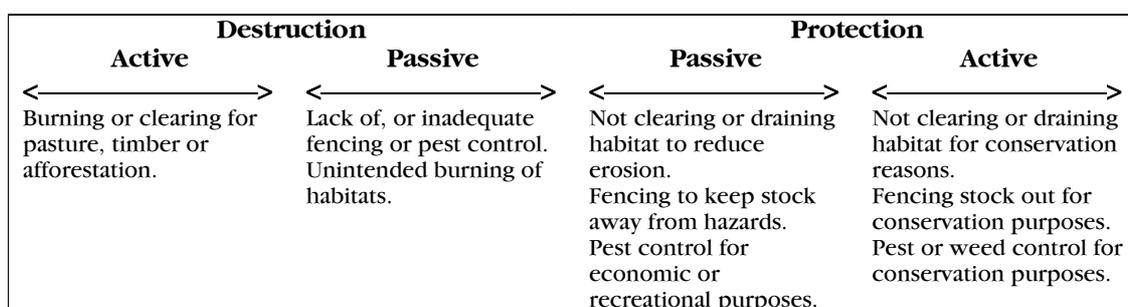


Figure 6. A habitat destruction - protection continuum.

habitats, however, have been intentionally retained and cared for by the landowner for the ecological, cultural and amenity values they provide. Such active protection is the last step in this continuum and is also likely to provide other benefits such as erosion control.

The objective of conservation policy and advocacy can be conceived, in broad terms, as being to achieve movement from the left of this continuum to the right. Regulatory approaches have, to some extent, diminished the opportunities for active destruction, though this depends to some extent on the content and implementation of regional and district plans. However, the recent and future development plans of farmers indicate the financial motivation to 'develop' land still exists, and habitat loss will continue to occur both actively and passively unless prohibited. Even if clearances were prohibited, while compulsory protection can prevent some active clearance, this does not prevent degradation from occurring, and may cause landowners to lose any sense of responsibility they have for the habitat (Young et al. 1996). Encouraging landowners to retain and develop their sense of stewardship is important, as they are well placed to undertake the regular maintenance required for remnant habitats in productive landscapes (Hobbs & Saunders 1993).

Councils in Northland acknowledge that the retention of a large proportion of remaining habitats is important for the high number of threatened species in the region. However, based on aggregate income data, Northland farmers, with the third lowest farming incomes when compared with farmers in other regions, are not well placed to carry the costs involved in habitat protection and maintenance. Nor, given it has the lowest per capita income, is the region as a whole well placed.

At the national level, data point to an inverse relationship between per capital income levels and per capita area of habitat on private land. This raises the question of whether the regions which have more habitat to retain and protect (on a per capita basis) are those with the weakest economies. This only becomes an issue if responsibility for retaining and protecting habitat rests at the local level. Regions with low incomes and high conservation needs on private land will either not be able to afford the desired protection, or will risk political pressure to reduce the desired level of protection to something that they can live with. If retaining and protecting habitats, particularly those of national significance, is the responsibility of regional and local government, there may need to be some financial balancing mechanism to ensure the distribution of costs are not inequitable and counter productive.

The issue of cost at the individual level has also been discussed. Many of the benefits that habitats provide are public goods. While landowners benefit to some extent from retaining and protecting habitats, such as amenity and erosion control, few consider there is any financial incentive to invest in their habitats, in the sense of fencing or establishing covenants. Most landowners incur costs through having habitat on their properties. Rates are charged on most habitats and this is largely seen as a financial and motivational disincentive to landowners to retain habitats. Landowners are being charged for providing a public environmental benefit. If rates are to be charged on habitats, that revenue could be used to help meet the costs of protecting and maintaining habitats by assisting with fencing and legal costs.

One approach that could be considered would be to 'capitalise' rate payments for landowners who enter their habitats on some form of register. The council would then meet the establishment costs of protection (for fencing and any legal requirements), and the landowner would continue to pay rates over a specified period of time as their contribution to the costs, after which the area could be exempted from rates. To discourage the future destruction of habitats, and ensure their maintenance, landowners could be required to repay a specified portion of the foregone rates if the habitat is cleared, drained or degraded.

Such an approach still relies on landowners 'investing' in their habitats. A counter-argument would be that landowners who commit to maintaining their habitats should receive a fee that acknowledges the public benefits their habitats provide (in addition to any assistance with meeting the upfront costs of protection that is available). Even the payment of a token fee (perhaps rebated against rates if rates are still charged) could have a significant motivational effect and would go some way to redressing the inequities under existing mechanisms.

In terms of the role that local communities can take in assisting with protection, it was evident from the individual case studies that greater understanding by residents of the natural heritage issues in their locality could lead to greater appreciation of the need for habitat protection. This suggests that education about natural heritage, at a local level, through local newsletters, groups, etc., is a worthwhile activity. However, what also needs to be addressed is the issue of how the costs of providing the public good that results from retaining and protecting natural heritage are distributed between those who provide the benefit and those who benefit from its provision.

We would recommend that, since habitat protection on private land has been largely devolved to the local and regional level, and given that the incidence of associated costs falls largely on the landowner or the local or regional community, there needs to be greater financial responsibility assumed at the national level, over and above that which occurs through the taxpayer funding of the QEII National Trust, the Forest Heritage Fund, and Nga Whenua Rahui.

In conclusion, in regard to its advocacy role for habitat protection on private land, we would recommend that DOC:

- advocate for, or engage in, further research on the options for reducing the financial disincentives and barriers that landowners currently face;
- explore options for and develop some intermediary level of protection between that provided informally by landowners and that achieved under the QEII National Trust; and
- lobby for national approaches to further address the spatial inequities inherent in the current legislative approaches.

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