

15 Terrestrial Biodiversity

15	TERRESTRIAL BIODIVERSITY	247
15.1	TERRESTRIAL BIODIVERSITY: MAIN POINTS.....	248
15.2	INTRODUCTION TO TERRESTRIAL BIODIVERSITY IN NORTHLAND.....	249
15.3	REGIONAL POLICY STATEMENT OBJECTIVES.....	249
15.4	TERRESTRIAL BIODIVERSITY ISSUES	250
15.5	PRESSURES AFFECTING TERRESTRIAL BIODIVERSITY.....	250
15.5.1	<i>Habitat Loss</i>	250
15.5.2	<i>Habitat Fragmentation</i>	250
15.5.3	<i>Loss of Wetlands</i>	251
15.5.4	<i>Loss of Species</i>	251
15.5.5	<i>Pests and Weeds</i>	252
15.6	STATE OF TERRESTRIAL BIODIVERSITY	253
15.6.1	<i>Extent of Indigenous Vegetation</i>	253
15.6.2	<i>Threatened Species</i>	257
15.7	RESPONSE TO TERRESTRIAL BIODIVERSITY ISSUES	257
15.7.1	<i>Other Responses</i>	257
15.7.2	<i>Legally Protected Areas</i>	259
15.7.3	<i>Northland Regional Council</i>	259
15.7.4	<i>Community Care Groups</i>	260

15.1 Terrestrial Biodiversity: Main Points

Pressures

- Since 1850, approximately 80% of Northland's indigenous vegetation has been converted to pasture, horticulture, pine plantations, or urban areas.
- Many remaining indigenous habitats are small and fragmented. This increases the pressures from surrounding land uses.
- Introduced pests and weeds are a major threat to Northland's indigenous biodiversity.

State

- Today, approximately 22% of the Northland region remains in indigenous forest.
- Only 5% of the original coastal/freshwater wetlands remain.
- There are more than 100 threatened plant and animal species in the Northland region. This is greater than for any other region in New Zealand.

Response

- The major focus for Council pest management is possum control operations.
- Biological controls have successfully been released for a number of pest plants.
- Approximately 50% of the remaining indigenous vegetation is protected by the Department of Conservation, or through other legal means such as covenants.
- Northland Regional Council has set up an environmental fund to help improve and protect Northland's natural environment, including its indigenous biodiversity.
- A regional forum, the Northland Biodiversity Enhancement Group, has been formed to coordinate efforts in promoting and enhancing biodiversity in Northland.

15.2 Introduction to Terrestrial Biodiversity in Northland

Biodiversity (short for biological diversity) refers to the variety of life-forms that exist in a particular place. Northland supports a wide variety of natural areas, including indigenous forests and shrublands, wetlands, gumlands, rivers, lakes, streams, dunelands, and coastal and marine habitats. The diversity of plant and animal species and communities contained in each of these contributes to the unique biodiversity of Northland. This is particularly characterised by a large number of species endemic to Northland, some of which are only known from small or scattered areas. Many of the region's major indigenous forests and wetlands have been gifted to or purchased by the Crown for conservation purposes.

Biodiversity is important within the context of sustainable resource management for many reasons. It is essential for the maintenance of resilient ecosystems. Ecosystems which are high in diversity are more flexible and more able to respond to changes in circumstances. For example, ecological processes such as the operation of food chains and nutrient cycles can continue despite changes to the environment. Where biodiversity is low, an ecosystem is restricted in its options in responding to any disturbance and is consequently more vulnerable to change. The fragmentation of many habitats which has occurred in Northland has accentuated this vulnerability. Biodiversity also provides for future economic, scientific and cultural development, and also provides less tangible aesthetic and spiritual benefits as well as a more interesting environment in which to live.

The difficulty for human kind is that while it is dependent on the biological resources for its survival, many human activities modify or destroy them, creating ecosystems which are low in diversity and consequently more vulnerable to change. The Northland region has the highest numbers of threatened species in New Zealand.

Northland contains a mosaic of habitats from temperate to subtropical, ranging from fragments of beech forest to expanses of kauri and mangrove forests, harbours, freshwater and brackish wetlands.

15.3 Regional Policy Statement Objectives

The Regional Policy Statement contains a range of objectives relating to biodiversity. These objectives seek to maintain the biodiversity of the Northland region.

The Regional Policy Statement objectives are the:

- **Maintenance of the biodiversity of the Northland region.**
- **Protection of the life supporting capacity of ecosystems through avoiding, remedying or mitigating (in that order of priority) the adverse effects of activities, substances and introduced species on the functioning of natural ecosystems.**
- **Protection of areas of significant indigenous vegetation and the significant habitats of indigenous fauna.**

15.4 Terrestrial Biodiversity Issues

- Modification or permanent loss of most of the region's terrestrial and freshwater ecosystems due to the clearance of indigenous forest and shrublands, and drainage of wetlands, pollution and the introduced pests and noxious plants.
- The vulnerability of significant indigenous vegetation and remnant habitats of indigenous species located on private land.
- The lack of linkage between areas of ecological significance, (through use of corridors and establishing buffer zones around them to reinforce other protection mechanisms)

15.5 Pressures Affecting Terrestrial Biodiversity

15.5.1 Habitat Loss

Since 1850, approximately 80% of Northland's indigenous vegetation has been converted to pasture, horticulture, pine plantation, or urban areas. A major pressure on indigenous vegetation is from land use activities on private land, including vegetation clearance, subdivision and development, grazing and drainage of wetlands.

It is difficult to say exactly, but currently approximately 50% of indigenous vegetation is protected by the Department of Conservation, or through other legal means such as covenants. However, the other 50% remains in private ownership, and is therefore under pressure from surrounding land uses, and development pressures.

15.5.2 Habitat Fragmentation

The remaining habitats in Northland are small and fragmented. This increases the pressures from surrounding land uses. Natural ecosystems rely on interaction with neighbouring areas of sufficient size to maintain the processes that drive them. As habitats are destroyed, they are separated into 'habitat islands' separated by pasture, plantations, orchards, roads or urban settlements.



Kauri-Podocarp remnant at Kaiwaka

Department of Conservation

The boundaries of small habitat fragments are susceptible to pests, stock damage and development of light and wind tolerant species different to that of the main body of the ecosystem. Habitat isolation makes it difficult for species to find sufficient food, or disperse their seeds to suitable germination sites. Unless small habitats contain viable populations, they are likely to develop into areas of low diversity and poor habitat quality.

15.5.3 Loss of Wetlands

Remaining wetlands are under pressure from drainage, fertiliser and animal wastes runoff, water abstractions, clearance of riparian and catchment vegetation, pine planting and logging, weir and dam construction, grazing and trampling of littoral vegetation by stock, and invasion of plant pests.



Wetland with spotless crane and waterfowl habitat

Department of Conservation

15.5.4 Loss of Species

The key pressures on indigenous species are insufficient and fragmented habitat and introduced invasive species, which prey on native species, compete with them or damage their habitat and key ecosystem processes.



Kauri snail

Department of Conservation

15.5.5 Pests and Weeds

Introduced pests and weeds are a major threat to our indigenous biodiversity. New Zealand's ecosystems have evolved in the absence of many of the pests now established here. Some of these pests are causing significant changes to our natural ecosystems.

Probably the most well known pest in New Zealand is the possum. They are voracious eaters, feeding on young foliage, particularly native plants. Their browsing habits damage and destroy forests, and affect both pasture and horticultural crops.

Possoms are a major threat to the region's primary industries as they are a potential vector in the spread of bovine tuberculosis. Northland is presently free of bovine Tb. Possoms are found throughout the region, although their population density varies from area to area. The current population is estimated to be around 15 million in Northland.

Feral cats, goats, ferrets, weasels, stoats, rats and rabbits can also cause significant damage to native ecosystems.



Tradescantia smothering the floor of a Taraire remnant near Maungatapere

Department of Conservation

With its warm, moist climate, which becomes almost subtropical further north, Northland is a favourable place for weed spread and appears to have the greatest range of weed problems in New Zealand. More than 100 species of weeds threaten Northland's biodiversity.

The most significant weeds are those with the capacity to invade pristine ecosystems and damage the natural processes of ecosystem functioning.

Plants such as African feathergrass, Manchurian ricegrass and pampas are very aggressive and spread

easily from wasteland into productive farmland and in some cases forests. Other plants such as mistflower, privet and wild ginger are a more serious threat to the region's native forests. They can take over the habitat of rare and endangered species, prevent regeneration and reduce the biodiversity of indigenous ecosystems.

15.6 State of Terrestrial Biodiversity

15.6.1 Extent of Indigenous Vegetation

Since human settlement 1000 years ago, the region's indigenous ecosystems and species have undergone dramatic changes. In the last 150 years, modification and habitat loss and loss of species has been extensive.

The remaining areas are fragmented and are modified to some extent. Today, approximately 271,600 ha (22% of the Northland region) remains in indigenous forest (Landcover Database, 1996).

Currently, most protected areas are in uplands that are not useful for production. In contrast, protected areas in the fertile lowlands tend to be small, fragmented and isolated. This is clearly illustrated in Table 26, where ecosystem loss is especially concentrated in the lowlands.

Table 26: The conservation status of forests at different altitudes in the Northland region, based on a survey of 1500 sites >5 ha

Altitude	Area (ha)	% of land area	% loss of forests	Mean forest area (ha)	% area in protection
< 100m	324,330	59.0%	79.3%	35	15.6%
100m-200m	140,751	25.6%	66.7%	68	17.7%
200m-300m	54,193	9.9%	66.0%	258	17.6%
>300m ¹	30,538	5.5%	17.0%	910	53.0%

¹ The highest point in the region is 774m, but for this study the data above 300 m was aggregated

Source: Craig *et al.* (2000)

There are four broad habitat types identified in Northland. These are forests and shrublands, wetlands (freshwater/coastal), dunelands and podzol gumlands. The following graph illustrates the extent of these habitats remaining as a result of land use changes since 1850 (Department of Conservation, 1999).

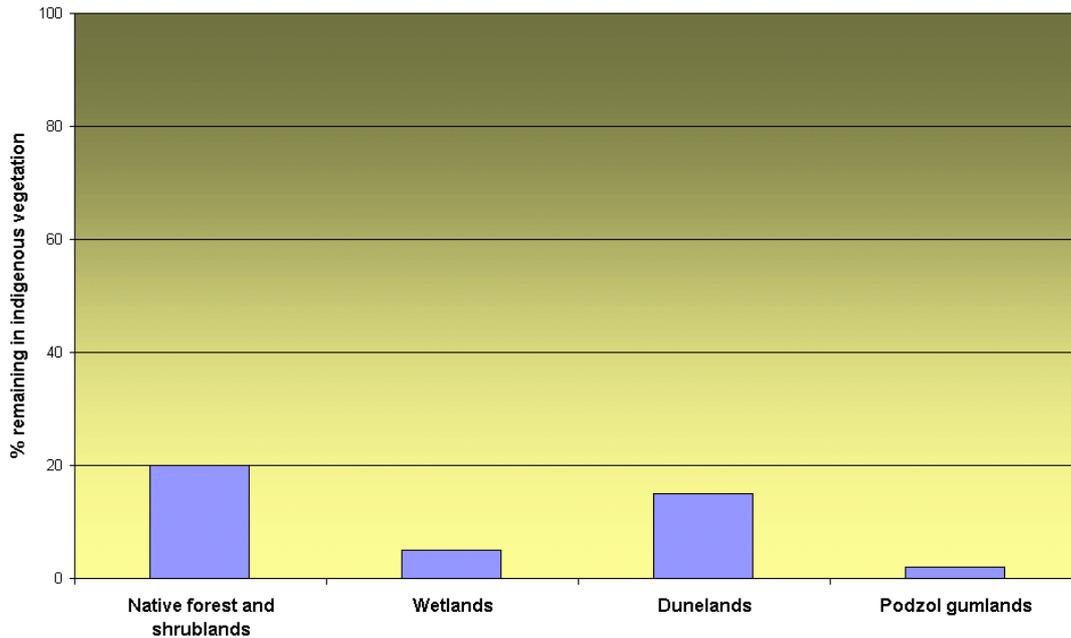


Figure 46: Percentage of indigenous habitats remaining in Northland

Only about 20% of Northland’s original forests remain today. Of those remaining, the most common are the mixed kauri-podocarp-broadleaf forest, frequently found in rolling to steep hill country areas, and the mixed podocarp-broadleaf forest found on clay soils, rolling hill country and at higher altitudes.

Volcanic broadleaf forests have been severely depleted and now occur only as small fragmented remnants or individual trees on rich volcanic soils in the Whangarei and Kaikohe districts.



Unmodified mature podocarp forest at Utakura

Department of Conservation

Less than 2% of the original Kauri forest (but only 0.5% of mature), now remains in Northland, nearly all of these areas are protected in the Waipoua, Trounson, Warawara, Herekino, Pukekaroro, and Puketi-Omahuta forests.

Less than 1% of the original mature podocarp forests of Northland remain, the last remaining area is situated at Utakura, and has just been acquired for reserve purposes.

Northland’s coastline and offshore islands were once covered in considerable areas of coastal forest characterised by species including pohutukawa, puriri, karaka, kowhai and cabbage trees. As a result of burning, land clearance, subdivision,

browsing by stock and invasion by weeds, these areas now only exist as small remnants on the steep slopes, cliffs and headlands on the east coast and North Cape.

Riverine flood and alluvial forest is one of the rarest, most fragmented and under-represented forest types in Northland. Remaining areas consist of thin, fragmented riparian strips and most are eaten out by stock and are not regenerating.

Duneland forests remain on the Aupouri and Pouto Peninsulas.



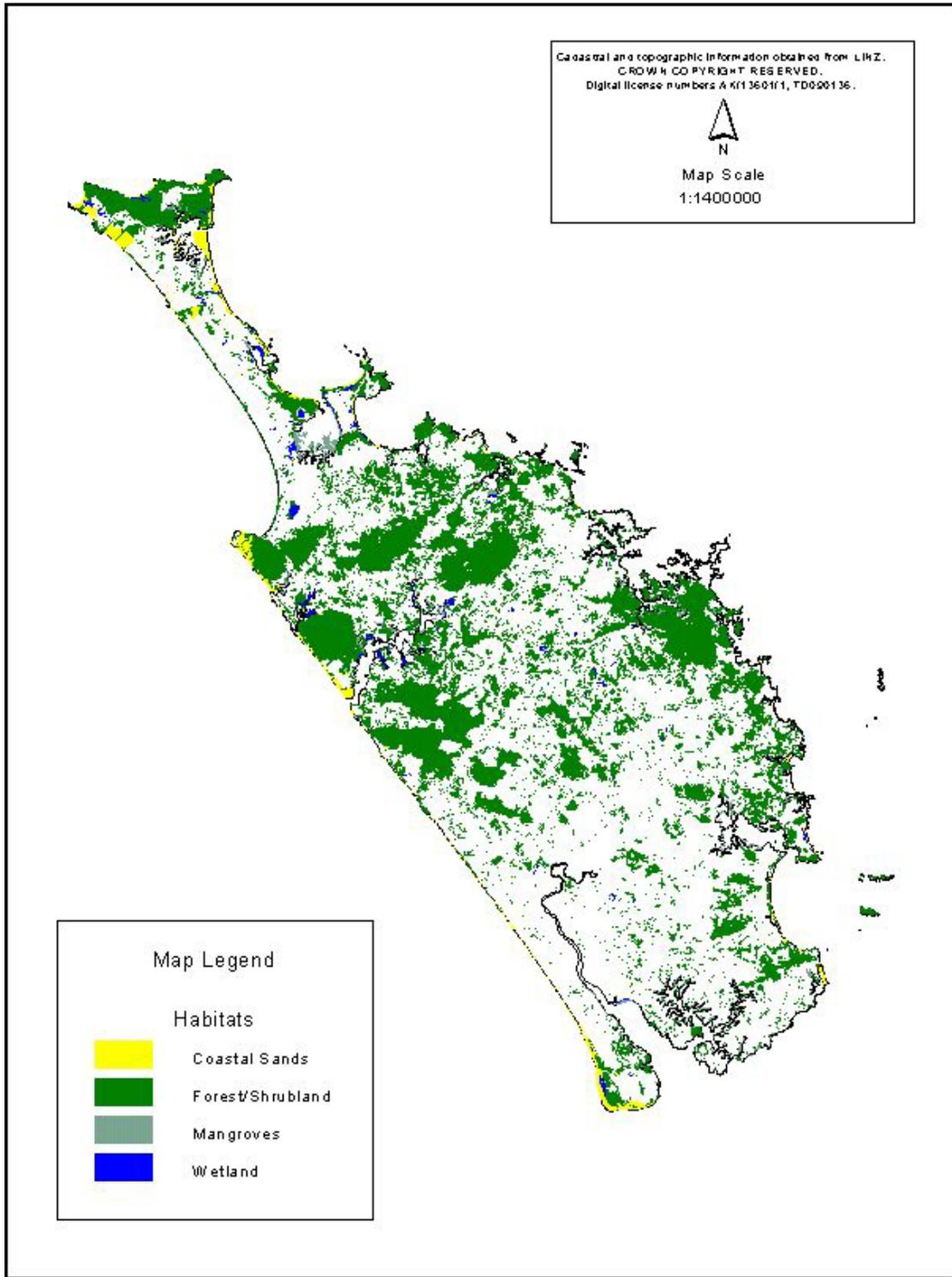
Duneland forest on the Pouto Peninsula

Department of Conservation

There are two main shrublands in Northland, which are important for forest succession and corridors and buffers. Many of the North Cape shrublands are protected by DoC, however, elsewhere they have little protection.

Only 5% of Northland's wetlands remain as a result of drainage and disturbance. Some wetland types are now close to being lost forever.

The following map illustrates the extent of indigenous habitats remaining in Northland.



Map 23: Indigenous habitats in Northland

15.6.2 Threatened Species

The Department of Conservation lists over 100 threatened plant and animal species in the Northland region. This is greater than any other region in New Zealand. The native animals, and especially the plants of the region, have been shaped by climatic change and alternating periods of isolation and contact with the mainland. This has made them extremely vulnerable to changing habitats and pressures from pests.

Table 27: Examples of some threatened species in the Northland Region

Plants	<i>Davallia "puketi"</i>
	<i>Coprosma waima</i>
	<i>Olearia waima</i>
Fish	dwarf inanga
	black mudfish
Reptiles	McGregor's skink
	tuatara
Mammals	long-tailed bat
	short-tailed bat
Birds	North Island brown kiwi
	kaka
	kakariki
	brown teal
	North Island kokako
	N.Z. dotterel

There are many other threatened species, including the kauri snail, fernbird, spotless crane, bittern, Hochstetters frog, New Zealand pigeon, and a whole host of plants including threatened ferns, orchids, shrubs, small herbaceous plants, sedges and rushes.



North Island kokako at Puketi Forest, Northland

Department of Conservation

15.7 Response to Terrestrial Biodiversity Issues

15.7.1 Other Responses

The New Zealand Government released the New Zealand Biodiversity Strategy in March 2000. The strategy is a plan adopted by the Government to halt the decline in New Zealand's indigenous biodiversity.

The Biodiversity Strategy sets national goals to conserve and sustainably manage New Zealand's biodiversity.

The Department of Conservation is taking a lead role in coordinating implementation of the New Zealand Biodiversity Strategy.

In addition to the Biodiversity Strategy the Minister for the Environment appointed a Ministerial Advisory Committee to provide advice on how to manage threats to indigenous biodiversity from the use of private land. The resulting report "Bio-what" was produced in December 2000. The report stressed the importance of land managers having ownership of proposals to protect and enhance biodiversity on the land they manage.

The Bio-what report recommended a greater involvement for Regional Councils in biodiversity management on private land although the legislative mandate for this is lacking at present. An upcoming amendment to the Resource Management Act is expected to clarify this issue.

A key factor in biodiversity management is that an integrated approach between all organisations is needed. The Department of Conservation manages its estate to protect conservation values and protect key species and places. However, there are many other organisations concerned with biodiversity:

A recent development in Northland is the formation of the **Northland Biodiversity Enhancement Group (N-BEG)**. This regional biodiversity forum involves representatives from the Northland Regional Council, Department of Conservation, QE II Trust and the Landcare Trust. Key objectives for N-BEG include:

- Co-ordinating the efforts of all agencies involved in promoting and enhancing biodiversity and sustainable land management in Northland.
- To provide information to enable landowners to develop their own plans and access the necessary expert knowledge.
- To provide assistance to landholders wishing to maintain and enhance their piece of biodiversity.

15.7.2 Legally Protected Areas

About 12% of Northland is directly administered by the Department of Conservation (DoC, 1999). Of this, 107,346 ha are protected under the Conservation Act 1987. The Department has also protected 1680 ha of private land under covenant. The Department is also trying to improve the representativeness of our protected areas through the Protected Natural Areas Programme (PNAP).

Other organisations involved in protecting private land include the Queen Elizabeth II National Trust, Nature Heritage Fund, Nga Whenua Rahui, NZ Native Forests Restoration Trust and the Royal Forest and Bird Protection Society.

15.7.3 Northland Regional Council

Policies and Plans

The **Regional Policy Statement** for Northland contains policies and methods providing for the maintenance of biodiversity values in the Region. This provides the policy framework for the management of significant indigenous vegetation and habitats of indigenous fauna. The Regional Water and Soil Plan includes rules restricting vegetation clearance. However, these are for the purposes of soil conservation, avoiding natural hazards and maintaining water quality. The Coastal Plan includes provisions for the management of biodiversity in the coastal marine area.

In April 1998 the Council adopted the **Northland Regional Pest Management Strategies**. This document contains eight individual animal pest management strategies and 18 plant management strategies, some of which are for groups of similar plants or animals. The Pest Management Strategy is currently under review.

Animal Pests

A major focus of animal pest control programmes is possum control operations. Possum control alone is one of the Council's single largest budgetary items, with \$1,400,000 budgeted for the 2001/02 year. The possum control strategy provides for a Council-managed control programme under which contractors are required to reduce possum densities below 20% of their pre-control levels. The programme has involved working outwards from physical barriers to possum migration, particularly the coast, harbours and rivers, and from areas of open farmland, to eventually cover the whole region. This once-over kill is expected to be completed in the 2003/2004 year. Landholders are expected to maintain treated areas at below 40% of their pre-control levels, and almost 90% of private landholders have signed an agreement saying that they would.

Other animal pests specified in the strategy include:

- feral cat, ferret, stoat, weasel and rats
- deer
- goats
- rabbit and hare
- magpie and myna
- wasps

Plant Pests

The Northland Regional Pest Management Strategy includes a “Nationally Banned from Sale and Distribution Strategy” covering 124 plants. This is a list of the plants that the Nursery and Garden Industry Association in 1995 agreed with officers of Regional Councils should not be sold or distributed within New Zealand. The strategy also specifies the “dirty dozen”, 12 unwanted plants that are present in small numbers in Northland, and the Council is anxious to keep it that way or eradicate them entirely. This list includes highly aggressive aquatic plants (water poppy, Senegal tea, eelgrass, nardoo, fringed water lily, entire marshwort, houltuynia), an invasive tree of the coastline and forests (rhamnus), a destructive vine (old man’s beard) a potentially major weed of pasture (needlegrass) and a major weed of crops (skeleton weed). All of these plants are major plant pests of other regions but not recorded in Northland.

The most promising method of plant pest management is biological control. To date biological control agents have been released for gorse, ragwort, alligator weed, nodding thistle, broom and mistflower. Feasibility studies are currently underway for climbing asparagus, bone seed, Chilean needlegrass, nassella tussock, banana passionfruit, woolly nightshade and variegated thistle.

Environmental Fund

The Northland Regional Council has set up an Environmental Fund of currently \$100,000 per year to help people improve and protect Northland’s natural environment, including its indigenous biodiversity. The fund will provide up to 50% of the costs of projects protecting indigenous vegetation and habitats by fencing out stock, allowing regeneration of native plants and replanting streamsides with appropriate native plants.

15.7.4 Community Care Groups

Northland Regional Council supports the active involvement in environmental issues by the public in community care groups. These groups are highly varied, and work on a wide range of issues, some relating to Northland’s biodiversity.

More information is at http://www.nrc.govt.nz/land/care_groups.shtml

Links

New Zealand Biodiversity Strategy

<http://www.doc.govt.nz/cons/biodiversity/index.html>

Biowhat report

<http://www.biowhat.co.nz>

Queen Elizabeth II National Trust

<http://www.nationaltrust.org.nz/>

Royal Forest and Bird Protection Society

<http://www.forest-bird.org.nz>