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Plan Topics

Indigenous Biodiversity

THE RMA QUALITY PLANNING RESOURCE

Indigenous Biodiversity

This guidance note on indigenous biodiversity is primarily targeted at those involved in the preparation and implementation of Resource Management Act 1991 (RMA) policy statements and plans. It provides an overview of relevant biodiversity matters including concepts, management, protection and restoration.

The guidance note contains a comprehensive analysis of a large number of methods that councils can use to address their responsibilities for indigenous biodiversity. These include: regulatory provisions; non-regulatory tools; economic instruments; the management of council lands; and the implementation of other council functions. While this note outlines the requirement to monitor the policy outcomes it does not describe how to undertake this monitoring.

Guidance note

What is Biodiversity

Introduction

The Convention on Biological Diversity and associated New Zealand Biodiversity Strategy define biological diversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems". Section 2 of the Resource Management Act 1991 (RMA) provides a simplified and similar definition, as follows: "the variability among living organisms, and the ecological complexes of which they are a part, including diversity within species, between species, and of ecosystems".

Components of biological diversity include:

- genetic diversity: the variability in the genetic makeup among individuals within a single species
- species diversity: the variety of species – whether wild or domesticated – within a particular geographical area
- ecological (ecosystem) diversity: the variety of ecosystem types (eg, forests, grasslands, streams, lakes, wetlands and oceans) and their biological communities that interact with one another and their non-living environments. This includes the manner in which the ecosystem functions, which in turn is directly linked to its diversity.

Biological diversity is often shortened to biodiversity, and it is this common terminology that is used in this guidance note. Biodiversity is sometimes interpreted narrowly as a synonym for species richness based on the total number of species present. This interpretation is not consistent with the definitions in the Convention on Biological Diversity, the New Zealand Biodiversity Strategy or the RMA.

A variety of scientific disciplines study different aspects of biodiversity. These disciplines include ecology, population biology, taxonomy and genetics. A scientist may specialise in particular environments (eg, lakes, estuaries, wetlands, forests, scrub) and/or particular groups of biota (eg, vascular plants, insects, freshwater or marine fish, seabirds). Ecologists study the interaction between organisms and their environments.

What is indigenous, endemic and introduced biodiversity?

An indigenous or native species is one that occurs naturally in New Zealand. That is, they have evolved or arrived here without any assistance from humans. Indigenous species include migratory species that travel to or from New Zealand or to or from other parts of the world, to either breed or feed. Some indigenous species occur naturally in other countries (eg, pukeko also occur naturally in Australia).

An endemic species is an indigenous species that breeds exclusively in a specific country or locality. Endemic New Zealand species are of high conservation importance as they are unique to our country and the survival of natural populations can only be ensured in New Zealand.

An introduced species (also known as exotic, adventive or alien species) is one that has been brought to New Zealand by humans, either by accident or intent. Naturalised or acclimatised species are introduced species that breed in the wild and are able to maintain populations in competition with New Zealand's indigenous biodiversity. Invasive species are introduced species that are considered pests because they negatively affect biodiversity or other values. Cultivated species are those maintained in gardens, horticulture and agriculture.

Why is indigenous biodiversity important and vulnerable?

Ecological values

New Zealand is one of 34 priority global terrestrial biodiversity hotspots. Biodiversity hotspots are defined quantitatively as those areas where:

- there are more than 1500 species (greater than 0.5 per cent of the world total) of endemic vascular plants
- at least 70 per cent of the original habitat has been lost.

Biodiversity hotspots hold especially high numbers of endemic species, yet their combined area of remaining habitat covers only 2.3 per cent of the Earth's land surface. Each hotspot faces extreme threats and has already lost at least 70 per cent of its original natural vegetation.

New Zealand has an extraordinary number of endemic species. As the New Zealand Biodiversity Strategy points out, this is a result of a long period of isolated evolution and the diversity of New Zealand's landscapes and seascapes. All three species of New Zealand bat are endemic, as are all four frogs, all 60 reptiles, more than 90 per cent of insects and a similar percentage of marine molluscs, about 80 per cent of vascular plants, 87 per cent of terrestrial birds and 44 per cent of all breeding seabirds.

This level of endemism is remarkable internationally. By comparison, Great Britain, which separated from continental Europe only 10,000 years ago, has only two endemic species – one plant and one animal.

Many New Zealand animal species are endemic at taxonomic levels above that of genus or species. This means that, internationally, they are highly distinctive. For example, there are two orders of birds (one containing 10 extinct species of moa and one containing five kiwi species) and one order of reptiles (containing two species of tuatara) that are found only in New Zealand.

The uniqueness of much of New Zealand's indigenous biodiversity means that responsibility for its continued existence is entirely ours. It cannot be conserved in nature anywhere else in the world.

New Zealand's long geographic isolation from other land masses has meant that indigenous species have evolved without terrestrial mammalian species (with the exception of bats). The introduction of mammalian predators and competitors by people has contributed to the extinction of many species and numerous others becoming

threatened. Non-mammalian animal pests, such as koi carp and magpies, and thousands of introduced plants also threaten native flora and fauna.

New Zealand's biodiversity is also vulnerable because of habitat destruction and invasive introduced species. Habitats continue to be destroyed through vegetation clearance, wetland drainage, seabed dredging, dam construction and other habitat degradation.

Potential climate change impacts on indigenous biodiversity

In the future, it is very likely that these existing threats to biodiversity will be exacerbated by the impacts of climate change.

Climate change is projected to affect individual organisms, populations, species distributions and ecosystem composition and function both directly (eg, through increases in temperature and changes in precipitation regimes) and indirectly (eg, through changes in distributions of both native and introduced invasive species).

District and regional councils need to work together to respond to climate change. See the Climate change guidance note for more information.

National, regional and local identity

Many of the New Zealand national emblems are based on our indigenous biological world – such as the koru, silver fern and kiwi. New Zealanders are known around the world as 'kiwis'.

New Zealand's indigenous biodiversity is an integral aspect of the Māori world view, and Māori have special roles and responsibilities as 'kaitiaki' (guardians). At the local and regional level, New Zealanders often have a strong bond with the landscapes and ecosystems of their region and local area.

Ecosystem services

Indigenous biodiversity provides a variety of often unrecognised ecosystem services. These services, which can be provided directly or indirectly, include:

- regulation of atmospheric carbon levels and temperature, including sequestration of atmospheric carbon by growing forests
- the retention of soil by catchment vegetation, thereby reducing erosion and downstream sedimentation
- catchment vegetation and wetland moderation of run-off peaks (potentially flooding) and the provision of more consistent water flows in dry conditions
- wetland sediment trapping
- nutrient filtering by riparian and wetland vegetation to improve downstream water quality
- waste decomposition and nutrient recycling
- habitat for native species and 'taonga' (treasures)
- provision of resources for medicinal use (traditional and western medicine)
- provision of resources for cultural use
- provision of food (eg, fish, honey) and resources for commercial use

- providing the backdrop and essence of much of New Zealand's tourism industry
- opportunities for recreational activities
- natural character, aesthetic values and sense of place.

The New Zealand Biodiversity Strategy describes the provision of ecosystem services. The International Union for Conservation of Nature (IUCN) (PDF 4.9MB) published Building Biodiversity Business in 2008, which provides a comprehensive overview of ecosystem services from a business perspective. Information on carbon sequestration in different land covers is available from the Ministry for Primary Industries.

New Zealand's ecosystems

Introduction

New Zealand has a great diversity of ecosystems for its land area. Most indigenous terrestrial and freshwater ecosystems are unique to New Zealand although some are structurally similar to ecosystems found in land masses that were once part of the ancient southern continent, 'Gondwanaland'.

Unique ecosystems include:

- mature kauri forests
- kahikatea swamp forests
- pohutukawa forests
- tall tussock grasslands
- multi-tiered subtropical podocarp/mixed broadleaved rain forests
- mature red beech forests
- scrub dominated by divaricating species
- Fiordland marine ecosystems
- marine environments of the northern offshore islands
- certain seamounts
- geothermal seep ecosystems.

New Zealand ecosystem types

The following are general descriptions of selected ecosystem types in New Zealand:

- wetlands
- riparian
- dunelands
- forests
- shrublands and scrub
- lowland grasslands
- alpine and mountain
- rare ecosystems.

Councils should obtain a better understanding of the specific ecosystems within their boundaries.

Wetlands

The RMA defines wetlands as permanently or intermittently wet areas, shallow water and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions. This is a broad definition that includes:

- swamps, marshes, bogs and seeps
- lakes, ponds, rivers and streams
- estuaries and intertidal areas
- geothermal pools, splash zones and wet terraces.

The agreed classification of wetlands in New Zealand includes the full range of wetland types covered by the Ramsar Convention on Wetlands.

Shallow, freshwater wetlands with emergent vegetation (rooted below water or wet soil) are technically referred to as palustrine wetlands. They range from permanently saturated or flooded land (as in marshes, swamps, bogs and lake shores) to land that is wet only seasonally (as in vernal pools).

Wetlands are now one of New Zealand's rarer ecosystem types, supporting a greater diversity of native species than most other ecosystems, yet nationally they continue to be drained and modified. Over 90 per cent of New Zealand's freshwater wetlands have been drained, with a 99 per cent loss of the palustrine wetlands in the Bay of Plenty. The loss of large areas of wetland habitat and the introduction of plant and animal pests have threatened the survival of many native species of plants and animals.

Wetland biodiversity values are often vulnerable to:

- vegetation clearance, burning, spraying and discing
- land drainage, humping and hollowing and other re-contouring
- channelising, diverting or piping waterways
- impoundment and damming flows
- barriers to fish passage
- discharges contaminated with sediment, nutrients or toxins
- grazing by stock or feral animals
- predation by feral and domestic animals
- invasion by plant or invertebrate pests.

Wetlands can have very high recreational, cultural and spiritual values and they also perform vital ecosystem services such as improving water quality and reducing flood risks. Peat bogs can be year-round sinks for 2–5 tonnes of carbon per hectare – making them potentially a more important environment for mitigating climate change than native forests.

The diverse range of threats to wetland biodiversity values, the potential for activities far removed from wetlands (eg, up-catchment topdressing) to impact on those values and the often delayed impact of land development changes (eg, hydrological or biosecurity) mean that biodiversity maintenance provisions for wetlands in council planning frameworks need to be comprehensive, complementary and catchment-wide.

Wetlands have been identified as being vulnerable to the impacts of climate change, particularly changes to precipitation. Projected impacts of climate change on wetlands include changes in salinity, primary production and species composition.

Riparian areas

Riparian areas are generally defined to be those linear strips of land along the edge of a river or stream over which either the water influences processes on the land (eg, deposition of silt onto a floodplain), or the processes and structures on the land influence attributes of the water (eg, vegetation shading the water surface). Hence riparian strips are as wide as those processes and influences extend, and may vary from 2 to 200 metres in width depending on topography and hydrology.

Current practice is to manage riparian areas for the intrinsic biodiversity values that they can sustain. These include specific plantings to restore spawning habitat quality for whitebait species in intertidal riparian areas; sequential planting of indigenous species of shrubs and trees to catalyse the successional evolution of riparian forest corridors for indigenous wildlife; and control of riparian predators, such as stoats and rats, to restore habitat quality for ground dwelling and nesting waterfowl, such as the endangered brown teal (eg, Northland) and blue duck (eg, Taranaki).

Because of the diverse range of functions and values of riparian areas it has been difficult to reach agreement between different sector interests about how they should be managed and the extent to which damaging activities should be constrained.

Issues

The management issues and main options for their resolution are relatively straightforward when addressing potential planning provisions and proposals for new uses or development of riparian areas with existing indigenous vegetation or habitats. Generally, there is substantial support for quite restrictive protective provisions and development setbacks. Often, encouragement for restoration initiatives is provided to offset residual adverse effects of development potentially impacting on riparian or aquatic biodiversity.

Challenge

However, a major challenge is in applying the sustainable management tests to the continuation of ongoing land use practices and activities in or near to riparian areas that have cumulative adverse impacts on riparian and aquatic habitats and other biodiversity values. While s85 of the RMA constrains the extent to which a plan or proposed plan may restrict activities in such a way that "renders any land incapable of reasonable use", the definition of the term 'reasonable use' would exclude use of the land for an activity whose potential effects on the environment would be significant. Therefore, plan provisions to constrain specified ongoing activities adversely impacting on the biodiversity of riparian and aquatic systems would not necessarily render the land incapable of reasonable use.

Whether or not the establishment of a restrictive rule within such plan provisions could actually constrain existing use activities that were established before the provisions came into force does depend upon whether the intensity of the activity and its effects have

increased (s10(1)) in relation to any district plan rule. However, if the provisions and restrictive rules were made in a regional plan for which the use of land was controlled under s30(1)(c) for the purposes of soil conservation, or maintaining or enhancing ecosystems or water quality in water bodies then the existing use rights to continue such activities are effectively negated by s10(4)(a).

Methods

Few councils have seriously wrestled with this issue, apart from contributing funding to landowner-initiated riparian retirement projects. However, Environment Waikato has negotiated a package of provisions for Lake Taupo and its tributary streams and catchment that does include progressive restrictions on existing agricultural uses of land and riparian areas. These restrictions are complemented with substantial contributions of funding from central and local government. Environment Bay of Plenty is part-way through a similar process to protect the water bodies of the Rotorua Lakes. It did have a head start in terms of comprehensive riparian retirement and planting programmes for several of the lake catchments, but this component of the Upper Kaituna Catchment Control Scheme of 1974 was highly subsidised by central government.

Most lowland riparian vegetation in developed landscapes is in the form of thin linear strips so is highly vulnerable to 'edge effects'.

Dunelands

Dunelands are coastal ecosystems based on accreted sediments of low cohesiveness (and conversely high erodibility) with quite variable drainage. Most are composed of sequences of sand dune ridges with finer silts and clays accumulating in the intervening swales, often forming poorly drained linear wetlands and sometimes lakes. They are formed by and evolve through the action of wind on the sand supply delivered to the adjoining drying beach berm.

Other similarly profiled coastal depositional ecosystems are composed of shingle ridges with intervening wetter hollows. These are common where there are very high rates of erosion and transport of coarse sediment and are often associated with braided river systems. These shingle systems are formed by (and conversely removed through) high energy wave action, with only a relatively small amount of finer material reworked by wind action.

Dunes are naturally stabilised by specialised indigenous sand-binding plants. These form the basis of relatively fragile duneland communities. These biological communities include the pioneering plants (such as pingao and spinifex) of 'active' fore dunes through to the tall forests that have evolved on stable back dunes over thousands of years. Many indigenous animals that depend on duneland habitats are quite specialised and often have restricted distribution. These include indigenous snails (PDF) such as Succinea archeyi , spiders such as the iconic katipo, shorebirds such as the threatened New Zealand dotterel as well as many species of threatened plants.

Active dunelands owe their natural character to the ongoing movement of sand by wind. These have declined in area by about 80,000 hectares or 70 per cent since the early 1900s. Dunelands are an ecosystem type particularly vulnerable to the impacts of climate

change. Dune systems provide a natural defence against coastal erosion and are valued for this ecosystem service.

The main cause of decline has been the stabilisation/afforestation of active dunelands using marram grass and plantation conifers, but agricultural development, uncontrolled grazing by stock, sand mining and urbanisation have caused localised losses. Historically, coastal landfill sites (with their leachates, rats and gulls), military manoeuvres and off-road recreational vehicles have also caused widespread degradation. However, only off-road recreational vehicles are still a major issue. River impoundments and coastal structures can potentially affect sediment supply to beaches.

Weeds threaten the biological integrity of dunelands and affect dune shape. Without effective control, weeds will continue to invade dunelands and replace native vegetation communities.

Indigenous forests

Tall forests covered around 80 per cent of the land when people first came to New Zealand. The only areas without tall forests were the upper slopes of high mountains, active dunes, frost flats, the margins of rivers with aggrading beds, recently disturbed sites, some areas of wetland and the driest parts of Central Otago.

Indigenous forests have been reduced to around 23 per cent of the country because of clearance, burning and logging. Clearance has concentrated on the favourable land for agriculture and settlement in the lowlands and around the coast. There is a useful series of maps showing the progressive deforestation across New Zealand from the time before people first arrived around 1200 AD, to the beginning of European settlement in 1840 AD and in more recent times at 2000 AD.

New Zealand forests can be divided into two main types. The first is dominated by one or more species of beech, the second by one or more species of native conifer. These two elements are not mutually exclusive. Conifers including the podocarps, native cedars (Libocedrus) and even kauri can grow with beech.

The beeches are the major element in New Zealand forests today. They either totally dominate a forest to form 'pure beech forest' or they occur in mixtures with any, or all, of kauri, the podocarps or broadleaf species to form 'mixed beech forest'. Pure beech forest covers about 46 per cent of the area of indigenous forest in New Zealand today. Thirty-two per cent of indigenous forest has little or no beech.

The beech element tends to be associated with southern latitudes and mountain areas, with 84 per cent of the total indigenous forest area of the South Island being pure or mixed beech forest. Click here to view a map of the extent of beech forests.

New Zealand lowland conifer and broadleaf forests, especially in the north, are structurally like the forests of the tropics. The conifer kahikatea is the tallest tree in New Zealand and can reach heights of 50 metres. It towers, along with the other emergent podocarps (rimu, totara, matai, miro), above the broadleaved hardwood canopy, giving the forest its characteristic layered appearance. Instead of bearing seeds in cones like other conifers, the podocarp seeds are either in a dry nut (eg, rimu), on a fleshy stalk or

within a fleshy 'berry' (eg, miro). The fleshy 'berries' are distributed by large forest birds such as kereru.

Totara, matai and kahikatea favour fertile soils. Where soils are dry, especially at lower altitudes, totara predominates (eg, Horowhenua). Kahikatea prefers the wet soils of alluvial flood plains (eg, Waikato, South Island West Coast). Matai is most abundant on fertile alluvial or volcanic ash soils. Rimu is the most widespread podocarp and is present on a wide range of reasonably moist sites including flats, slopes and ridges around New Zealand.

Dense podocarp stands are not common today. Examples include sites with thick volcanic ash deposits from major volcanic eruptions (eg, parts of Whirinaki Forest in the Central North Island); sites subject to flooding and other alluvial plain processes (eg, flood plains in the Waikato); and some sites of poor drainage (eg, parts of West Coast lowlands).

Several flowering tree species can also be emergent including northern rata, which is present in some North Island and northern South Island podocarp and broadleaf forests.

Kauri grows naturally north of a line from Kawhia to Tauranga and reaches its southern limit at about 38 degrees South. The loss of kauri forest has been immense. In pre-European times New Zealand kauri forests extended over 1,500,000 hectares. Today mature kauri forest occupies only approximately 0.5 percent of its pre-European extent, that is, only approximately 7,500 hectares.

Most of New Zealand's land birds inhabit native forest or scrub. Many of the uncommon and threatened species (eg, kokako, brown creeper, mohua and saddleback) are completely dependent on quality native forest habitat. Even those species that visit gardens (eg, tui) usually require native forest habitat at times. The tall lowland conifer and broadleaf forests and lowland beech forests are of most value to wildlife as these forests have a diverse habitat structure and complex food webs. Aside from kauri, it is this type of forest that has been most reduced in extent since human arrival in New Zealand.

Today the major threats to indigenous forest ecosystems include:

- damage of sensitive forest vegetation by introduced herbivores (species such as rata, pohutukawa and mistletoe are particularly vulnerable to damage by browsing)
- predation of native forest bird species by a wide range of introduced animal species
- fragmentation of lowland and coastal forests, especially on private land.

A functioning forest ecosystem includes a range of plant species of a wide variety of sizes and the fauna they support. Many smaller plants specialise in growing in the groundcover tier and will never be tall. Sustaining a functioning forest ecosystem involves ensuring that these smaller species are protected. It also means allowing small seedlings of future canopy trees to grow to replace the existing forest canopy when it reaches the end of its natural life. In addition, the dead wood, rocky outcrops, leaf litter and soil that provide specialised habitats required by a vast array of species need to be protected.
In New Zealand, fragmented native forests of drier lowland areas (Northland, Waikato, Manawatu) and in the east (from East Cape to Southland) are likely to be most vulnerable to the impacts of climate change.

Shrublands and scrub

Atkinson defines scrub as woody vegetation in which the cover of shrubs and trees in the canopy is greater than 80 percent and in which shrub cover exceeds that of trees. Shrubs are woody plants with a trunk diameter of less than 10 centimetres at chest height.

Shrubland is a plant community in which the cover of shrubs in the canopy is 20–80 per cent and in which the shrub cover exceeds that of any other growth form or bare ground.

New Zealanders generally think of native scrub as either manuka (North Island) or matagouri (South Island), but there are many different types of scrub, falling into two main categories: short-lived (temporary) and long-lived (persistent).

Scrub covers some 7.5 million hectares – 28 per cent of New Zealand. It is often much maligned, considered as wasteland or as invasive in paddocks or plantations. Much of it is still cleared in New Zealand, particularly for plantation establishment.

Scrub plays a valuable role as:

- a climax vegetation type in environments that favour its persistence, such as geothermal, alpine, coastal and wetland areas
- a nursery for regenerating forest
- habitat for many native plants and animals, including threatened species such as kiwi, lizards and rare orchids, some of which only live in scrub
- habitat for unique species such as divaricating plants – a small-leaved, twiggy growth form that possibly evolved in response to moa browsing. These are an important food source and hiding place for lizards
- habitat for around 445 native shrub species (more than twice the number of tree species), just over a third of which are uncommon or threatened
- corridors between other areas of natural vegetation
- buffers to native forest, wetlands and waterways
- land stabilisers, preventing slips and minimising erosion
- storage for greenhouse gases – New Zealand scrub could be accumulating about 1 million tonnes of carbon dioxide per year
- a storehouse of commercial products, such as honey and essential oils, and traditional products, such as medicines.

Most people are familiar with short-lived scrub, usually comprising manuka and common shrubs like five-finger, coprosmas, young pittosporums and wineberry. Short-lived scrub is nature's 'band-aid', covering bare land or abandoned paddocks. It is the early successional stage that allows cleared land to develop back into native forest, usually within 30–50 years in suitable sites.
Long-lived (persistent) scrub occurs where the conditions are too harsh for native forest to establish, such as on mountains, in wetlands, along exposed coastlines, on poor soils and in geothermal areas. Highly specialised plants often grow in long-lived scrub, including prostrate kanuka, marsh ribbonwood, mountain neinei, coastal tree daisy, snow totara and whip-cord hebes.
Scrub is mainly threatened by clearance, but can also be susceptible to weed invasion (particularly wilding pines) and fire, and most areas of scrub will have animal pests such as rodents and mustelids.

A description of scrub and shrubland types in New Zealand including maps showing the national distribution of shrubland is available.

Lowland tussock grasslands

At the time of European settlement, much of the eastern side of the South Island as well as the Southland Plains was in native grassland. Short tussock grassland was on the driest sites and tall tussock grassland was on the moister Southland Plains and eastern Otago Hills. Until relatively recently it was assumed that the short tussock grassland was the original vegetation cover although recent research has shown that this landscape was originally forest.

Short tussock grasslands grow where the annual rainfall is from 350 millimetres to 1000 millimetres. It is likely that the only significant areas of temperate lowland grasslands existing before Polynesian settlement were in the intermontane basins in central Otago, McKenzie and Marlborough where annual rainfall was less than 500 millimetres.

The early European sheep farmers burnt the grasslands and extended them at the expense of forest and scrub communities. Initially the fire killed the speargrasses and much of the matagouri scrub and provided fresh tussock growth for the stock. Eventually the fire weakened and killed the snow tussocks. Their replacements were hard and blue tussocks that were then depleted by the fire and grazing regime.

Rabbits quickly became a plague after their introduction in the 1870s. The settlers soon realised that the European grasses and clovers were more productive and tolerant of grazing than the native grasses. Oversowing using the introduced grasses became common. The depletion of the native vegetation assisted the establishment and spread of introduced plant species, including weeds like Hieracium.

Tall lowland tussock grasslands are dominated by red tussock. Normally red tussock is a species of wetter soils, but following the extensive forest destruction by fire within 200 years of the arrival of Polynesians in Southland, it spread to a wider range of sites in places such as the Southland Plains.

Today the main threats to tussock grassland include:

- oversowing with pasture grasses and topdressing, thereby converting an area to pasture dominated by introduced species
- burning and grazing by domestic stock
- grazing by animal pests
- invasion by weed species (introduced tree species as well as ground species such as Hieracium), especially in areas of degraded grassland.

The 'invasion' of grassland by native shrub and tree species is a natural process in areas that were formerly forest.

Alpine and mountain

New Zealand indigenous alpine ecosystems have generally been spared the destruction resulting from human settlement that has occurred to many other New Zealand

ecosystems. Thus, their extent has not been significantly reduced in comparison with many lowland ecosystems.

Many alpine areas are relatively small and physically isolated from other alpine areas. This isolation has led to the evolution of endemic species with a limited distribution. Climate change is likely to have a significant effect on small isolated alpine areas because species are unlikely to migrate naturally to alternative environments as the climate warms.

Species with limited climatic ranges and/or restricted habitat requirements are typically the most vulnerable to extinction. Many mountainous areas have endemic species with narrow habitat requirements that could be lost if they cannot move up in elevation. Changes in the duration and depth of snow cover, the location of the upper tree line, reduced glacier extent and a potentially shortened snow-melt period will all affect alpine biodiversity.

There has, however, been damage resulting from introduced animals especially deer, Himalayan thar, chamois and goats. This damage has altered plant species composition led to accelerated erosion where vegetation cover has been significantly reduced. These effects were particularly pronounced in the 1940s to 1970s when deer and thar numbers reached their peaks. While major animal control programmes have reduced numbers of pest animals in the alpine zone, the harsh conditions mean recovery can take a long time. In some places, pest animal numbers may still be too high to allow full recovery of indigenous plants and animals.

Some eastern alpine areas have been used for pastoral farming. Often these areas were burnt deliberately and/or accidentally. As a consequence the alpine vegetation has been degraded and the area is more prone to erosion. Species composition has often been significantly changed as those species sensitive to fire and grazing (especially when the grazing immediately follows fire) are replaced by less sensitive species.

It is projected that 200–300 indigenous New Zealand alpine plant species may become extinct by 2080.

Rare ecosystems (eg, karst, serpentine, geothermal)

The protection of indigenous vegetation associated with originally rare ecosystems has been identified as one of the four national priorities for biodiversity protection by the Department of Conservation and Ministry for the Environment (PDF 1.39 MB). Rare terrestrial ecosystems are defined as having a total extent of less than 0.5 per cent of New Zealand's total area and having been rare since before humans colonised New Zealand. The Landcare Research list of 72 rare terrestrial ecosystem types can be used to guide protection at national and regional scales. An equivalent list has not been developed for aquatic ecosystems.

New Zealand vegetation classification

New Zealand vegetation classification: The mostly widely used system is the Atkinson system for New Zealand terrestrial vegetation classification.

New Zealand ecologists commonly use the terrestrial vegetation classification system developed by Ian Atkinson. It includes two components:

- the structural form of the vegetation (eg, forest, grassland)
- the floristic composition as determined by the dominant species (eg, mountain beech forest, manuka scrub).

These standard definitions of structural classes such as forest, scrub, shrubland and treeland can be helpful when writing definitions or criteria in policy, as follows.

- Forest is defined as woody vegetation in which the cover of trees and shrubs in the canopy is more than 80 per cent and in which tree cover exceeds that of shrubs.

- Treeland is defined as vegetation in which the cover of trees in the canopy is 20–80 percent, with tree cover exceeding that of any other growth form, and in which the trees form a discontinuous upper canopy above either a lower canopy of predominantly non-woody vegetation or bare ground, for example, mahoe/bracken treeland.

(Note: Vegetation consisting of trees above shrubs is classified as either forest or scrub depending on the proportion of trees and shrubs in the canopy.)

The system is relatively complex for non-woody vegetation. In palustrine wetlands (particularly where there is a range of species), it may be useful to use the LCDB2 structural class 'herbaceous freshwater wetland' rather than distinguishing between rushland, reedland, sedgeland and tussockland.

Biodiversity Protection and Threat Issues for Councils

There are a number of threat issues to biodiversity that councils need to consider, which can be categorised as:

- general/ecosystem wide
- terrestrial
- aquatic
- planning.

General and ecosystem-wide issues

1. Little remains of many lowland and coastal habitat types and less are legally protected. Both may be particularly vulnerable to the impacts of climate change.
2. Many rare and threatened habitat types are vulnerable to irreversible loss.
3. The habitats, and therefore survival, of many threatened and/or rare species are at risk from a variety of pressures.
4. Migratory species are vulnerable to loss of any of the several habitats they require, and/or obstructions and other hazards along their migratory route.
5. Plant and animal pest species threaten the integrity of many indigenous ecosystems and the survival of many indigenous species.
6. New pest species are likely to be viable in New Zealand as a result of climate change.
7. The ranges of existing pest species are likely to change as New Zealand experiences climate change.
8. Certain activities allowed by existing use rights may result in ongoing adverse effects on indigenous biodiversity.
9. Many modified lowland ecosystems are vulnerable to the cumulative effects of repeated small-scale modifications, such as vegetation clearance and streambed modifications.

Terrestrial issues

1. Vegetation clearance, even on a small scale, can damage habitats of value and/or result in habitat fragmentation and/or increase the edge effect and weed invasion.
2. Burning, over-sowing and topdressing of natural grasslands decrease their biodiversity values.
3. The establishment of exotic conifer forest plantations close to or within native grasslands can lead to wilding tree invasion of natural areas.
4. Agricultural intensification can increase impacts of agricultural activities on native vegetation remnants, downstream freshwater, estuarine and marine habitats and ecosystems.
5. Mining, quarrying and earthworks can adversely affect terrestrial and aquatic ecosystems.
6. Roading and utility corridors fragment natural areas, increasing edge effects and encouraging weed and animal pest invasion.
7. Settlement intensification, including subdivision and new housing, can destroy or damage sensitive habitats by habitat clearance or infilling, excessive human use of sensitive areas such as dunes, pet impacts on wildlife and weed invasion. Note: these effects need to be weighed against costs of urban expansion of settlements into greenfield and rural areas.

8. Stock grazing in native forest and scrub destroys the understory and prevents regeneration. It also increases light and nutrient levels thereby encouraging weed invasion.
9. Poorly contained/released farmed goats and/or deer pose a significant risk to biodiversity values in nearby native vegetation.
10. Vehicle use in some ecosystems, such as beaches, dunes and river beds, can damage habitats and the species that use them.
11. Important indigenous biodiversity values on some lands held by councils are not legally protected (eg, paper roads around some harbour and estuary margins, water supply catchments).
12. Climate change will potentially reduce the viability of certain species at the climatic margins of their ranges. Officers of councils responsible for managing reserves, parks and other open spaces will have to consider how to cope with these shifts in biomes and their effect on migratory and non-migratory species.

Aquatic issues

1. Drainage, diversion and stop-banking to lower water tables and control or divert natural waters for the purposes of increasing and/or protecting human settlement and agricultural activities can adversely impact aquatic ecosystems.
2. Discharges of nutrients and contaminants (both point and diffuse) can adversely affect aquatic biodiversity.
3. Impoundments and large-scale abstractions of natural waters can adversely affect aquatic ecosystems, while the flooding associated with impoundments and raised water levels can destroy riparian and riverine habitats.
4. Road culverts, weirs and flood control works can create significant impediments to the migrations of diadromous fish.
5. Mining and dredging of river beds and the coastal marine area, along with marine spoil dumping, can adversely affect aquatic habitats.
6. Development and management of aquaculture and other facilities can adversely affect aquatic biodiversity values.
7. Methods used to harvest fishery resources can adversely damage marine ecosystems (the effects of the actual harvest on fisheries resources are outside the scope of the RMA and local authorities' control).
8. The progressive acidification of oceans due to increasing atmospheric carbon dioxide is expected to have negative impacts on marine shell-forming organisms (eg, corals) and their dependent species.
9. Urban development increases hard-standing areas and hence increases the volume of run-off entering watercourses immediately following a rain-fall event, which can cause flooding and erosion. Also, affects ground water levels.

Planning issues

1. It can be difficult to resolve conflicts between some private property rights and the maintenance of biodiversity within the RMA arena. Related to this, non-regulatory methods can be ineffective and may not address the issue head-on.
2. Biodiversity maintenance is at risk without access to appropriate ecological expertise and ongoing resources for management.
3. While some ecosystems and species habitats may straddle local authority boundaries, council plan preparation and administration processes do not necessarily recognise or prepare coordinated strategies and programmes.

4. There is often inadequate information on trends in biodiversity condition and extent for different ecosystem types to evaluate policy performance.
5. Lack of overall strategic biodiversity direction and priorities to guide plan policies. Part of this response is an increasing need for good strong interagency coordination.
6. Difficult for councils to prepare long-term frameworks with precise, measurable and effective objectives and policies.

Section 2 of the RMA provides a definition of 'biological diversity'.

The 'maintenance' of indigenous biological diversity by councils is to be undertaken in the context of ss5 to 8 of the RMA. These sections use the terms 'safeguarding the life supporting capacity' (of ecosystems); 'preservation' (of natural character of the coastal environment, wetlands, rivers, lakes and their margins); and 'protection' (of significant indigenous vegetation and significant habitats of indigenous fauna). These s5, 6 and 7 matters contribute to the interpretation of the term 'maintenance of indigenous biological diversity'. Maintenance can include protection, enhancement and restoration. Section 8 requires councils to take account of the principles of the Treaty of Waitangi when making plans and any other RMA decisions.

Part 2 of the RMA requires particular regard be given to the effects of climate change (s7(i)). This means that councils have both social and legal obligations to take climate change effects into account in their planning. Therefore long-term planning functions need to embrace expected long-term shifts and changes in climate extremes and patterns to ensure future generations are adequately prepared for future climate conditions.

The RMA provides a number of mechanisms that can be used by the Crown, and primarily local authorities, to assist with the maintenance of biodiversity. These mechanisms include national policy statements (including the mandatory New Zealand Coastal Policy Statement 2010), regional policy statements, regional plans and district plans.

Special instruments that fit into this planning framework include water conservation orders, heritage orders, designations, esplanade reserves and strips, and water quality class assignments.

Roles and responsibilities for indigenous biodiversity

Local authority primary roles and responsibilities affecting indigenous biodiversity

RMA

The following sections in Part 2 of the Act are relevant to local authority functions for indigenous biodiversity:

"5 Purpose

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

(2) In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables 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.

6 Matters of national importance
In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall recognise and provide for the following matters of national importance:

(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:
…
(c) the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:
…

7 Other matters
In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to—
…
(c) the maintenance and enhancement of amenity values:
(d) intrinsic values of ecosystems:
…
(f) maintenance and enhancement of the quality of the environment:
…
(h) the protection of the habitat of trout and salmon:"

Section 2 defines 'intrinsic values' in relation to ecosystems as:
"[T]hose aspects of ecosystems and their constituent parts which have value in their own right including:

- their biological and genetic diversity; and
- the essential characteristics that determine an ecosystem's integrity, form, functioning and resilience."

Regional councils and territorial authorities both have responsibilities relating to maintaining biological diversity:

- Under s30 of the RMA, regional councils have the function of controlling the use of land for the purpose of maintaining and enhancing ecosystems in water bodies and coastal water. They are also responsible for objectives, policies and methods for maintaining biological diversity.
- Under s31 of the RMA, territorial authorities are responsible for controlling the effects of the use, development, or protection of land, including for the purpose of maintaining indigenous biological diversity.

Section 62(1)(i)(iii) of the RMA requires a regional policy statement to state the local authority responsible, in the whole or any part of the region, for specifying the objectives, policies and methods for the control of the use of land to maintain indigenous biodiversity. This is an important matter that requires discussion and negotiation between a regional council and its respective territorial local authorities. This discussion should result in a clear allocation of roles and unambiguous accountabilities in the context that territorial authorities are required to give effect to regional policy statements through their district plans (s75(3)(c)).

When developing regional policy statements, regional councils are to have regard to conservation management strategies and plans prepared by the Department of Conservation.

The role of the New Zealand Coastal Policy Statement

The New Zealand Coastal Policy Statement 2010 provides guidance on national priorities for biodiversity in the coastal environment. The main policy addressing national biodiversity is Policy 11 to protect indigenous biological diversity in the coastal environment.

Local Government Act 2002

Section 14 of the Local Government Act 2002 (LGA) sets out a series of principles which local authorities must act in accordance with. Section 14(h) specifies that, in taking a sustainable development approach, local authorities shall take into account three matters including:

"…

(ii) the need to maintain and enhance the quality of the environment; and

(iii) the reasonably foreseeable needs of future generations".

The LGA specifies community planning processes through long term plans and annual plans. These plans deliver the non-regulatory components of indigenous biodiversity maintenance (and enhancement), primarily through the allocation of resources to programmes and protection and enhancement initiatives, as well as self-imposed constraints on councils' own potentially damaging activities.

Under the LGA, regional councils can acquire land for regional parks. Using s139(2), the Governor-General may declare all or part of a park to be protected in perpetuity from disposition.

Other statutes

There are a number of other relevant statutes that provide primary functions for and powers to councils that affect biodiversity. These are summarised in Table 1 below.

Table 1: Primary functions and powers of local government that affect biodiversity

Statute	Regional council functions, powers>	Territorial authority functions, powers and responsibilities
Resource Management Act 1991	Control use of land for the purpose of: maintaining and enhancing ecosystems in	Control any actual or potential effects of the use, development, or protection of land, including for the

	water bodies and coastal water (s30). Establishing, implementing and reviewing objectives, policies and methods for maintaining indigenous biological diversity (s30). Prepare regional policy statement, regional plans.	purpose of maintaining indigenous biodiversity (s31). Prepare district plan. Control activities on surface of water. Control noise (for example, from bird scarers).
Local Government Act 2002	Prepare long term plans and annual plans. Manage water supply catchments (exceptions). Power to acquire land for regional parks.	Prepare long term plans and annual plans. Manage water supply catchments.
Wellington Regional Water Board Act 1972	Manage land and catchments in Wellington Region.	
Local Government Act 1974		Construct, upgrade, repair roads (Part 21). Alter course, level, width or close roads (Part 21). Subject to Resource Management Act 1991. Councils can make, maintain, alter, repair or enlarge drainage channel or land drainage works (Part 29).
Land Drainage Act 1908	Drainage boards maintain, deepen, widen, straighten or divert drains (includes all natural water courses excluding navigable rivers). Every local authority that is not within a drainage district can exercise the powers of a drainage board (s61).	
Soil Conservation and Rivers Control Act 1941	Catchment boards have powers to: • construct, reconstruct, alter, repair and maintain all works considered necessary to control or regulate the flow of water towards, into, within and from watercourses • prevent or lessen overflow of banks and erosion • maintain watercourses and defences; deepen, widen, straighten, divert	

	or make new watercourses.	
Reserves Act 1977	Management of scenic, recreational and local purpose reserves (including esplanade reserves) with biodiversity values. This can include management on behalf of the Crown.	Management of scenic, recreational and local purpose reserves (including esplanade reserves) with biodiversity values. This can include management on behalf of the Crown.
Biosecurity Act 1993	Prepare and administer regional pest management strategies. Monitor and undertake surveillance for pests.	Act as management agency under a pest management strategy.
Waitakere Ranges Heritage Area Act 2008	Special provisions to supplement existing statutes for managing the Waitakere Ranges.	Special provisions to supplement existing statutes for managing the Waitakere Ranges.
Hauraki Gulf Marine Park Act 2000 (HGMPA)	Section 10 states that the HGMPA is to be treated as a New Zealand coastal policy statement. Section 8 of the HGMPA addresses the management of the Hauraki Gulf.	Territorial authorities must ensure that plans do not conflict with s7, which recognises the national significance of the Hauraki Gulf) and s8 (which addresses the management of the Hauraki Gulf), as these sections have the force of a national policy statement.

Central government roles and responsibilities for indigenous biodiversity

The Ministers of Conservation and Environment have functions under the RMA in ss28 and 24 respectively. The Department of Conservation has the primary responsibility for biodiversity protection under a number of statutes.

Table 2: Primary biodiversity functions, powers and responsibilities of the Department of Conservation

Statute	Main functions, powers and responsibilities
Conservation Act 1987	Manage all land resources held under the Act for conservation purposes. Preserve indigenous fisheries and protect freshwater fish habitats. Advocate for conservation of natural resources. Prepare conservation management strategies for all natural resources, areas and species administered by the Department.
Reserves Act 1977	Manage the majority of lands of the Crown held under the Reserves Act. Ministerial approval required for a number of activities on reserves not managed by the Department.
National Parks	Manage national parks to achieve the purpose of the Act.

Act 1980	
Marine Reserves Act 1971	Manage marine reserves to achieve the purpose of the Act, which is to preserve for "scientific study of marine life, areas of New Zealand that contain underwater scenery, natural features, or marine life, of such distinctive quality, or so typical, or beautiful, or unique, that their continued preservation is in the national interest".
Wildlife Act 1953	Manage wildlife sanctuaries, wildlife refuges and wildlife management reserves. All wildlife as defined in the Act is protected throughout New Zealand and the Exclusive Economic Zone except for species listed in specified schedules. This excludes introduced species, fish, almost all marine species and most insects.
Trade in Endangered Species Act 1989	Investigate species threatened by trade. Execute a wide variety of powers relating to the implementation of the Act. Fulfil New Zealand's obligations under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
Marine Mammals Protection Act 1978	Manage marine mammal sanctuaries. Act protects marine mammals.
Wild Animal Control Act 1977	Includes coordinating the policies and activities of departments, local authorities and landowners in relation to the control and eradication of any species of wild animal (pest species).
Native Plants Protection Act 1934	Provides for the Governor-General to declare any native plant to be protected. It is an offence to take such a plant on public land or from private land without landowner permission.
Resource Management Act 1991	The preparation and recommendation of New Zealand coastal policy statements under s57. The approval of regional coastal plans in accordance with Schedule 1. The monitoring of the effect and implementation of New Zealand coastal policy statements and coastal permits for restricted coastal activities.

The Ministry for Primary Industries administers the Fisheries Act 1996, which has the purpose of utilising fisheries resources while ensuring sustainability. Under s9:
"…all persons exercising or performing functions, duties or powers under this Act, in relation to the utilisation of fisheries resources…shall take into account the following environmental principles:

- associated or dependent species should be maintained above a level that insures their long-term viability:
- biological diversity of the aquatic environment should be maintained:
- habitat of particular significance for fisheries management should be protected".

The Ministry of Primary Industries also administers the Forests Act 1949. Under this Act, the felling of indigenous trees for timber requires a registered sustainable forest management plan or permit and harvest is to be in accord with an annual logging plan. The Act does not control the felling of indigenous vegetation for any purpose other than milling (eg, land clearance for agriculture or plantation forestry) and therefore cannot be relied upon to protect indigenous forests.

Other organisations with roles and responsibilities for indigenous biodiversity

The Queen Elizabeth II National Trust promotes and facilitates the preservation and enhancement of open space under the Queen Elizabeth the Second National Trust Act 1977. This includes negotiating covenants on private land and acquiring open space land in its own account. These powers can be used to protect land when granting resource consents.

The following organisations have statutory roles and responsibilities for indigenous biodiversity protection, maintenance and restoration:

- New Zealand Conservation Authority and conservation boards
- Guardians of Lakes Manapouri, Monowai, Te Anau and Wanaka
- regional fish and game councils, which maintain and enhance populations of indigenous game birds and their habitats

There are also a large number of non-statutory organisations and community groups undertaking biodiversity protection and management roles. Some of these national organisations and their primary activities are listed in table 3 'Selection of National Organisations that are not Established by Statute'.

Table 3: Selection of national organisations that are not established by statute

Organisation	Primary activities
New Zealand Landcare Trust and Landcare groups	New Zealand Landcare Trust facilitates sustainable land management and biodiversity initiatives with rural communities. Regional coordinators work with groups around the country, providing support and information to assist them manage their land more sustainably. Landcare groups are groups of people who join together to work on land management issues in their local area.
National Wetland Trust of New Zealand	Aims to increase public knowledge and appreciation of wetland value and to increase understanding of wetland functions and processes. Also aims to ensure landowners and government agencies commit to wetland protection, enhancement and restoration.
Ducks Unlimited New Zealand	Dedicated to wetland and waterfowl conservation. Aims to deliver effective wetland restoration and development along with research, education and advocacy.
Royal Forest and Bird Protection Society of New Zealand	A society that aims to preserve and protect the native plants and animals and natural features of New Zealand and is active on a wide range of conservation and environmental issues. Is involved in advocacy and lobbying work at all levels of government.
New Zealand Ecological Society	A society formed to promote the study of ecology and the application of ecological knowledge. Attempts to encourage ecological research, increase awareness and understanding of ecological principles, promote sound ecological planning and management of the natural and human environment and promote high standards both within the profession of

	ecology by those practising it, and by those bodies employing ecologists.
New Zealand Freshwater Sciences Society (previously New Zealand Limnological Society)	A society that aims to establish effective liaison between all people interested in any aspect of fresh and brackish water research in New Zealand, and to encourage and promote these interests.
New Zealand Botanical Society and regional societies	Societies of professional and amateur botanists who undertake research, field work, publication and advocacy. Provide botanical expertise and advocate for the conservation and protection of New Zealand native plants.
Ornithological Society of New Zealand and regional branches	Societies of professional and amateur ornithologists. Aim to encourage, organise and promote the study, knowledge and enjoyment of birds and their habitat use particularly within the New Zealand region. Provide ornithological expertise to assist the conservation and management of birds.
New Zealand Plant Conservation Network	Organisation that aims to protect and restore New Zealand's indigenous plant life and their natural habitats and associated species through dissemination of information about indigenous plant species and communities. Also undertakes conservation activities and runs training programmes to protect threatened plants and communities.

Relationships with landowners, Māori and the community

Relationships with landowners

Much of New Zealand's remaining lowland and coastal indigenous vegetation and wildlife habitats are on private land. Where landowners understand and appreciate the importance of the dependence of indigenous biodiversity on their property management they are more likely to try to protect the relevant areas.

Regional council processes for preparing farm/environment property plans could be extended to directly address terrestrial and freshwater indigenous biodiversity protection. This would require council staff preparing such plans to be aware of existing information about biodiversity values on and close to the property and to seek ecological advice where this is appropriate.

Active protection of indigenous biodiversity on private land usually requires funding for activities such as fencing, animal pest and weed control, and alternative stock water sources. Councils can help by allocating funding to assist landowners to protect and maintain indigenous biodiversity on their properties. They can also assist landowners to apply for other sources of funding and joining multi-agency funding packages (eg, a package involving the district council, regional council, Queen Elizabeth II National Trust and Nature Heritage Fund.

Regulatory provisions are needed as a backup to methods focused on education and practical assistance. These work best when a council is seen to be operating in a principled, thorough, consultative and fair manner.

Freshwater and estuarine habitats have diminished in quality in many areas because of the impacts of increased human settlement and/or land use intensification. Voluntary improvements are encouraged through industry accords (e.g., the Dairying and Clean Streams Accord) and regional council farm planning education and practical assistance are needed, along with regulation-induced improvements in land use practice. Good relationships with landowners should be based on mutual understanding of the biodiversity and other values at risk and the measures needed to reverse the damage, as well as an understanding of economic and commercial imperatives.

Māori landowners

Māori land ownership can provide additional challenges and opportunities for councils. A major challenge can be identifying the appropriate person to talk to about biodiversity values on land that is in multiple ownership (note powers to amalgamate land are available under Te Ture Whenua Māori Act 1993). Discussions may take time and can be improved where there is continuity of staff involved. Māori relationships with their land are long term. It is important that council staff recognise and appreciate these values.

The Nga Whenua Rahui Fund provides opportunities for protecting biodiversity on Māori land. There can be successful collaborations between the fund and councils (e.g., fencing the indigenous vegetation and margins of Lake Rotoehu in the Bay of Plenty).

Treaty of Waitangi settlements with Te Arawa (for the Rotorua Lakes) and Tainui (for the Waikato River) have included funding for environmental restoration as well as a governance role. This provides opportunities for regional and district councils to work cooperatively with iwi to improve the quality of aquatic ecosystems and to work together to develop policies and objectives for district and regional plans.

The community

The community is becoming increasingly involved in biodiversity protection and restoration activities on public and private land. This can be via:

- direct volunteering by individuals to work on planting and other ecological restoration activities in agency-run programmes on public land
- branches or affiliates of national organisations working on public lands
- branches or affiliates of national organisations working on private lands
- special-purpose organisations working on public land
- special-purpose organisations working on species-focused ecological restoration projects on private land
- volunteers working on species-focused ecological restoration projects on public land
- special-purpose working on public and private land
- organisations set up and provided with ongoing assistance by councils
- major ecological restoration projects involving public agencies, community trusts and extensive sponsorship and fund-raising and ongoing volunteer activities.

Community volunteers can make an important contribution to biodiversity protection and restoration activities throughout New Zealand. Councils can work with these volunteers and volunteer groups to help them make a greater contribution to achieving goals set out in long term plans and RMA plans. Positive things councils can do include:

- providing advice and resources
- providing funding
- helping groups access other sources of funding
- providing a context through a biodiversity strategy for the region or district
- establishing a local or regional biodiversity forum
- recognising the value of sites in plans through policies and objectives to help protect sensitive and/or valuable resources.

Councils can also assist community groups by removing impediments to ecological restoration such as:

- landfill fees for disposal of non-compostable weed species like ginger
- requirements for costly and lengthy resource consent processes for ecological restoration activities such as repairing the hydrology in wetlands threatened by surrounding land drainage and undertaking animal pest control operations with aerially applied poison where landowners agree.

Property rights and duties for biodiversity

The Crown has a number of legislative responsibilities for biodiversity that impact on land ownership. This means that rights associated with fee simple titles and pastoral leases are subject to various limitations and duties of care, particularly s17 of the RMA, which places a duty on landowners to avoid, remedy or mitigate adverse effects on the environment.

Responding to and meeting the above challenges and obligations requires, amongst other things, that natural and physical resources, including biota and their habitats, be managed in an integrated manner.

Protected species of 'wildlife' (eg, native birds, bats, frogs, lizards, invertebrates) are the property of the Crown (s57 Wildlife Act 1953), both alive and dead, unless lawfully taken by authorities granted under the Act. Gamebirds are also vested in the Crown, but fish and game councils have a regulatory interest in these species. Species of wildlife that are 'unprotected' (Schedule 5, Wildlife Act 1953) are not vested in the Crown so the owners and occupiers of land inhabited by these have some rights to take or kill them.

'Wild animals' as defined in the Wild Animal Control Act 1977 are specified as introduced species (eg, possums, feral deer, goats and pigs) that have developed pest populations that need controlling. They are also owned by the Crown under s9 but regional councils have a regulatory interest in many under the Biosecurity Act 1993. Their relevance to protection of indigenous biodiversity lies in the damage they can do and the origins of obligations and authority to control their impacts.

Fish (in the wild) and other forms of aquatic life included in the definition of fisheries (eg, shellfish and seaweeds) are vested in the Crown, but specific entitlements and other rights to take or kill are assigned under regulations or (for quota management species) through tradeable Individual Tradeable Quotas and Annual Catch Entitlements under the Fisheries Act 1996. While the RMA has an arguably minor role in controlling the adverse effects on the environment of harvesting fish under the Fisheries Act 1996, this constraint does not apply to the impacts of taking freshwater fish under the Conservation Act 1987 (eg, whitebait fishery). Marine mammals management is the responsibility of

the Crown under s3A of the Marine Mammals Protection Act 1978, including control of possession of live animals and dead parts, but the Act makes no explicit claim to any greater property interest.

At the species level of biodiversity most are still the property of the Crown, regardless of the tenure of the lands or waters they inhabit. The public property rights in individual organisms sometimes extend to powers to require protection of their habitats (eg, s63(1)(c) Wildlife Act 1953 prohibits damage to the nests of protected species). Where this is not the case, the owner of the organism (often the Crown) may need to seek appropriate protection of habitat through negotiation or advocacy.

In New Zealand, the Crown's legal interest in land has always established the basic obligations of a landowner to a duty of care. This duty is also reflected in s17 of the RMA. The RMA has devolved to councils a variety of managerial responsibilities for Crown property interests in lands and waters, including those specified in s354 (including natural waters, geothermal fluids and energy, and beds of navigable rivers).

The take-home message for the debate on property rights and biodiversity maintenance is that, in addition to private property rights, there are also major public property interests to be safeguarded and private property interests that include a duty of care and other obligations not to have significant adverse effects on the environment.

Integrated Management

Achieving integrated management can pose special challenges in relation to biodiversity. This is because of the high level of interconnectedness between ecosystems and the often delayed or long-distance impacts of the use or development of resources.

Integrated management also implies coordinating the planning and management processes under the different legislation that applies to a particular resource. For councils addressing biodiversity, this would include the RMA, Reserves Act 1977, Soil Conservation and Rivers Control Act 1941, Biosecurity Act 1993, Local Government Act 2002 and Local Government Act 1974. For a more integrated approach, councils also need to consider planning and management under statutes administered by other (primarily Crown) agencies (eg, the Conservation Act 1987, Fisheries Act 1996 and Wildlife Act 1953).

Ecological characterisation and assessment

Ecological characterisation and assessment are undertaken for a variety of purposes and at a variety of scales. A characterisation or description identifies the key species, communities and ecological processes present and should include pertinent attributes of the non-biotic environment.

Ecological assessments

An ecological assessment includes an evaluation of the relative ecological importance of the area and typically identifies threats and management requirements. The evaluation of relative importance typically occurs within the context of one of several spatial frameworks for terrestrial and aquatic environments.

There are a number of reasons that councils assess the ecological value of natural areas, which include:

- providing information to assist a council to develop RMA plans and other methods and/or a strategy for promoting the maintenance of indigenous biodiversity (eg, developing schedules of significant areas of indigenous vegetation and/or significant habitat for indigenous fauna)
- assessing environmental effects of regulated activities
- prioritising proactive management (eg, pest control, funding for plants and fencing)
- developing monitoring programmes
- acquiring and managing reserves.

Ecological assessments tend to adopt similar methodologies, but there are variations in the detail of information gathered depending upon the purpose of the assessment and the resources available to undertake it.

Purposes and scales for ecological assessment range from broad scale rapid assessment for identifying priorities for protection (as in a Protected Natural Areas Programme ecological district survey) to a detailed ecological assessment of a single site as part of a resource consent application for a development (eg, a subdivision proposal).

Ecological assessment effort and methodology varies, and should be related to the type of ecosystem and the magnitude of the issue, whether that be the amount of expenditure being considered for purchase, restoration or enhancement or the level of potential impact of a proposed development. Extra effort should be expended in highly fragmented or depleted regions or ecosystem types. Even a highly degraded site may have value if it is a rare or depleted ecosystem or contains a population of a threatened species.

Assessment effort can be targeted. In some circumstances, local or expert knowledge about the environment can suggest that a particular value is likely to be present in a given site. For example, if a species such as kiwi is known to occupy similar habitat in the general area or has been sighted at the location in the past, then it is appropriate to request further information about the presence and abundance of kiwi.

Spatial frameworks for ecological assessment

The relative importance of an area is typically evaluated within the context of a spatial framework. In the terrestrial environment, the key spatial frameworks used in New Zealand are:

- ecological regions and districts
- Land Environments of New Zealand
- land systems
- ecodomains.

The River Environment Classification and Marine Environment Classification have been developed for rivers and the marine environment respectively.

'Ecological regions and districts' is the spatial framework for the Protected Natural Areas Programme. New Zealand is divided into 85 ecological regions and 268 ecological districts using information about geology, topography, climate and biota. Not all ecological districts have been surveyed.

Land Environments of New Zealand (LENZ) is a spatial framework developed by Landcare Research to provide a framework for the assessment of terrestrial biodiversity. Units are defined by computer analysis of available quantitative data on various climatic and geological/soil parameters that affect the growth of plants. 'Land environments' are areas with similar climatic and geological/soil characteristics. Unlike the ecological regions and districts spatial framework, a single land environment may be present in a number of non-contiguous locations. LENZ is scalable, with more environments being identified at finer levels of analysis.

Land systems are defined by expert opinion, using information on rock type, tectonics, climate and biota. The concept was developed by Landcare Research and Lucas Associates and land systems have been defined for several local authorities including Environment Bay of Plenty and Marlborough.

Eco-domains is a spatial framework developed for the Wellington Region. The boundaries are delineated manually using a variety of data sources addressing climate, soil type, rock type and vegetation. Sixty-four eco-domains have been developed for the Wellington Region.

The River Environment Classification divides river systems into units based on similarities and differences in a range of physical variables. The underlying assumption is that the physical variables chosen ('controlling variables') determine the physical habitat and therefore the biota most likely to be found there. Available physical databases are used to classify river reaches using 'rules' developed by an expert panel.

The Marine Environment Classification uses multi-variate clustering of several spatial data layers that describe the physical environment. The classification system has been developed at two scales:

- a broad scale classification of the entire Exclusive Economic Zone (covering the area below the mean high water line (but not including estuaries) from

approximately 25 to 58 degrees South and 158 degrees East to 172 degrees West)
- at the regional scale for the Hauraki Gulf Region (encompasses waters below the mean high water line (but not including estuaries)).

Ecological survey methodology at the district-wide scale

Broad scale rapid assessments tend to follow a similar process although there is usually greater emphasis on mapping for identifying priorities for protection (as in a Protected Natural Areas Programme ecological district survey).

The main components of broad scale assessments in terrestrial environments include:

- studying aerial photographs, topographical, soil and geology maps
- gathering existing ecological, botanical and zoological information, as well as information on the location of threatened species
- using ecological district maps, Land Environments of New Zealand environment maps together with geology and soil maps to divide up ecological district into land systems
- evaluating threatened environment maps
- identifying original vegetation by using Landcare Research predicted-vegetation maps or, if there is more time, using old survey maps, topography, soils and so on
- developing vegetation classification
- mapping and classifying indigenous vegetation of ecological districts using field surveys, aerial photos and classification systems
- undertaking a field survey of natural areas – using walk-through descriptions or survey sheets. This includes describing key vegetation patterns and vegetation types identifying flora and fauna present
- ensuring wetlands, dune systems, riparian habitats, coastal forest, lowland ecosystems are a priority (eg, map all wetlands)
- developing a database linking to vegetation polygons in a geographic information system (GIS)
- developing an ecological unit classification (vegetation and landform)
- identifying significant natural areas based on significance criteria
- assessing representativeness based on original vegetation types as well as existing vegetation patterns
- identifying significant fragments as well as larger areas
- identifying areas that provide buffering, corridors and connections
- evaluating the connections across the landscape and natural areas that are important as part of the wider landscape
- identifying natural areas of value for fauna such as skinks and geckos as well as more visible species such as birds
- describing the natural areas – this includes the key vegetation types and land units present, ecological significance within the district, special features and species present
- summarising key findings
- producing the report as well as GIS database and maps.

Ecological survey methodology at the site scale

Robust site-based scientific ecological assessment methods for terrestrial areas generally include the following components:

- literature review and background information on the site's history, age, composition, threatened or unusual species. Historical accounts will often give an insight into the original pattern of indigenous vegetation and habitats across the landscape. They can help to distinguish which parts of the landscape support remnant areas and which areas of vegetation have arisen as a result of disturbance since people arrived.
- investigation of the underlying physical environment of the landscape. Indigenous vegetation patterns respond to the physical conditions and vary according to physical parameters such as soil, geology, slopes, drainage, altitude and climate. To that end, information about the physical aspects of the landscape, such as topographic maps, soil and geology maps and Land Environments of New Zealand information can be used to indicate the original ecosystems expected at a locality and the sort of regeneration that would be expected after disturbance
- remote sensing, including reviewing topographic maps, recent and historic air photographs, 3D assessment of stereo pair air photos. These techniques give information about the vegetation and habitats that are present at a site and can also be helpful for context setting
- seeking local knowledge of current conditions, values and changes over time from landowners, neighbours, local conservation or specialist groups – such as the Ornithological Society of New Zealand or Botanical Society, local authorities, Department of Conservation or staff from academic or research institutions and consultants with local knowledge
- context setting – reviewing the wider landscape, taking into account relative loss of ecosystem extent in the ecological district or environmental domain, connections (via for instance waterways or forest fragment stepping stones), buffering by other vegetation types, or matrices (eg, if the site is part of an ecological sequence along an altitudinal or coastal to inland gradient, or part of a diverse matrix of habitat types)
- field assessment to determine the site's current size, shape, condition, structural intactness, species composition, evidence of functioning (eg, seedlings, nesting), existing weed or pest problems and other disturbances
- report writing, including methodology and recommendations (may include peer review as appropriate).

A good site-based terrestrial ecological assessment should generally include:

- ecosystem and hydrosystem type(s)/classification
- size, shape, aspect, altitudinal range, location (map and geographic reference such as global positioning system or topographical map coordinates)
- a species list (native and introduced, with the latter generally indicated by a * or separately listed)
- tenure of the lands involved
- a vegetation or habitat type map where appropriate, with scale, North arrow, date of representation (current or historic) and legend
- a description of habitats and biological communities present (usually by reference to the dominant and/or most abundant species)

- notes on any special features (threatened or locally endemic species, geomorphic features, species at their geographic or altitudinal limits, unusually high diversity)
- notes on those species likely to be particularly susceptible to the impacts of climate change
- the site condition, considering features such as impacts of grazing animals, pest animals, plant pests, constructed features (tracks and so on), water quality
- methodology, including field survey effort (time spent, proportion of area covered, time of day/season visited), equipment used (eg, bat detectors, electric fishing gear, samples collected, analyses of data undertaken and so on)
- limitations (eg, acknowledgement that the survey did not assess invertebrate fauna).

Existing large-scale datasets that may be used in ecological assessments, including cautions

Protected Natural Areas Programme

In some parts of the country, Protected Natural Areas (PNA) Programme ecological region and/or district surveys and associated reports have been completed. These can be helpful, but should be used with an understanding of their original purposes and limitations and consideration of the age of the information.

It is tempting to regard areas that have been recommended for protection in a PNA Programme report as being a full list of areas that should be considered as significant under s6(c) of the RMA. However, the purpose of the PNA Programme was to recommend for protection only the best examples of natural areas that represent the ecological diversity of a district. In addition, the programme was not intended to be the final identification of all of the good examples. It should also be noted that the PNA Programme had a terrestrial focus that included palustrine wetlands and sometimes smaller lakes.

PNA Programme information can still be useful as a snapshot in time. Information about the vegetation classes and types and the land-systems and landforms can be a helpful reference.

Sites of Special Wildlife Interest

The local Sites of Special Wildlife Interest (SSWI) data set is available in hard copy form (maps and field sheets) in relevant Department of Conservation offices. In some cases, reports have been prepared, although the associated maps may not be sufficiently detailed for some site-based work. The sites identified in these databases should not be considered as being a full list of areas that can be considered as significant under the RMA. The purpose of the survey programme underlying this database was to identify good wildlife habitat. The emphasis was on those species that can be relatively rapidly located at a site. The SSWI database does not include areas of significant vegetation or habitats of threatened plant species unless wildlife of interest was also found.

This is now an old dataset with most of the survey work having been done in the 1980s and a number of the identified wildlife habitats have changed as have some of the species of fauna present.

Wetlands of Ecological and Representative Importance

Wetlands of Ecological and Representative Importance (WERI) is a computer database

that contains records on approximately 3000 wetlands throughout New Zealand. Information includes: size; location; land ownership; classification (hydroclass, geomorphic origin, community class, dominant plant species); modifiers and threats; buffer, wildlife and vegetation values; other ecological values; cultural values; significance; and sources of
information.

This is a relatively superficial database prepared in the 1980s with no accompanying map. It is useful for an overall picture but should be used with caution when making decisions about a particular site.

NIWA freshwater fish database
This is an electronic database managed by the National Institute of Water and Atmospheric Research (NIWA). Site information on fish records is added as it becomes available from a variety of organisations from throughout New Zealand. The database is not user friendly and does need to be accessed and interpreted by a suitable expert.

While the database is continually added to, there is no systematic survey programme. This means that an absence of records for a site should not be interpreted to mean that there is nothing of interest present. In addition, many of the records have been obtained from electric fishing, which is a method only suited to certain types of water bodies.

Other datasets
Other relevant datasets include the Department of Conservation's Bioweb and herbaria at universities, Crown research institutes and Te Papa. Regional councils have a variety of datasets, especially for freshwater environments.

Evaluating significance under section 6(c) of the RMA

Section 6(c) of the RMA requires all those exercising functions and powers under the Act to recognise and provide for "the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna", including on private land.

A variety of criteria sets have been developed for assessing significance under s6(c). The types of format have usually been one or more of:

- open-ended criteria
- standards to be met
- factor headings
- use of filter criteria (note filter criteria should be used with caution).

Criteria sets typically include various combinations of the following elements:

- representativeness
- rarity and distinctive features
- naturalness
- ecological context
- diversity of ecological units and patterns
- size and shape
- ecological viability

- sites previously assessed and identified as being of ecological value
- particular threatened habitat types
- migratory species passage
- indigenous cover in land environments
- non-ecological matters.

When criteria sets for evaluating ecological significance under s6(c) are being prepared the following should be addressed.

- A council needs to decide between 'standards' based criteria and those that form a general list of matters to consider.
- Criteria should be able to be assessed objectively, as this provides a transparent and repeatable assessment process.
- A council needs to identify how many criteria need to be 'met' for a natural area to be considered ecologically significant.
- A sustainability or viability filter should not be part of a significance assessment, but may be considered in setting conditions on consents or prioritising areas for management.
- The criteria should encompass a wide range of important ecological attributes.

A criteria set should be developed in association with an ecologist and preferably also with local communities.

Criteria format types

A variety of criteria sets have been developed for assessing significance under s6(c). The types of format normally used include:

- open ended criteria: usually criteria are assessed collectively and an assessment of 'significance' is a matter of expert judgement (an example of such a criterion could be the degree of naturalness relative to what remains in the ecological district)
- standards to be met: usually one or more criteria are to be met before a site is considered to be 'significant' (eg, indigenous vegetation or habitat of indigenous fauna that supports one or more indigenous species that are threatened or rare nationally or regionally). Well-written standards are more transparent and can be easily applied and used in the field
- factor headings: in this approach, criteria are written as a set of factors that are usually considered collectively. Two examples include representativeness and rarity. An assessment of such 'criteria' is a matter of expert judgement. There may be inconsistencies in the application of such 'criteria' as their wording provides little guidance
- use of a filter criterion: in this approach, a site must meet a specific criterion to be considered 'significant'. This is the case regardless of how well the site may meet other criteria. The filter criterion used is typically one addressing viability or sustainability. Given the wide variety of sites and situations, the use of a single filter criterion in assessing 'significance' is inappropriate.

The use of a filter criterion that all sites must meet (regardless of their other values) can lead to perverse outcomes. For example, if a site has to meet a viability criterion, this may (perversely) encourage some landowners to undertake damaging permitted

activities (grazing a freshwater wetland) to ensure that the site is assessed as being 'non-viable' and, therefore, is not 'significant'. Another example is where vegetation has to exceed a minimum height before it can be considered significant and, therefore, subject to restrictions on clearance. Such a filter criterion may (perversely) encourage landowners to clear indigenous vegetation before it reaches this height.

Equally, it is important to recognise that triggering one of the criteria only may cause a site to be listed as significant, which may not in fact be the case. Hence, filter criteria should be used carefully, recognising the above limitations.

Criteria addressing representativeness

Representativeness is a core criterion in ecological significance assessments. It is the degree to which a site could contribute to a network of protected sites that represent the full diversity of species, ecological communities and ecosystems in an ecological district or other spatial framework unit. It is determined from:

- the extent of the original ecosystems and biological communities
- the extent and quality of the remaining natural areas.

The assessment of representativeness should address both the original vegetation types as well as current ecosystem types (eg, regenerating forests, induced habitats).

Using the 'standards' approach to criteria writing, regional examples of such a criterion are as follows.

- "Indigenous vegetation or habitat of indigenous fauna contains associations of indigenous species representative, typical or characteristic of the natural diversity of the region or any relevant ecological districts"
- "It is vegetation or habitat that is currently under-represented (10% or less of its known or likely original extent remaining) in an ecological district or ecological region or nationally"

Criteria addressing rarity and distinctive features

Rarity and distinctive features are typically part of the core set of criteria for assessing ecological significance. Usually these matters are addressed in different criteria but where the criteria list is abbreviated, rarity and distinctive features are combined in one criterion. Rarity addresses the presence and abundance of rare and/or threatened species, associations, assemblages and communities at multiple scales. Distinctive ecological features include: unusual species distributions, national distribution limit boundaries, endemic species and assemblages and unusual species associations.

Examples of the rarity criteria are as follows.

- "Indigenous vegetation or habitat of indigenous fauna supports an indigenous species or associations of indigenous species threatened or rare nationally, regionally or within the relevant ecological district".

- "Indigenous vegetation or habitat of indigenous fauna can contribute to the maintenance or recovery of a species threatened or rare nationally, regionally or within the relevant ecological district".
- "It is vegetation or habitat that is currently habitat for indigenous species or associations of indigenous species that are: threatened with extinction; or endemic to the Waikato region"

Examples of the distinctiveness criteria areas follows.

- "Indigenous vegetation or habitat of indigenous fauna is distinctive, of restricted occurrence, or at the limits of its natural distribution range, or has developed as a result of factors such as natural geothermal activity, historic cultural practices, altitude, water table, or soil type".
- "It is indigenous vegetation or habitat that is, and prior to human settlement was, nationally uncommon such as geothermal, Chenier plain, or kaarst ecosystems".
- "Distinctiveness/Special Ecological Characteristics – The type and range of unusual features of the area itself and the role of the area in relationship to other areas locally, regionally or nationally, including: – presence of species at their distribution limit; – levels of endemism; – supporting protected indigenous fauna for some part of their life-cycle (e.g. breeding, feeding, moulting, roosting), whether on a regular or infrequent basis; – playing an important role in the life-cycle of protected migratory indigenous fauna; – containing an intact sequence, or a substantial part of an intact sequence, of unusual ecological features or gradients".

Criteria addressing naturalness

Naturalness is part of many sets of criteria that assess ecological significance. Naturalness is a simple, but ultimately complex concept. Typically the extent of ecological naturalness of an area is interpreted to mean how close the structure, composition and functioning of an area is compared with an ideal 'original' condition.

An example of a 'naturalness' criterion is:

- "Indigenous vegetation or habitat of indigenous fauna is in a natural state or healthy condition, or is in an original condition".

Criteria addressing ecological context

Most sets of criteria address ecological context. Ecological context includes:

- the degree to which the site is important for connecting habitats and/or other sites of significance
- the extent to which the condition of the site safeguards attributes of other important sites (eg, upstream riparian habitats enhancing adjoining and downstream riverine habitats; downstream fish passage protection maintaining fisheries values upstream).

Another aspect of ecological context is the value that small remnants can have in a landscape that has lost almost all of its indigenous vegetation. These remnants can

provide seed sources for more mature tree species and provide seasonal food sources for birds that otherwise reside in more intact upland areas. Small but sustainable natural features can provide 'stepping stones' of habitat for indigenous wildlife across a developed landscape.

Examples of ecological context criteria are as follows.

- "Indigenous vegetation or habitat of indigenous fauna contributes to the ecological viability of adjoining natural areas and biological communities, by providing or contributing to an important ecological linkage or network, or providing a buffer from adjacent land uses".
- "Indigenous vegetation or habitat of indigenous fauna provides habitat for indigenous species at key stages of their life cycle".
- "It is an area of indigenous vegetation or habitat for indigenous species (which habitat is either naturally occurring or has been established as a mitigation measure) that forms, either on its own or in combination with other similar areas, an ecological buffer, linkage or corridor and which is necessary to protect any site identified as significant under criteria 1–10 from external adverse effects".

Criteria addressing diversity of ecological units and patterns

A criterion that addresses diversity of ecological units and patterns is part of many sets of criteria of assessing ecological significance. An example of a diversity and pattern criterion is as follows.

- "Indigenous vegetation or habitat of indigenous fauna contains a high diversity of indigenous ecosystem or habitat types, or changes in species composition, reflecting the existence of diverse natural features (for example landforms, soil types or hydrology), or communities along an ecological gradient".
- "It is an area of indigenous vegetation or habitat that forms part of an ecological sequence, that is either not common in the Region or an ecological district, or is an exceptional, representative example of its type"

Criteria addressing size and shape

Some criteria sets address size and shape either on their own or as part of criteria addressing ecological viability. Size and shape criteria are derived from terrestrial reserve design principles where larger size and the shortest length of boundary relative to the size are preferred. This is because this minimises the edge effect. The importance of such criteria varies between habitat types.

Large extensive areas of vegetation have special values. These include habitats for species that require large ranges (eg, New Zealand falcon), and protecting intact ecological sequences covering broad altitudinal ranges or other environmental gradients. Options for protecting such areas are often limited so those large areas and ecological sequences can be particularly valuable.

An example of a size and shape criterion is as follows.

- "It is an area of indigenous vegetation or naturally occurring habitat that is large relative to other examples in the Region of similar habitat types, and which contains all or almost all indigenous species typical of that habitat type"

Criteria addressing ecological viability/sustainability

Ecological viability criteria are commonly used when assessing priorities for establishing reserves and other protected areas. This is important because reserve acquisition is expensive and funds for acquisition and management are limited.

Ecological viability has been included as part of a set of criteria for assessing ecological significance in a number of council RMA documents. It can be appropriate to use ecological viability and sustainability criteria as long as a site does not have to meet ecological viability criteria to be considered 'significant' under s6(c) of the RMA.

A viability or sustainability criterion should not be used as a filter for determining significance. The use of filter criteria can be problematic and should be handled carefully. Improper use of these criteria can result in identification of ecological areas as being significant, whereas otherwise this may not be the case.

Criteria for addressing sites previously assessed and identified as being of ecological value

Some sets of criteria for assessing significance under s6(c) include areas set aside by statute or covenant for preservation purposes. An example is as follows.

- "It is indigenous vegetation or habitat for indigenous fauna that has been specially set aside by statute or covenant for protection and preservation unless the site can be shown to meet none of criteria 3–11."
- "It is indigenous vegetation or habitat recommended for protection by the Nature Heritage Fund, or Nga Whenua Rahui Committees, or the Queen Elizabeth II National Trust Board of Directors, unless the site can be shown to meet none of criteria 3–11."

It should be noted that some areas are covenanted as being significant for reasons other than their ecological values.

Criteria that address particular threatened habitat types

Some sets of criteria for assessing significance under s6(c) include provisions for specific threatened habitat types. An example is a criterion that makes natural wetlands of indigenous species 'significant'.

The relevant criterion is as follows.

- "It is wetland habitat for indigenous plant communities and/or indigenous fauna communities that has not been created and subsequently maintained for or in connection with: waste treatment; or wastewater renovation; or hydro electric power lakes; or water storage for irrigation; or water supply storage; unless in those instances they meet the criteria in Whaley et al (1995)."

Criteria addressing migratory species passages

Migratory species have special habitat requirements that include not only sites where they spend time, but the routes between those sites.

Most indigenous New Zealand freshwater fish species migrate between the sea and upstream fresh waters. This may involve distances of thousands of kilometres and include aquatic corridors of otherwise low ecological value. Many freshwater fish species travel through long distances of highly modified lowland rivers, which in themselves may not have high ecological values, but their continued existence as a unimpeded passage for native fish is essential both for the survival of those fish species and for maintaining the often high ecological values of less modified upland reaches. Another matter to consider is the protection of migratory bird passage from the adverse effects of tall moving structures such as wind farm turbines.

Sometimes migratory passages are addressed, at least in part in the ecological context and/or distinctiveness/special features criteria. Rather than deeming most lowland rivers 'significant' because they provide passage to native fish it may be appropriate to include a criterion that recognises that particular corridor attribute as ecologically significant.

An example of a criterion addressing migratory species habitat is:
"Migratory Habitat: The area is important as habitat for significant migratory species or for feeding, breeding or other vulnerable stages of indigenous species, including indigenous freshwater fish."

It would be helpful to expand such a criterion to clarify that the passage between the habitats is also important, but primarily as an unobstructed corridor.

Note that climate change is likely to affect the availability and extent of migratory routes, particularly in habitats already at the margins of viability.

Criteria addressing indigenous cover in land environments

Priority 1 of the Statement of National Priorities for Protecting Rare and Threatened Indigenous Biodiversity on Private Land (April 2007) (PDF 1.39MB) is to protect indigenous vegetation associated with land environments (defined by Land Environments of New Zealand at Level IV) that have 20 per cent or less remaining in indigenous cover.

This is based on the premise that whatever is vulnerable is of value, which is not always true as there can be some very important unprotected areas of indigenous vegetation in land environments that still have large areas of indigenous vegetation remaining. Some but not all of these areas may be covered by National Priority 4 to protect the habitats of acutely and chronically threatened species, which include highly mobile species requiring large habitat ranges, such as eastern falcon, kereru and kukupa.

This concept needs to be used with caution to avoid perverse outcomes in land environments where there is valuable unprotected indigenous vegetation in land environments with more than 20 per cent indigenous cover.

Criteria addressing other non-ecological matters

The s6(c) criteria sets from several councils include criteria that address human values and uses. For example criteria that address Māori, historical and local community values. Other potential criteria include proximity and accessibility.

Additional commentary on criteria for assessing ecological significance

When developing criteria sets for evaluating significance under s6(c), planners should be aware of the following.

- The term 'significant' is not prefixed with the qualifier 'ecological'. Areas of vegetation and wildlife habitat could be significant for cultural, historical, educational, spiritual, recreational, scientific or aesthetic reasons.
- An evaluation of 'significance' is scale dependent. A remnant that is of local significance is probably not of international significance. Regional policy statements typically consider significance at regional level and above. District plans consider significance at district level and above.
- An evaluation of 'significance' is context dependent and often uses a spatial framework such as ecological regions and districts or Land Environments of New Zealand.
- Indigenous vegetation is not restricted to forest or vegetation over a certain height. There are less prominent vegetation types such as herbfields, saltmarshes and grasslands. There are also smaller scale communities such as orchid communities in grasslands, shrublands or pine plantations.
- Some areas of significance for indigenous fauna may be highly modified (eg, high tide roost sites in municipal parks and paddocks, gorse inhabited by Mahoenui giant weta, plantation forests utilised by kiwi, grazed alluvial flats used by brown teal for foraging).
- Section 6(c) is not limited to terrestrial or freshwater wetland ecosystems, and equally applies to marine, river or lake ecosystems.
- Viability/sustainability criterion relates to the ability or likelihood that a land environment is likely to survive on its own and is important because reserve acquisition is expensive and funds for acquisition and management are limited. However, a viability/sustainability criterion should not be used as a filter for determining significance. This is because in highly modified land environments remaining indigenous biodiversity is also likely to be modified and its long-term survival is uncertain without appropriate management, for example, removal of stock, weed control, return of a more natural hydrological regime. These sites may have important wildlife values and/or provide conditions necessary for rare, threatened or unusual species and assemblages. That these sites require management to ensure their long-term viability does not diminish their ecological significance.
- Local government boundaries often cut through habitats so it is important to consider adjoining areas as part of the context when deciding what is significant within a particular council's boundaries.

A criteria set should be developed in association with an ecologist and preferably also with local communities. Using local expertise and involving local communities helps to ensure that the criteria as a group are appropriate, workable and are upheld and

recognised by local people. It is suggested that criteria be written as standards where one or more need to be met.

Actual assessments of ecological significance using criteria should be undertaken by an appropriately qualified expert. Different types of experts may be appropriate for different types of environments.

Scientific advice should be used throughout the criteria preparation process, to ensure that the final criteria are workable. For instance, criteria that refer to a site having 'indigenous and endemic species', without specifying the geographic unit to which endemic refers, lose the impact of the importance of locally endemic species.

The role of the Statement of Priorities for Protecting Rare and Threatened Indigenous Biodiversity on Private Land

The Statement of National Priorities for Protecting Rare and Threatened Indigenous Biodiversity on Private Land (April 2007) (PDF 1.39MB) issued by the Minister for the Environment and the Minister of Conservation is intended to inform councils in exercising their biodiversity responsibilities under the RMA. The statement identifies four priorities.

- Protect indigenous vegetation associated with land environments (defined at Level IV) with less than 20 per cent remaining in indigenous cover.
- Protect indigenous vegetation associated with sand dunes and wetlands.
- Protect indigenous vegetation associated with 'originally rare' terrestrial ecosystems.
- Protect habitats of acutely and chronically threatened indigenous species.

The statement sets out that the priorities do not collectively identify all indigenous biodiversity that is significant under s6(c) of the RMA.

The following list identifies some of the issues and cautions to be aware of in the use of this statement of priorities.

- It lists priorities for protecting rare and threatened biodiversity – it does not address representativeness.
- Land environments defined to Level IV are a relatively coarse filter in some areas of New Zealand where, for example, poor data about soil variability limits the identification of distinctively different areas at Level IV (eg, much of Northland).
- There can be highly valuable unprotected areas on private land in land environments where there is more than 20 per cent indigenous cover. Vegetation and ecosystems within a land environment may vary considerably and what remains may be dominated by one vegetation type with few examples of other now uncommon/rare vegetation types.
- The statement addresses terrestrial biodiversity only.

Policy statements and plans prepared under the RMA must contain objectives and policies. Whilst regional plans normally provide the focus for biodiversity objectives and policies they should also be formed within district plans and, in so doing, must give effect to regional policies and objectives, providing more local detail as necessary. Objectives and policies should be precise and measurable so that their effectiveness can be monitored (as is required by s35(2) of the Act). Objectives also need to be appropriately and sufficiently specific, providing a framework within which precise policies (and rules) can be formed.

In forming objectives and policies, councils should identify what needs to occur in order to maintain and enhance biodiversity.

To assist in preparing biodiversity objectives and policies (and in order to thus inform methods) identification of the following would be useful:

- actual outcomes of current policy and importantly the gaps in policy and comparison with what is wanted to be achieved
- extent and condition of the indigenous biodiversity remaining within the region or district
- actual and potential threats and other issues affecting that biodiversity
- opportunities for preventing biodiversity loss and promoting its recovery where it has been damaged
- likely future patterns in land use and other economic activity, and how these patterns and activity may affect biodiversity values within the life cycle of the policy
- national policies and other guidance about national priorities
- underlying level of community understanding and support for indigenous biodiversity.

When preparing biodiversity policies and plans in order to help secure better implementation outcomes, the following should be considered:

- developing plans in consultation with the consents staff to help ensure the provisions can be effectively implemented
- preparing a plan implementation strategy
- 'field-testing' policies (eg, trial application of significance criteria on actual sites using independent assessors)
- developing guidelines and training for consents and enforcement staff
- developing a formal checklist for planners to help them identify matters that need to be addressed for different types of applications and in different environments
- developing consent condition templates designed to address different types of habitat and activity
- forming or joining regional (and district) biodiversity forums to share information and ideas.

The analysis should be sufficiently detailed and comprehensive, to both provide a sound basis for the policy and methods and clearly guide subsequent decision making.

A simple set of biodiversity objectives could be developed based on the following broad principles:

- no extinction of indigenous species from the region
- no loss of indigenous ecosystem types
- no loss of ecosystem mosaics and sequences
- no reduction in area/extent of rare ecosystems (less than 5000 hectares in total nationally)
- stabilisation of indigenous species populations
- no significant reduction in the natural range of indigenous species across the region
- indigenous dominance of ecosystems.

The development of specific and measurable regional policy statement objectives for biodiversity can be a difficult process. The following discussion provides background information that may assist regional councils with this.

New Zealand Biodiversity Strategy

The New Zealand Biodiversity Strategy (NZBS) provides guidance on appropriate biodiversity objectives. Goal Three of the NZBS delivers the bottom line. It is to halt the decline in New Zealand's indigenous biodiversity. The main objectives under this goal are to:

- "Maintain and restore a full range of remaining natural habitats and ecosystems to a healthy functioning state, enhance critically scarce habitats, and sustain the more modified ecosystems in production and urban environments; and do what else is necessary to
- Maintain and restore viable populations of all indigenous species and subspecies across their natural range and maintain their genetic diversity."

These general objectives may form a useful basis for councils developing their own objectives. However, they are qualitative in approach and it would be easier over time to monitor a more quantitative set of objectives. The NZBS provides a suite of desired outcomes for each habitat in relation to key issues. Many of these are more quantitative and easier to monitor. These have been summarised in table 4.

Table 4: Summary of NZBS desired outcomes by ecosystem type

	Land	**Freshwater**	**Coastal and marine**
Habitat extent	Net gain in extent and condition.	Extent and condition of ecosystems and habitats maintained.	Habitats and ecosystems maintained in a healthy functioning state.
Habitat condition	Scarce and fragmented habitats increased in area and in better health, some modified habitats restored.	Scarce and degraded habitats increased in area and in better health.	Degraded habitats are recovering.
Legal	More representative	Intact areas	Representative range

protection	range of habitats and ecosystems in legal protection on public and private land.	protected, natural character maintained.	of marine habitats and ecosystems protected.
Pest management	Increased and more effective pest control has restored ecosystem functioning.	All freshwater ecosystems dominated by indigenous species.	Threats from pests reduced and controlled.
Pest prevention	No new pests established.	No further spread of pests and pests eradicated where necessary.	No new pests established.
Extinction	No further human-induced extinctions.	No further human-induced extinctions.	No further human-induced extinctions.
Population range	Populations of all indigenous species sustained in natural or semi-natural habitats.		
Genetic diversity	Genetic diversity of indigenous species maintained.		
Threatened species	Fewer threatened species require active recovery programmes.	Threatened species on their way to recovery in their natural habitats.	Rare and threatened species are recovering through protection from human activity.
Resource use	Threats to indigenous species from human activity avoided or mitigated.	Threats to freshwater biodiversity from human activity avoided or mitigated.	Threats from human activity avoided or mitigated, harvest or development sustainable.
Game species		Introduced game species managed to protect native species.	
Harvest		Sustainable harvest of species.	Rare and threatened species protected from harvest.

Detailed consideration for formulation of regional policy statement objectives

Additional matters that might be considered when preparing regional policy statement objectives could include:

- preventing further loss of indigenous vegetation cover from the region
- increasing the level of legal and physical protection of ecosystems that are under-represented in extent and in degree of legal protection

- restoring or recreating ecosystem types that have been depleted to less than 20 per cent of their known pre-human range in the region
- restoring indigenous cover to Land Environments of New Zealand to a minimum of 20 per cent by area
- restoring the health and functioning to a representative range of each ecosystem type
- protecting and restoring examples of each type of ecological sequence and habitat mosaic represented in the region (eg, mountains to the sea, forest/wetland/geothermal mosaics)
- recreating ecosystems/sequences that have been lost from the region (eg, dune to forest sequence)
- preventing further loss of any indigenous species from the region
- reintroducing indigenous species that have been lost from the region
- returning indigenous species to their natural habitat
- expanding the range of indigenous species that are in the region
- protecting and restoring corridors and linkages, particularly those needed for different life-stages (eg, freshwater fish)
- protecting and restoring breeding and feeding habitats for coastal bird and fish species.

When preparing objectives, the provisions of s32 of the RMA must be considered particularly with regard to the policies that might be needed to deliver the proposed objectives.

See the writing provisions for regional and district plans guidance note for detailed guidance on writing objectives and policies.

Overview of Methods for Managing Biodiversity

Ecosystem management concepts

There are several concepts that are relevant to the management of ecosystems:

- buffers
- corridors
- eco-sourcing/eco-siting
- ecosystem
- edge effect
- habitat
- ecological restoration.

The glossary contains further definitions.

Regulatory and non-regulatory tools

The following sets out the methods (regulatory and non-regulatory) for managing biodiversity.

1. Regulatory provisions
2. Regulatory economic instruments
3. Non-regulatory tools
4. Non-regulatory economic instruments
5. Council lands
6. Council infrastructure development and maintenance
7. Council biosecurity work
8. Accessing expertise

To go to a method **within** a section, click on the relevant section heading below to jump to its contents table listing the methods and tools relevant to that section. Then click on the method or tool sub-heading to go to the method itself.

Overview of methods and tools available and their application

Methods/tools	Application				Key words summary
	Regional		District		
	Area Wide	Site Specific	Area Wide	Site Specific	
1. Regulatory provisions					
Reg1: Biodiversity management/protection as a key theme in plans	Y		Y		Framework for management.
Reg2: Zones with restrictive rules for biodiversity protection purposes		Y		Y	Zones where precise information not known.
Reg3: Schedules of 'significant natural areas'				Y	Precise information needed. Can form

with associated rules					basis for action.
Reg4: Schedules of 'significant natural areas' without associated rules				Y	Precise information needed. Generic rules needed.
Reg5: District wide rules on indigenous vegetation clearance, logging and/or modification			Y		Generic protection that can be cost effective. Monitoring and compliance issues.
Reg6: District rules allowing landowners to seek exemption from vegetation clearance/modification rules			Y		Allows landowners to obtain certificate of compliance, but issue of significance of an area enhancing over time.
Reg7: Regional rules on vegetation clearance or modification	Y				Typically apply to steep land. Effects tend to be limited to aquatic impacts.
Reg8: District rules restricting wetland drainage and infilling			Y		Reduces need to collect data. Monitoring and compliance issues. Can result in cumulative loss.
Reg9: Regional rules restricting ecologically damaging activities for wetlands, lakes and rivers	Y				Address various damaging activities, including structures, taking heat and energy, and planting.
Reg10: Regional rules and methods to encourage landowners to enhance wetlands	Y	Y			Allow wetland enhancement, which could be limited to that in accordance with a management plan.
Reg11: Regional rules restricting a wide array of ecologically damaging activities for terrestrial and aquatic rare, threatened and at-risk habitats	Y	Y			Specifies/controls activities for habitat types. Sites need not be specified. Monitoring issues. Can lead to loss of 'green' corridors connecting important areas.
Reg12: Combination of schedule of ecologically significant sites and district wide rules			Y	Y	Sites and generic rules. Useful if data incomplete. Schedule can

controlling vegetation clearance (and wetland drainage)					outweigh generic rules so they become less effective.
Reg13: Linking rules to criteria identifying significant natural areas	Y		Y		Allows significant natural areas to identified and projected in future including when determining applications.
Reg14: District rules and methods to specifically address aquatic ecosystems			Y	Y	Suite of measures to protect aquatic eco-systems from land use development. Effects can be from existing land uses.
Reg15: District rules controlling farming of potential pest animal species			Y	Y	Reduce risk of goat invasions. Cost of requiring landowners to erect goat proof fences. Can specify zones for rules.
Reg16: Rules addressing natural hazard mitigation in a way that protects biodiversity values			Y	Y	Rules to reduce risk of inundation, coastal erosion and reduces mitigation costs. Can restrict current landowners.
Reg17: District and regional plan rules to support water conservation orders	Y		Y		Regional control intent of orders. Regulate riparian activity.
Reg18: Designations, heritage protection orders		Y		Y	Legal control. Potentially expensive and protracted process.
Reg19: Water conservation orders		Y			National tools binds local decision making. Expensive and lengthy process.
Reg20: Plan standards for biodiversity protection and enhancement	Y		Y		Standard conditions that can be varied to suit circumstance. Rules need to support.
Reg21: Requiring covenants as conditions			Y		Covenants to protect/enhance

for resource consents					areas in return for allowing subdivision. Compliance issues. Needs monitoring.
Reg22: Esplanade reserves and strips to protect and facilitate enhancement of riparian and aquatic biodiversity			Y		Facilitates protection and enhancement. Can be maintenance burden to councils.
Reg23: Special legislation		Y		Y	Used where existing legislation inadequate.
2. Regulatory economic instruments					
RegE1: On-site subdivision privileges for biodiversity protection (protection lots)			Y		Provide subdivision privileges in exchange for protecting an area of ecological value. Compliance and monitoring issues.
RegE2: On-site subdivision privileges for scheduled significant natural areas				Y	Same as above, but targets sites.
RegE3: On-site subdivision privileges for biodiversity restoration			Y		Same as RegE1, but privileges increase pro rata to scale of ecological works. Once lot sold, compliance can be issue.
RegE4: Transferable off-site subdivision development privilege in return for protecting an identified area of biodiversity value					Similar to RegE1 but rights transferable to other sites. Helps protect areas where no demand for development.
RegE5: Plan provisions enabling financial contributions for biodiversity protection purposes			Y		Useful where there is growth. Need clear link between growth and investment. Programme of investment needed.
RegE6: Waiving application fees for identified significant natural areas		Y		Y	Reduces objections to SNA listing. Encourages protection.
RegE7: Prosecuting those		Y		Y	Well publicised

who infringe rules or conditions of resource consents					prosecution increases compliance. Requires good monitoring and evidence base.
3. Non-regulatory tools					
NReg1: Biodiversity strategies and action plans for a region or district	Y		Y		Regional plan – coordinates activity, requiring multi-agency sign off. District – action plan. May not link with other agencies.
NReg2: Providing biodiversity management information/education resources for landowners and the community	Y	Y	Y	Y	Distribution of material to inform, engage, educate, empower. Used on their own tend to be ineffective so should be linked.
NReg3: Telephone advice service	Y	Y	Y	Y	Free (independent) advice. Need good advisors and information.
NReg4: Landowner property plans that address biodiversity		Y		Y	Voluntary plans, can be grant assisted. Often first step towards meeting broader environmental objectives.
NReg5: Comprehensive ecological assessment and indigenous biodiversity protection programme for private land		Y		Y	Council resources (officer and money) to develop evidence, work with landowners on plans, obtain funding from government.
NReg6: Employing appropriate staff	Y		Y		Increases quality of decisions and management, but also costs.
NReg7: Industry standards, accords and protocols for biodiversity protection and restoration	Y		Y		Encourages improved standards. Not a substitute for plan provisions as are strategic/generic. Normally applies

					nationally.
NReg8: Multi-agency and community environmental restoration programmes		Y		Y	Goes beyond the scope of what single agency can provide.
NReg9: Multi-agency biodiversity management and ecological restoration accords	Y		Y		Align activities of agencies. Set objectives, roles and processes for working together, and hence basis for individual projects.
4. Non-regulatory economic instruments					
NRegE1: Contestable council funds for environmental protection and enhancement	Y		Y		Incentives for ecological protection and restoration. Incentive must be attractive. Needs to be well publicised.
NRegE2: Comprehensive package of non-regulatory mechanisms to assist landowners to protect and restore biodiversity values	Y		Y		Alternative to NRegE1. Range of mechanisms and incentives to help protect and enhance. Needs sufficient funds and be well publicised.
NRegE3: Discounted disposal of environmental weeds	Y		Y		Reduces dumping (road side and sensitive areas). Encourages action. Needs to be well publicised.
NRegE4: Annual rates relief for protected areas	Y		Y		Recognition for protecting values normally when application for rates relief made. Relief needs to be attractive.
NRegE5: Annual grant for legally protected areas on private land					Grants based on rating and lot size. Grant must be attractive – issue when scheme stopped or reduced. Care to ensure not double dipped with other tools.
NRegE6: Free or	Y	Y	Y	Y	Tends to be linked

discounted resources					to agreements with council on land. Positive working with landowners. Encourages action.
NRegE7: Assisting community trusts involved in environmental protection activities		Y		Y	Financial assistance.
5. Council lands					
CL1: Managing biodiversity values on council lands		Y		Y	Lands can have significant biodiversity values and can include esplanade reserves. Management plans assist.
CL2: Identification and legal protection status for council areas of biodiversity value		Y		Y	Council to lead by example protecting areas of high biodiversity value on its lands.
CL3: Encourage community involvement in ecological restoration activities on public lands	Y	Y	Y	Y	National contestable fund available to community groups.
CL4: Acquisition of areas of biodiversity value		Y		Y	Monies can be raised through rates increases.
6.Council infrastructure development and maintenance					
7. Council bio security work					
8. Accessing expertise					

Choosing an appropriate mix of tools

The following factors will influence the methods a council chooses to manage indigenous biodiversity:

- the characteristics of indigenous biodiversity present (species, populations, ecological associations and ecosystems), along with their distribution, abundance and condition
- threats to that biodiversity, including the type and level of development pressures
- the characteristics of the indigenous biodiversity in legally protected areas compared with the indigenous biodiversity that is not legally protected
- the resources that the council is able to access, including staff expertise
- community and landowner knowledge about indigenous biodiversity and attitudes about how it should be managed.

Each council should undertake an analysis of their situation to help them select the most appropriate mix of tools and their relative weighting. There is no single 'best practice'

combination of tools that would address the circumstances of all councils. In some cases, it may be appropriate to divide a region or district into unit types that identify the type and intensity of development pressures and the state of remaining biodiversity.

Other appropriate actions towards maintaining indigenous biodiversity could include:

- infrastructure development and management (eg, roading, water supply, wastewater management)
- management of lands owned by a council, including water supply catchments, forestry lands, parks and reserves (including esplanade and other reserves as well as unformed public roads along water margins)
- biosecurity administration and management
- natural hazard management.

A biodiversity strategy or action plan developed jointly between regional and district councils and the community can provide a rigorous basis for a council to determine the priority actions and funding for the circumstances.

Regulatory Provisions

Reg1: Biodiversity management/protection as a key theme in plans

Several plans have been developed using biodiversity as a key theme.

District example

The 'Green Network' is one of five themes in the Waitakere City District Plan. It consists of the remaining native resources and includes existing native vegetation and fauna habitat, streams, lakes, wetlands, the coastal area and other natural features such as landforms and soils. The four layers of the Green Network are: a descriptive layer; a land use management layer; a restoration layer; and an asset layer.

The green layer (land use management) areas ('Natural Areas') are shown on one set of district plan maps. Every part of Waitakere City fits into one of six Natural Area categories. The maps also show 'natural landscape elements' (eg, sensitive ridge lines) that are subject to separate rules. The Natural Area rules address the following six activities that are considered to have the greatest impact on natural resources: vegetation clearance; earthworks; impermeable surfaces; stock grazing; weeds, pests; and subdivision (densities and design).

A matching set of district plan maps shows the 'Human Environments'. Every part of the city also fits into one of 11 Human Environment categories. The Human Environment rules address the effect of people on other people (eg, effect of noise when building a house).

The Council also uses a suite of non-regulatory mechanisms to improve the quality of the Green Network, including encouraging linkages and corridors.

Regional example

The Horizons MW One Plan combines the Regional Policy Statement (part I) and all the regional plans (part II), including the regional coastal plan into one integrated planning document where threatened native habitats is one of four major regional issues identified.

The One Plan identifies 'rare and threatened' habitats and 'at-risk' habitats by type for terrestrial environments and water bodies by name. In the rare and threatened habitats, rules in the One Plan restrict: vegetation clearance; discharge of contaminants; and drainage or diversion of water. In the at-risk habitats, vegetation clearance and land disturbance are also regulated.

Proactive management to improve the quality of the best representative examples of rare and threatened habitats and at-risk habitats is to be addressed using a variety of non-regulatory tools.

Strength

- This can assist an integrated approach to address biodiversity matters under the RMA, as well as coordinating regulatory and non-regulatory approaches to maximise benefits.

Limitation

- More council resources may be required to develop such a plan.

The following factors improve the likelihood of success for this approach:

- council commitment to beneficial outcomes for biodiversity on public and private land and in aquatic environments
- community support for a comprehensive approach to biodiversity protection and management at the local authority level.

Reg2: Zones with restrictive rules for biodiversity protection purposes

Zones, areas or overlays can be designed specifically for biodiversity protection purposes. Zones can be defined by ecological factors (for example, the location of indigenous vegetation); a formula (for example, a set distance from a water body); or a combination of ecological parameters and property boundaries. The associated policies and rules are designed to protect the natural values within the zone. Where the zone is associated with a water body, the management of the zone may also contribute to the protection and/or enhancement of the ecological values of the water body itself.

However, under s76(4A) and s76(4B) of the RMA, district plan rules applying to urban allotments, regardless of any zone, area, or overlay, cannot restrict the felling, trimming, damaging, or removal of a tree or trees unless the tree(s) a schedule to the plan describes the trees and specifically identifies the allotment by street address or legal description. See the Ministry for the Environment's website for more information on tree protection in urban environments.

Strengths

- The information requirements are relatively moderate compared with the comprehensive requirements for a district (or regional) schedule of ecologically significant sites.
- The precise location of zone boundaries is less critical than for scheduled sites.
- A zone can provide a holistic approach to biodiversity protection as it can include linkages and buffers around key sites of biodiversity value.

Limitation

- Specialist zones with restrictive rules generally require effective landowner consultation.

The following factors improve the likelihood of success for this approach:

- the proposed zone has a coherent theme or purpose (eg, protecting the natural wildlife habitats and vegetation around estuary or lake margins)
- the proposed zone boundary is based on good quality information about the existing and potential biodiversity values within the zone
- the council has access to recent detailed aerial photographs for that part of the district where such a zone could be appropriate
- the council is prepared to consult with affected landowners.

Reg3: Schedules of 'significant natural areas' with associated rules

A schedule of ecologically significant sites can be contained in a district plan and referred to in rules, or policies or objectives. Where a rule relies on a schedule the rule can be framed to prevent or manage certain damaging activities specifically within an identified ecologically significant natural area.

District plan schedules usually include terrestrial habitats and wetlands within the district boundaries. Relevant activities that may be addressed by rules include the clearance and/or removal of native vegetation; logging of native trees; infilling and drainage of wetlands. Where schedules are used to protect trees on urban allotments, the schedule must identify and describe the trees being protected in accordance with s764A-764B of the RMA.

Regional plan schedules can also be used. Examples include schedules of wetlands, water bodies or coastal marine sites with restrictive rules. Regional plan schedules can also identify areas of significant terrestrial habitats

Strengths

- Schedules with rules can be easier for district councils to administer than district wide rules because particular sites have already been identified as being of ecological significance.
- Where there has been an effective consultation process with landowners, a schedule can help target council actions to improve biodiversity outcomes on private land. This can include targeted financial and other incentives.
- It provides certainty for landowners and the council as to what is included and what is not included.
- Where a schedule is based on comprehensive and quality information, it can be used in a variety of council decision-making processes and for monitoring purposes.
- A comprehensive schedule can be used to effectively target incentives and other assistance to landowners.

Limitations

- If rules restricting activities that could adversely affect the state of biodiversity apply only to those sites included in a schedule, landowners may seek exclusion from the schedule. Depending on whether the decision for exclusion from the schedule is based on ecological criteria or landowner choice, the final schedule may be

composed of only a few ecologically significant sites. In the latter situation, other ecologically significant sites would remain outside the schedule.

- The rules only apply to those areas included within the schedule. If this schedule contains few of the areas of ecological value within a district or region, the effect of such rules on the state of biodiversity within the district is likely to be limited without appropriate additional methods.
- Comprehensive and up-to-date information on the natural values and vulnerability of an entire district or region is generally not available unless it has been collected specifically for a schedule. Existing information is usually highly variable in age, quality and coverage. It has often been collected for quite different purposes and may not be suitable for inclusion within a RMA schedule.
- A comprehensive schedule of ecological sites cannot be assumed to include all significant sites, due to the inherent difficulties of region or district wide ecological surveys. Even well planned and executed surveys will inevitably miss significant sites due to database errors, inadequate access or the inability to detect populations of threatened biota.
- Schedules need to be regularly reviewed and updated in the medium to long term in response to ongoing land use changes, such as vegetation clearance.
- Landowners can misinterpret the intention or effect of a schedule. For example, they may think that they require resource consents for activities for which no consent is required, or they may be required to fence the identified site. Alternatively, they may be concerned that they will lose some control over part of their property. They can be distrustful of what a future council may do, even if the current provisions are not a problem.
- Schedules with rules can bring forward land use debates that may not arise for many years, if at all. This is because landowners may wish to keep their options open and may be concerned that future councils may introduce stricter rules and/or make it more difficult to get a resource consent for activities within identified significant ecological sites.
- Sufficient time and resources need to be provided for early consultation with landowners. This can be a problem when resources are limited and/or plan preparation timetables are tight.

Schedules and maps of areas may be appropriate to use in a number of circumstances including:

- when a council intends to resource the development of an information base and take advantage of economies of scale and of standardised information gathering and assessment methods appropriate for the council's purpose
- in highly developed districts where there is a depleted cover of indigenous vegetation and habitat, with smaller, discrete areas with distinctive boundaries that are easily mapped and described
- when development pressures are high and many areas are likely to need assessment and consideration by council staff in response to resource consent applications
- when accurate and up-to-date information is available for a council to use in its assessment of significance.

Where a group of trees on one or more urban allotment is protected by a rule in a district plan, aerial photography and/or GIS mapping can be used as part of, or in addition to, the schedule to help identify the protected trees.

The following factors improve the likelihood of success for this approach:

- the council undertakes a comprehensive consultation programme with affected landowners before including the schedule in a notified plan
- the community within the district/region is generally supportive of measures to protect indigenous biodiversity of remnants
- the council offers, or intends to offer, incentives and advice to promote the protection of identified significant sites where they are on private land.

Reg4: Schedules of 'significant natural areas' without associated rules

A schedule of 'ecologically significant' sites that may or may not be part of a plan can be provided in plans. In contrast to the previous approach there are no rules associated specifically with this type of schedule. The purposes of such schedules include assisting the council with its decision-making processes and/or providing a basis for conservation incentives.

A territorial authority using this approach would also need to include rules controlling the modification of indigenous vegetation and wetlands (or similar) throughout a larger area of district. This is because case law indicates an inadequate schedule with rules and, by implication, a schedule without rules would not on its own address the RMA requirements for biodiversity.

Strengths

- If there are no rules, landowners are likely to be more accepting of their property being included in a schedule.
- A comprehensive schedule can be used to effectively target incentives and other assistance to landowners.

Limitations

- A territorial authority will still need to use rules controlling certain ecologically damaging activities. Such rules would not be directly linked to a schedule of 'significant natural areas'.
- Considerable resources are required to compile a comprehensive and up-to-date schedule.

Reg5: District wide rules on indigenous vegetation clearance, logging and/or modification

A number of districts have rules specifying the maximum area of indigenous forest or vegetation that can be cleared or logged before a resource consent is required. Often this maximum area is what can be cleared over a period of time (often one or multiple years). The maximum area may vary between zones. For example, a larger maximum area may be used in a rural zone and a smaller area used in a rural–residential zone.

Where such rules apply the plan contains a definition of indigenous forest or vegetation. Such definitions vary between plans. In some cases, a vegetation clearance rule uses a minimum vegetation height above which consent must be obtained. The specified

minimum height may either be in the rule itself or in some cases in the definition of indigenous vegetation.

Some definitions of 'indigenous vegetation' exclude manuka and kanuka – even though they are clearly indigenous species and can form some important ecological associations. Equally, on former indigenous forest sites they can provide a good nursery area for other indigenous species.

Restricting vegetation clearance through district wide rules is likely to be considered a form of blanket tree protection. Therefore, pursuant to section 76 of the RMA, district wide rules in district plans can only apply to an urban environment allotment if the trees are identified and described in a schedule to the plan.

Strengths

- District wide rules on vegetation clearance can allow councils to avoid investing considerable resources compiling comprehensive biodiversity databases.
- District wide rules may reduce landowner opposition, because the rules apply equally to everyone and particular areas with restrictive rules are not specifically identified in the district plan.
- Potential alternative uses for areas with an indigenous vegetation cover can be addressed at the time of any application rather than all together when a schedule with restrictive rules is introduced in a plan change or new plan.
- The onus for collecting information on biodiversity values rests with applicants who wish to clear or modify indigenous vegetation. This contrasts with schedules where the onus is on the council to obtain comprehensive and accurate information about indigenous habitats throughout the district.

Limitations

- Vegetation clearance rules stipulating small permitted areas of clearance and/or modification within defined time periods can potentially lead to large district or region wide adverse cumulative effects over time.
- There can be a relatively low level of certainty because particular areas of indigenous vegetation and wildlife habitat are not specifically excluded from being covered by the rule. Some councils allow landowners to proactively provide a report from a council-recognised ecologist that argues that a particular area of indigenous vegetation or potential wildlife habitat is 'not significant' (eg, Far North District Council).
- Landowners may clear or damage indigenous vegetation because they are unaware of vegetation clearance rules. This is a particular risk if the rules have not been well publicised.
- Where there is limited context information, it can be difficult to determine the relative value of particular areas of indigenous vegetation or wildlife habitat.
- If the definition of indigenous vegetation used in a plan excludes ecologically important vegetation types, this can undermine the ecological utility of a rule controlling indigenous vegetation modification.
- Monitoring is difficult. For example, the extent of clearance cannot be accurately determined if there is inadequate information on the extent of indigenous vegetation when the rule came into effect.

- Where vegetation clearance rules are based on height, this can result in perverse ecological outcomes, especially where there is no schedule that could potentially identify ecologically important areas of shorter stature.

The potential consequences of height-based clearance rules mean that native 'low lying' vegetation can be removed as of right, or as a controlled activity where exotic species which can grow faster become protected.

Rules that only control modification of indigenous vegetation above a minimum height may not provide any protection to the majority of threatened plant species outside of reserves and covenants, or scheduled sites. Also, in some cases, it may be unclear whether such a rule would apply to all indigenous vegetation within an area where the canopy exceeds a minimum height, or whether understory below the minimum height may be cleared.

Both of these problems may be able to be addressed by including special provisions for the habitats of threatened species and/or using a more inclusive definition of indigenous vegetation. Such a definition should clarify that the understory vegetation is included.

District wide rules restricting activities such as vegetation clearance are likely to be appropriate in a variety of circumstances including when:

- development pressures are low and it is unlikely that information will be required for a majority of the indigenous vegetation and habitat over the lifetime of the plan or policy statement
- the district contains large tracts of indigenous vegetation and habitat, which often occur within a complex mosaic of land covers, making it difficult to accurately delineate appropriate vegetation and wildlife habitat boundaries
- there is little recent accurate information available about the indigenous vegetation and habitat in the district or region, and it is likely that significant indigenous vegetation or significant habitat of indigenous fauna would be omitted from a schedule
- it is highly likely that a schedule would be incomplete because the commonly used rapid survey methods would not detect rare and threatened species (including cryptic species) that may be present
- a schedule of ecologically significant sites could be based on disputed information
- the council wishes to provide a degree of protection to areas that would not qualify as significant, but collectively provide important ecosystem services or intrinsic ecological values
- the vegetation to be protected is not within one or more urban allotments.

Reg6: District rules allowing landowners to seek exemption from vegetation clearance/modification rules

A number of district councils have rules requiring landowners to obtain a resource consent for the clearance/modification of indigenous vegetation over and above what is allowed by way of a permitted activity. As this can create some uncertainty for landowners, several councils provide a system whereby landowners can obtain a certificate of compliance stating that a specific area of indigenous vegetation is not 'significant' using a specified set of criteria.

Strength

- Such a provision can help councils obtain rural landowner support for general indigenous vegetation clearance/modification rules in districts where there are relatively large amounts of indigenous vegetation.

Limitations

- Over time, a large number of certificates may be issued in an area and if clearances are delayed, the 'significance' of areas that are assessed later may be underestimated if the earlier areas are subsequently cleared.
- If these certificates are not time-bound, they may a cause a problem many years in the future if someone decides to exercise their right to clear what may have become more ecologically valuable over time.

The following factors improve the likelihood of success for this approach:

- there are consistent and thorough criteria for assessment and an agreed and transparent process for obtaining such a certificate
- the certificates are time-bound
- there is a database of where certificates have been issued
- the ecologist is appropriately qualified.

Reg7: Regional rules on vegetation clearance or modification

Regional council land management plans may have rules requiring regional council consent for clearance of vegetation. These rules typically are for vegetation on steeper slopes (eg, greater than 20 degrees), vegetation adjoining water bodies and for larger areas of clearance. The primary purposes of these rules have been: soil conservation; aquatic ecosystem maintenance and enhancement; the maintenance and enhancement of water quality; and the avoidance and mitigation of natural hazards. This has meant that rules regulating vegetation clearance have typically applied to both native and introduced vegetation.

Rules can also be for the purpose of providing for the maintenance of indigenous biodiversity, which may increase the scope of indigenous vegetation or wildlife habitat covered and increase the factors addressed in decision making.

Regional councils are not prevented from using rules in regional plans as a method for maintaining indigenous vegetation in urban environment allotments.

Strength

- Regional rules controlling vegetation clearance on steeper slopes and riparian margins have a long history RMA and previously s34 notices under the Soil Conservation and Rivers Control Act 1941) so are generally well accepted by the rural community.

Limitation

- In the past, Environment Court decisions have limited regional council consideration of vegetation clearance impacts on biodiversity to impacts on aquatic ecosystems. The 2003 amendment to the RMA has expanded this to biodiversity generally.

Reg8: District rules restricting wetland drainage and infilling

Some district plans contain a rule specifying a maximum area or size of wetland that can be drained or subject to infill before council consent is required. Often this maximum area applies over a period of time (often one or multiple years).

Strengths

- District wide rules on wetland drainage and infilling can allow councils to minimise resources expended on compiling comprehensive biodiversity databases.
- District wide rules tend to reduce landowner opposition because the rules apply equally to everyone and particular areas with restrictive rules are not specifically identified in the district plan.
- Potential alternative uses for wetlands can be addressed at the time of any application rather than all together when a schedule with restrictive rules is introduced.
- The onus for collecting information on biodiversity values rests with applicants who wish to drain or fill in a wetland. This contrasts with schedules where the onus is on the council to obtain comprehensive and accurate information about indigenous habitats throughout the district.

Limitations

- There can be a relatively low level of certainty because particular wetlands and wet areas are not specifically excluded from being covered by the rule.
- Landowners may undertake drainage or infilling works because they are unaware of the relevant district plan rules. This is a particular risk if the rules have not been well publicised.
- It can be difficult to determine the relative value of particular wetland or wet area that is the subject of an application where there is only limited ecological information that can provide context.
- Monitoring is difficult. For example, the extent of clearance cannot be accurately determined if there is inadequate information on the extent of indigenous vegetation when the rule came into effect.
- Specifying a maximum area that can be drained or subject to infill before a resource consent is required could lead to ongoing cumulative loss of wetland area. Ongoing loss of wetlands is contradictory to National Priority 2 in the Statement of National Priorities for Protecting Rare and Threatened Indigenous Biodiversity on Private Land.
- There may be some conflict with regional plan rules on river/stream beds and drainage.

The following factors improve the likelihood of success for this approach:

- there is community awareness that a variety of different types of wetland can be ecologically valuable and so it is appropriate to apply for consent before undertaking potentially damaging activities
- council staff understand the key differences between wetland types and how these different types can be affected by human activities
- ecologists undertaking assessments of wetlands for landowners are required to have a minimum acceptable level of qualification and expertise
- there is integration between the relevant regional and district plan provisions applying to wetlands.

Reg9: Regional rules restricting ecologically damaging activities for wetlands, lakes and rivers

Regional plans address various damaging activities affecting wetlands, rivers and lakes. Typically the emphasis has been on core council functions including soil conservation, water quality and quantity, river and lake bed management, and natural hazards. The types of activities regulated can include:

- damming, diversion, taking natural water and discharges
- planting in river and lake beds
- taking heat or energy from natural waters and geothermal resources
- construction of structures in river and lake beds
- alterations of flow regimes and water levels (including wetlands, rivers and lakes).

The nature of the rules and other methods varies between regions. The treatment of indigenous biodiversity using such rules has varied.

The partly operative Environment Waikato Regional Plan requires that new drain creation and the deepening of drain invert levels in and around wetlands are controlled by rules. Under rule 3.7.4.6, these activities have discretionary status within 200 metres of the legal property boundaries of an extensive list of wetlands. Under rule 3.7.4.7, these activities have discretionary status within wetlands of significant indigenous vegetation and significant habitats of wildlife.

Reg10: Regional rules and methods to encourage landowners to enhance wetlands

In the Environment Bay of Plenty Regional Water and Land Plan, rule 79 (chapter 9) provides for wetland modification for the purposes of wetland maintenance and enhancement to be a permitted activity where the activity is:

- in accordance with a (landowner) Wetland Management Agreement with Environment Bay of Plenty, a public agency reserves management plan and a conservation management strategy
- is consistent with the relevant policy (135) in the plan
- is restricted to an extensive list of activities.

Chapter 8 contains the policies and methods for wetlands. This provides more information about Wetland Management Agreements, which are intended to be a cost-effective and efficient alternative to resource consent processes and to promote and achieve best management practices for the site. They are voluntary agreements to promote wetland management and facilitate specified works that are necessary for wetland maintenance and enhancement.

Reg11: Regional rules restricting a wide array of ecologically damaging activities for terrestrial and aquatic rare, threatened and at-risk habitats

The Horizons MW Proposed One Plan specifies a number of activities that are restricted to different levels particularly for 'rare and threatened' habitats and to a lesser degree 'at-risk' habitats. Schedule E, table E1 provides a comprehensive list of 'rare', 'threatened' and 'at-risk' habitats within the region based on indigenous vegetation type. Their physical locations are not specified. Table E2 specifies the criteria for defining a 'habitat' for the purposes of plan implementation. The criteria address structural class, vegetation or habitat type and minimum sizes for different biotic associations.

Policies 7.2 (activities in rare and threatened habitats) and 7.3 (activities in at-risk habitats) provide an overview of the intent of the plan rules. The associated rules for land are in chapter 12.

The activities that are restricted are:

- vegetation clearance and land disturbance
- drainage or diversion of water within or near these areas.

Activities for the purposes of pest control and habitat enhancement are excluded. In rare and threatened habitats these activities are non-complying, while in at-risk habitats they are discretionary.

Vegetation clearance and land disturbance on coastal foredunes and the margins of rivers, lakes and wetlands are discretionary activities.

Strengths

- The regulatory focus addresses types of habitat rather than specific locations so this does not require an accurate database of where each habitat is located.
- This approach is probably more acceptable to landowners than a schedule of specific sites with associated rules.

Limitations

- Landowners may not realise that an area they proposed to clear or drain is of a habitat type included in schedule E. This will need to be addressed by comprehensive research and ongoing landowner education.
- If there is no database of where the specified habitats are located then it will be difficult to monitor change and therefore policy effectiveness.
- This approach may result in the loss of some areas of habitat that are not rare or threatened but may provide important linkages and corridors for wildlife.

The following factor improves the likelihood of success for this approach.

- Landowner education about the rules and the habitat types in schedule E. This may need to include direct contact so that a landowner is able to see which parts of their property are affected.

Reg12: Combination of schedule of ecologically significant sites and district wide rules controlling vegetation clearance (and wetland drainage)

Some district plans combine a limited or 'incomplete' schedule of ecologically significant sites with rules controlling vegetation clearance throughout a wide area (often the district). The rules applying to the sites in the schedule are usually stricter than those applying elsewhere. There may also be additional incentives available for scheduled sites.

Strengths

- This approach can be useful when information on a district's biodiversity values is incomplete. The well-known sites can be included in a schedule and other sites can be evaluated as and when the need arises when an application is lodged.
- A combined approach can reduce landowner concerns compared with a full schedule. This is because the sites with more uncertain status would not be included in the schedule.

Limitations

- Effective landowner consultation is still required for sites included within the schedule.
- Sufficient information on the district's biodiversity values is required to ensure that the schedule is accurate.
- If the schedule has a high profile, the district wide rules controlling vegetation clearance may be overlooked by landowners.

The following factors improve the likelihood of success for this approach:

- there is good information on the biodiversity values of the district but not enough to identify all areas of biodiversity value
- the council wishes to use a comprehensive regulatory approach to address biodiversity protection and incentives are available for sites on the schedule
- the rule controlling vegetation clearance should be sufficiently inclusive to include all types of areas that may be ecologically significant.

Reg13: Linking rules to criteria identifying significant natural areas

Many district plans and regional policy statements include a set of 'criteria' for identifying significant natural areas. The style and substance of these criteria can differ considerably between planning documents.

Some councils link the criteria for identifying significance (for the purpose of s6(c) of the RMA) to rules. One purpose for such rules can be to extend the applicability of the rules relating to development privilege or subdivision beyond significant natural areas currently

identified on planning maps and/or in schedules. An example of this is rule 7.14.3.2 for the "subdivision of the sites for the protection of native bush or significant natural areas" in the Rodney District Plan.

Other uses for criteria include:

- to add sites to a schedule of significant natural areas
- to use when assessing resource applications that may affect areas of indigenous vegetation or possible wildlife habitat
- to use when assessing applications to clear, drain or modify indigenous vegetation and/or wildlife habitat (depending on the nature of the rule that requires such applications).

Examples of criteria for assessing ecological significance

Environment Bay of Plenty Regional Policy Statement. Appendix F specifies criteria for assessing specified matters in the Bay of Plenty Region, and set 3 addresses significant indigenous vegetation and habitats of indigenous fauna. Appendix G contains the criteria for assessing whether subdivision, use and development are appropriate.

Environment Waikato Regional Policy Statement, appendix 3 (PDF).

Environment Waikato – Guidelines (Technical report: Areas of significant indigenous vegetation and habitats of indigenous fauna in the Waikato Region).

Reg14: District rules and methods to specifically address aquatic ecosystems

District plan rules and methods for land use can have a major impact on aquatic ecosystems. Where such provisions are developed in conjunction with the relevant regional council this helps to ensure that all relevant aspects are appropriately addressed and minimises duplications and omissions of functions.

Strength

- In areas with ongoing land use development regional councils are limited in what they can achieve using their functions alone. A comprehensive approach to addressing the potential impacts on aquatic ecosystems of land use activities controlled by the district is also needed.

Limitation

- Many of the damaging impacts on aquatic ecosystems are from existing land use activities. Non-regulatory approaches are normally more effective for improving existing land use practices.

The following factor improves the likelihood of success for this approach:

- a good working partnership between the regional council and the district councils.

Reg15: District rules controlling farming of potential pest animal species

Several district plans contain rules specifying fencing requirements and various notification requirements for the farming of specified animal species within a certain distance of a large area of public land with important biodiversity values. Normally this approach is applied to goats because of the major damage that they can inflict on plants.

Strengths

- This measure helps reduce the risk of goat reinvasion to large tracts of ecologically important land managed by the Department of Conservation. This reduces damage to ecological and water and soil conservation values in the Department of Conservation lands. It also saves on public expenditure for goat control in these areas.
- It forces landowners/managers to think carefully before they bring in goats as they have to notify council and erect goat-proof fencing. It is less likely that goats will be used for short-term weed control from which they may easily escape.
- Landowners will be less likely to release goats when they no longer need them as the animals are to be marked and the council knows of the farm.

Limitation

- Some landowners adjoining large tracts of land managed by the Department of Conservation may wish to use goats for 'weed control' at the 'back' of the farm. They may object to having to provide plans to council and erect goat-proof fences.

The following factor improves the likelihood of success for this approach:

- there is strong public and council support for maintaining the ecological integrity and biodiversity values of the Department of Conservation lands in question.

Example

In the New Plymouth District Plan (PDF) goat farming within 2 kilometres of the Egmont National Park is required to meet the conditions of rules Rur70 and Rur71. Rule Rur70 requires a landowner/farmer to notify council of an intention to farm goats and to provide a plan of the property and the 'goat-proof' fencing.

Reg16: Rules addressing natural hazard mitigation in a way that protects biodiversity values

Most district councils and all regional councils have some methods and/or rules that address natural hazards. Typically these methods and rules focus on reducing the risk from natural hazards to human property and infrastructure.

Ideally this approach should focus on hazard avoidance, as natural hazard mitigation may have significant impacts on biodiversity, particularly for the coastal environment and waterways and their margins. The hazards of particular relevance are coastal erosion, dune blowouts, flooding and river bank erosion. These hazards are predicted to increase in frequency and magnitude as the global climate changes.

Natural hazard avoidance includes: not locating human structures in areas at risk and shifting existing at-risk structures. The alternative of natural hazard mitigation can significantly damage the biodiversity values of the coastal environment and waterways and their margins. Examples of this damage include seawall impacts on a variety of coastal ecosystems and over-steepening of dunes caused by the introduced marram grass. Flood mitigation works include dams, channelisation, stop-banking and river-mouth manipulation.

Policies in the New Zealand Coastal Policy Statement 2010 state that plans should recognise that some natural features may migrate inland as a result of dynamic coastal processes and that new developments should be located and designed to avoid the need for hazard protection rules.

District plan rules and methods that focus on hazard avoidance require adequate setbacks for buildings and other structures. In addition they address building elevation in low lying sites at risk from inundation. The construction of coastal erosion defences and the removal or modification of sediment and vegetation on coastal dunes is tightly controlled.

Strengths

- Requiring adequate setbacks and elevations for new structures reduces the risk of future mitigation works and consequential adverse effects on biodiversity values. It also provides space for natural systems to migrate inland if the sea level rises and the magnitude of storm events increases.
- Severely restricting the construction of coastal erosion defences and the removal or modification of sediment and vegetation on coastal dunes can reduce the risks of adverse impacts from mitigation works.

Limitations

- Property owners can object to the identification of natural hazard risk areas and the subsequent restrictions as to what they can do with their property.
- Property owners can object to all or part of their property being identified as being at risk of natural hazards because they fear it may lower their property's value.

The following factors improve the likelihood of success for this approach:

- there is little existing development in areas at risk from coastal erosion or inundation by coastal waters
- the community understands the risks and the consequences of different options
- those affected have to pay the full costs of mitigating natural hazards, including mitigating the adverse effects of natural hazard mitigation.

Reg17: District and regional plan rules to support water conservation orders

The purpose of water conservation orders (in Part 9 of the RMA) is to recognise and sustain the outstanding amenity or intrinsic values of waters in their natural state, or where that state has been modified, the amenity or intrinsic values of those waters that are outstanding.

Under s200 of the RMA, a water conservation order prohibits or restricts the exercise of a regional council's powers under s30(1)(e) and (f) of the RMA.

Regional councils may choose to include rules that reinforce or extend the intent of parts of a water conservation order.

A district council may use its district plan to regulate riparian and catchment activities that could adversely affect the values of the water body protected by a water conservation order.

An example of a regional council's response is Horizons MW Proposed One Plan chapter 16. This plan prohibits damming in specified protected waters and treats a variety of other activities as non-complying activities.

Reg18: Designations, heritage protection orders

Heritage orders have been rarely used as a tool for biodiversity protection. They have been only sparingly used for built heritage protection (eg, by the New Zealand Historic Places Trust) due to the risks relating to costs.

Under the former Town and Country Planning Act 1977 designations were commonly used to identify areas that the Crown wished to acquire for ecological purposes. This included areas identified in the coastal and lakeshore reserves surveys under s4 of the Reserves Act 1977 and areas identified under the Wildlife Act 1953. Designations are rarely used for ecological purposes today.

Strength

- Heritage protection orders and designations are legal tools with a formal contestable process.

Limitations

- The formal processes can be expensive and may generate ill-will with the affected landowner. The processes may include protracted decision making and uncertainty about the outcomes.
- A heritage protection authority may be required to reimburse the owner for any additional costs of upkeep of the place or structure resulting from the order being made (s191(3)(a) RMA).
- The Environment Court may order a heritage protection agency to either acquire the property or remove the order (s198 RMA).

Further information on heritage orders can be found at:
http://www.mfe.govt.nz/rma/central/heritage/index.html

Reg19: Water conservation orders

A water conservation order can be used to preserve a natural state or to protect characteristics, such as:

- the water body's value as a habitat or fishery
- its wild and scenic nature
- its value for recreational, historic, spiritual, cultural or scenic purposes.

Water conservation orders can be used to protect outstanding amenity or intrinsic values that water provides, in either a natural or modified state. Orders may be applied over rivers, lakes, streams, ponds, wetlands or aquifers, and can cover freshwater or geothermal water.

Strengths

- A formal process is followed to establish and change a water conservation order.
- The order is high profile and relatively secure given the process required to change it.
- This is a national tool and binds local decision making.

Limitations

- The process is expensive and lengthy.
- Few rivers or sections of rivers have secured this status, especially since the RMA was enacted.
- The water conservation order status applies only to the bed and the water. Additional tools are needed to protect the riparian margins and address catchment land uses.

The following factors improve the likelihood of success for this approach:

- widespread public support, good financial base
- either many water conservation order criteria in the legislation apply to the nominated water body or it is an exceptional example of only one or several criteria.

There are currently 15 conservation orders (including one amendment order) covering water bodies that have outstanding amenity or intrinsic values.

Reg20: Plan standards for biodiversity protection and enhancement

Some matters relating to biodiversity management are frequently addressed in resource consents, including subdivisions. It can be helpful to use standard conditions that can be varied if necessary rather than having to develop similar provisions each time. However, standard conditions should be used carefully as they may not relate well to the particular requirements of development. Examples of such topics where standard conditions may be useful include: the nature of stock-proof fencing, vegetation protection, standards for native revegetation activities and monitoring, wetland protection management.

Any vegetation on a site proposed for subdivision could potentially be required to be protected by a consent notice, if the plan is set out in a way that entitles the council to

manage and protect vegetation accordingly. This approach enables case by case protection of vegetation without having to go through a plan change process to schedule vegetation (including a group of notable trees).

For this method to be effective the plan needs rules that specify the circumstances for which the standards would apply. If a plan is not already set up in a way that entitles the council to manage and protect vegetation, a plan change process will be required to amend the subdivision provisions accordingly.

Strengths

- Standards typically go through a review process so should be more robust than one-off iterations.
- Standards are easier for councils to administer and monitor than many one-off sets of conditions.
- Standards in plans can be evaluated by potential applicants at the outset so they can design their project to address and implement the standards rather than retro-fitting standards after the initial design.
- Standards may deter potential applicants from submitting dubious applications.

Limitation

- The district plan review processes may lead to changes that may significantly affect the utility of the standards.

The following factors improve the likelihood of success for this approach:

- the standards should be well-reviewed by appropriate experts to ensure that they are practicable and likely to achieve the intended outcome
- there are many potential and actual applications for which the standards would be relevant.

Reg21: Requiring covenants as conditions for resource consents

Resource consent conditions are a mechanism through which vegetation or individual trees can be protected. Conditions of consent can, for example, prevent the removal or damage of vegetation during the building construction process, restrict the pruning of one or more trees to a particular area or require a qualified tree surgeon to undertake corrective pruning. Councils can also require a covenant to be registered against the title of a property via a condition of resource or subdivision consent as a mechanism for protecting vegetation. The intent of imposing a covenant is to limit or restrict how a property owner or any future property owners can use the land on which notable vegetation/trees are located.

In order to impose a consent condition that protects vegetation, the plan should first be set up in a way that specifies that the council may seek to manage and protect vegetation/trees when a resource consent is required for development within the urban environment. For example objectives, policies, and rules/assessment criteria. If a plan is not set up to entitle the council to manage and protect vegetation, a plan change process will be required to amend the relevant provisions accordingly.

A number of district plans contain regulatory incentives that allow landowners to obtain additional subdivision or development privileges in return for legally protecting an area of ecological value and/or undertaking extensive revegetation using native species. The 'security' for this incentive is typically a covenant over the area to be protected and/or restored. Covenants can also be used to protect areas of ecological value or as security for restoration activities required as a condition of other types of resource consents. Where subdivision privileges have been popular with landowners there are now many such covenants (e.g. Rodney, Western Bay of Plenty and Franklin districts).

These 'covenants' are often established via a consent notice that specifies responsibilities. Some landowners choose to use alternative covenant provisions available under the Queen Elizabeth II National Trust Act 1977, Reserves Act 1977 or Conservation Act 1987.

Strengths

- The establishment of covenants to legally protect notable vegetation and areas of ecological value and/or as security for ecological restoration can result in the protection of considerable areas of vegetation and wildlife habitat that would not otherwise have been legally protected and/or restored.
- A council does not need to complete an inventory of ecological values and/or schedule of 'significant natural areas' or notable trees.

Limitations

- Assessments in the Waikato, Thames-Coromandel and Rodney districts have shown that there is a much lower level of compliance with covenant conditions where those covenants result from subdivision or other development privileges, rather than voluntary protection without economic benefit.
- Conditions can vary considerably between covenants and in some districts there can be many such covenants. This can create a large monitoring project for a council.
- Earlier covenants may not have been accurately recorded in council databases so care is needed to ensure that the area remains protected.
- When land ownership changes, the new owner may be unaware of the covenant and associated conditions.
- The mechanism does not target the most ecologically significant sites and/or areas where restoration is most needed so it may not protect and promote the restoration of areas of greatest value.
- Where rules allow a single area of ecological value to be divided into many titles this may adversely affect long-term ecological outcomes.

The following factors improve the likelihood of success for this approach:

- include the covenant at the top of the property file and ensure it is an encumbrance on the title
- establishing and maintaining a good council database of covenants with all covenant boundaries included in a council's geographic information system (GIS) system
- using standard conditions for covenants where possible to assist with long-term monitoring
- ensuring that covenants are designed and established in a way that facilitates an effective ongoing monitoring and compliance programme

- designing plan rules to minimise the risk of a single natural area being split in to many titles with many landowners
- providing information and advice to landowners who have covenants to help them meet the covenant conditions
- making subsequent landowners aware of their responsibilities
- using an economic penalty for non-compliance with covenant conditions.

Examples

See RegE1, RegE2, RegE3 and RegE4.

Reg22: Esplanade reserves and strips to protect and facilitate enhancement of riparian and aquatic biodiversity

Esplanade reserves and strips provide opportunities for facilitating the protection and enhancement of riparian and aquatic biodiversity. This opportunity tends not to be fully exploited as esplanade reserves can be seen by councils as a maintenance burden. District plans can specify policies and rules for new esplanade reserves and strips. This can include fencing and other requirements.

Example

The Kapiti Coast District Plan provision on esplanade reserves and strips (PDF) specifies the requirements for different water bodies. Along coastal margins the requirements are 50 metres in the rural zone and 20 metres in other zones, with a seven wire post and wire fence or equivalent. Fencing is also required for esplanade reserves and strips by lakes of more than 8 hectares and parts of specified rivers and streams.

Reg23: Special legislation

In some situations existing legislation, and policy statements and plans prepared under that legislation, are considered insufficient. This can lead to the promotion of special legislation, often by the local Member of Parliament.

One recent example is the Waitakere Ranges Heritage Area Act 2008. This established a Waitakere Ranges Heritage Area, which includes public (Waitakere Ranges Regional Park) and private land where more than 21,000 people live. The Act was enacted to better protect the Waitakere Ranges and its foothills and coasts, especially with respect to managing the cumulative and precedent effects of development on landscapes, the desired future character and amenity of the area, the ecological and biological environment and to maintain the rural character of the foothills. This legislation was considered necessary because the existing legislative provisions (especially the RMA) and the associated planning documents and processes did not seem to be delivering the outcomes sought by the community.

Regulatory economic instruments

RegE1: On-site subdivision privileges for biodiversity protection (protection lots)

This method (alongside RegE2, RegE3 and RegE4) provides additional subdivision privileges in exchange for a landowner legally protecting an area of ecological value or undertaking a minimum area of revegetation using native species.

A district plan can provide extra subdivision privileges (extra lots) to landowners who legally protect ecologically valuable areas. The number of extra lots usually depends on the size of the area being protected. The number of lots per unit area varies between council and may vary between habitat types (eg, forest versus wetland).

Typically the form of legal protection has been via a consent notice rather than a covenant under the Queen Elizabeth II National Trust Act 1977, Reserves Act 1977 or Conservation Act 1987.

To qualify for a subdivision privilege the area to be protected needs to be of sufficient ecological quality. Councils may address this through the use of general criteria and a requirement for a report from an approved ecologist. In some cases more detailed guidance is given (eg, Rodney District, see example below).

Strengths

- This is a low-cost option for a council and the community.
- Subdivision privileges can result in legal protection of many areas that would not have otherwise been legally protected.

Limitations

- The mechanism for protection has typically been a consent notice rather than an encumbrance on the title.
- Assessments in the Waikato, Thames-Coromandel and Rodney districts have shown that there is a much lower level of compliance with covenant conditions where covenants have been established via a consent notice (as a condition of subdivision or other development privileges), compared with covenants established voluntarily without economic benefit.
- This mechanism is not particularly effective in districts where there is little subdivision pressure over and above what can be done within the standard rules in the plan.
- There may be little demand for additional lots where the areas of ecological value are located.

The following factors improve the likelihood of success for this approach:

- there is a good database showing the location, boundaries and conditions of consent notices
- consent notices are standardised as much as possible
- initial biodiversity protection works (eg, fencing) are completed by the subdividing owner before titles are issued and the property is on-sold

- where appropriate, subdivisions can be required by a consent condition to set up a body corporate of landowners sharing an interest in covenanted land that has arisen from the development. This seeds a coordinated group of people responsible for the ongoing management of the covenant. It also reduces the ownership division of the land (and hence monitoring and administration requirements)
- landowners are informed about their obligations under covenants and involved in the ongoing compliance monitoring
- there are many small to medium unprotected areas of indigenous vegetation and wildlife habitat
- mechanisms put in place to reduce the risks of more intense subdivision on vulnerable wildlife. This may include restrictions on pet cat and dog ownership.

Transferable development rights as discussed in RegE4 (below), could potentially address some of the on-site problems (eg, increased threat to wildlife from pet cats and dogs) that can occur when the extra lots include or adjoin the areas of ecological value.

Examples

Rule 752 applying to the rural and conservation zones in the Thames-Coromandel District Plan provides opportunities for one extra lot in return for protecting more than 5 hectares of continuous native forest or other feature of value. Two extra lots are possible if more than 20 hectares is to be protected or there is a discrete feature for each lot. This rule also provides for an extra lot for retiring 5 hectares, planting it in native species and managing it according to a management plan.

RegE2: On-site subdivision privileges for scheduled significant natural areas

This is a variation of the previous instrument. It targets the subdivision privilege so that it is only available to properties that have a scheduled site of ecological value that is subject to rules restricting certain damaging activities.

Strengths

- This targets the subdivision privilege to sites of highest priority.
- The targeting of the privilege to scheduled sites subject to restrictive rules can help offset what can be perceived by some landowners as the downside of being included in the schedule.

Limitation

- The provision is not available to other sites of ecological value that were not recognised at the time of plan preparation (although presumably this could be addressed by means of a plan change that adds new sites to the schedule).

Factors improving success

- This provision is most suitable for districts where limited natural areas of value remain and these areas have been clearly identified in a comprehensive schedule.
- Including a simple mechanism to add newly discovered sites of ecological value in the schedule.

This method could be combined with Method RegE3 (below) to encourage restoration, particularly for degraded rare or threatened vegetation communities such as wetlands.

RegE3: On-site subdivision privileges for biodiversity restoration

This is a relatively recent variation on the on-site subdivision development privilege in return for protecting an area of biodiversity value. In this instance, an area is to be subject to biodiversity restoration works (eg, planted in native species) in return for extra lots, with the number of lots depending on the area involved in restoration. This option has been developed based on Environment Court decisions about how much planting of native species provides sufficient mitigation for the effects of a new lot in the coastal environment.

Strength

- This potentially provides opportunities for large scale revegetation using ecologically appropriate species in areas where farming is not profitable and/or is degrading the environment.

Limitations

- The mitigation benefits of large scale planting take some time to eventuate and can be uncertain on difficult sites.
- There is a risk that the adverse effects of development occur a long time before the positive effects of revegetation.
- Weeds can become a major problem in difficult to access sites especially in the early stages.
- Once the lots have been on-sold the new landowners may have little interest in managing the planted areas to maximise long-term biodiversity benefits.

The following factors improve the likelihood of success for this approach:

- conditions that clearly specify what is required in terms of planting density, initial and ongoing site management, species to use in different situations, planting regime, monitoring, timing for issuing certificate of completion and bonds
- sources of large quantities of eco-sourced native species
- people with the expertise to manage such projects, particularly in steep and difficult to access sites
- planting before development would provide some mitigation before the adverse effects of development occur
- the use of bonds held until the revegetation reaches a suitable standard (eg, 80 per cent closed canopy for forest species)
- delaying issue of s224 certification until the planting proves to be sustainable. This avoids the need for monitoring compliance
- subsequent development on the new lot is regulated to minimise adverse effects, especially while the plants have not formed a closed canopy
- council maintains a good database of these sites and monitors them regularly (funded by the developer).

RegE4: Transferable off-site subdivision development privilege in return for protecting an identified area of biodiversity value

This is a variation of the on-site subdivision development privilege in return for protecting an area of biodiversity value. The key point of difference is that the bonus lot or lots do not need to be located on the same pre-subdivided title. In practice, it is likely that both on-site and transferable subdivision privileges would be used in those districts that provide for transferable subdivision privileges.

Strengths

- This is a low-cost option for a council and the community.
- Subdivision privileges can result in legal protection of many areas that would not have otherwise been legally protected.
- This method can protect significant biodiversity values located in areas where there is little demand for additional lots or where housing is discouraged due to high landscape values.
- This method can avoid slicing natural features into several ownerships, which complicates future coordinated management of the whole natural feature.
- Housing development can be concentrated into areas where it has less effect on fragmenting biodiversity values.

Limitations

- There may need to be additional rules addressing potential adverse effects in those areas where the extra lots may be desired, particularly non-ecological effects such as impact on rural amenity and roading where a number of lots are transferred to the same title.
- There would need to be a good database to prevent subdivision privileges being claimed more than once for the same protected area.
- Transferable subdivision privileges are likely to require more administration by council.
- Also refer to RegE1 to RegE3.

The following factors improve the likelihood of success for this approach:

- careful development of the framework for managing transferable development privileges
- transferable subdivision privileges would be popular in those districts where the favoured locations for extra lots (in addition to what the district plan provides) are in different locations to the unprotected areas of biodiversity value
- also refer to RegE1 to RegE3.

Examples

Far North District Plan method 12.1.6.3.1 provides for an extra lot (which may be on the parent title or elsewhere) for all or part of identified 'outstanding landscapes' or 'outstanding natural features' that are given permanent protection. The list of outstanding landscapes and outstanding natural features includes some areas of biodiversity value.

RegE5: Plan provisions enabling financial contributions for biodiversity protection purposes

This is where plans specifically provide for tagged financial contributions to be used for biodiversity protection and enhancement purposes, rather than general reserves funding.

Strength

- This can provide another useful source of funding for council biodiversity protection and enhancement activities providing that the contributions are of significant size.

Limitations

- Sometimes councils can be reluctant to expand the scope of financial contributions and to require financial contributions of sufficient size for non-traditional purposes.
- This provision is only useful where growth is occurring. There is also a need to prove the nexus between that growth and the need for the contribution.

The following factors improve the likelihood of success for this approach:

- using contributions in the local area where the development occurs to provide mitigation for direct and indirect effects of development
- using contributions in a transparent way to increase public support for the use of this type of contribution.

Example

Western Bay of Plenty District Council District Plan's financial contribution provisions require a monetary contribution for ecological protection and enhancement purposes for each new lot or dwelling. This contribution may be decreased or waived where legally binding environmental protection or enhancement has been or is proposed to be undertaken in conjunction with the primary activity. In such cases the primary activity becomes a limited discretionary activity for the environmental measures concerned.

RegE6: Waiving application fees for identified significant natural areas

The main purposes of waiving application fees for applications relating to sites included in a schedule of significant natural areas are to:

- reduce landowner objections to being included in the schedule
- promote compliance with the district plan rules applying to the schedule.

Those activities for which application fees are waived are those that would be permitted activities had the site not been included in the schedule.

Strengths

- If fees are waived, most landowners are more likely to apply for consent. If consent is applied for there are opportunities to explore options if the area concerned is of biodiversity value.

- This can help to reduce landowner opposition to be included in a schedule of ecologically sensitive sites.

Limitation

- Some landowners may so mistrust the council that a fees waiver would have little influence in those cases.

The following factor improves the likelihood of success for this approach:

- landowners are aware of the district plan's provisions for sites included in a schedule of significant natural areas.

RegE7: Prosecuting those who infringe rules or conditions of resource consents

Where individuals or organisations undertake environmentally damaging activities that infringe plan rules, a council can commence legal proceedings. Also, if a resource consent holder does not adhere to conditions intended to protect and/or restore indigenous biodiversity, a council can commence legal proceedings.

Strength

- Well-publicised prosecutions with high fines can be a strong deterrent to resource consent and rule infringement.

Limitations

- Effective prosecutions require a council commitment to monitor resource consents and compliance with plan rules.
- It can be difficult to acquire sufficient evidence to mount a successful prosecution.
- Sometimes fines can be too low to act as a deterrent.

The following factors improve the likelihood of success for this approach:

- education and raising awareness programmes
- thorough record keeping by council staff to minimise chances of people getting off on technicalities
- encouraging community reporting of possible infringements
- a council commitment to taking prosecutions where there have been serious infringements.

NReg1: Biodiversity strategies and action plans for a region or district

There are two primary approaches to a regional or district biodiversity strategy.

- The first approach addresses the roles and actions as they affect biodiversity for the wide variety of agencies and organisations in the region or district. Usually priorities are identified and actions, targets and monitoring requirements may be specified in varying degrees of detail. Such documents may be 'signed off' or otherwise endorsed by the agencies and organisations involved.
- The second approach focuses on the council's role and contains a council action plan. This approach recognises that many agencies are involved in biodiversity management but does not try to coordinate them all.

Strengths of the first approach

- This provides an opportunity to achieve some degree of coordination and cooperation between agencies and organisations working in the region or district for activities affecting biodiversity outcomes in that region or district.
- The appointment of a coordinator as part of the implementation process is likely to increase the effectiveness of the strategy.

Strengths of the second approach

- This provides a public document specifying a council's objectives, policies, methods and targets for biodiversity protection and restoration in respect of its own actions and funding.
- This is more of a council action plan and typically is more detailed and specific than the first approach.
- It provides clearer guidance to staff in their daily activities.

Limitations of the first approach

- A regional strategy may require political 'sign-off' by a large number of organisations, the actions may be highly generalised, providing little practical guidance.
- It may also be necessary to have a separate 'council' biodiversity action plan to provide more detailed guidance as to how the council should implement its responsibilities under legislation and agreements.

Limitation of the second approach

- This approach may not maximise opportunities to work with other agencies and the community to develop a coordinated programme.

Examples

A biodiversity strategy for the Canterbury Region was coordinated by Environment Canterbury and is an example of the first approach.

The Taranaki Regional Council biodiversity strategy is an example of the second approach.

The Wellington City Council biodiversity action plan is a district example of the second approach.

NReg2: Providing biodiversity management information/education resources for landowners and the community

Councils can prepare and distribute biodiversity-related information that can assist landowners and community groups involved in environmental protection and restoration activities.

Information resources can be in a variety of formats including:

- brochures and booklets
- material aligned with the school curricula
- articles showing good practice in local newspapers
- articles in council newsletters included within local newspapers, rate demands or other council communications with landowners
- reports with more detailed technical information
- website information that may include electronic copies of material available in hard copy form and links to other relevant websites
- video, CD and DVD
- field and training days for landowners and the community
- summer programme visiting areas managed by the council
- school field trips (eg, Environment Waikato Rivers and Us programme)
- mobile resources
- phone numbers that landowners and members of the community can call for advice.

This information can address a range of topics including:

- the different types of ecosystems present in the region or district
- appropriate species to plant in different types of site
- ecosystem services
- identifying and eradicating/controlling animal and plant pests
- riparian management
- wetland management
- coast care
- estuary care
- managing forest remnants
- successful biodiversity and other land and/or water management projects by landowners
- sources of assistance including funding.

Another type of information resource is council newsletters for a specific biodiversity programme (eg, 'significant natural area' or coastcare) or on biodiversity generally. These newsletters report past events, recent progress on biodiversity programmes, good examples and case studies and upcoming events and opportunities such as funding.

Strength

- Information resources are viewed favourably by landowners and the community.

Limitation

- On their own, such resources are generally insufficient and need to be used in conjunction with other tools.

The following factors improve the likelihood of success for this approach:

- the effectiveness of this information is likely to be increased if it is included as part of a council 'out-reach' programme to actively work with individual landowners to improve biodiversity outcomes on their properties
- there are active community groups involved in biodiversity protection and restoration (eg, land care groups, dune care groups, local environmental groups)
- the council administers funds that landowners and community groups can apply to for financial assistance for biodiversity protection and restoration activities
- it can be useful to produce combined agency publications where all agencies can use the same high-quality publication
- the submission of 'general' articles to local newspapers without the council logo and other direct signs of council authorship are useful for reaching those who are cynical of councils and do not want to read anything associated with them (ie, make the issue mainstream rather than council pushing it).

Examples

The Rotorua District Lakes A Zone Revegetation Guide provides detailed guidance to landowners to assist them with the practicalities of larger scale revegetation including site preparation, pest management and species requirements.

Environment Bay of Plenty has prepared a number of brochures relating to dune management. These focus on improving dune resilience and stability as well as improving biodiversity values. The Environment Bay of Plenty brochure 'Backyard Buffers' (PDF) includes an excellent illustrated guide as to what native species are appropriate for each of the ecological 'zones' in Bay of Plenty dunes. Environment Bay of Plenty has also created a school teaching resource called 'Life's a beach'.

Most regional councils have electronic and/or paper-based information sheets addressing different pest plant species that have been identified as a particular problem in the region. These may be species that are abundant and need ongoing control. Conversely they may be species that are of risk that are either absent or are present in only a few locations. The information sheets typically provide information on how to identify the plant, its habitat and behaviour in New Zealand and/or the region, and control and preventative measures that can be taken to minimise spread or invasion.

Examples of council plant and animal pest information for members of the public include the following.
Environment Waikato plant pest fact sheets and animal pest fact sheets.

Taranaki Regional Council has information sheets on riparian management, the establishment of riparian vegetation (using native species), wetlands and bush retirement.

Greater Wellington Regional Council produces several restoration pamphlets including one on wetland restoration.

Northland Regional Council also has a wetland restoration guide.

Auckland Council has a series of coastal planting guides for different coastal habitats such as dunes, clay banks and forests.

In contrast the Northland Regional Council/Department of Conservation planting guide (PDF) focuses on suitable native plants and their utility as a food source for native birds.

Examples of council biodiversity or biodiversity programme newsletters include the Kaikoura District Council biodiversity newsletters and Marlborough District Council significant natural area newsletters.

NReg3: Telephone advice service

The Waikato Biodiversity Forum is a partnership between research and management agencies, iwi groups, private landowners and the community. It is independent of the management agencies and through funding grants is able to offer a freephone service (Biodiversity Advice Waikato) for rural and urban landowners in the Waikato Region. It provides free information on planting, pest management, native species, local conservation groups and how to contact agencies. Callers may be referred to specialists for more information and free on-site visits are available.

Strengths

- The phone service is free and available at times reasonably convenient to its target audience.
- The service provides independent advice for landowners and community groups who may prefer not to contact their local authority or the Department of Conservation.
- The service is intended to be a one-stop-shop, so as to reduce caller frustration from redirection from one organisation to another.

Limitation

- To be successful, such services must be well advertised and must also be supported by ready access to good information and willing expert advisors.

NReg4: Landowner property plans that address biodiversity

Regional councils prepare landowner property-based plans for a variety of purposes. Traditionally the focus has been on soil conservation and nutrient containment. Recently there has been an increased focus on riparian management. Some plans address biodiversity management on a property more generally. Part of the preparation and approval of the plans can include financial assistance with work such as fencing, planting

and alternative stock water sources (eg, Environment Bay of Plenty). Some district councils also contribute to the funding (eg, Western Bay of Plenty District Council).

Strengths

- These plans are usually voluntary and prepared in cooperation with the landowner.
- The landowners often find the process and product useful.
- The plans can be a first step in obtaining funding assistance or subsidised resources (eg, plants).
- When plan implementation is monitored and the council maintains a good database, progress across a region can be measured.
- Landowners can become more aware of the biodiversity values they have on their property.
- As part of the property plan preparation process, council staff can advise landowners about legal protection options and processes for areas of biodiversity value (eg, open space covenant with the Queen Elizabeth II National Trust).
- Landowners can choose whether to follow up particular legal protection options. If they do enter into formal agreements it will be because they choose to do so, and as such they should be good guardians.

Limitations

- The plans are voluntary so not all property owners who could benefit from a plan will choose to request one.
- Implementation is voluntary.
- Not all types of property plans address indigenous biodiversity maintenance and enhancement.

Examples

Taranaki Regional Council has a comprehensive programme of riparian plan preparation. These plans address fencing, planting and areas of retirement along rivers and streams, especially those on the Taranaki Ring Plain.

Horizons MW Proposed One Plan (PDF) proposes proactive management of representative 'rare and threatened' habitats and 'at-risk' habitats identified by type (rather than location) in schedule E of that plan.

The Environment Bay of Plenty Regional Water and Land Plan provides for Wetland Management Agreements (chapter 8), which are voluntary agreements between the Council and landowners to promote wetland management and facilitate specified works that are necessary for wetland maintenance and enhancement.

NReg5: Comprehensive ecological assessment and indigenous biodiversity protection programme for private land

This method focuses on work undertaken by the Marlborough District Council. As a unitary council it has both regional and district functions, including managing indigenous biodiversity. Since 2000 the Council has undertaken a 'significant natural areas' (SNA) project that identifies and promotes protection of significant natural areas and indigenous

biodiversity on private land in Marlborough. In terms of resources this has entailed systematic on-the-ground ecological survey work. The survey process also established relationships and partnerships with landowners (who now participate on a voluntary basis). These relationships are maintained and developed through ongoing communication and contact.

Alongside the voluntary 'SNA' programme, general vegetation and land drainage rules were developed and apply to all landowners regardless of whether they have identified SNA sites on their property or not. Where resource consents are required, the general assessment criteria in the plans anticipate that ecological values (amongst other things) will be taken into account. Conditions can be attached to consents that maintain and protect identified values.

Following completion of the SNA survey work, the focus has shifted to the 'promotion' of protection. A programme to assist landowners to protect areas on their properties has been running alongside the survey work since 2003 and is now well established. The Council has committed $100,000.00 per annum to this programme and funding is also regularly sought from the Central Government Biodiversity Fund to boost the local programme. The bulk of this funding directly funds projects on private land. Approximately 20 per cent has been used for associated projects, including publicity material and programmes, native seed collection and farm plan development.

The following factors are key to the success for the Marlborough District Council approach:

- sound planning at the outset – communications strategy, working group established, political support for programme established and maintained
- care to employ a quality team, experienced practical ecologists and a positive communication strategy, including initial contact with landowners and ongoing publicity using mainstream media
- role as a catalyst – informing and inspiring landowners through property reports, contact with ecologists, newsletters and publicity, linking with positive landowners to provide community leadership
- proactive non-regulatory approach (field survey followed by assistance programme for protection)
- focused and effective working group to provide guidance and, through this group, a good relationship with Department of Conservation and Federated Farmers
- strong political support with an emphasis on ongoing councillor education and involvement
- maintaining credibility through a proactive landowner assistance programme, providing funding (50–75 per cent), links with other agencies (Department of Conservation and Queen Elizabeth II National Trust for covenanting), technical advice and support, publicity
- based on strong principles but a flexible approach in practice (for instance, promote covenanting with landowners but do not insist on it; recognise that the system for evaluating the significance of sites needs to be robust but is always subjective; promote and practice eco-sourcing in a broad sense)
- SNA landowners not 'penalised' by more regulation than other landowners
- keep jargon, paperwork and administration for landowners to a minimum.

Strength

- This type of approach can build a strong level of support for biodiversity protection amongst landowners.

Limitation

- Such a programme can be time-consuming and expensive if properly done.

The following factors improve the likelihood of success for this approach:

- staff continuity: landowners often prefer to deal with the same person over time
- districts or regions where little remains of certain habitats make it worthwhile to expend considerable time and effort to establish a commitment to biodiversity protection and enhancement by individual landowners.

Examples

Marlborough District Council Significant Natural Areas Project.

NReg6: Employing appropriate staff

Councils are increasingly recognising that they need appropriately qualified staff to help them address their responsibilities for biodiversity and community expectations for assistance. Depending on council size and resources, such staff may provide or assist with providing one or more of the following:

- ecological expertise and advice
- development of biodiversity policy and strategy documents or action plans
- development and/or management of council biodiversity programmes and projects (eg, plant and animal pest control programmes affecting natural areas)
- development and/or facilitation of community biodiversity projects
- management of significant natural area programmes including working with landowners
- development or commissioning of appropriate biodiversity monitoring programmes.

Larger councils have led the way in employing ecologists and coordinators of biodiversity programmes, particularly where the council has extensive land holdings. Recently other councils have begun to employ biodiversity officers to focus on community outreach programmes such as significant natural area programmes and other community biodiversity projects (e.g. Kaikoura District).

Strength

- A council that has access to appropriate biodiversity expertise is in a better position to make decisions that adequately address its biodiversity responsibilities.

Limitation

- If additional people are employed this may result in additional costs, although this could be addressed by changing the focus and required expertise for some existing positions.

NReg7: Industry standards, accords and protocols for biodiversity protection and restoration

Many industries have activities that can adversely affect the environment. Several of these industries have developed national accords, protocols or standards that seek to reduce the adverse effects of that industry on the environment. This includes reducing impacts on indigenous biodiversity.

Strengths of industry accords, standards and protocols

- These provide industry peer support and encouragement for improving environmental standards across that industry.
- They tend to be well publicised, especially within the industry concerned.
- Typically accords and standards apply nationally.
- They can assist councils seeking to improve environmental outcomes, particularly when they address existing damaging uses.

Limitations of industry accords, standards and protocols

- They are not a substitute for appropriate council plan provisions.
- There is a risk that the measures proposed in the accords, standards and protocols may be 'watered down' by the competing interests of stakeholders.

Examples

The Dairying and Clean Streams Accord was signed in 2003 and ran for a 10 year period ending on 31 December 2012. The parties are: Fonterra Cooperative Group, regional councils, Ministry for the Environment and Ministry of Agriculture and Forestry. The Accord provided a framework that raised the profile of environmental performance within the dairying industry and the wider New Zealand public. Snapshots of progress over the 10-year period have been published.

The New Zealand Forest Accord was signed in 1991 by various members of the forest and timber industry and the conservation movement. Its objectives include defining areas where it is inappropriate to establish plantation forestry and acknowledging that the existing area of natural indigenous forest should be maintained and enhanced.

The National Pest Plant Accord is an agreement between the Nursery and Garden Industry Association, regional councils and government departments with biosecurity functions. All plants on the Accord are unwanted organisms under the Biosecurity Act 1993 and cannot be sold, propagated or distributed in New Zealand.

NReg8: Multi-agency and community environmental restoration programmes

Councils can coordinate multi-agency and community partnership environmental projects that benefit biodiversity. Such projects usually provide a range of benefits, extending beyond the scope of what a single agency could achieve.

One such example is Beachcare, which was initiated in 1993 by Environment Waikato working with local district councils, communities and iwi to protect and restore beaches. Environment Waikato and the district councils provide administrative support and other resources including plants, signage, technical advice and building materials to beachcare groups at 19 beaches.

A similar example is Coast Care BOP, which is coordinated by Environment Bay of Plenty. This programme began in 1994 and is a partnership between the regional council, the four coastal district councils and Department of Conservation. There are nearly 30 volunteer groups associated with the programme. A 2004 review of the Coast Care BOP Programme provides a good description of the programme, including its establishment and operation.

The Peninsula Project seeks to improve the health of the environment and decrease flood risks on the Coromandel Peninsula. It is a partnership between Environment Waikato, Thames Coromandel District Council, Department of Conservation and the Hauraki Maori Trust Board. The main activities are flood protection, river and catchment management and animal pest control.

A number of voluntary initiatives have been undertaken to promote vegetation/tree protection. Voluntary methods include community organisations and initiatives, for example most councils help coordinate community reserve planting days year round to help with preservation and restoration, to improve biodiversity and to protect areas from things like erosion.

Arbor day is a national event where individuals and groups are encouraged to plant and care for trees. Arbor day is celebrated throughout the country through various activities including organising community planting in parks and reserves and supporting schools in their tree planting activities.

Trees for Canterbury is a community organisation created to meet the following objectives:

- Establishing a sense of involvement in the community for disadvantaged people and providing an environment of acceptance as well as support and training for self-development;
- Working with educational institutions, providing assistance in the teaching of environmental awareness; and
- Cultivating native plants for community plantings and using plant material eco-sourced from local areas.

NReg9: Multi-agency biodiversity management and ecological restoration accords

Where effective biodiversity management and restoration requires the cooperation of many agencies, a multi-agency accord can be helpful. Such accords typically tend to set out broad objectives, agency roles and the process for working together.

Examples

The North-West Wildlink Accord (PDF) was signed on 28 February 2006 for an initial three-year term with an ongoing right of renewal. Founding signatories to the North-West Wildlink Accord are Auckland Regional Council, Department of Conservation, Royal Forest and Bird Protection Society, North Shore City Council, Rodney District Council and Waitakere City Council. The purpose of the Accord is to provide a healthy and safe habitat in the North West of the Auckland Region and to link community, individual and agency effort along the wildlink.

The broad goals of the North-West Wildlink are to:

- increase the ecological health and connectivity of native habitats throughout the area
- increase meaningful community participation in environmental care
- increase collaboration and communication between agencies, groups and individuals.

These benefits are to be achieved through prioritising and coordinating efforts, and linking individual actions and community projects into a broader regional picture.

On 1 February 2002, Environment Waikato, Waipa District Council, Department of Conservation, Auckland/Waikato Fish and Game Council and Ngaa Iwi Toopu O Waipa signed the Waipa Peat Lakes Accord. The purpose of the Accord is to align the activities of management agencies, when working with landowners, tāngata whenua and interested parties, towards the restoration and enhancement of lakes and wetlands in the Waipa District. Much of the land containing and surrounding the lakes is privately owned. Accord members meet regularly to discuss projects, share information and consider opportunities to work together on initiatives. The Accord has also increased awareness about the peat lakes and their management requirements.

Non-regulatory economic instruments

NRegE1: Contestable council funds for environmental protection and enhancement

Regional and district councils can manage contestable funds for environmental and ecological protection and restoration activities. Typically landowners and community groups can apply for financial assistance for activities such as fencing of forest remnants and wetlands, pest management in forest, wetland, riparian and coastal areas and planting such areas with appropriate native species.

Funding is usually only available for materials and the landowner and community group is expected to contribute their own labour and sometimes other resources depending on the percentage contribution to the total project cost provided by the council. Councils may

provide different percentage contributions for different types of projects or in different parts of the region or district.

Such funds are usually contestable to projects from throughout the region or district. Sometimes a project may receive funding from both a regional and a district fund. Before and after property inspections are usually undertaken.

Strengths

- Such funds can provide a strong incentive for landowners to undertake ecological protection and restoration activities, particularly when the council has a relatively large amount of funding available each year.
- Such funds can enhance community and landowner commitment to undertake biodiversity protection and enhancement activities.
- Such funds can help protect or enhance biodiversity values on private land.
- Such funds can help foster pest management and planting on riparian and coastal public land. Often public agencies are not prepared to fund the full cost of council undertaking pest control and planting with native plants in such areas. They may, however, be prepared to fund the materials if community groups undertake the work.

Limitations

- Where the total amount of funds available each year is low, such funds may have minimal impact on biodiversity outcomes.
- Such funds depend on individual landowners and community groups applying for assistance. This means that applications may not come from the areas where funding is most needed because of the biodiversity values at risk and/or needing enhancement or restoration.
- If landowners are not provided with guidance they may plant inappropriate species.
- Funding is typically short term, while many biodiversity protection and enhancement projects require ongoing financial support, especially for pest management.

The following factors improve the likelihood of success for this approach:

- providing adequate funding either directly or in partnership with other organisations
- inspecting projects before approving the grant and after the work has been completed (by one agency if there is multi-party funding)
- providing advice or directing applicants to appropriate sources of advice (eg, how to control particular pest plant species)
- notifying successful applicants in time for them to obtain suitable plants and complete the planting while conditions are suitable
- encouraging landowners applying for funding to join appropriate support networks such as a local Landcare group
- provide opportunities for longer term funding for ongoing pest control
- ring fencing some of the funding for projects that focus on protecting and restoring ecosystems and wildlife habitats of high biodiversity value.

Examples

Environment Canterbury's Environment Enhancement Fund.

Environment Bay of Plenty has a variety of environmental funding options providing for different types and scales of environmental protection and enhancement activities on public and private land.

Northland Regional Council Environment Fund provides funding for a variety of biodiversity protection and restoration activities including wetlands protection and enhancement, plant and animal pest control (specified species) outside of community control areas, revegetation with native plants, coastal dune enhancement and protection and stock exclusion from the coastal marine area. The latter supports a rule in the regional coastal plan requiring the exclusion of all stock from the coastal marine area.

NRegE2: Comprehensive package of non-regulatory mechanisms to assist landowners to protect and restore biodiversity values

Some councils offer a comprehensive package of non-regulatory provisions to support and encourage landowners to protect and restore biodiversity. Such packages tend to be alternatives to contestable council funds. Typically they include information and advice services, assistance with pest management, assistance with fencing areas from stock, plants, funding assistance with the legal and survey costs associated with covenanting and rate relief. Such assistance is not available to assist property owners fulfilling regulatory requirements (such as restoring a site as part of a resource consent).

Strengths

- This approach provides a range of mechanisms to assist landowners protect and restore biodiversity.
- A comprehensive package of incentives for biodiversity protection and enhancement can improve outcomes on the ground, especially if landowners become enthusiastic about protecting and restoring biodiversity values on their property.
- This can generate landowner goodwill for biodiversity protection and restoration.

Limitations

- This requires sufficient council funding so that the level of assistance is perceived as being a real incentive for biodiversity protection and restoration.
- Not all landowners will choose to participate.

The following factors improve the likelihood of success for this approach:

- sufficient council funding being allocated
- council staff with biodiversity protection and restoration expertise relevant for the region or district
- effective publicity of the assistance available
- motivated landowners.

NRegE3: Discounted disposal of environmental weeds

Environmental weeds can seriously damage the biodiversity values of a site. Areas of vegetation near human settlement are particularly prone to the invasion and spread by a wide variety of environmental weed species. While different weed species have different dispersal methods, roadside/natural area weed dumping dramatically increases the spread by the many weed species that can be spread from fragments or can grow from dumped roots and rhizomes.

Some councils provide free or discounted disposal services for environmental weeds. This can include the provision of special bins or bags for environmental weeds that are collected for free and a provision for landowners to leave certain weed species at a transfer station or landfill for no charge.

Strengths

- This encourages landowners and community groups to remove environmental weeds from natural areas (at no cost in terms of disposal charges to themselves).
- This reduces the risk of environmental weed species being dumped in reserves and other 'natural areas'.
- This generates community goodwill, especially for those situations where weeds are being removed from council lands including esplanade reserves, recreation reserves and paper roads.

Limitation

- Councils may forgo some potential income for dumping weeds at a transfer station or landfill, although in the long term preventing dumping should reduce a council's costs in managing its land portfolio.

The following factors improve the likelihood of success for this approach:

- effective publicity of the assistance available
- good information on what constitutes an environmental weed, appropriate control methods for different weed species and the environmental problems caused by roadside/natural area dumping of environmental weeds
- institute fines for roadside/natural area dumping.

NRegE4: Annual rates relief for protected areas

A number of councils provide some form of rate relief for protected areas.

Strength

- This provides the landowner with some recognition for protecting biodiversity values and compensation for forgoing potential income from the protected land.

Limitations

- The amounts involved tend to be limited so may not provide much of an incentive.

- Some councils require an application to be made annually for rates relief.

The following factors improve the likelihood of success for this approach:

- including it as one of a number of mechanisms to assist landowners with biodiversity protection and restoration
- for covenants in perpetuity, make the rates relief endure for periods of time (say 10 years) so as to reduce the administrative burden to the owner needing to apply every year and also to provide a degree of certainty. It could be reassessed if at any time the covenant was lifted, or varied, or if the owner was in breach of the covenant
- there is no requirement for landowners who receive rate relief to provide public access.

Examples

Kaikoura District Council provides rate remission for special features of natural, historical or cultural value where those features significantly affect the use or property value, and the area is protected to the extent that economic utilisation is restricted. Applications for rates remission are made annually.

NRegE5: Annual grant for legally protected areas on private land

District councils can provide an annual grant to landowners that legally protect areas of ecological value. Such grants would usually be based on the size of the area protected or its rating value. This approach does not appear to be widely used at present.

Strength

- This is a positive signal to landowners that a council values landowners legally protecting areas of biodiversity value.

Limitations

- The amounts offered in such grants have tended to be insufficient to act as a strong incentive for legal protection.
- A council can reduce the amount and/or remove the scheme and potentially lose landowner goodwill.
- If landowners who gain subdivision privileges from legally protecting areas of ecological value also receive the grant this could be seen as 'double dipping'.

The following factors improve the likelihood of success for this approach:

- the grant is well publicised
- the amount offered per hectare is sufficient to be an incentive
- it is only offered to landowners who legally protect areas of ecological value without receiving development privileges (eg, opportunities to create additional lots).

NRegE6: Free or discounted resources

Some councils provide free or discounted resources (eg, plant materials, pesticides) for biodiversity protection and restoration work on private land. This is usually restricted to those landowners with agreements with a council, and may include community restoration activities on private land. These resources are not available for restoration work that is required as part of a resource consent.

Strengths

- Free and discounted resources can encourage more landowners and community groups to undertake ecological protection and restoration work.
- This can provide opportunities for council staff to work with landowners in a positive way.

Limitation

- The resources may not be used in high-priority sites.

The following factor improves the likelihood of success for this approach:

- the availability of resources is advertised along with the conditions that apply.

Examples

Environment Waikato contracts the bulk growing of common eco-sourced plants. These are available to community groups and landowners involved in restoration projects at a discounted price.

NRegE7: Assisting community trusts involved in environmental protection activities

Some councils provide financial assistance to community trusts involved in biodiversity and environmental protection and restoration activities.

Example

Taranaki Regional Council administers, services and provides a facilitator for the Taranaki Tree Trust. The Taranaki Tree Trust is a charitable trust that assists landowners with the management of forest remnants and wetlands. This includes assistance with fencing and planting.

Council Lands

CL1: Managing biodiversity values on council lands

Many councils own lands that may have considerable biodiversity value. These lands may be held for a variety of purposes including recreation, actual or potential water supply catchment, natural hazard management, forestry and open space protection. These areas are often of value because they are in lowland and coastal environments where few natural ecosystems remain.

Council water supply catchments were often set aside in the 19th century and may now be one of the very few areas with unlogged lowland indigenous forest in a district or region.

Local council reserves can be important for protection of biodiversity in urban and rural areas as well as for provision of ecosystems services such as flood mitigation and soil conservation, and provision of amenity and recreation.

Reserves with a primarily recreation or amenity role can also be important for biodiversity protection (eg, orchids in the middle of the Rotorua Racecourse and bush at the Waikumete Cemetery in Waitakere City).

Auckland Council and Greater Wellington Regional Council both have an extensive network of regional parks managed for conservation, catchment water supply and recreation. The Local Government Act 2002 provides for the development of regional parks.

Greater Wellington Regional Council manages over 50,000 hectares of parks, forest and other recreation areas. Some of the water catchment areas contain the best examples of original lowland podocarp forest in the lower North Island and parts are now subject to intensive animal pest control.

Local authorities may manage Crown-owned land (including scenic reserves) with biodiversity values (eg, Whakatane District Council).

Esplanade reserves and paper roads around water margins may contain important biodiversity values. They may also play an important role in protecting adjoining aquatic ecosystem values. Esplanade reserves are managed under the Reserves Act 1977. Combined management of esplanades with adjacent paper roads can reduce overall management costs and have biodiversity benefits.

Where there is a network of esplanade reserves and possibly other council reserves along the coast or water body margin a combined management plan is sometimes prepared by the relevant council. An example of such a plan is the Golden Gate Reserves Management Plan in Porirua City.

Esplanade reserves are often managed by the adjoining landowner, particularly in districts with few resources. This can benefit biodiversity values, particularly if the council is able to provide some support (eg, free disposal of environmental weeds, native plants). However, some adjoining landowners are more interested in improving their

views, boat access and amenity values and so do not manage these areas to maintain biodiversity values. A variety of techniques is needed to address this. See Esplanade areas guidance note for more information.

Lands owned and managed by a council may be administered through a variety of council departments with often different objectives. Protecting and enhancing biodiversity values on council lands should be part of the objectives for all departments.

Appropriate actions include:

- effective and timely terrestrial and aquatic plant and animal pest control as a leading example to the rest of the community
- planting appropriate eco-sourced native species
- habitat restoration activities as appropriate (eg, planting native trees after removal of pines; removing willows from waterways and riparian margins; ensuring streams and rivers provide their natural levels of fish passage (before culverts, dams, weirs and so on)).

In most cases road reserves and recreation reserves will not fall within the definition of an 'urban environment allotment' under sections 76(4A), 76(4B), or 76(4C) by virtue of them being part of large areas greater than 4,000 square metres, or not having a residential or commercial building on them. In such circumstances a council could still have a form of blanket protection applying to those trees.

In other circumstances, the road reserve has typically been vested in a council so that it, and anything on it, becomes the property of the council. Similarly, on any other land that Council owns Council would be the only party entitled to remove or prune a tree. Anyone damaging or removing trees in a road reserve without council permission may either be breaking by-laws (if these exist) or could be offending under other legislation by virtue of 'damaging council property'.

CL2: Identification and legal protection status for council areas of biological value

Some areas of particularly high biodiversity value on council lands are not legally protected from activities such as vegetation clearance, road construction and infrastructure development, including wind farms, dams and impoundments.

Councils that manage lands should lead by example. Areas with biodiversity values should be identified by way of systematic survey and actions would be taken to ensure that those biodiversity values are legally protected.

The legal status of water margin lands (reserves of various status and paper roads) should be rationalised and a strategy for their management developed.

CL3: Encourage community involvement in ecological restoration activities on public lands

Landcare groups, various local 'friends' organisations and other care groups (eg, Coast Care) have become increasingly popular as communities become more involved in biodiversity protection and restoration activities on public lands.

An example of the leasing of council reserve land for biodiversity protection is the Karori Sanctuary/Zealandia in Wellington, which is run by a charitable community trust. This comprises of 225 hectares of council owned lowland regenerating forest surrounded by an 8.6 kilometre-long predator-proof fence. The idea for the sanctuary came from the community and was supported by both the Wellington City Council and Greater Wellington Regional Council. Find out more about the Karori Sanctuary's story.

A smaller scale example is the Thames Coromandel District Council leasing land to the local branch of the Royal Forest and Bird Protection Society. The Society has developed plans in partnership with the Department of Conservation, Environment Waikato, recreational groups and iwi to restore floodplain vegetation while enhancing the recreational values of the area.

CL4: Acquisition of areas of biological value

Councils can acquire areas of biodiversity value. To help maximise benefits from this system a region-wide assessment to identify purchase priorities could be undertaken. It may be possible to involve other agencies and organisations in the purchase of expensive properties (eg, Kaikoura Island).

Council infrastructure development and maintenance

Examples of council infrastructure development and maintenance activities that can affect biodiversity values include:

- road construction, realignment, widening and resurfacing
- road stormwater management
- road margin management
- construction of sewer lines (where they pass through natural areas and water margins)
- construction of stopbanks, planting certain willow species and river realignment for flood management purposes
- drainage works especially in the vicinity of wetlands
- water supply dams and reservoirs
- water takes from rivers for municipal supply
- altering river mouth positions.

Councils could reduce the adverse impacts of their activities on biodiversity values by:

- addressing the avoidance of adverse impacts on biodiversity in the initial planning and design stages
- seeking appropriate ecological advice

- developing council-wide protocols on best practice for council activities (including road construction and maintenance, water supply, wastewater and stormwater management, river control, land drainage, erosion control, other natural hazard mitigation works and forestry) affecting terrestrial and aquatic habitats
- minimising discharges of waste to water bodies through waste avoidance and minimisation.

Council biosecurity work

Regional council functions under the Biosecurity Act 1993 provide councils with opportunities to improve indigenous biodiversity outcomes by:

- including environmental weeds and animal pests of natural areas within the pest management strategy
- undertaking eradication operations for pest species recently arrived with limited distribution to date
- undertaking control operations of plant and animal pests of natural areas with other agencies as appropriate.

Accessing expertise

Some of the larger regional councils and territorial local authorities employ staff or regularly contract specialist expertise on ecological assessment, biodiversity management, planning and monitoring. This is particularly so where the council actively manages lands of biodiversity value. In these cases there can be groups or sections charged with managing and conserving land to enhance biodiversity.

Smaller councils will increasingly need to access appropriate expertise via mechanisms such as staffing, contracting and staff sharing between organisations.

Where councils implement biodiversity programmes requiring active ongoing communication with landowners and/or the community, it is important to ensure that there are sufficient credible personnel to undertake these tasks.

The position of a biodiversity officer is becoming increasingly popular, even in smaller councils. This type of position is particularly likely where the council is responsible for monitoring a number of covenants and/or there are a number of sites of biodiversity value where the council is seeking to improve biodiversity outcomes.

The integrity of some plan rules can depend on appropriate ecological advice. For example, some territorial local authorities have rules that provide for landowners to receive extra development privileges in return for legally protecting an area of ecological value, or for landowners to clear an area of indigenous vegetation after proving that it is not of value. It is wise to use independent ecologists to carry out the certification.

Offsetting

Biodiversity offsetting is a tool that could be used to compliment other methods to avoid, remedy and mitigate effects. The international Business and Biodiversity Offsets Programme (BBOP) defines biodiversity offsetting as:

"measurable conservation outcomes of actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken. The goal of biodiversity offsets is to achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity".

The definition is based on biodiversity offsets being considered last. That is, developers should first seek to avoid, then minimise (design a project to reduce harm) and then remedy (e.g. make good temporary impacts at the site) their impacts on biodiversity. Offsetting is then used to address remaining, or residual, unavoidable impacts on biodiversity. There are ten key principles that must be adhered to for a biodiversity offset to meet international best practice. See the BBOP site for further information about these principles, and about the international standard that BBOP have developed.

New Zealand-specific guidance on voluntary biodiversity offsetting is expected to be available later in 2013.

Improving plan implementation

Implementation is the point in plan development process where attention to detail and approach can directly influence outcomes. Some of the difficulties councils have faced in implementing plans (typically first generation plans) include:

- difficulty in interpreting some plan provisions (wording is ambiguous or imprecise)
- lack of information and knowledge about ecological matters and biodiversity in the district or region
- applicants for resource consent providing inadequate assessments of ecological effects
- difficulty of enforcing plan provisions with some landowners
- monitoring compliance with resource consent decisions especially for remote sites
- clarifying the respective accountabilities of regional and district councils.

Compliance with the biodiversity-related conditions in resource consents

Consent conditions relating to maintaining indigenous biodiversity usually require ongoing protection or restoration actions. Accordingly, in setting conditions, councils should consider the following:

- monitoring of consent conditions
- covenants established by way of a consent notice that can require natural areas to be protected in perpetuity. A monitoring and compliance programme for these covenants requires that their initial design, establishment and management be undertaken properly and their boundaries added to the council's GIS databases.
- encourage use of voluntary covenants, where compliance tends to be much higher for example, where landowners voluntarily enter into a covenant under the Queen Elizabeth the Second National Trust Act 1977 or the Reserves Act 1977.

The following approaches can help manage effects on biodiversity and ecology.

- Have early discussions with an applicant to clarify whether the proposed covenant could best be secured by a covenant with a third party (eg, Queen Elizabeth II National Trust covenant) or through encumbrances on the titles of the relevant lots or through a consent notice.
- Provide adequate advice to developers and technical support to the consent planners.
- Include consent conditions that require placement of covenants on the title. In general, these should be fully implemented before titles or bonds are released. These could include specific long-term management requirements that, for example, prevent or control predatory pets (cats and dogs) on rural properties.
- Council officers should ensure that the initial works are completed at the expense of the subdividing owner before properties are passed to subsequent owners. It is recommended that processes be developed and implemented to ensure that this is the case. Fencing needs to be completed and weed and pest management plans need to be produced. Initial weed removal and any installation of pest control networks (such as trap lines or bait stations) should also be completed before

properties are on-sold. The best way to do this is to delay the issue of titles until these works are completed.

- Bonds should be used for conditions that may need a number of years to be fully implemented (eg, 'revegetation using indigenous woody species that achieves indigenous canopy closure'). In these cases, the bond would need to be sufficiently large to ensure the planting and subsequent maintenance is undertaken.
- Where weeds are a major problem, a bond should be imposed to cover likely heavy weed control requirements in the first few years. The bond should be sufficient to cover the costs of undertaking the works.
- Ensure that the application and consent conditions have addressed the administration and management of the natural area in the long term.
- Consent notices should include a clause that allows councils to recover costs and requires owners to pay for monitoring at suitable intervals.
- Involve landowners. Many seem to be unclear about their responsibilities under the terms of the covenant or bond. This may be especially problematic for subsequent landowners. Landowners are often unsure about what they need to do to keep the bush and wetland areas in good condition. Involving landowners in a monitoring programme would encourage them to actively undertake fencing, and weed and pest control.

Monitoring the effectiveness of RMA plans and policies

It is important to monitor the outcomes of plan and policy biodiversity objectives, otherwise it is not possible to determine whether the anticipated outcomes are actually being achieved. It is beyond the scope of this guidance note to provide detailed guidance on the design, implementation and reporting of biodiversity monitoring programmes. See guidance on monitoring plan and policy effectiveness.

There is no finalised national set of indicators. However, several councils have begun to monitor aspects of biodiversity using indicators.

Information management

Robust biodiversity management relies on: good information collection, management and reporting to determine issues and priorities, set and review objectives, monitor changes from baseline conditions, manage natural areas, educate resource owners and users, and make informed decisions regarding use and development of natural resources. The New Zealand Biodiversity Strategy states that "good accessible information, underpinned by a growing knowledge base and the capacity to take action, are vital precursors to achieving most actions in this Strategy". As a result, two programmes were established by the Government in 2000.

1. The Terrestrial and Freshwater Biodiversity Information System (TFBIS) Programme aims to improve awareness of and access to existing information about terrestrial and freshwater biodiversity. It includes an annual funding round. The programme is being led by the Department of Conservation.
2. The National Aquatic Biodiversity Information System (NABIS) aims to compile and provide, via an interactive web-based tool, access to existing information about the marine environment. The NABIS will also identify key biodiversity information and information gaps. This programme is being led by the Ministry of Fisheries in

consultation with the Ministry for the Environment, Department of Conservation and regional councils.

The Dataversity website http://dataversity.org.nz/, funded through the TFBIS Programme, facilitates knowledge-sharing and collaboration to support biodata management in regional and territorial councils. It includes an online discussion group restricted to local government biodiversity data managers, links to data sets, council data development projects and a calendar of biodiversity data-related events. It has also a public discussion group through which government managers can be in touch with other authorities and members of the public.

There are several regional information and monitoring forums. Another information sharing mechanism is a broad-based partnership between research and management agencies, iwi groups, private landowners, communities and projects in relation to native biodiversity in a region.

What is indigenous?

Indigenous species include migratory species that travel from New Zealand to other parts of the world to either breed or feed. Albatrosses and many species of petrels, for example, breed in colonies on land in New Zealand. When they have finished breeding, they travel to feed in oceans in other parts of the world, often thousands of kilometres from New Zealand. In contrast, the Arctic waders breed in the northern hemisphere and travel south to spend summer feeding in New Zealand when it is winter in the Arctic.

Many indigenous marine and some freshwater species also travel to and from New Zealand waters. Humpback whales pass through New Zealand waters on their way north from their summer feeding grounds in the Antarctic to their winter breeding grounds near Tonga. Long- and short-finned eels travel from New Zealand waterways 5000 kilometres into the Pacific to breed, returning as larvae drifting on currents.

Recent arrivals that have reached New Zealand without human intervention are also considered to be indigenous species. An example is the welcome swallow, which was first noticed breeding near Kaitaia in 1958 and has since spread throughout much of the country. Plants are also still arriving naturally. An example is a tongue orchid (Cryptostylis subulata), which arrived recently from Australia by wind on the high altitude jet stream. Tongue orchids have been able to establish in Northland swamps because the specific Australian wasp they need for pollination has also arrived here.

What is endemic?

New Zealand's endemic species include birds that breed only in New Zealand, but which may disperse to other countries in the non-breeding season or as sub-adults. Examples of New Zealand endemic birds are kiwi, kokako and royal albatross. Endemic species are of high conservation importance as they are unique to our country and only the protection of their natural habitat in New Zealand can ensure their survival.

Ecosystem services

The New Zealand Biodiversity Strategy describes ecosystem services as:

"The free 'services' such as clean air and water that are provided by healthy ecosystems are often taken for granted. Although New Zealand's land-based primary production (such as farming, forestry and horticulture) is based on introduced species, its success relies on natural biological systems…

"A 1997 study by Massey University economists suggested that the total annual value provided by New Zealand's native biodiversity to the country's economy could be more than twice the value of our gross domestic product. They estimated the annual value of native biodiversity on land in 1994 at $46 billion, and valued marine ecosystem services at $184 billion – a total of $230 billion a year. By comparison, New Zealand's gross domestic product that year was $84 billion.

"Scientists believe that possible uses of our native biodiversity that may lead to new economic opportunities – such as new medicines – have still to be discovered.

"Protecting biodiversity can be likened to buying an insurance policy because it keeps our options open. Biodiversity is vital for the 'clean and green' image that supports our primary producers and tourism industry, as well as our growing film industry."

Glossary

Alien species:

See Introduced species below.

Biological diversity:

See What is biodiversity?

Biosecurity (from New Zealand Biodiversity Strategy):

The protection of people and natural resources, including biodiversity, from unwanted organisms capable of causing harm.

Biota (from New Zealand Biodiversity Strategy):

All the living organisms at a particular locality.

Buffers:

Buffer zones are areas around a remnant that are managed to limit adverse effects from adjacent land uses. An example is a shrubby buffer around a forest remnant. Benefits of buffers can include:

- decreasing fire risk
- protecting forest edges from wind penetration and weeds
- protecting sensitive plants and animals in the remnant interior
- limiting input of nutrients and sediment (especially to wetlands and aquatic ecosystems)

Climate change (from Resource Management Act 1991):

This means a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods.

Coastal environment (from New Zealand Biodiversity Strategy):

An environment in which the coast is a significant element or part. The extent of the coastal environment will vary from place to place depending on how much it affects, or is affected by, coastal processes and the management issues concerned. It includes at least

three distinct, but inter-related, parts: the coastal marine area, active coastal zone and land back-drop.

Conservation (from Conservation Act 1987):

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

Convention on Biological Diversity (from New Zealand Biodiversity Strategy):

An international agreement on biological diversity that came into force in December 1993. The objectives of the Convention are: the conservation of biological diversity; the sustainable use of its components; and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources.

Ecological corridor:

An ecological corridor can be described as a narrow strip of habitat connecting two or more larger areas of similar habitat and potentially used by wildlife so allowing movement between primary habitats. Corridors have been considered important for migration and to reduce extinction rates in a fragmented landscape although this does not always occur.

The effectiveness of corridors varies considerably between species. In addition to assisting the movement of desired native species, corridors can also enable the spread of predators, disease organisms and opportunistic species such as weeds.

The concept of a corridor tends to be used loosely although particular species have specific requirements. Aspects to consider include the shape, the type of habitat and how it assists the dispersion of particular species.

A corridor should only be used as an offset or trade-off for the negative ecological consequences of habitat fragmentation where the benefits of a particular corridor can be clearly demonstrated for an identified species.

Ecological district (from New Zealand Biodiversity Strategy):

A local part of New Zealand where the features of geology, topography, climate and biology, plus the broad cultural pattern, inter-relate to produce a characteristic landscape and range of biological communities unique to that area. In New Zealand, 268 ecological districts have been identified and mapped (at 1:500,000 scale).

Ecology:

The study of the relationships between organisms and their environments, including: the interactions of living organisms with one another and with their non-living surroundings; the flow of matter and energy in an environment; and the structure and functions of

nature. The term was coined in 1866 by German biologist Ernst Haeckel from the Greek 'oikos' meaning 'house' and 'logos' meaning 'science'.

Eco-sourcing:

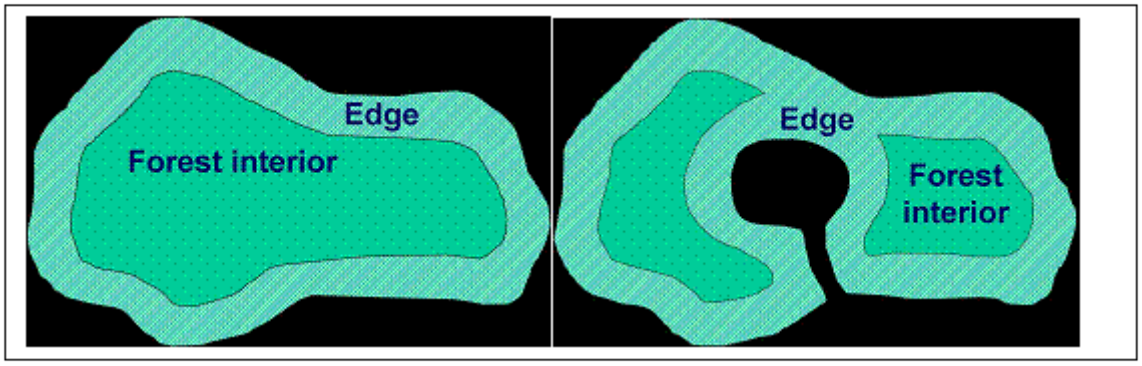
Eco-sourcing is sourcing native plants from local seed or vegetative material for local use in plantings. It is used in order to ensure that:

- plants will be well adapted to surviving in the environment where they are planted
- genetic provenance of the local species is retained, enabling the local population to maintain its ability to survive in the local environment
- vegetation is being restored as close as possible to the vegetation type that naturally grows in the area
- cultivar and hybrid forms that do not grow locally are not used
- native species are not planted outside their natural ecological range.

Edge effect (forests):

The edges of areas of indigenous vegetation are where the impacts of surrounding land use are greatest and are where pests and weeds can invade and penetrate edges more easily. For a forest this is where light levels are higher and soil moisture and humidity are less. The edge effect can be seen most clearly where mature native forest adjoins pasture. Where a forest becomes highly fragmented (eg, by roads), the effective edge becomes proportionally larger relative to the intact core. This can be seen by comparing figures 1(a) and 1(b) below.

Figure 1(a) Intact forest Figure 1(b) fragmentation increases forest edge



Eco-siting:

Recreating the same ecosystem that used to exist in the area by using plants that grew naturally at the site and matching each plant species to its preferred habitat.

Ecosystem (from New Zealand Biodiversity Strategy):

An interacting system of living and non-living parts such as sunlight, air, water, minerals and nutrients. Ecosystems can be small and short-lived, for example, water-filled tree holes or rotting logs on a forest floor, or large and long-lived such as forests or lakes.

Endemic species (from New Zealand Biodiversity Strategy):

An indigenous species that breeds only within a specified region or locality and is unique to that area. New Zealand's endemic species include birds that breed only in New Zealand, but which may disperse to other countries in the non-breeding season or as sub-adults.

Exotic:

See Introduced species below.

Fauna (from Reserves Act 1977):

Animals of any kind.

Flora (from Reserves Act 1977):

Plants of any kind.

Fragmentation:

The clearance or loss of parts of a continuous natural area in a manner that reduces its total area and will change it in one or more of the following ways:

- increasing the amount of edge
- decreasing the amount of interior habitat
- isolation of one fragment from other natural areas
- breaking up of one natural area into several smaller patches
- decreasing the average size of each natural area patch.

Genetic diversity:

See Biological diversity above.

Habitat:

This has two potential meanings. The first, and one used in this guidance note, is that it is the environment of a particular organism. For example, the habitat of kokako is mature podocarp/mixed broadleaved forest, while the habitat of fernbird is relatively undisturbed wetland and scrub.

The alternative usage is that a habitat is a relatively homogeneous 'mini-ecosystem' that is spatially bounded.

Indigenous species (from New Zealand Biodiversity Strategy):

A plant or animal species that occurs naturally in New Zealand. A synonym is 'native'.

Indigenous vegetation (from New Zealand Biodiversity Strategy):

Any local indigenous plant community containing throughout its growth the complement of native species and habitats normally associated with that vegetation type or having the potential to develop these characteristics. It includes vegetation with these characteristics that has been regenerated with human assistance following disturbance, but excludes plantations and vegetation that have been established for commercial purposes.

Introduced species (from New Zealand Biodiversity Strategy):

A plant or animal species that has been brought to New Zealand by humans, either by accident or design. A synonym is 'exotic species'.

Invasive species (from New Zealand Biodiversity Strategy):

An animal pest or weed that can adversely affect indigenous species and ecosystems by altering genetic variation within species, or by affecting the survival of species, or the quality or sustainability of natural communities. In New Zealand, invasive animal pests or weeds are almost always species that have been introduced to the country.

Invertebrate (from New Zealand Biodiversity Strategy):

An animal without a backbone or spinal column. Insects, spiders, worms, slaters and many marine animals such as corals, sponges and jellyfish are examples of invertebrates. Invertebrates make up the majority of all animal species; only fish, amphibians, reptiles, birds and mammals are not invertebrates.

Mainland island (from New Zealand Biodiversity Strategy):

An area of land on mainland New Zealand, isolated by means of fencing or geographical features, and intensively managed for the purpose of protecting and restoring habitats and ecological processes.

Migratory:

Species that move annually and seasonally between breeding and non-breeding areas either within New Zealand (eg, wrybill, whitebait) or to other countries (eg, godwit, long-finned eel). In the Department of Conservation tables of threatened species, migrants are considered to be taxa that predictably and cyclically visit New Zealand as part of their normal life cycle, but do not breed here.

Native species:

See Indigenous species above.

Natural habitats and ecosystems (from New Zealand Biodiversity Strategy):

Habitats and ecosystems with a dominant or significant indigenous natural character. They do not include modified areas, such as farm or forestry land, where the indigenous vegetation has largely been replaced, although these areas may still provide important habitat for indigenous species.

Naturalised (from New Zealand Biodiversity Strategy):

A species or other taxon, originating from a region outside New Zealand, but reproducing freely and maintaining its position in competition with indigenous biota in New Zealand.

Protected area (from New Zealand Biodiversity Strategy):

A geographically defined area that is protected primarily for nature conservation purposes or to maintain biodiversity values, using any of a range of legal mechanisms that provide long-term security of either tenure or land use purpose. It may be either publicly or privately owned.

Protected area network (from New Zealand Biodiversity Strategy):

A network or system of protected areas. The principal criteria for New Zealand's protected area network are as follows:

- comprehensiveness: the degree to which the full range of ecological communities and their biological diversity are incorporated within protected areas
- representativeness: the extent to which areas selected for inclusion in the protected area network are capable of reflecting the known biological diversity and ecological patterns and processes of the ecological community or ecosystem concerned, or the extent to which populations represent or exemplify the range of genetic diversity of a taxonomic unit.

Representativeness:

See Protected area network above.

Restoration (from New Zealand Biodiversity Strategy):

The active intervention and management of degraded biotic communities, landforms and landscapes in order to restore biological character, ecological and physical processes and their cultural and visual qualities.

Revegetation:

Re-establishing a cover of vegetation.

Riparian (from Johnson & Gerbeaux (2004) Wetland Types in New Zealand):

Situated along the immediate margin of a river or stream.

Riverine (from Johnson & Gerbeaux (2004) Wetland Types in New Zealand):

Hydrosystem associated with rivers, streams and other open channels, both natural and artificial, where the dominant function is continually or intermittently flowing fresh water. Although many wetlands occupy landforms such as valley floors, floodplains and deltas which owe their genesis to river processes, the riverine hydrosystem extends only so far as flowing channels retain a current influence, which can be defined as the extent covered by the mean annual flood.

Species (from New Zealand Biodiversity Strategy):

A group of organisms capable of interbreeding freely with each other but not with members of other species.

Taxon (from New Zealand Biodiversity Strategy) (plural taxa):

A named biological classification unit assigned to individuals or sets of species, for example, species, sub-species, genus or order.

Threatened species:

A species or community that is vulnerable, endangered or presumed extinct. The Department of Conservation has assessed species in New Zealand using criteria relating to the number of mature individuals in the species, the ongoing or predicted population trends in response to threats, how many populations there are and how widespread or localised they are. Threatened taxa have been classified into three categories: nationally critical, nationally endangered and nationally vulnerable.

Tree (Defined by the Environment Court having regard to the Shorter Oxford English Dictionary, 6th Edition, OUP):

Means a woody perennial plant, typically having a single stem or trunk growing to a considerable height and bearing lateral branches at some distance from the ground. In the absence of any definition in the Act itself, a district plan may contain its own definition of trees which, in those cases, would prevail over this definition.

Vascular plants:

In general, this refers to plants with a vascular system that transports water and food throughout the plant. Includes ferns, flowering plants and trees and those that bear cones, but does not include mosses and liverworts.

Weeds (Landcare Research):

A weed is a plant growing where it is not wanted and with a harmful impact. Environmental weeds are plants that invade native vegetation and are harmful to native ecosystems. Also referred to as pest plants or invasive plants.

Wetland (from Resource Management Act 1991):

Includes permanently or intermittently wet areas, shallow water and land water margins that support a natural ecosystem of plants and animals that are adapted to wet conditions.