

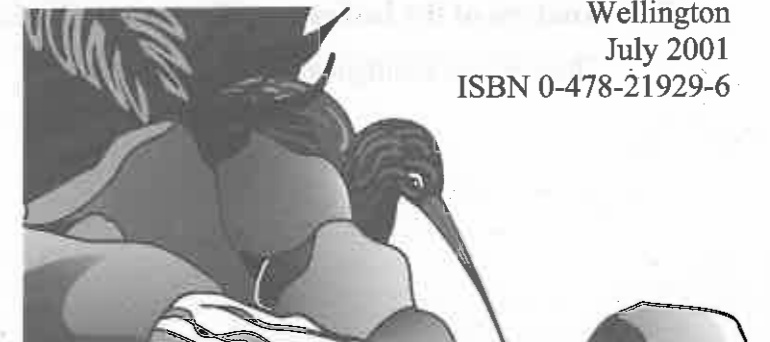


NORTHLAND PROTECTION STRATEGY

A REPORT TO THE NATURE HERITAGE FUND COMMITTEE

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Northland Protection Strategy
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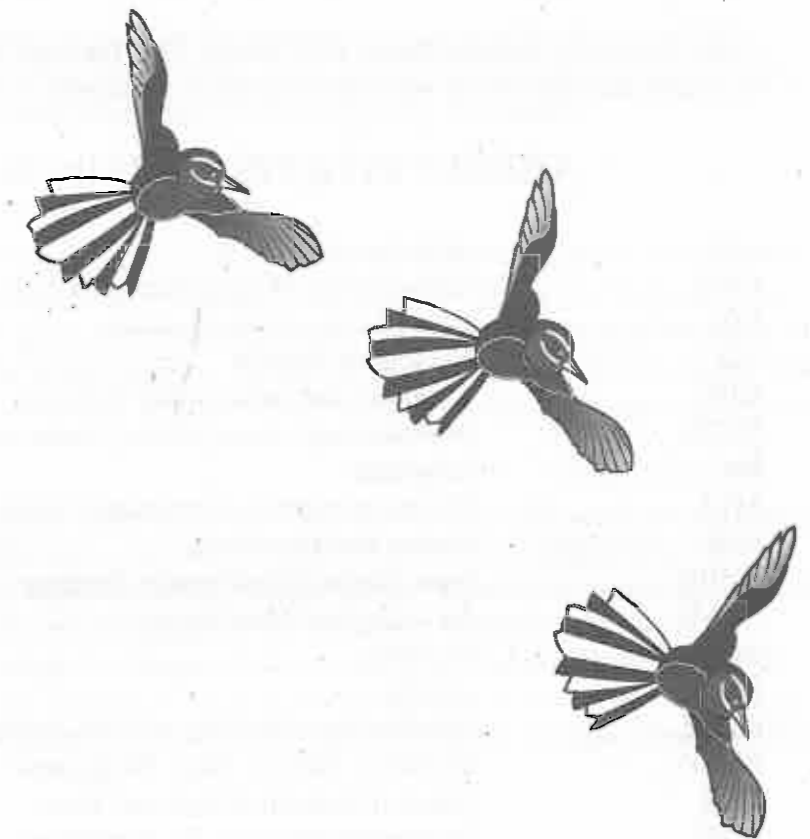
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This strategy draws heavily on previous work undertaken in Northland:

- Conservation Management Strategy
- Protected Natural Areas Programmes Surveys and Reports
- Conservancy Strategic Planning Project

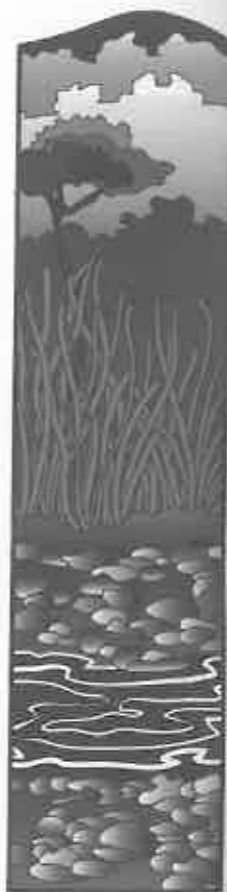
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ABBREVIATIONS USED IN THIS REPORT

a.s.l.	above sea level
CMS	Conservation Management Strategy
DoC	Department of Conservation
ED	Ecological District
GIS	Geographical Information Systems
IUCN	International Union for the Conservation of Nature
km	kilometre
MCI	Macroinvertebrate Community Index
NHF	Nature Heritage Fund
NZBS	New Zealand Biodiversity Strategy
NZMS	New Zealand Map Series
ha	hectares
m	metres
OSNZ	Ornithological Society of New Zealand
PNAP	Protected Natural Areas Programme
QEII	Queen Elizabeth II National Trust
RAP	Recommended Area for Protection
SSBI	Sites of Special Biological Interest



1.0 INTRODUCTION

This report has been prepared to assist the Nature Heritage Fund (NHF) with the assessment of priorities for further protection or restoration of indigenous ecosystems in the Department of Conservation's Northland Conservancy. This Introductory Chapter gives a broad overview of the state of Northland's ecosystems and Chapter 2 sets out the approach and methodology used in the report. In Chapters 3 and 4 respectively, qualitative information about Northland's ecosystem types and Ecological Districts is given. Chapter 5 sets out existing guidelines, policies and criteria for assessing ecological priorities in Northland. Chapter 6 lays out the proposed strategy.

How to Use This Report

It is assumed that applications to the Nature Heritage Fund will be considered within their ecological context. This report may be used to do this in two ways:

- consideration of the ecosystem type including representativeness and rarity, which can be determined by referring to the appropriate sections of Chapter 2 e.g kauri forest, peat bog.
- consideration of the Ecological District context including significance in the Ecological District, as can be determined from the appropriate Ecological District description and priorities in Chapter 4.

It is envisaged that applications would then be assessed according to the general NHF criteria set out in Section 3.3 of Harding (1994), with detailed assessment according to the criteria in Chapter 6 of this report where specific prioritisation is required.

Physical Characteristics

Northland consists of a narrow irregular peninsular no more than 80 km wide, with several groups of offshore islands. The inland topography is mainly low lying (0-300 m a.s.l.) but steep rolling hill country. A series of small ranges and plateaux rise to the highest point, Te Rauhu (781 m a.s.l.), in the Waima Range. No part of Northland is more than 40 km from the sea (DoC 1999). (The coastal zone as referred in this report refers to the area within one kilometre from the coast.)

Effects of environmental gradients such as altitude and proximity to the coast are not clearly defined across the region, although a sub-montane zone occurs above 600 m a.s.l. A diversity of landform and soil types has contributed to a wide diversity of natural ecosystems and an unusually high diversity and endemism of species in the Northland region. It also contains one of the highest listings for threatened species in New Zealand (Molloy & Davis 1994; de Lange et al 1999), and contains a range of ecosystems poorly represented in existing protected areas including rare endemic types such as podzol gumland, volcanic broadleaf forest and serpentine shrubland.

Biodiversity Loss

Since the arrival of the first human settlers in Northland, the region has undergone dramatic changes to its indigenous ecosystems. By the time the Europeans arrived about 160 years ago, nearly all the large flightless or near flightless birds, large frogs and giant lizards had already disappeared (Anderson et al 1984), while others like the tuatara and large *Cyclodina* lizards

were restricted to small and generally rodent-free offshore islands. In many of the offshore islands, coastal areas and some inland sites, the original forest cover had been destroyed and replaced by fernland, shrubland or sandfield vegetation.

Ecosystem loss in the last 150 years has included approximately 96% of kauri forest, 99% of podocarp forest, 96% of volcanic broadleaf forest and 95% of dune forest; 95% of freshwater wetlands (including 99% fertile swamps, 98% peat bogs and 95% intermediate wetlands); 93% of inland dune hills and significant areas of mangrove forest, mudflats, coastline and offshore islands from direct or indirect human impacts.

However in the mid 19th century, extensive indigenous ecosystems persisted. In 1871 Kirk noted "*Extensive swamps with dense raupo and coarse sedges occurred throughout Northland, from Dargaville-Whangarei northwards*" (in Ogle 1984); Dieffenbach (1843) described "*almost forests or jungles*" of cabbage tree along the Awanui River; Carse (1911) described Lake Tangonge as being 5 kilometres long and 2.5 kilometres wide and surrounded by a much larger area of raupo swamps.

Today Lake Tangonge is completely drained and converted to farmland with only some small modified wetland areas remaining and which are now only seasonally wet, and the modification and loss has become so severe that natural areas in Northland today are often little more than fragmented islands within a sea of human induced environments. The remaining fragmented natural areas are modified to some extent and are now either being, or have been, colonised by a large number of introduced species (DoC 1999).

A re-survey of wildlife-habitats mapped by the Wildlife Service in Northland just five years on from the original survey in 1977-78 showed that approximately 43% of all habitats recorded had suffered some loss in area due to clearance, while some habitats had been completely eliminated. Freshwater wetland and shrubland showed the greatest loss of area (Anderson et al 1984). More recently a resurvey of threatened plant sites recorded prior to 1980 has had a positive return rate of approximately 30%, with habitat destruction being the main reason for the disappearance of individual record sites (L. Forester pers.comm.).

Protection Status

Many examples of the more common indigenous forest ecosystems (e.g. mixed kauri-broadleaf-podocarp forest) are protected and managed by the Department of Conservation, but the less common forest ecosystems, shrubland, freshwater wetland and coastal ecosystems are under-represented in lands administered by the Department. Some of the under-represented ecosystems are now very rare, modified, fragmented, or are under threat from human impacts and pests, and could be lost forever if not afforded protection in the near future.

The ultimate objective of this strategy is to assist in the establishment of a representative and sustainable protected system of indigenous ecosystems in the Northland Conservancy.

Important Note

The Ecological District boundaries used in this report follow Brook (1996), which revises McEwen (1987) based on a more detailed analysis of Northland's geology and geomorphology.

2.0 METHODOLOGY

2.1 Scope of Report

This report covers all major terrestrial and freshwater indigenous ecosystems in Northland, including offshore islands. The major offshore island groups which themselves constitute Ecological Regions or Districts (Three Kings, Poor Knights, Hen and Chickens), whilst mentioned in the report, do not form part of the strategy due to their unique biological features and existing protection as Nature Reserves. Northland is defined as that part of northern New Zealand that lies within the Northland Conservancy of the Department of Conservation (DoC) (see Map 1), but does not include the Mokohinau group, administered by Auckland Conservancy of DoC.

The area covered in this report includes the rohe of many iwi, the main groupings being Ngatikuri, Te Aupouri, Te Rarawa, Ngatikahu, Ngatiwai, Ngapuhi, Te Roroa and Ngatiwhatua (see Map 2).

2.2 Identifying and Describing Ecosystems

Northland contains a wide range of ecosystem types (see 3.0 below), most of which are likely to be comprised of a large number of ecological units. In fact the character of Northland's forest ecosystems as we view them today, is of a complex mosaic of forest types, many of which are secondary or induced types. In some Ecological Districts, indigenous ecosystems are largely represented by secondary vegetation e.g. Aupouri and Otamatea Ecological Districts.

In this report, broad ecosystem types, such as kauri-broadleaf-podocarp forest, are grouped as one type, as there is either insufficient data to split these types into separate vegetation types, or, where known, there are too many separate types (for example there are 24 ecological units identified within Puketi Forest and more than 100 in the Kaikohe Ecological District) for an overall regional strategy document such as this. The effects of grouping indigenous communities into broad vegetation types in this way is balanced to some degree by using Ecological Districts as the basis for identifying specific priorities and determining protection opportunities.

This report takes a qualitative approach. Comprehensive quantitative data on all ecosystem types by Ecological District is not available as the Protected Natural Areas Programme reporting in Northland is only partially complete, *data on the aerial extent of individual ecological units have not been collected*, and satellite photographic data on GIS are still being processed at the time of writing. It is probable that in the future, efforts to estimate numerically the extent of indigenous ecosystems would be made more practicable in response to increased knowledge and information and more sophisticated use of GIS. Estimates of ecosystem depletion presented in the CMS, which are adopted in this report, were compiled on the basis of existing vegetation, topography and soil type (P.Anderson pers.comm.).

In addition to the absence of specific data, the original vegetation patterns are difficult to interpret:

quickly form dense swards preventing natural regeneration if a remnant is later fenced without accompanying weed control).

These forests are particularly important habitat and food source for NZ pigeon, which will move between remnants (most under 5ha in size) allowing discontinuous habitats to become part of the same ecosystem (Pierce and Graham 1994). They are also important for tui and silvereye and seasonal use by kaka, the latter probably visiting from the Hen and Chickens Islands - Whangarei Heads area.

3.1.4 Kauri Forest

It is difficult to estimate the original extent of kauri forest per se as opposed to 'forest containing kauri', which was clearly widespread.⁴ From the estimates of Masters et al, on a pro rata area basis it is estimated that the original extent of dominant kauri forest in what is now the Northland Conservancy, was approximately 200,000 ha.

Similarly Halkett (1978) refers to a "kauri element", much of which is assumed to be kauri-podocarp-broadleaf forest, as that publication provides a figure of remaining mature kauri as being 6239 ha in 1978. It is estimated that at least 6000 ha of that remains today, nearly all of which is protected in the Waipoua, Trounson, Warawara, Herekino, and Puketi-Omahuta Conservation Parks. The largest immature stands occur in the Russell Conservation Park and Pukekoraro Scenic Reserve. Kauri is very rarely found as a pure forest type outside of lands administered by the Department of Conservation. Outside of these protected areas, kauri occurs as immature trees, rickers in dense local stands, or occasionally as scattered mature trees in association with a mixed podocarp-broadleaf forest type in rolling to steep hill country where it dominates the ridges and spurs.

Some plant species which grow in association with kauri in Northland are toatoa, tanekaha, tawari, *Pittosporum pineleoides*, hard beech, white maire, the short creeping trunked form of *Dicksonia lanata* "North" which is restricted to Northland kauri forest, *Metrosideros albiflora*, the kauri grass *Gahnia zanthocarpa* and the fan fern *Schizaea dichotoma*.

The fauna of the kauri forest is similar to the mixed kauri-podocarp-broadleaf forest type, but the short-tailed bat is found at some sites, and a tiny relict population of the North Island rifleman occurs in Warawara Forest (this population is the sole mainland population known north of the Kaimai Ranges and Mt Pirongia).

The restricted distribution of this forest type accentuates the importance of what remains in Northland.

3.1.5 Podocarp Forest

In Northland, podocarp forest was probably of limited extent originally, and restricted to alluvial riverine flats, swamp margins (kahikatea) and on ridges, terraces and spurs in association with kauri and broadleaf forest types.

⁴ Masters et al are quoted in Ogle (1984, p5) as estimating 809,000 ha of forest contained kauri, about 35% of the region. However on the basis of these figures, the Northland region would be 2.3 million hectares, whereas the Northland Conservancy is a little over 1.2 million hectares. It is assumed that Masters et al were referring to the area 'north of Auckland'.

As with the once great kauri forest, the podocarps as a mature forest type have been severely decimated and less than 1% now remains in Northland, with only about 100 ha protected. Even within lands administered by the Department there are today no large areas that can be classified as being predominantly mature podocarp forest. The last remaining, but very small area of dense mature podocarp and kawaka forest, and which contains some kauri, is situated at Utakura, outside of protected areas.⁵

There are, however, a number of small regenerating remnants containing dense pole stands of rimu-totara-tanekaha with occasional miro, kawaka, matai and manaoa on hillside ridges and terraces and pure stands of kahikatea on lowlands, old drained swamplands, or poorly drained hillsides. Very few of these areas, especially rimu and kahikatea stands, are protected.

Kahikatea is an important component of riverine forest in Northland (see 3.1.7 below).

Totara is a significant landscape feature in Northland. Despite major land clearances in Northland over the past 160 years, this tree has been amazingly resilient and occurs commonly as individual trees or in small groups in open pasture, along roadways, fencelines and streams. In many sites it successfully regenerates despite the presence of browsing animals, and is one of the first canopy species to appear in shrubland succession. It is the favoured host species of the threatened mistletoe *Ileostylis micranthus* in Northland.

During the fruiting season the podocarp forests are important habitats for frugivorous species such as NZ pigeon, tui and silvereye. They are also habitat for bats, and were previously major habitats for kaka, kakariki and kokako in Northland.

3.1.6 Coastal Forest

Coastal forest is nationally under-represented as a forest type in New Zealand. It is possible that up to 120,000 ha of Northland's extensive and indented coastline and offshore islands would have been covered in coastal forest but nearly all of these areas have disappeared. About 10% remains in pockets of coastal forest at Te Pahi, in some gullies and western margins of forest on the west coast and in small fragmented remnants on the steep slopes, cliffs and headlands, along the eastern coast. About 4000 ha is protected.

Northland's coastal forest is characterised by the presence of pohutukawa, puriri, karaka, tawaroa, tawapou, kowhai, cabbage tree, kanuka and kohekohe. *Olearia* spp, houpara, *Pseudopanax lessonii*, *Pittosporum umbellatum*, taupata, whau, manuka, *Pteris comans*, flax and rengarenga lily occur as understorey species or as pure coastal shrublands. *Nestegis apetala* can occur locally on some headlands.

Threatened plants found in coastal forest include e.g. *Calystegia marginata* and some Northland endemics e.g. *Pomaderris paniculosa* subsp. *novae-zelandiae*, *Pseudopanax gilliesii*, and *Coprosma neglecta* subsp. "whangaroa" and it is the sole home for the endemic and threatened flax snails (*Placostylus*). Some areas are important breeding habitats for little blue penguins and provide habitat for a number of the northern lizard species, i.e. shore skink and Suters skink. Where they are adjacent to major offshore islands such as the Hen and Chicken Islands, coastal forests can be seasonally important for forest birds such as tui, bellbird and kaka, after breeding. At least two mainland grey-faced petrel colonies are known in Northland west coast forests.

⁵ Since this report was written, this area at Utakura has been protected by the NHF but figures quoted exclude this area.

The mixed coastal shrubland-forest situated on the serpentine soils of the North Cape area is probably the most unique vegetation type in New Zealand, and is in a coastal class all of its own. An extraordinary number of endemic plants are to be found there, and a number of endemic invertebrates. This type is limited to a restricted area of serpentine and associated soils (approximately 110 ha⁶) and is mostly protected in the North Cape Scientific Reserve.

3.1.7 Riverine Flood/Alluvial Forest

Riverine flood and alluvial forests would have been relatively common in low lying swampy plains and valleys throughout the region (about 25,000 ha) but are now one of the rarest, most fragmented and under represented forest types occurring in Northland. Approximately 3000 ha remains (including secondary kahikatea forest), of which about 300 ha is protected.

Riverine forest is periodically flooded, and the roots and ground layer can tolerate inundation for extended periods. Species typical of riverine forests in Northland include kahikatea, cabbage tree, kowhai, pukatea, titoki, lowland ribbonwood and kaikomako.

Forest on alluvial soils which are drier or less frequently flooded than riverine forest include matai, karaka, totara, kanuka, taraire and puriri. Kahikatea can form dense monotypic remnants on alluvial flats.

Cabbage tree, flax, divaricating shrubs and *Gahnia* sedges are typical within these forests. The understorey is characterised by a dense divaricating shrub thicket where species such as *Melicope simplex*, *Melicytus micranthus*, *Streblus heterophyllus*, *Myrsine divaricata* and small-leaved coprosmas are dominant with flax and carex sedges also present. They may contain significant species such as *Mazus novaezeelandiae*, *Pittosporum obcordatum*, *Christella* aff. *dentata*, banded rail and bittern.

The remaining riverine flood forests consist of thin fragmented riparian strips along meandering, sluggish and flood prone streams, and only small remnants remain of alluvial forest. Most are heavily grazed with a high occurrence of senescent and dying trees, weed infestations, and are not regenerating. They are being incrementally cleared and drained. The Manganui River is one of the largest and best examples of a riverine flood forest type in New Zealand.

3.1.8 Duneland Forest

Duneland forest is Northland's rarest forest type, occurring in two locations:

- (i) The remaining Aupouri Peninsula groves are tiny, scattered groves consisting of pohutukawa, kanuka and other species. Only one small area is protected on public land, at Te Arai, the pohutukawa component of which is less than a hectare. A covenant covering 5.8 ha occurs within pine plantations west of Pukenui. Approximately 12 ha of broadleaf dune forest and about 30 ha or less of pohutukawa-kanuka forest on dunes remains in the Far North.
- (ii) The Pouto Peninsula remnants are larger and contain a greater diversity of species. Of particular interest is Pretty Bush (57 ha), a unique forest remnant which is dominated by a

narrow leaved maire canopy and the larger Tapu Bush (198 ha), which also includes some podocarps and broadleaf species. All other areas are dominated by kanuka. Both Pretty and Tapu Bush contain relict kiwi populations. Only Pretty Bush and some smaller kanuka remnants are protected in lands administered by the Department.

Uncommon plants in both of these areas include *Pseudopanax ferox* and *Hebe diosmifolia*.

Dunelands are a dynamic ecosystem, with archaeological evidence of three phases of forest cover on the Aupouri Peninsula in the last 40,000 years. Although at the time of human settlement the unforested dunes were extensive, archaeological evidence suggests that broadleaf-podocarp forest persisted in some areas. Scattered pohutukawa forest and manuka groves were not uncommon (Sale 1985).

It is assumed that at the time of human settlement, approximately 10% of Northland was duneland. Based on data in Sale (1985), at least 5% of the dunes would have comprised pockets of forest, or more than 6000 ha. With only 300 ha of dune forest vegetation remaining in Northland, this is less than 5% of what was originally present, and less than 70 ha of which is protected.

3.1.9 Shrubland

The remaining shrubland in Northland forms about 10% of the land area⁷, and the vast majority of this comprises manuka-kanuka in successional stages and as corridors, buffers and ecotones to mature forest and wetlands. The original area of New Zealand thought to have shrubland cover has been estimated at 5.5% (Taylor et al 1997), and in the absence of detailed information for the region, this has been extrapolated to Northland. It is difficult to assess the representative values of shrubland, as there is an inextricable link between seral types and the establishment and retention of the climax stage such types may eventually reach.

Despite this, seral types may have high values for biodiversity generally where important components are threatened native plants and animals such as kiwi, fernbird, tusked weta, Northland green gecko, kauri snail, orchids, ferns as well as other shrub species such as *Pittosporum pimeleoides* and *Pomaderris polifolia*. Many of these plants and animals are endemic to Northland.

Northland contains three main shrubland types. The most common type is the manuka-kanuka association that is widespread and can vary from long established tall seral kanuka, to young recently established areas of manuka. Mingimingi, hangehange, mapou, *Coprosma rhamnoides*, and lancewood are commonly found in these shrublands. It occurs in a very wide diversity of soil and geographical situations both as a "climax" stage e.g. dune, swamp shrubland and podzol gumland, and as a successional stage, which comprises the greatest aerial extent.

The second and much less common type of shrubland is broad-leaved shrubland that is generally of local occurrence in coastal situations or on exposed rock outcrops or range tops. It is possible that this type originally covered a greater area in proportion to manuka-kanuka shrubland than it does now, considering the extent of potential coastal sites available. Extensive grazing in European times may also have contributed to its decline in relation to manuka and kanuka, which are much more resistant to grazing. These shrublands are often

⁶ Druce, A.P.; Bartlett, J.K.; Gardner, R.O. 1979.

⁷ See Table Section 3.7. This figure is an overestimate as it is likely to include exotic species.

3.4 Estuarine/Coastal

Northland has an extensive coastline (1500 km, nearly equalling the total length of New Zealand), and contains one of the most diverse ranges of coastal features in New Zealand. The region has extensive long, sandy beaches and dunelands (Pouto and Aupouri Peninsulas, west coast at Dargaville), rocky shorelines and headlands (North Cape and east coast), bays and inlets (Bay of Islands), large peninsulas (Aupouri, Karikari and Pouto), deepwater harbours (Whangaroa and Mangonui), large estuaries (Kaipara, Whangarei, Rangaunu, Parengarenga and Hokianga), and numerous offshore islands and stacks (Three Kings, Poor Knights, Hen and Chickens and others).

Northland contains one of the country's largest area of relatively unmodified duneland, some of the largest areas of mudflat, and because of its northern geographical location, the largest areas of mangrove forest and largest mangrove trees.

3.4.1 Estuarine

Estuaries are an intrinsic part of the Northland landscape with most river and stream systems draining into them. The estuaries are of varied size, shape and character adding to the diversity of the coastline and are particularly rich in animal life and are also important for cultural, spiritual, scenic, recreational and economic values.

(a) Mangroves

Northland has large areas of mangrove forest. Many of the original mangrove forests were reclaimed for agriculture and amenity purposes, especially in Rangaunu, Whangaroa, Whangarei, Hokianga and Kaipara harbours. In some locations today the area of mangrove is increasing because estuarine margins (as with all wetlands) are dynamic and are in the process of very gradual succession from wetland to dryland.

In Northland this has been greatly accelerated due to land use changes over the last 160 years, where native forest on rolling to steep hill country and in a high rainfall area has been cleared. Deforestation and inappropriate land management practices has led to thousands of tonnes of silt entering and being deposited into many estuaries. Former sandy estuaries, such as parts of Whangarei Harbour and Ruakaka, have now been replaced by mudflat and the mangrove, a natural northern coloniser of intertidal mudflat, has increased accordingly. In some sites such as the Ruakaka estuary, mangroves were relatively rare just 50 years ago, but have now formed dense thickets over previously pristine sandflats.

Mangroves in Northland are key habitats for banded rail. Banded rail are to be found in nearly all mangrove areas, including those within the urban areas of Whangarei. As with the North Island brown kiwi, the region contains the most important population for this species in New Zealand. Those mangrove forests that have intact sequences of saltmarsh and shrubland contain the highest number of banded rail. Mangrove forests in Northland are also important habitats as roosts for the endangered brown teal, as nesting colonies for shags, and for a host of other estuarine and passerine birds, crustaceans and invertebrates, fish, especially mullet and parore, and even seasonally, for the little known yellow-bellied and banded sea snakes. In Rangaunu Harbour, which has New Zealand's most extensive mangrove forest area, marine turtles are reported to periodically frequent the tidal channels.

(b) Saltmarsh

Saltmarsh is the rarest estuarine habitat type in Northland. Less than 15% of the original saltmarsh remains today, with the Hokianga, Whangarei, Kaipara and Rangaunu harbours having suffered the greatest losses. Whangarei and Kaipara harbours have less than 5% of their original saltmarsh systems left today.

In Northland saltmarsh is an important ecotone between terrestrial shrublands and forests, freshwater and brackish wetlands, and mangrove forests and coastal waters. Jointed rush, sea rush, *Baumea juncea*, *Bolboschoenus* sedges, saltmarsh ribbonwood, glasswort and flax constitute the main saltmarsh plants. Saltmarshes are habitats for banded rail, bittern, fernbird and marsh crake (one of only two habitats where this species has been recorded in Northland).

(c) Intertidal Sand-Mudflat

Sand and mudflat in Northland generally lie outside of the mangrove and saltmarsh zones within harbours and estuaries. These highly productive ecosystems, including beds of *Zostera*, are feeding habitat to many thousands of arctic and internal migratory waders, waterfowl, gulls, terns and shags. Northland attracts 10-15% of the NZ wintering population of godwits, 20% of knots, and about 30% of each of turnstones and golden plover (Northland Region OSNZ records), all of which come from the northern hemisphere. Local migrant or residential waders such as banded dotterel, pied stilt, NZ dotterel and variable oystercatcher also frequently use Northland tidal flats. Several threatened native species, such as NZ dotterel, are dependant on these ecosystems for much, if not all, of their annual food requirements.

Past reclamations, especially in the Kaipara, Hokianga and Whangarei harbours, reduced large areas of sand and mudflat. Where mudflat is expanding through siltation from land use activity (see 3.4.1(a)), there is a corresponding reduction of sandflat. Apart from livestock trampling, the greatest potential threat to these intertidal ecosystems today is from developments such as marine farms, ports and marinas, and the spread of the introduced cord grass (*Spartina* spp.), factors largely outside the control of the Nature Heritage Fund protection mechanisms.

Fencing of riparian and ecotone margins to exclude domestic stock is required with some urgency in certain harbours, i.e. Parengarenga, Rangaunu, Whangarei, Hokianga and Kaipara.

(d) Shellbanks

Shellbanks are an integral part of the estuarine ecosystem. They can be very important, if not essential, as roost sites at high tide to accommodate the large numbers of waders, gulls and terns, which feed on the intertidal mudflats and shellbanks often provide the only breeding habitat for a large number of waders, gulls and terns, as in the Whangarei and Rangaunu Harbours.

All important shellbanks should be identified and protected with the appropriate protective designation. Where shell banks are not protected and are under threat, or have been lost, or do not occur at all, their consideration should be given to artificially establishing new banks in key wader or tern habitats.

3.4.2 Coastal

Northland coasts can be divided into two categories. These are (a) hard coasts, and (b) soft coasts, which also include dunelands and spits.

(a) Hard Coasts

Northland's hard coasts are confined to the North Cape area, east coast and on the west coast between Maunganui Bluff and Ahipara. These ecosystems are characterised by stony beaches, rocky platforms, cliffs, headlands, and broken fragmented sites with adjoining stacks and islets. This restricted habitat zone is found between high tide mark and the immediate surrounds, the landward ecotone of which has disappeared or is significantly degraded throughout most of the region.

The hard coasts are important feeding and breeding habitats for the threatened reef heron and migratory variable oystercatcher, and as locally important mainland habitats for Suters' skink, (the largest known mainland skink occurring in Northland), Moko skink, and little blue penguin. The fur seal, whose numbers continue to increase in Northland, utilises this ecosystem as a habitat type along the Waipoua coast, Matapia Island and Three Kings. The Hard Coast ecotone contains populations of threatened or significant plants such as *Fuchsia procumbens*, *Asplenium obtusatum* ssp. *northlandicum*, *Leptinella rotundata* (endangered and endemic to the Warawara coastline), *Hebe speciosa*, *Mazus pumilio* and rengarenga lily.

(b) Soft Coasts

There are two main types of soft coasts in Northland.

- (i) **Foredunes and Beaches:** The foredunes and beaches of Northland consist of intertidal sandy beaches and adjacent sand cliffs, such as those found on the Pouto Peninsula, and areas of beach, which may have a narrow band of foredune, or which back onto small intertidal streams. Some relatively isolated soft coasts in Northland are still contain much of the original peripheral native coastal vegetation where *Spinifex*, *Ozomanthus*, toetoe, sand convolvulus, pingao, *Muehlenbeckia complexa*, and *Isolepis nodosa* dominate. However, many soft coast margins now have salt tolerant introduced grasses dominate i.e. buffalo grass, kikuyu and pampas, or exotic forest.

The soft coasts are the main breeding area for the threatened NZ dotterel of which two-thirds of the NZ population is found within the Conservancy. They are equally important breeding areas for the rare variable oystercatcher, banded dotterel and Northland's three breeding tern species, the endangered fairy tern, and the Caspian and white-fronted terns, both of which are also threatened. The soft coasts are the main habitat for the shore skink, a northern coastal species, which can be found in high numbers locally.

Threatened species include *Hibiscus diversifolius* (which only occurs in Northland in New Zealand), *Euphorbia glauca*, *Eleocharis neozelandica*, *Atriplex* aff. *billiardieri*, pingao, *Austrofestuca littoralis*, *Phrixgnathus* "smugglers" and Archey's dune snail.



Many unmodified margins of important soft coasts still occur outside protected areas.

- (ii) **Duneland and Spits:** Northland probably contains New Zealand's greatest area of unmodified duneland. The dunes in Northland can be divided into two groups -

- (a) **Sandhills** - These are the large high drifting "inland" sandhills of the Aupouri Peninsula, Ahipara, North Hokianga Head, Mangawhai and southern Pouto Peninsula.

Probably less than 7% of the original sand hills remain in Northland and most of these are protected within lands administered by the Department of Conservation. The sandhills have high landscape, morphological and archaeological values and are a feature of Aupouri, Ahipara, Hokianga and Pouto Peninsula. They are habitat to species such as kanuka, toetoe, pingao, scarab and carabid beetles, Archey's dune snail, NZ pipit and banded dotterel.

Sandhills, being unstable and dynamic, can be a threat to adjoining natural habitats, such as dune lakes and forests, as well as to pasture and pine forest.

- (b) **Coastal deflation zone** - the more common dune systems and spits.

These are very important ecosystems for biodiversity. Whilst some significant areas are protected within lands administered by the Department of Conservation, much still remains unprotected, such as Kokota and Ngunguru Sandspits. The low 'wet' foredunes of the Pouto Peninsula, North Cape and Aupouri Peninsula can be a mosaic of tidal beaches, dune lakes, ephemeral wetlands, swamp and reed zones, bare dunes, semi dry non-woody vegetative and dry woody (shrubland) areas.

These duneland mosaics can contain an unusually high number of threatened and significant species, some of which are endemic to Northland including *Placostylus ambagiosus*, Archey's dune snail, black katipo spider, NZ dotterel, banded dotterel, banded rail, Caspian tern, fairy tern, bittern, NZ dabchick, scaup, fernbird, the swamp ferns (*Thelypteris confluens* and *Cyclosorus interruptus*), *Pseudopanax ferox*, *Eleocharis neozelandica*, *Euphorbia glauca*, *Hibiscus trinonum*, pingao, *Atriplex* aff. *billiardieri* and *Pimelea arenaria*.

Large areas are in a rapid state of deterioration. Archaeological and wahi tapu sites are also being damaged by the adverse land use activities.

3.5 Offshore Islands

Island ecosystems include coastal forest (see 3.1.6), coastal shrublands (3.1.9), and associations in which sedges and other monocotyledonous species are predominant. There are some distinct differences in the species associations in some of the island ecosystems e.g. in Kerikeri Ecological District, there are seven ecological units of coastal forest occurring on islands, none of which occur at mainland sites. Species such as tawapou and coastal mahoe are locally dominant, and the forest ecosystems are generally in better condition than those on the

mainland. The predominant shrubland types on the mainland (manuka-kanuka), occur infrequently on the islands, with broad-leaved taupata and houpara being predominant shrubland species.

On islands ecosystems that are rare or non-existent on the mainland e.g. sedgeland, tussocks, vines and grasslands occur, including flax, coastal tussock, jointed rush, knobby clubrush, umbrella sedge, *Astelia* as well as the pohuehue vine, coastal herbs and indigenous grasses (*Poa* and *Zoysia*).

Northland contains a wealth of offshore islands and stacks. Some islands contain a high endemism of species, especially plants and invertebrates, many of which are classified as threatened. Islands may contain relict populations of species such as giant weta, robust and McGregors skink, Duvaucels gecko, tuatara and saddleback all of which are now extinct on the mainland. Nearly all of Northland's offshore islands have been modified by past human activities. Rodents and other introduced pests have been removed from many islands. This has meant that many modified islands that previously had lower biological importance are now important for the restoration and rehabilitation of threatened species.

Some of the most important islands are administered by the Department for their natural and historic values, and include:

- The Three Kings Islands which contain two of the world's rarest plants *Pennantia baylisiana* and *Tecomanthe speciosa* which is limited to just one plant in the wild, the threatened *Rhytida buddlei*, the largest known species of *Rhytida*, as well as many endemic species including invertebrates, the large flax snail *Placostylus bolonsi*, the very large Falla's skink and endemic plants such as *Myrsine oliveri*, the Three Kings milk tree and Three Kings rangiora.
- Poor Knights Islands, the only known breeding area in the world for Buller's shearwater, also contains the largest population of *Placostylus hongii*, two species of giant weta and other endemic invertebrates, possibly an endemic skink, northern tuatara, one of only two known populations of the endangered coastal fern, *Asplenium pauperequitum* and the Poor Knights lily.
- Hen and Chickens Islands, which previously held the last remaining population of North Island saddlebacks, also contains northern tuatara, a wide diversity of breeding seabirds including the threatened Pycroft's petrel, lizards, *Amborhytida taranensis*, and rare plants such as the New Zealand watercress *Rorippa divaricata* and *Asplenium pauperequitum*. More recently liberations of little spotted kiwi has raised the importance of these islands. Unlike the Three Kings and Poor Knights islands, the Hen and Chickens Islands contain rodents (kiore). These are presently being eradicated from all but one of the Chickens islands.

Important islands not administered by the Department of Conservation which have no existing formal protection and which contain populations of threatened species include Matapia, Stephenson, Moturoa Group, outer Cavalli Islands and Motukokako. These islands contain a number of threatened species such as robust skink, the endemic "Matapia" gecko and Pycrofts petrel.

3.6 Key areas for conservation management in Northland

Northland Conservancy staff have identified through a Strategic Planning project, specific areas of protected lands which have a high priority for conservation management.

Unprotected lands adjacent to these areas are considered to be a high priority for protection where the habitat has similar values to the protected lands and may therefore support similar biodiversity, and also as a buffer to these important habitats or linkage between fragmented protected areas. The Mainland Island Project at Trounson is demonstrating that intensive management is resulting in increased populations of some species e.g. NI robin, which may lead to new populations being established in adjacent areas (N. Miller pers. comm.) and enriching existing ecosystems.

Strengthening the extent and viability of core areas is considered a priority to the longterm sustainability of ecosystems in the region.

These areas have been incorporated into the Ecological District priorities, but also form part of the overall strategy.

The priority areas are (See Map 1):

(a) The offshore islands Three Kings, Poor Knights, Hen and Chickens:

- § Te Pahi and Parengarenga Harbour
- § Kaimaumau and Karikari Peninsula
- § Aupouri dunes
- § Ahipara
- § Maunganui Bluff
- § Pouto
- § Otakairangi
- § Purua kiwi zone

(b) Waipoua/Mataraua/Waima/Trounson complex

- § Puketi/Warawara
- § Whangaroa
- § Ngawha/Kerikeri Airport
- § Bay of Islands - Mimiwhangata
- § Bream Head/Manaia
- § Bream Bay/Mangawhai
- § Mareretu/Brynderwyn



3.7 Overview of Indigenous Ecosystems and Protected Areas in Northland

Table 1. Indigenous Ecosystems in Northland and on Department of Conservation Administered Lands (in ha)

Ecosystem	Northland	% Northland	DoC	DoC % Northland	% Remaining Area Protected
Coastal Sand	16871.47	1.34	8949.66	0.71	53.04
Mangrove	14006.49	1.11	527.33	0.04	3.76
Coastal Wetland	3115.01	0.25	360.74	0.02	11.58
Indigenous Forest	264248.82	20.98	100444.83	7.97	38
Shrubland	132394.48	10.51	32939.77	2.61	24.88
Inland Water	3824.56	0.3	425.07	0.03	11.11
Inland Wetland	4617.28	0.36	1590.84	0.13	9.21
Total	439078.13	34.86	145238.27	11.53	

Data derived from satellite imagery. Areas are estimates only. Shrubland may include exotic species.

Area of Northland = 1,259,400 ha. Balance Area = cloud cover, pasture, exotic forest, urban areas etc

Discussion

Data presented in Table 1 indicate that, at a very broad scale, approximately one third of Northland comprises natural lands, of which 11% is protected in lands administered by DoC.

Although other natural lands are protected by agencies such as District Councils and the Queen Elizabeth II National Trust, the percentage of such areas protected is small and does not alter the overall picture. (As at January 1999, 4151 ha was protected under QEII covenants, which is one third of a percent of Northland and less than 1% of the indigenous ecosystems remaining in the region).

Coastal sands and wetlands, and inland wetlands comprise a small percentage of remaining natural areas in the region. Protected areas of these habitats are all <12% of the areas remaining, with the exception of coastal sands, of which about half the remaining area is protected. However coastal (and inland dunes) have been depleted to a considerable extent by afforestation on the Aupouri Peninsula, and to a lesser but still significant extent on the Pouto Peninsula. It should also be remembered that about half of the remaining natural dunelands occur in Northland, giving these areas a national significance.

These data indicate that lands other than forest and shrubland are a priority for protection. However, having said this, examination of forest and shrubland types represented within lands administered by DoC indicate a similar situation to QEII covenants, being primarily (more than 80%) kauri-broadleaf-podocarp forest, kanuka forest with some regenerating kauri and podocarps and manuka-kanuka shrublands (CMS Inventory), whilst some forest and shrubland types are depleted and under-represented e.g. volcanic broadleaf is not represented at all in the DoC estate; less than 200 ha comprises riverine/alluvial forest. Table 2 below summarises the level of protection of the remaining forest ecosystems.

Table 2. Summary of Remaining Forest Ecosystems in Northland

Forest Type	Original Extent (ha)	% Original Area of Forest & Shrubland	Remaining Area (ha)	% of original area	Area Protected (ha)	Protected area as % Area remaining	Protected Area as % of original extent
Mixed lowland kauri-podocarp broadleaf	521,453	52	226,248	43.38	83,300	36.8	16
Upland podocarp-broadleaf	10,000	1	9,500	100	c 9000	>95	c 90
Volcanic broadleaf	25,000	2.5	1000	4	<50	5	0.02
Kauri mature	200,000	20	6000	3	most	most	3.15
- secondary	-	-	3000	1.5	c. 300	10	
Podocarp mature	c. 30,000	3	c. 300	1	100	33	0.33
- secondary	-	-	c. 400	-	-	-	-
Coastal	120,000	12	12,000	10	4000	33	3.33
Riverine/Alluvial#	25,000	2.5	3000	12	300	10	1.2
Dune	c 6000	0.6	>300	5	<70	23	1.16
Shrubland	70,000	5.5	132,394*	10.5	28,914	22	42
Podzol gumland	30-40,000	c. 2.8	5-6000	15.7	1500	27	4.28

Includes swamp forest and secondary kahikatea forest on alluvium.

* This figure includes the majority of the remaining podzol gumland but may also include exotic woody species, being derived from satellite imagery.

Notes:

- 1) This table has been constructed to provide a general indicative context for assessing the extent of representative values of forest ecosystems across the Conservancy. The areas are estimates and approximations only, and are not considered definitive for the reasons outlined in Section 2.2.
- 2) The area covered by the Northland Conservancy is 1,256,400 ha.
- 3) Apart from Note 1, discrepancies between Table 1 and Table 2 are attributable to the fact that the figures in Table 1 are derived from satellite data, whereas most of the figures in Table 2 are derived from planometered or surveyed figures.
- 4) This table is based on the assumption that 80% of Northland, or 1,006,720 ha, was originally forest.

Discussion:

This table illustrates that several forest types are grossly depleted, and only a minuscule proportion of their original extent is represented in protected areas (volcanic broadleaf, kauri, podocarp, coastal, riverine/alluvial and dune).

Table 3, is taken from the CMS, and considers representation of all the ecosystem types described in Section 3.

Based on this table, priorities for protection include:

- riverine flood/alluvial, volcanic broadleaf, podocarp, and duneland forests
- North Cape serpentine shrubland
- freshwater wetlands including volcanic lakes, thermal lakes, peatbogs, ephemeral wetlands, swamps and dune lake margins
- podzol gumland
- estuarine/coastal saltmarshes and shellbanks
- islands which contain threatened or endemic species.

In Chapter 4, analysis of the region by Ecological Districts, further identifies the location and types of under-represented ecosystems.

Table 3: Habitat Types by Area on and off Land Administered by the Department of Conservation

Ecosystem	Habitat Type	Area Represented	
		Within DoC	Outside DoC
Forest and shrubland	Kauri-podocarp-broadleaf	5	5
	Podocarp-broadleaf -		
	(a) Lowland	5	5
	(b) Upland	2	1
	Kauri	3	2
	Shrubland -		
	(a) Manuka/kanuka	3	4
	(b) Coastal/broadleaf	2	2
	(c) Nth Cape/serpentine	1	1
	Coastal	2	2
	Volcanic broadleaf	1	1
	Podocarp	1	2
	Riverine flood/Alluvial	1	1
Duneland	1	1	
Podzol Gumland	1	1	
Freshwater wetland	Rivers and Streams -		
	(a) Upper catchments and riparian	5	5
	(b) Lower orders and riparian	1	5
	Ephemeral		
	(a) Duneland	1	1
	(b) Hinterland	0	1
	Peatbog	1	1
	Intermediate	1	2
	Swamp	1	1
	Dunelake	2	2
	Dunelake riparian	1	1
	Volcanic lake	0	1
	Volcanic lake riparian	1	1
Ngawha thermal lake	1	1	
Estuarine	Mangrove	1	5

AUCKLAND ECOLOGICAL REGION

Rodney Ecological District (part)

Description and Location

This District lies south of the Brynderwyn hills, running south to Auckland east of the Otamatea and Kaipara Districts. Only a small portion of this District lies within the Northland Conservancy - the area north of a line from the southern side of the Mangawhai estuary to Topuni and taking in the Brynderwyn outliers Cattlemount and Pukekaroro but excluding the Pukearenga Hills.

Vegetation History

The District was mostly heavily forested, with areas of dense kauri. By 1860 nearer the coast "fern and tea tree" were widespread with freshwater swamp of raupo, flax and rushlike plants along the river margins, and mangroves on the Kaipara Harbour margins (Beever 1981). Some of the scrubland had previously been in kauri forest.

Present Vegetation

The District is characterised by low rolling hill country with scattered, fragmented broadleaf-podocarp-kauri forest remnants, in which taraire and totara are the dominant species, and podocarps regenerating. Small kahikatea stands occur, and wetlands too are small and depleted.

Protection Status

Extent of Areas Protected

Area of ED	Area of Indigenous Ecosystems	% of ED in Indigenous Ecosystems	Area of ED Protected	% of ED Protected	% of Ecosystems Protected
20,625*			2080.14	10.08	

* Area within the Northland Conservancy including the Mangawhai Harbour. (The total area of Rodney ED is 200,250 ha). More than 1800 ha of the protected land consists of the Mangawhai dunes.

Priorities for Protection

1. Under-represented ecosystems including gumland, estuarine, pohutukawa forest and broadleaf forest on volcanic soils, wetland ecosystems.
2. Areas supporting Hochstetter's frog and fairy tern.
3. Kauri and podocarp forest ecosystems.



SUMMARY OF ECOSYSTEM TYPES AND PROTECTED AREAS

Table 4. Summary of Ecosystem Types and Protected Areas in Northland by Ecological District

ED	Relative % of remaining Ecosystem Types						% ED in Natural Lands	% ED Protected	% Natural Lands Protected
	Forest	Shrubland	Wetland	Dune	Estuary	Other			
Te Paki	5	82	6.4	6.6	<0.5		79	78	93
Aupouri	0.4	22.35	9.68	20.34	43.44	3.63 SS 0.002 Is	35	8.7	24
Whangaroa	36	55	<1	<1	8		36	10.8	30
Kerikeri	31	52	4		7	6 Is	21	5.37	25
Puketi	966	3.7	<1				92	70	76
Kaikohe	51	34	3.5	10 Lake		1.5 SS	21	3.1	14.14
Whangaruru	69.83	21.53	0.4	0.36	6.44	1.41 Is	43.54	13.97	32.09
Whangarei	43	5.25	1		47	2.86 SS 0.5 Is	18.7	3.5	18.9
Manaia	67.3	21.6	0.44	10.1		0.45 Is	33	15.9	47.21
Waipu								11.4	
Ahipara	71	22.3	<1	5			88	59	67
Maungataniwha	66	31	<1		2.5		33	10.24	30.8
Hokianga	38.5	22	1.5	3.5	34.5		23	2.25	9.4
Tutamoe	87.46	10.64	0.63	1.37	0.13		49.93	37.27	74.65
Tangihua								5.27	
Tokatoka	68	25	7				6.6	1	15.1
Otamatea								0.48	
Kaipara								4.96	
Rodney								10.08	

SS = swamp shrubland Is = Islands

Data on % of remaining ecosystem types are not available for Waipu, Tangihua, Otamatea, Kaipara and Rodney EDs.

In 13 Ecological Districts, (Aupouri, Kerikeri, Whangaroa, Kaikohe, Whangarei, Waipu, Maungataniwha, Hokianga, Tangihua, Tokatoka, Otamatea, Kaipara and Rodney), about 10% or less of the Ecological District is in protected lands. Tokatoka and Otamatea in particular have only a very small area of protected lands.

For most of the Districts mentioned above, this is indicative of the degree of modification of ecosystems and is partly related to the percentage of potential arable land. In Aupouri, Whangarei, Waipu, Tokatoka and Kaipara, extensive areas of fertile lowland swampy land and duneland have been converted into farmland or exotic forestry.

Te Paki, Puketi, Ahipara and Tutamoe EDs have more than 50% of the indigenous ecosystems protected, and in Manaia 47%. However even in these EDs some uncommon vegetation types and sites important for threatened species occur outside the protected areas. Most of the protected lands in Northland comprise broadleaf-podocarp-kauri forest, only one of many forest types in the region.

- The area contains a locally important site, or part of a regionally important site;
- The area contains a site, or part of a locally important site;

6.2.4. Restoration Proposals

Priorities for restoration mirror the protection priorities i.e. restoring critically depleted representative habitats or habitats critical for conserving threatened species. It is noted that 41% of New Zealand's threatened plants occupy "open" habitats (de Lange et al 1999), and in Northland the majority of threatened plant records are from coastal, duneland, gumland and wetland locations, indicating that any restoration projects should be focused on these habitat types. Aquatic habitats such as swamps, bogs and riparian areas are also priorities for restoration.

Restoration proposals that involve re-creating an ecosystem would take a lower priority than proposals which focus on enhancing an existing site. Longterm sustainability is a key criterion for restoration projects.

6.3 Recommended Protection Strategy for Northland

A six-point strategy is proposed for the protection and restoration of indigenous ecosystems in Northland:

1. To seek protection of the following indigenous ecosystems:

First priority

- riverine swamp forest and flood plain forest
- dune forest
- broadleaf¹⁴ forest on alluvium and volcanic soils
- podocarp forest (other than secondary totara forest)

Second Priority

- peat bogs
- podzol gumland
- geothermal ecosystems
- coastal wetlands including saltmarsh¹⁵

¹⁴ Priority broadleaf forests include taraire, kowhai, nikau-puriri, puriri, puriri-karaka, & titoki forests

¹⁵ Exclusion of stock from estuaries especially Parengarenga, Hokianga, Rangaunu, Whangarei and Kaipara Harbours is the main priority for coastal wetlands and mangrove forests and would achieve a significant level of protection.

- coastal herbfield, shrubland and forest¹⁶
- predator-free offshore islands
- ephemeral inland wetlands
- dunes including dune lakes
- wetlands¹⁷
- lower and middle order rivers and streams¹⁸
- buffers to and linkages between key areas for conservation management¹⁹

Third Priority

- mangrove forest²⁰
- kauri forest
- volcanic lakes
- serpentine shrubland
- broadleaf shrubland
- upland broadleaf forest
- ecosystems generally in Otamatea Ecological District

2. Seek the restoration, where feasible, of critically depleted ecosystems

- coastal (dune including dune lakes, shrubland and forest)
- riverine forest, swamp forest and podocarp forest on alluvium
- broadleaf volcanic forest
- swamps, bogs, and riparian ecotones including estuarine
- where the site is vital to the survival of a threatened species

¹⁶ Priority coastal forests include pohutukawa forest, pohutukawa-kowhai forest, tawapou forest, and coastal forests in Kaipara and Otamatea EDs.

¹⁷ Priority for wetlands is 1st priority > 20 ha, aggregation of sites up to 20 ha, mineralised swamps or flax, cabbage tree or Coprosma wetlands; 2nd priority wetlands > 5 ha; 3rd priority < 5ha

¹⁸ See Note 11.

¹⁹ See section 3.6

²⁰ See Note 15.

- margins of lower and middle order rivers and streams
- islands

Note:

To achieve protection of the highest priority areas in some cases will require a substantial restoration effort requiring additional resources, as well as active input from the Department of Conservation and the community. The technical feasibility of restoring some unusual habitat types is unknown (e.g. podzol gumlands) or physically challenging at best. In many cases remnant areas may be best protected through covenant where there is a resident landowner willing and able to actively manage the area, but may nevertheless require substantial support for restoration works.

3. To actively pursue protection initiatives for some key ecosystems in Northland.

Explanation

There are some notable areas in Northland which are important representative sites or strategically important in terms of landscape integrity, as well as having a reasonably high level of sustainability. Some of these areas are almost entirely unprotected, including some of the largest wetland complexes in the region.

First Priority

- the Manganui riverine forest complex
- Ngawha Springs geothermal and gumland areas
- Pouto dune forest and cliffs
- the large wetland complexes in the Tangihua ED
- Karikari Peninsula dunes and wetlands

Second Priority

- Whangarei Heads/Mt Manaia buffers and enclaves
- fencing of the Parengarenga, Hokianga, Rangaunu, Whangarei and Kaipara harbours
- coastal sequences at Waikare, Tapuwae, Ngunguru, Ahipara and Waipoua

4. To assess applications/proposals for the above in terms of the NHF criteria as outlined in Harding 1994, applying the criteria in 6.2 to determine the relative merit of competing applications.
5. Determine proposals to be funded according to ecological priority, potential opportunities for protection, current or potential threats to indigenous ecosystems, and cost of protection relative to the values protected.
6. Work with other agencies such as Queen Elizabeth II National Trust, Nga Whenua Rahui, local government, community groups and landowners, to encourage protection of natural areas for their intrinsic values generally, including remnant sites and sites of low priority within this strategy.

