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8. Appendices

8.1 FIELD SURVEY FORM

**DEPARTMENT OF CONSERVATION
PROTECTED NATURAL AREAS PROGRAMME**

NATURAL AREA NAME:..... DATE:

GRID REF: SSBI NO.: PNA NO.:

HABITAT TYPE(S):

GEOMORPHOLOGICAL TYPE(S):.....

VEGETATION TYPE(S):

Vegetation Type	% of Total Area	Percentage of Cover Value (Canopy)			
		Abundant (50-100)	Common (20-50)	Uncommon (5-20)	Rare (0-5)
HYD STR DYN LFU					

NATURAL AREA NAME: PNA NO.:

Vegetation Type	% of Total Area	Percentage of Cover Value (Canopy)			
		Abundant (50-100)	Common (20-50)	Uncommon (5-20)	Rare (0-5)
HYD STR DYN LFU					

NOTES: (e.g. naturalness, buffering, linkages, corridors, long-term viability, landowner comments, fauna, flora, threats)

8.2 LETTER TO RATEPAYERS/NEWS MEDIA ITEM



Department of Conservation *Te Papa Atawhai*

20 September 2005

Dear Landowner

This notice is to advise that Wildland Consultants Ltd under contract with the Department of Conservation will soon be undertaking an updated survey of natural features such as forest, wetlands, gumlands and dunelands within the Kaipara District. The natural features have initially been identified from recent aerial photography and are viewed from roadsides or (with the permission of landowners) from other viewpoints, recording information on their vegetation type and general condition. This survey is a continuation of work first undertaken by the Department in 1994.

In some cases, if these areas are not visible from the road, you may be contacted for permission to enter your land to enable a quick survey of the natural feature to gain information on the vegetation type and key plant species present.

Why are we doing this survey? Northland's natural features make a significant contribution to the character and quality of the region. Many of these areas are habitat for some of our increasingly rare plants and animals. The Department of Conservation and Kaipara District Council have existing information on many of the natural features in the District. However some of this information is now out of date, and therefore may no longer be accurate. This survey enables us to update our information and is an important reference point for assessing habitat changes over time and to assist landowners with management of their natural features.

The information gathered in this survey will be made available to anyone interested in natural features such as landowners, iwi, environmental groups, local bodies, and professionals.

The Kaipara District Council will be provided with the results of the survey upon completion.

With an increasing awareness in the value of natural features many residents and future residents to the District will have updated information describing the District's ecological character and biodiversity values. The Governments Biodiversity Condition and Advice Fund and the Northland Regional Council's Environment Fund are examples of how this information is effectively used by the landowner. The Funds were set up to support landowners for the management and protection of natural areas, the information provided in this survey is an important tool in achieving these aims.

If you have any questions about the survey, please contact the Department of Conservation, (attention Peter Anderson or Wendy Holland) at Northland Conservancy Office in Whangarei, telephone (09) 430 2470; fax 09 430 2479 or email panderson@doc.govt.nz or wholland@doc.govt.nz.

A handwritten signature in black ink, appearing to read 'Chris Jenkins'.

Chris Jenkins
CONSERVATOR NORTHLAND
Department of Conservation

Survey identifying key natural habitats

■ THE DEPARTMENT of Conservation has contracted Wildland Consultants Ltd to identify important natural habitats near Kaiwaka in the Kaipara district.

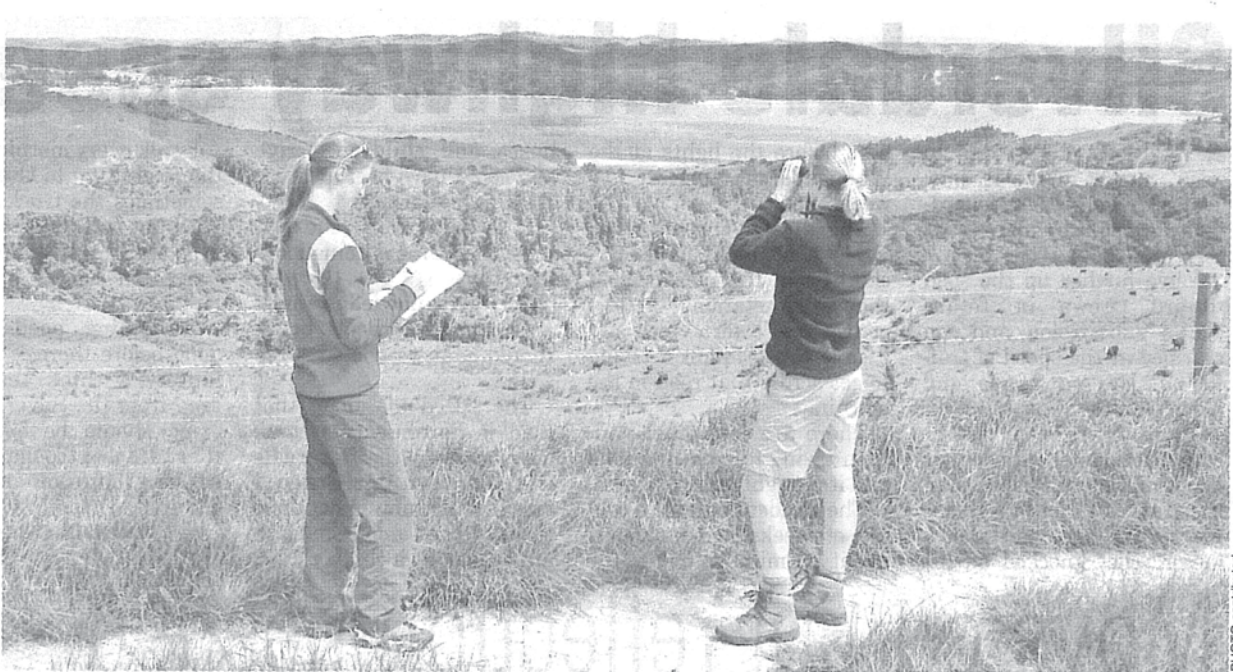
Wildland Consultants has started working on this project, which is expected to be finished in early 2006. The aim of the survey is to update existing information on the natural features of the area. The information will be available to anyone interested in natural features, including landowners, iwi, environmental groups, local bodies and professionals.

The natural features will be identified from roadsides or, with

the permission of landowners, from other viewpoints. People who live or work in the area may notice the Wildlands truck at work.

Only a portion of the Kaipara district will be surveyed. This area is known as the Otamatea Ecological District which occurs around the north-eastern portion of the Kaipara Harbour.

This type of survey has been ongoing in the Northland region since 1994 and the majority of the region has been covered. After the completion of this survey DOC hopes to identify important natural areas in the Pouto and Waipu areas to complete the project.



JENNY LUX and Sarah Beadel from Wildland Consultants are describing an important area of kauri regenerating bush on Oneriri Station-Puketotara Peninsula as part of a survey on the natural areas of the Otamatea Ecological District.

8.3 CATEGORIES OF THREAT

In this report the categories of threat are taken from the New Zealand Threat Classification developed by Molloy et al. (2002). This new system replaces Molloy & Davis (1994), the prioritising system used previously for threatened species work by the Department of Conservation.

Below are Sections 3 and 7, which have been taken from Molloy et al. (2002) to explain the new species classification system.

3. Classification structure and categories

... This section describes each of the categories (shown in Fig. 1).

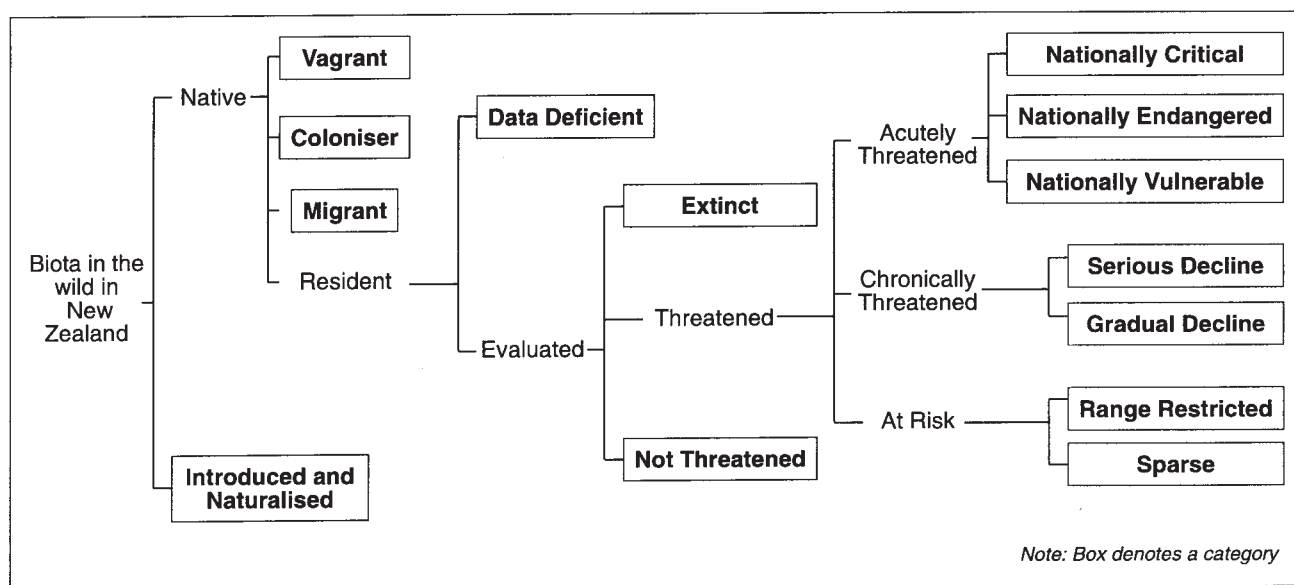


Figure 1. Structure of the New Zealand Threat Classification System.

INTRODUCED AND NATURALISED

Introduced and Naturalised taxa are those that have become naturalised in the wild after being deliberately or accidentally introduced to New Zealand by human agency.

If an Introduced and Naturalised taxon has an IUCN Red Listing in its country (or countries) of origin, the IUCN category and source of the listing are shown after the taxon's name in the New Zealand list. Current examples of this include the cress *Lepidium byssopifolium* and the southern bell frog (*Litoria raniformis*), both of which are listed as Endangered in Australia; and the parma wallaby (*Macropus parma*), listed as Lower risk/Near threatened.

VAGRANT

For the purposes of this document, vagrants are taxa that are found unexpectedly and rarely in New Zealand, and whose presence in our region is naturally transitory. These are taxa that do not establish themselves beyond their point of arrival because of reproductive failure or for specific ecological reasons (see de Lange & Norton 1998).

Examples include the red-kneed dotterel (*Erythrogonys cinctus*) and the blue moon butterfly (*Hypolimnna bolina nerina*), both from Australia, and the spotted sawtail (*Prionurus maculatus*) from the tropical south-west Pacific Ocean.

If a taxon in the Vagrant category has been listed in an IUCN Red List in its country of origin, the IUCN category and source of the listing are shown beside the taxon's name in the New Zealand list.

COLONISER

Colonisers are taxa that have arrived in New Zealand without direct or indirect help from humans and have been successfully reproducing in the wild for less than 50 years. Three examples are the Nankeen night heron (*Nycticorax caledonicus*), the scoliid wasp *Radumeris tasmaniensis* and the orchid *Cryptostylis subulata*.

The IUCN Red List category and source of the listing is included where this exists.

MIGRANT

Taxa that predictably and cyclically visit New Zealand as part of their normal life cycle, but do not breed here are included in the category Migrant. Examples include the Arctic skua (*Stercorarius parasiticus*) and striped marlin (*Tetrapturus audax*).

In contrast, taxa that either breed here and migrate beyond New Zealand during their life cycle, e.g. Chatham Island albatross (*Thalassarche eremita*), or taxa that are resident in New Zealand for most of their lives, such as longfinned eels (*Anguilla dieffenbachii*), are not included in this category.

The IUCN Red List category and source of the listing is included where this exists.

DATA DEFICIENT

The amount of information available for assessing the threat of extinction is highly variable between taxa and groups of taxa. At one extreme there are taxa such as kakapo, *Gunnera hamiltonii* and *Tecomathe speciosa* where every wild individual is known, while at the other extreme there are taxa whose ecology and biology is virtually unknown (e.g. *Koeleria riguorum*, a recently described grass).

Certain criteria and/or definitions must be met for a taxon to be listed in a category. Where information is so lacking that an assessment is not possible, the taxon is assigned to the Data Deficient category. If a taxon is listed in a category other than Data Deficient but confidence in the listing is low due to poor quality data, then the listing can be qualified with the letters DP (Data Poor) to indicate this ...

EXTINCT

A taxon is listed as Extinct when there is no reasonable doubt, after repeated surveys in known or expected habitats at appropriate times (diurnal, seasonal and annual) and throughout the taxon's historic range, that the last individual has died. Examples include huia (*Heteralocha acutirostris*) and Adams's

mistletoe (*Trilepidea adamsii*). Only taxa that have become extinct since 1840 are included in the list. Taxa that are extinct in the wild but occur in captivity or cultivation are not listed in this category. These are listed as Critically Endangered and are qualified with the letters EW (Extinct in the Wild).

THREATENED

The threatened categories are grouped into three major divisions: 'Acutely Threatened', 'Chronically Threatened' and 'At Risk'.

Acutely Threatened

The categories in the 'Acutely Threatened' division—Nationally Critical, Nationally Endangered and Nationally Vulnerable—equate with the IUCN categories of Critically Endangered, Endangered and Vulnerable. Taxa in these three categories are facing a very high risk of extinction in the wild, as defined by criteria that quantify:

- Total population size
- Area of occupancy
- Fragmentation of populations
- Declines in total population
- Declines in habitat area
- Predicted declines due to existing threats

Although the criteria (described in Section 6) measure similar population features as those in the IUCN Red List criteria, numerical limits and timeframes are tailored to suit New Zealand circumstances. These were set through a process of testing and refinement by the project team and as a result of feedback from New Zealand species experts. Criteria that attempt to predict declines due to possible future threats are not included because of the highly speculative nature of this type of assessment.

Chronically Threatened

Taxa listed in either of the two categories in the 'Chronically Threatened' grouping (Serious Decline and Gradual Decline) also face extinction, but are buffered slightly by either a large total population, or a slow decline rate (see Section 6).

At Risk

Taxa that do not meet the criteria for Acutely Threatened or Chronically Threatened, but have either restricted ranges or small scattered subpopulations, are listed in one of two categories (Range Restricted and Sparse) that fall under the division 'At Risk'. Although these taxa are not currently in decline, their population characteristics mean a new threat could rapidly deplete their population(s). Range Restricted taxa either occur in a small geographic area (e.g. Three Kings Islands), are restricted to a particular habitat (e.g. geothermal areas), or require very specific substrates (e.g. ultramafic rock), and for colonial breeders, have fewer than 10 subpopulations. Taxa that have naturally restricted ranges and taxa that have become restricted as a result of human activities are both included in this category. This is because both would face the same risk of extinction in the face of a new threat. The two groups are differentiated by the use of a qualifier (see Section 4).

Sparse taxa have very small, widely scattered populations, e.g. New Zealand spinach (*Tetragonia tetragonoides*). As with the Range Restricted category, taxa that are either naturally sparse or have become sparse as a result of human activities are included in this category.

NOT THREATENED

Taxa that are assessed and do not fit any of the Threatened categories are listed in the Not Threatened category.

7. Criteria for the Acutely Threatened and Chronically Threatened categories

... a taxon must meet specific criteria to be listed in one of the Acutely Threatened or Chronically Threatened categories. The criteria for each category are set out below ...

NATIONALLY CRITICAL

Very small population *or* a very high predicted decline

A taxon is Nationally Critical when available scientific evidence indicates that it meets any of the following three criteria:

1. The total population size is < 250 mature individuals.
2. Human influences have resulted in < 2 sub-populations *and either*:
 - a. < 200 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is < 1 ha (0.01 km²).
3. There is a predicted decline of > 80% in the total population in the next 10 years due to existing threats.

NATIONALLY ENDANGERED

A: Small population *and* moderate to high recent or predicted decline

A taxon is Nationally Endangered when available scientific evidence indicates that it fits at least one Status criterion *and* one Trend criterion as follows:

Status criteria

1. The total population size is 250-1000 mature individuals.
2. There are < 5 sub-populations *and either*:
 - a. < 300 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is < 10 ha (0.1 km²).

Trend criteria

1. There has been a decline of > 30% in the total population or habitat area in the last 100 years.
2. There is a predicted decline of > 30% in the total population in the next 10 years due to existing threats.

B: Small to moderate population *and* high recent or predicted decline

A taxon is Nationally Endangered when available scientific evidence indicates that it fits at least one Status criterion *and* one Trend criterion:

Status criteria

1. The total population size is 1000–5000 mature individuals.
2. There are < 15 sub-populations *and either*:
 - a. 300–500 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is 10–100 ha (0.1–1 km²).

Trend criteria

1. There has been a decline of > 60% in the total population or habitat area in the last 100 years.
2. There is a predicted decline of > 60% in the total population in the next 10 years due to existing threats.

NATIONALLY VULNERABLE

Small to moderate population *and* moderate recent or predicted decline

A taxon is Nationally Vulnerable when scientific evidence indicates that it fits at least one Status criterion *and* one Trend criterion:

Status criteria

1. The total population size is 1000–5000 mature individuals.
2. There are < 15 sub-populations *and either*:
 - a. 300–500 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is 10–100 ha (0.1–1 km²).

Trend criteria

1. There has been a decline of 30–60% in the total population or habitat area in the last 100 years and the total population or habitat area is still in decline.
2. There is a predicted decline of 30–60% in the total population in the next 10 years due to existing threats.

SERIOUS DECLINE

A. Moderate to large population *and* moderate to large predicted decline

A taxon is listed in Serious Decline when scientific evidence indicates that it fits at least one Status criterion *and* the Trend criterion:

Status criteria

1. The total population size is > 5000 mature individuals.
2. There are > 15 sub-populations *and either*:
 - a. > 500 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is >100 ha (1 km²).

Trend criterion

1. There is a predicted decline of > 30% in the total population in the next 10 years due to existing threats.

B. Small to moderate population *and* small to moderate predicted decline

A taxon is listed in Serious Decline when available scientific evidence indicates that it fits at least one Status criterion *and* the Trend criterion:

Status criteria

1. The total population size is < 5000 mature individuals.
2. There are < 15 sub-populations *and either*:
 - a. < 500 mature individuals in the largest sub-population, *or*

- b. the total area of occupancy is ≤ 100 ha (1 km²).

Trend criterion

1. There is a predicted decline of 5-30% in the total population in the next 10 years due to existing threats.

GRADUAL DECLINE

Moderate to large population *and* small to moderate decline

A taxon is listed in Gradual Decline when available scientific evidence indicates that it fits at least one Status criterion *and* the Trend criterion:

Status criteria

1. The total population size is > 5000 mature individuals.
2. There are > 15 sub-populations *and either*:
 - a. > 500 mature individuals in the largest sub-population, *or*
 - b. the total area of occupancy is > 100 ha (1 km²).

Trend criterion

1. There is a predicted decline of 5-30% in the total population in the next 10 years due to existing threats, and *the decline is predicted to continue beyond 10 years*.

8.4 CATEGORIES OF IMPORTANCE FOR GEOLOGICAL SITES

Ranking criteria for important geological sites and landforms in the Northland Region follow Kenny & Hayward (1996).

Sites are listed under three levels of importance:

- (a) International – site of international scientific importance.
- (b) National – site of national scientific, educational or aesthetic importance.
- (c) Regional – site of regional scientific, educational or aesthetic importance.

The importance given to each site was assessed by those informants of Kenny & Hayward (1996) who were familiar with the site.

8.5 CHECKLIST OF PLANT SPECIES IN OTAMATEA ECOLOGICAL DISTRICT (NORTHLAND CONSERVANCY)

This species list was compiled by the authors during a reconnaissance survey in the summer of 2005/2006. Other records, including those from Department of Conservation Sites of Specific Biological Interest (SSBI) information system, Auckland Museum Herbarium (AK) and Te Papa Herbarium (WELT), have been referenced following the Latin species name.

1. INDIGENOUS SPECIES

Gymnosperms		<i>Coprosma spatulata</i> (Wright & Beever 1990)	
<i>Agathis australis</i>	kauri	<i>Coprosma tenuicaulis</i> (Julia Walker, pers. comm.)	
<i>Dacrycarpus dacrydioides</i>	kahikatea	<i>Coriaria arborea</i> var. <i>arborea</i>	tutu
<i>Dacrydium cupressinum</i>	rimu	<i>Corynocarpus laevigatus</i>	karaka
<i>Libocedrus plumosa</i> (Julia Walker pers. comm.)	kawaka	<i>Dracophyllum latifolium</i> (Wright & Beever 1990)	neinei
<i>Phyllocladus trichomanoides</i> var. <i>trichomanoides</i>	tanekaha	<i>Dysoxylum spectabile</i>	kohekohe
<i>Podocarpus totara</i>	totara	<i>Elaeocarpus dentatus</i>	hinau
<i>Prumnopitys taxifolia</i>	matai	<i>Entelea arborescens</i>	whau
<i>Stachypitys ferruginea</i> (SSBI Q08/H015 & Q08/H037)	miro	<i>Fuchsia excorticata</i>	kotukutuku
		<i>Gaultheria antipoda</i>	snowberry
		<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>	hangehange
		<i>Griselinia lucida</i>	puka
		<i>Hebe macrocarpa</i> var. <i>macrocarpa</i> (SSBI Q08/H070)	kokomuka
		<i>Hebe stricta</i> var. <i>stricta</i>	koromiko
		<i>Hedycarya arborea</i>	pigeonwood,
		<i>porokaiwhiri</i>	
		<i>Hoheria populnea</i>	houhere
		<i>Ileostylus micranthus</i> (AK 11264) ¹	green mistletoe
		<i>Knightsia excelsa</i>	rewarewa
		<i>Kunzea ericoides</i>	kanuka
		<i>Laurelia novae-zelandiae</i>	pukatea
		<i>Leptocophylla juniperina</i> subsp. <i>juniperina</i>	prickly mingimingi
		<i>Leptospermum scoparium</i>	manuka
		<i>Leucopogon fasciculatus</i>	mingimingi
		<i>Leucopogon fraseri</i>	patotara
		<i>Litsea calicaris</i>	mangeao
		<i>Macropiper excelsum</i> var. <i>excelsum</i>	kawakawa
		<i>Melicope simplex</i>	poataniwha
		<i>Melicytus macrophyllus</i> (Wright & Beever 1990)	large leaved mahoe
		<i>Melicytus micranthus</i> (Wright & Beever 1990)	
		<i>Melicytus ramiflorus</i> subsp. <i>ramiflorus</i>	mahoe
		<i>Metrosideros carminea</i> (AK 11444) ²	carmine rata
		<i>Metrosideros excelsa</i>	pohutukawa
Monocot. trees and shrubs			
<i>Cordyline australis</i>	ti kouka, cabbage tree		
<i>Cordyline banksii</i> (Wildland Consultants 2004)	ti ngahere, forest cabbage tree		
<i>Phormium tenax</i>	harakeke, flax		
<i>Rhopalostylis sapida</i>	nikau		
Dicot. trees and shrubs			
<i>Alectryon excelsus</i> var. <i>excelsus</i>	titoki		
<i>Alseuosmia macrophylla</i>	karapapa		
<i>Alseuosmia quercifolia</i>			
<i>Androstoma empetrifolia</i>			
<i>Avicennia marina</i> subsp. <i>australasica</i>	mangrove, manawa		
<i>Beilschmiedia tarairi</i>	taraire		
<i>Beilschmiedia tawa</i>	tawa		
<i>Brachyglottis repanda</i>	rangiora		
<i>Carmichaelia australis</i>			
<i>Carpodetus serratus</i> (AK 296537)	putaputaweta		
<i>Coprosma arborea</i>	mamangi		
<i>Coprosma areolata</i>			
<i>Coprosma grandifolia</i>	kanono		
<i>Coprosma macrocarpa</i>			
<i>Coprosma propinqua</i> subsp. <i>propinqua</i> (Wildland Consultants 2004)			
<i>Coprosma propinqua</i> subsp. <i>propinqua</i> × <i>C. robusta</i>			
<i>Coprosma rbamnoides</i>			
<i>Coprosma robusta</i>	karamu		

¹ Not recorded in Otamatea ED Northland since 1867.

² Not recorded in Otamatea ED Northland since 1867.

<i>Metrosideros excelsa</i> × <i>M. robusta</i>	pohutukawa × northern rata hybrid
<i>Metrosideros robusta</i>	northern rata
<i>Mida salicifolia</i> (Wright & Beever 1990)	mida
<i>Myoporum laetum</i>	ngaio
<i>Myrsine australis</i>	mapou
<i>Myrsine salicina</i>	toro
<i>Nestegis lanceolata</i>	white maire
<i>Olearia furfuracea</i>	akepiro
<i>Olearia rani</i>	heketara
<i>Olearia solandri</i> (AK 233985)	
<i>Pennantia corymbosa</i>	kaikomako
(SSBI Q08/H038 & Q08/H015)	
<i>Pimelea prostrata</i> (SSBI Q08/H057)	pinatoro
<i>Pittosporum cornifolium</i> (Wright & Beever 1990)	perching pittosporum
<i>Pittosporum eugenioides</i>	tarata, lemonwood
<i>Pittosporum tenuifolium</i> ³	kohuhu
(WELT SP031346)	
<i>Plagianthus divaricatus</i>	saltmarsh ribbon-wood, makaka
<i>Pomaderris kumerabo</i>	kumarahou
<i>Pomaderris ericifolia</i>	
<i>Pouteria costata</i>	tawapou
<i>Pseudopanax arboreus</i> var. <i>arboreus</i>	five finger, whauwhaupaku
<i>Pseudopanax crassifolius</i>	lancewood, horoeke
<i>Pseudopanax lessonii</i>	houpara
<i>Rhabdotbamnus solandri</i>	taurepo
<i>Schefflera digitata</i>	pate
<i>Sophora chathamica</i>	kowhai
<i>Streblus banksii</i>	large-leaved milk tree
<i>Streblus heterophyllus</i> (AK 296539)	small-leaved milk tree
<i>Syzygium maire</i> (Wright & Beever 1990)	swamp maire, maire tawake
<i>Toronia toru</i>	toru
<i>Trilepidea adamsii</i> (WELT SP031299) ⁴	Adam's mistletoe
<i>Tupeia antarctica</i> (AK 11268)	
(WELT SP031346) ⁵	
<i>Vitex lucens</i>	puriri

Monocot. lianes

<i>Freycinetia banksii</i>	kiekie
<i>Ripogonum scandens</i>	supplejack, kareao

Dicot. lianes

<i>Calystegia marginata</i> (WELT SP004696)	
<i>Calystegia sepium</i>	pink bindweed, pohue
<i>Calystegia soldanella</i>	shore bindweed, panahi
<i>Clematis paniculata</i>	puawananga

³ Kohuhu was noted as the host plant for *Tupeia antarctica* by T. Kirk in 1867.

⁴ Not recorded in Otamatea ED Northland since 1867, now presumed extinct.

⁵ Not recorded in Otamatea ED Northland since 1867.

<i>Metrosideros diffusa</i>	
<i>Metrosideros fulgens</i>	
<i>Metrosideros perforata</i>	aka
<i>Muehlenbeckia australis</i>	
<i>Muehlenbeckia complexa</i>	pohuehue
<i>Parsonia capsularis</i>	NZ jasmine, akakiore
<i>Parsonia heterophylla</i>	NZ jasmine
<i>Passiflora tetrandra</i>	NZ passionfruit, kohia
<i>Rubus australis</i>	bush lawyer, tataramoa
<i>Rubus cissoides</i>	bush lawyer, tataramoa
<i>Rubus squarrosus</i> (AK 252397)	leafless lawyer
<i>Tetragonia implexicoma</i>	NZ spinach

Lycopods and psilopsids

<i>Huperzia varia</i> (Wright & Beever 1990)
<i>Lycopodiella cernua</i>
<i>Tmesipteris elongata</i>

Mosses⁶

<i>Breutelia pendula</i>
<i>Calomnion complanatum</i>
<i>Camptochaete arbuscula</i>
<i>Camptochaete pulvinata</i>
<i>Campylopus clavatus</i>
<i>Campylopus introflexus</i>
<i>Campylopus pyriformis</i>
<i>Cyathophorum bulbosum</i>
<i>Cyrtopus setosus</i>
<i>Dicranoloma fasciatum</i>
<i>Dicranoloma menziesii</i>
<i>Distichophyllum microcarpum</i>
<i>Distichophyllum pulchellum</i>
<i>Echinodium bispidum</i>
<i>Eurhynchium muriculatum</i>
<i>Fissidens asplenioides</i>
<i>Fissidens bumilis</i>
<i>Fissidens leptocladus</i>
<i>Fissidens pallidus</i>
<i>Fissidens pungens</i>
<i>Fissidens rigidulus</i>
<i>Fissidens tenellus</i>
<i>Fissidens</i> sp.
<i>Holomitrium perichaetiale</i>
<i>Homalia falcifolia</i>
<i>Homalia punctata</i>
<i>Hymenodon pilifer</i>
<i>Hypnodendron arcuatum</i>
<i>Hypnodendron colensoi</i>
<i>Hypnodendron kerrii</i>
<i>Hypnum cbrysogaster</i>
<i>Leptostomum macrocarpum</i>
<i>Leucobryum candidum</i>

⁶ All moss records are from Beever (1990).

<i>Lopidium concinnum</i>		<i>Hymenophyllum revolutum</i> (Wright & Beever 1990)	filmy fern
<i>Macrocoma tenue</i>		<i>Hymenophyllum sanguinolentum</i> (Wright & Beever 1990)	filmy fern, pipiripi
<i>Macromitrium gracile</i>		<i>Hypolepis distans</i> ⁷	
<i>Macromitrium ligulare</i>		<i>Lastreopsis glabella</i> (Wright & Beever 1990)	smooth shield fern
<i>Orthorrhynchium elegans</i>		<i>Lastreopsis hispida</i>	hairy shield fern
<i>Pbilonotis tenuis</i>		<i>Lastreopsis microsora</i> subsp. <i>petangularis</i> (Wright & Beever 1990)	
<i>Porotrichum oblongifolium</i>		<i>Lygodium articulatum</i>	mangemange
<i>Ptychomnion aciculare</i>		<i>Microsorium pustulatum</i>	hound's tongue fern, kowaowao
<i>Racopilum convolutaceum</i>		<i>Microsorium scandens</i>	mokimoki, fragrant fern
<i>Rhizogonium novae-hollandiae</i>		<i>Opbioglossum petiolatum</i> ⁸ (DOC Bioweb)	stalked adder's tongue
<i>Rhynchostegium tenuifolium</i>		<i>Paesia scaberula</i>	matata
<i>Sematophyllum amoenum</i>		<i>Pellaea rotundifolia</i>	tarawera, button fern
<i>Thamnobryum pandum</i>		<i>Pneumatopteris pennigera</i>	gully fern
<i>Thuidium furfurosum</i>		<i>Pteridium esculentum</i>	bracken, rarahu
<i>Thuidium laeviusculum</i>		<i>Pteris macilenta</i> (of NZ authors)	
<i>Thuidium sparsum</i>		<i>Pteris tremula</i>	shaking brake, turawera
<i>Weymouthia cochlearifolia</i>		<i>Pyrrosia eleagnifolia</i>	leather-leaf fern
<i>Wijkia extenuata</i>			
<i>Zygodon gracillimus</i>			
<i>Zygodon intermedius</i>			
<hr/>			
Ferns		Orchids	
<i>Adiantum cunninghamii</i>	common maidenhair	<i>Acianthus sinclairii</i>	
<i>Adiantum viridescens</i>		<i>Bulbophyllum pygmaeum</i> (Wright & Beever 1990)	pipiripi
<i>Anarthropteris lanceolata</i>		<i>Corybas oblongus</i> (Wright & Beever 1990)	
<i>Arthropteris tenella</i>		<i>Earina mucronata</i>	peka-a-waka
<i>Asplenium bulbiferum</i>	hen and chicken fern	<i>Microtis unifolia</i>	maikaika
<i>Asplenium flaccidum</i>	hanging spleenwort	<i>Pterostylis banksii</i>	tutukiwi, greenhood orchid
<i>Asplenium gracillimum</i>		<i>Thelymitra</i> sp.	
<i>Asplenium oblongifolium</i>	shining spleenwort, huruhuruwhenua		
<i>Asplenium polyodon</i>	sickle spleenwort, petako		
<i>Blechnum chambersii</i>	rereti		
<i>Blechnum discolor</i>	crown fern	Grasses	
<i>Blechnum filiforme</i>	thread fern, panako	<i>Austrostipa stipoides</i>	
<i>Blechnum fraseri</i>		<i>Bromus arenarius</i> (WELT SP076361) ⁹	sand brome
<i>Blechnum membranaceum</i>		<i>Cortaderia fulvida</i>	toetoe
<i>Blechnum novae-zelandiae</i>	kiokio	<i>Dichelachne crinita</i>	long-hair plume grass
<i>Cheilanthes sieberi</i> (SSBI Q08/H057)		<i>Dichelachne inaequiglumis</i> (WELT SP067113) ¹⁰	short-hair plume grass
<i>Cyathea cunninghamii</i>	gully tree fern	<i>Isachne globosa</i>	swamp millet
<i>Cyathea dealbata</i>	ponga, silver fern	<i>Lacynagrostis littoralis</i> ¹¹	coastal wind grass
<i>Cyathea medullaris</i>	mamaku, black tree fern	<i>Microlaena avenacea</i>	bush rice grass
<i>Deparia petersenii</i>		<i>Microlaena stipoides</i>	patiti
<i>Dicksonia lanata</i>		<i>Oplismenus hirtellus</i> subsp. <i>imbecillis</i>	
<i>Dicksonia squarrosa</i>	wheki	<i>Poa pusilla</i> ¹²	
<i>Diplazium australe</i>			
<i>Doodia australis</i>	rasp fern, pukupuku		
<i>Doodia mollis</i> (SSBI Q08/H047)			
<i>Gleichenia dicarpa</i>	tangle fern		
<i>Grammitis</i> sp.			
<i>Histiopteris incisa</i>	water fern, matata		
<i>Hymenophyllum demissum</i> (Wright & Beever 1990)	filmy fern, irirangi		
<i>Hymenophyllum dilatatum</i> (Wright & Beever 1990)	filmy fern		

⁷ Not recorded in Otamatea ED Northland since 1867.

⁸ Supposed T. Kirk collection from 1867, but no herbarium specimen noted.

⁹ Not recorded in Otamatea ED Northland since 1867.

¹⁰ Not recorded in Otamatea ED Northland since 1903.

¹¹ Not recorded in Otamatea ED Northland since 1867.

¹² Not recorded in Otamatea ED Northland since 1867.

Rytidosperma biannulare (Wright & Beever 1990)
*Trisetum arduanum*¹³

Sedges

Baumea juncea
Baumea tenax
Baumea teretifolia
Bolboschoenus fluviatilis marsh clubrush
Carex breviculmis
Carex dissita (Wright & Beever 1990)
Carex flagellifera manaia
Carex lambertiana (Wright & Beever 1990)
Carex ochrosaccus (Wright & Beever 1990)
Carex secta purei
Carex virgata purei
Cyperus ustulatus giant umbrella sedge, upokotangata
Ficinia nodosa knobby clubrush
Gabnia lacera cutty grass, tarangarara
Gabnia pauciflora takahikahi
Gabnia setifolia mapere
Gabnia xanthocarpa toikiwi
Isolepis cernua
Isolepis inundata
Lepidosperma laterale sword sedge
Schoenoplectus tabernaemontani lake clubrush, kuta
Schoenus maschalinus
Schoenus apogon
Schoenus tendo wiwi
Uncinia banksii hook sedge
Uncinia uncinata hook sedge
Uncinia zotovii (Wright & Beever 1990) hook sedge

Rushes

Juncus kraussii subsp. *australiensis* sea rush
Juncus edgariae
Juncus planifolius
Juncus sarophorus
Luzula picta var. *picta* (Wright & Beever 1990) painted woodrush

Monocot. herbs (other than orchids, grasses, sedges and rushes)

Apodasmia similis oioi
Artropodium cirratum rengarenga
Astelia banksii kowharawhara
Collospermum hastatum perching lily, kahakaha
Collospermum microspermum
Cordyline pumilio ti rauriki
Dianella nigra turutu
Triglochin striata arrow grass
Typha orientalis raupo

¹³ Not recorded in Otamatea ED Northland since 1867.

Composite herbs

Cotula coronopifolia bachelor's button
Leptinella tenella (AK 233971)
Picris burbridgeae (AK 11814)¹⁴
Pseudognaphalium luteoalbum agg. jersey cudweed
Senecio bispidulum fireweed
Senecio lautus shore groundsel

Dicot. herbs (other than composites)

Apium prostratum NZ celery
Callitriche muelleri starwort
Centella uniflora centella
Dichondra repens Mercury Bay weed
Disphyma australe (SSBI Q08/H056) native iceplant, horokaka
Drosera auriculata (SSBI Q08/H057) sundew
Epilobium birtigerum (WELT SP042470)¹⁵ hairy willowherb
Epilobium rotundifolium
Geranium solanderi
Gonocarpus incanus piripiri
Haloragis erecta subsp. *erecta*
Hydrocotyle dissecta
Leptostigma setulosa
Lobelia anceps punakuru
Myriophyllum propinquum (AK 243770)
Nertera dichondrifolia
Peperomia urvilleana (SSBI Q08/H056)
Persicaria decipiens native willow weed
Ranunculus reflexus maruru
Samolus repens sea primrose
Sarcocornia quinqueflora glasswort
Selliera radicans remuremu
Suaeda novae-zelandiae (AK 294674 and AK 294744)
Solanum americanum
Spergularia media

Unconfirmed records

*Coprosma rigida*¹⁶ (SSBI Q08/H038 & Q08/H063)
*Deparia tenuifolia*¹⁷ (Wright & Beever 1990)
*Libertia ixioides*¹⁸ (SSBI Q08/H056)
*Nephrolepis flexuosa*¹⁹ (DOC Bioweb) native ladder fern

¹⁴ Not recorded in Otamatea ED Northland since 1867.

¹⁵ Not recorded in Otamatea ED Northland since 1924.

¹⁶ Recorded in 1996 at two locations, Whakapirau River Scenic Reserve (Q08/128) and Kohatutahi Forest and Wetland (Q08/178), but no herbarium specimen collected. During the current survey *C. rigida* was not found amongst the coprosmas growing at Kohatuahi.

¹⁷ Otherwise not recorded in Northland; only confirmed records are from Waikato, Bay of Plenty and Nelson area (Brownsey and Smith-Dodsworth 2000).

¹⁸ Unconfirmed 1993 record from Kaiwhitu Island (Q08/175).

¹⁹ Unconfirmed 2001 record from Hukatere Hall Recreation Reserve (grid ref: Q08 156 575); unlikely to be a natural population.

*Plagianthus regius*²⁰ (SSBI Q08/H074 & Q08/H062) manatu, ribbonwood

2. EXOTIC SPECIES

Gymnosperms

Cupressus macrocarpa macrocarpa
Pinus pinaster maritime pine
Pinus radiata radiata pine

Dicot. trees and shrubs

Acacia mearnsii black wattle
Acacia melanoxylon Tasmanian blackwood
Banksia sp. banksia
Berberis glaucocarpa barberry
Betula pendula silver birch
Cotoneaster glaucophyllus cotoneaster
Crataegus monogyna hawthorn
Cytisus scoparius (AK 296480) broom
Elaeagnus 'reflexa' elaeagnus
Eriobotrya japonica loquat
Erythrina 'sykesii' coral tree
Hakea salicifolia willow-leaved hakea
Hakea sericea prickly hakea
Impatiens sodenii shrub balsam
Ligustrum lucidum tree privet
Ligustrum sinense Chinese privet
Paraserianthes lophantha brush wattle
Populus sp. poplar
Psoralea pinnata dally pine, cut-leaf
 psoralea
Robinia pseudacacia false acacia
Rubus sp. (*R. fruticosus* agg.) blackberry
Salix fragilis crack willow
Senecio petasitis velvet groundsel
Senna multiglandulosa buttercup bush
Solanum mauritianum woolly nightshade
Solanum pseudocapsicum Jerusalem cherry
Ulex europaeus gorse

Ferns

Azolla pinmata

Dicot. lianes

Jasminum polyanthum jasmine
Lonicera japonica Japanese honeysuckle
Passiflora tarminiana (AK 296544) banana passionfruit
Passiflora tripartita var. *mollissima*
Senecio mikanioides German ivy
Vitis vinifera grape
Wisteria sinensis wisteria

Lycopods and psilopsids

Sellaginella kraussiana selaginella

Grasses

(not named) bamboo
Agrostis capillaris browntop
Aira caryophyllea silvery hairy grass
Alopecurus pratensis (WELT SP062659) meadow foxtail
Antboxanthum odoratum sweet vernal
Arundo donax giant reed grass
Avena barbata slender oat
Axonopus fissifolius (Wright & Beever 1990) narrow-leaved carpet grass
Briza maxima large quaking grass
Cortaderia selloana pampas
Dactylis glomerata cocksfoot
Holcus lanatus Yorkshire fog
Lolium perenne rye grass
Paspalum dilatatum paspalum
Paspalum vaginatum saltwater paspalum
Pennisetum clandestinum kikuyu
Poa annua annual poa
Schedonorus pboenix tall fescue
Spartina alterniflora spartina
Sporobolus africanus ratstail
Stenotaphrum secundatum buffalo grass
Vulpia sp. hair grass

Sedges

Carex divulsa
Cyperus eragrostis umbrella sedge
Isolepis sepulcralis

Rushes

Juncus acutus sharp rush
Juncus articulatus (Wright & Beever 1990) jointed rush
Juncus bufonius toad rush
Juncus effusus soft rush

Monocot. herbs (other than orchids, grasses, sedges and rushes)

Agapanthus praecox agapanthus
Allium triquetrum three-cornered garlic
Aristea ecklonii aristea
Asparagus asparagoides smilax
Asparagus scandens climbing asparagus
Canna indica canna lily
Crocsmia 'crocsmiflora' montbretia
Hedychium gardnerianum kahili ginger;
 wild ginger
Kniphofia uvaria red hot poker
Tradescantia fluminensis tradescantia
Watsonia meriana watsonia
Zantedeschia aethiopica arum lily

Composite herbs

Achillea millefolium yarrow
Aster subulatus sea aster
Cirsium arvense California thistle

²⁰ Unconfirmed 2003 record from Donaldson's Forest (Q08/157).

<i>Cirsium vulgare</i>	Scotch thistle	<i>Galium aparine</i>	cleavers
<i>Conyza albida</i>	fleabane	<i>Geranium molle</i>	dove's foot
<i>Dimorphotheca pluvialis</i>	rain daisy	<i>Hypericum androsaemum</i>	tutsan
<i>Erigeron karvinskianus</i>	Mexican daisy	<i>Impatiens walleriana</i>	busy lizzie
<i>Hypochoeris radicata</i>	catsear	<i>Lotus pedunculatus</i>	lotus
<i>Lapsana communis</i>	nipplewort	<i>Lotus suaveolens</i>	hairy birdsfoot trefoil
<i>Leontodon taraxacoides</i>	hawkbit	<i>Myosotis laxa</i> var. <i>caespitosa</i>	forget-me-not
<i>Picris echioides</i>	oxtongue	<i>Nasturtium officinale</i>	watercress
<i>Senecio jacobaea</i>	ragwort	<i>Orobanche minor</i>	broomrape
<i>Sonchus asper</i>	prickly sow thistle	<i>Oxalis</i> sp.	oxalis
<i>Sonchus oleraceus</i>	sow thistle, puha	<i>Parentucellia viscosa</i>	tarweed
<i>Taraxacum officinale</i>	dandelion	<i>Plantago coronopus</i>	buck's-horn plantain
		<i>Plantago lanceolata</i>	narrow-leaved plantain
Dicot. herbs (other than composites)			
<i>Ageratina adenophora</i>	Mexican devil	<i>Plantago major</i>	broad-leaved plantain
<i>Alternanthera philoxeroides</i>	alligator weed	<i>Polygonum</i> sp.	willow weed
<i>Anagallis arvensis</i>	scarlet pimpernel	<i>Prunella vulgaris</i>	selfheal
<i>Apium nodiflorum</i>	water celery	<i>Ranunculus repens</i>	creeping buttercup
<i>Atriplex</i> sp.		<i>Rumex conglomeratus</i>	clustered dock
<i>Callitriche stagnalis</i>	starwort	<i>Rumex obtusifolius</i>	dock
<i>Cardamine</i> sp.	bitter cress	<i>Solanum nigrum</i>	black nightshade
<i>Carpobrotus edulis</i>	ice plant	<i>Trifolium repens</i>	white clover
<i>Conium maculatum</i>	hemlock	<i>Tropaeolum majus</i>	garden nasturtium
<i>Daucus carota</i>	wild carrot	<i>Verbena officinalis</i>	vervain
<i>Duchesnea indica</i>	Indian strawberry	<i>Veronica arvensis</i>	field speedwell
<i>Epilobium</i> sp.		<i>Vicia sativa</i>	vetch
<i>Euphorbia peplus</i>	milkweed	<i>Vinca major</i>	periwinkle
<i>Foeniculum vulgare</i>	fennel		

8.6 COMMON PLANT NAMES USED IN TEXT

Note: Some of these species *are not* native to or naturalised in Otamatea ED Northland, but are referred to in the text for other reasons.

INDIGENOUS SPECIES

Adam's mistletoe	<i>Trilepidea adamsii</i>	mangeao	<i>Litsea calicaris</i>
akepiro	<i>Olearia furfuracea</i>	mangemange	<i>Lygodium articulatum</i>
arrow grass	<i>Triglochin striata</i>	mangrove	<i>Avicennia marina</i> subsp. <i>australasica</i>
bachelor's button	<i>Cotula coronopifolia</i>	manuka	<i>Leptospermum scoparium</i>
bracken	<i>Pteridium esculentum</i>	mapou	<i>Myrsine australis</i>
bush lawyer	<i>Rubus cissoides</i>	marsh clubrush	<i>Bolboschoenus fluviatilis</i>
carmine rata	<i>Metrosideros carminea</i>	matai	<i>Prumnopitys taxifolia</i>
five finger	<i>Pseudopanax arboreus</i> var. <i>arboreus</i>	mida	<i>Mida salicifolia</i>
glasswort	<i>Sarcocornia quinqueflora</i>	mingimingi	<i>Leucopogon fasciculatus</i>
green mistletoe	<i>Ileostylus micranthus</i>	miro	<i>Stachypitys ferruginea</i>
gully fern	<i>Pneumatopteris pennigera</i>	native iceplant	<i>Disphyma australe</i>
gully tree fern	<i>Cyathea cunninghamii</i>	native willow weed	<i>Persicaria decipiens</i>
hairy willowherb	<i>Epilobium hirtigerum</i>	ngaio	<i>Myoporum laetum</i>
hangehange	<i>Geniostoma rupestre</i> var. <i>ligustrifolium</i>	nikau	<i>Rhopalostylis sapida</i>
hanging spleenwort	<i>Asplenium flaccidum</i>	northern rata	<i>Metrosideros robusta</i>
harakeke	<i>Phormium tenax</i>	NZ celery	<i>Apium prostratum</i>
heketara	<i>Olearia rani</i>	NZ jasmine	<i>Parsonsia heterophylla</i>
hinau	<i>Elaeocarpus dentatus</i>	NZ passionfruit	<i>Passiflora tetrandra</i>
hook sedge	<i>Uncinia uncinata</i>	NZ spinach	<i>Tetragonia implexicoma</i>
houhere	<i>Hoberia populnea</i>	oioi	<i>Apodasmia similis</i>
hound's tongue fern	<i>Microsorium pustulatum</i>	painted woodrush	<i>Luzula picta</i> var. <i>picta</i>
houpara	<i>Pseudopanax lessonii</i>	pate	<i>Scbefflera digitata</i>
kahikatea	<i>Dacrycarpus dacrydioides</i>	perching lily	<i>Collospermum hastatum</i>
kaikomako	<i>Pennantia corymbosa</i>	pigeonwood	<i>Hedycarya arborea</i>
kanono	<i>Coprosma grandifolia</i>	pink bindweed	<i>Calystegia sepium</i>
kanuka	<i>Kunzea ericoides</i>	pohuehue	<i>Muehlenbeckia complexa</i>
karaka	<i>Corynocarpus laevigatus</i>	pohutukawa	<i>Metrosideros excelsa</i>
karamu	<i>Coprosma robusta</i>	pohutukawa × northern rata hybrid	<i>Metrosideros excelsa</i> × <i>M. robusta</i>
kauri	<i>Agathis australis</i>	ponga	<i>Cyathea dealbata</i>
kawaka	<i>Libocedrus plumosa</i>	prickly mingimingi	<i>Leptocophylla juniperina</i> subsp. <i>juniperina</i>
kawakawa	<i>Macropiper excelsum</i> var. <i>excelsum</i>	puka	<i>Griselinia lucida</i>
kiekie	<i>Freycinetia banksii</i>	pukatea	<i>Laurelia novae-zelandiae</i>
kiokio	<i>Blechnum novae-zelandiae</i>	puriri	<i>Vitex lucens</i>
knobby clubrush	<i>Ficinia nodosa</i>	putaputaweta	<i>Carpodetus serratus</i>
kohekohe	<i>Dysoxylum spectabile</i>	rangiora	<i>Brachyglottis repanda</i>
kohuhu	<i>Pittosporum tenuifolium</i>	rasp fern	<i>Doodia australis</i>
koromiko	<i>Hebe stricta</i> var. <i>stricta</i>	raupo	<i>Typha orientalis</i>
kowhai	<i>Sopora chathamica</i>	remuremu	<i>Selliera radicans</i>
kowharawhara	<i>Astelia banksii</i>	rengarenga	<i>Arthropodium cirratum</i>
lake clubrush	<i>Schoenoplectus tabernaemontani</i>	rewarewa	<i>Knightia excelsa</i>
lancewood	<i>Pseudopanax crassifolius</i>	rimu	<i>Dacrydium cupressinum</i>
large-leaved milk tree	<i>Streblus banksii</i>	saltmarsh ribbonwood	<i>Plagianthus divaricatus</i>
leafless lawyer	<i>Rubus squarrosus</i>	sand brome	<i>Bromus arenarius</i>
leather-leaf fern	<i>Pyrrosia eleagnifolia</i>	sea primrose	<i>Samolus repens</i>
mahoe	<i>Melicytus ramiflorus</i> subsp. <i>ramiflorus</i>	sea rush	<i>Juncus kraussii</i> subsp. <i>australiensis</i>
mamaku	<i>Cyathea medullaris</i>	shaking brake	<i>Pteris tremula</i>
mamangi	<i>Coprosma arborea</i>		
manatu	<i>Plagianthus regius</i>		

shining spleenwort	<i>Asplenium oblongifolium</i>	cotoneaster	<i>Cotoneaster glaucophyllus</i>
shore bindweed	<i>Calystegia soldanella</i>	crack willow	<i>Salix fragilis</i>
short-hair plume grass	<i>Dichelachne inaequiglumis</i>	dally pine, cut-leaf psoralea	<i>Psoralea pinnata</i>
sickle spleenwort	<i>Asplenium polyodon</i>	Douglas fir	<i>Pseudotsuga menziesii</i>
small-leaved milk tree	<i>Streblus heterophyllus</i>	elaegnus	<i>Elaeagnus x reflexa</i>
stalked adder's tongue	<i>Opbioglossum petiolatum</i>	false acacia	<i>Robinia pseudacacia</i>
supplejack	<i>Ripogonum scandens</i>	garden nasturtium	<i>Tropaeolum majus</i>
swamp maire	<i>Syzygium maire</i>	German ivy	<i>Senecio mikanioides</i>
tanekaha	<i>Phyllocladus trichomanoides</i> var. <i>trichomanoides</i>	giant reed grass	<i>Arundo donax</i>
tangle fern	<i>Gleichenia dicarpa</i>	gorse	<i>Ulex europaeus</i>
taraire	<i>Beilschmiedia tarairi</i>	hawthorn	<i>Crataegus monogyna</i>
tarata, lemonwood	<i>Pittosporum eugeniioides</i>	Japanese honeysuckle	<i>Lonicera japonica</i>
taurepo	<i>Rhabdotbannus solandri</i>	jasmine	<i>Jasminum polyanthum</i>
tawa	<i>Beilschmiedia tawa</i>	kahili ginger; wild ginger	<i>Hedychium gardnerianum</i>
tawapou	<i>Pouteria costata</i>	kikuyu	<i>Pennisetum clandestinum</i>
thread fern	<i>Blechnum filiforme</i>	loquat	<i>Eriobotrya japonica</i>
ti kouka	<i>Cordyline australis</i>	lotus	<i>Lotus pedunculatus</i>
ti ngahere	<i>Cordyline banksii</i>	macrocarpa	<i>Cupressus macrocarpa</i>
titoki	<i>Alectryon excelsus</i> var. <i>excelsus</i>	maritime pine	<i>Pinus pinaster</i>
toetoe	<i>Cortaderia fulvida</i>	Mexican daisy	<i>Erigeron karvinskianus</i>
toro	<i>Myrsine salicina</i>	Mexican devil	<i>Ageratina adenophora</i>
toru	<i>Toronia toru</i>	montbretia	<i>Crococsmia x crocosmiiflora</i>
totara	<i>Podocarpus totara</i>	narrow-leaved plantain	<i>Plantago lanceolata</i>
towai	<i>Weinmannia silvicola</i>	Norfolk pine	<i>Araucaria heterophylla</i>
turutu	<i>Dianella nigra</i>	pampas	<i>Cortaderia selloana</i>
tutu	<i>Coriaria arborea</i> var. <i>arborea</i>	paspalum	<i>Paspalum dilatatum</i>
wharangi	<i>Melicope ternata</i>	periwinkle	<i>Vinca major</i>
wharariki	<i>Phormium cookianum</i>	poplar	<i>Populus</i> sp.
wheki	<i>Dicksonia squarrosa</i>	radiata pine	<i>Pinus radiata</i>
white maire	<i>Nestegis lanceolata</i>	saltwater paspalum	<i>Paspalum vaginatum</i>

EXOTIC SPECIES

agapanthus	<i>Agapanthus praecox</i>	sharp rush	<i>Juncus acutus</i>
alligator weed	<i>Alternanthera philoxeroides</i>	silver birch	<i>Betula pendula</i>
aristea	<i>Aristea ecklonii</i>	soft rush	<i>Juncus effusus</i>
arum lily	<i>Zantedeschia aethiopica</i>	spartina	<i>Spartina alterniflora</i>
bamboo (not named)		Tasmanian blackwood	<i>Acacia melanoxylon</i>
banana passionfruit	<i>Passiflora tripartita</i> var. <i>mollissima</i>	three-cornered garlic	<i>Allium triquetrum</i>
barberry	<i>Berberis glaucocarpa</i>	tradescantia	<i>Tradescantia fluminensis</i>
black wattle	<i>Acacia mearnsii</i>	tree privet	<i>Ligustrum lucidum</i>
blackberry	<i>Rubus</i> sp. (<i>R. fruticosus</i> agg.)	tutsan	<i>Hypericum androsaemum</i>
brush wattle	<i>Paraserianthes lophantha</i>	umbrella sedge	<i>Cyperus eragrostis</i>
buffalo grass	<i>Stenotaphrum secundatum</i>	velvet groundsel	<i>Senecio petasitis</i>
busy lizzie	<i>Impatiens walleriana</i>	willow	<i>Salix</i> spp.
Chinese privet	<i>Ligustrum sinense</i>	willow weed	<i>Polygonum</i> sp.
cleavers	<i>Galium aparine</i>	willow-leaved hakea	<i>Hakea salicifolia</i>
climbing asparagus	<i>Asparagus scandens</i>	woolly nightshade	<i>Solanum mauritianum</i>
		Yorkshire fog	<i>Holcus lanatus</i>

8.7 CHECKLIST OF FAUNA SPECIES IN OTAMATEA ECOLOGICAL DISTRICT (NORTHLAND CONSERVANCY)

Checklist compiled by the authors and Ray Pierce (Wildland Consultants Ltd). Ornithological Society of New Zealand (OSNZ) records are from Crockett (comp.) (1992-2004). Department of Conservation Sites of Special Biological Interest (SSBI) database records are cited using the SSBI site number.

PL = Present in large numbers (>100 present in study area at one time in last 15 years)

P = Present in small numbers (<100 present in study area at one time in last 15 years)

R = Recorded (<10 present in study area at one time in last 15 years)

E = Not recorded in last 15 years, though previous records exist; presumed locally extinct

MAMMALS		HARBOUR/ ESTUARY	MAINLAND
Native			
<i>Arctocephalus forsteri</i>	kekeno; New Zealand fur seal	P	
Introduced (feral)			
<i>Capra hircus</i>	goat		PL
<i>Erinaceus europaeus</i>	European hedgehog		PL
<i>Felis catus</i>	cat		PL
<i>Lepus europaeus</i>	brown hare		P
<i>Mus musculus</i>	kiore-iti; house mouse		PL
<i>Mustela erminea</i>	stoat		PL
<i>Mustela furo</i>	ferret		P
<i>Mustela nivalis</i>	weasel		P
<i>Oryctolagus cuniculus</i>	European rabbit		P
<i>Rattus norvegicus</i>	Norway rat		PL
<i>Rattus rattus</i>	ship rat		PL
<i>Sus scrofa</i>	pig		P
<i>Trichosurus vulpecula</i>	brush-tail possum		PL
BIRDS			
Native			
<i>Anarhynchus frontalis</i> (OSNZ)	wrybill; ngutuparore	P	
<i>Anas gracilis</i>	grey teal; tete		P
<i>Anas rhynchotis</i> (SSBI Q08/H031)	Australasian shoveler; kuruwhengi		R
<i>Anas superciliosa</i> ssp. <i>superciliosa</i>	grey duck; parera		P
<i>Antibus novaeseelandiae</i>	New Zealand pipit		P
<i>Apteryx mantelli</i>	North Island brown kiwi		E?
<i>Ardea novaehollandiae</i>	white-faced heron	P	PL
<i>Arenaria interpres</i> (OSNZ)	turnstone	P	
<i>Botaurus poiciloptilus</i>	Australasian bittern; matuku		E
<i>Bowdleria punctata</i> ssp. <i>vealeae</i>	North Island fernbird; mataa		R
<i>Bubulcus ibis</i>	cattle egret		R
<i>Calidris canutus</i>	lesser knot; huahou	PL	
<i>Charadrius bicinctus</i> ssp. <i>bicinctus</i>	banded dotterel; tuturiwhatu	P	
<i>Charadrius obscurus</i> ssp. <i>aquilonius</i>	northern New Zealand dotterel; tuturiwhatu	P	

BIRDS		HARBOUR/ ESTUARY	MAINLAND
Native			
<i>Cbrysococcyx lucidus</i> ssp. <i>lucidus</i>	shining cuckoo; pipiwharauroa		PL
<i>Circus approximans</i>	Australasian harrier; kahu		PL
<i>Egretta alba</i> ssp. <i>modesta</i> (Veitch 1979)	white heron; kotuku		E?
<i>Egretta garzetta</i> (Veitch 1979)	little egret		E?
<i>Egretta sacra</i> ssp. <i>sacra</i> (OSNZ)	reef heron; matuku-moana	R	R
<i>Eudyptula minor</i> ssp. <i>iredalei</i>	northern little blue penguin; korora	P	
<i>Gallirallus philippensis</i> ssp. <i>assimilis</i> (Wildland Consultants Ltd 2004)	banded rail; moho-pereru	R	
<i>Gerygone igata</i>	grey warbler; riroriro		PL
<i>Haematopus ostralegus</i>	pied oystercatcher; torea	PL	
<i>Haematopus unicolor</i> (OSNZ)	variable oystercatcher; torea; toreapango	P	
<i>Hemiphaga novaeseelandiae</i>	kukupa; New Zealand pigeon		PL
<i>Himantopus bimantopus</i> ssp. <i>leucocephalus</i>	pied stilt; poaka	PL	PL
<i>Himantopus novaeseelandiae</i> (OSNZ)	black stilt; kaki	R	
<i>Hirundo tabitica</i> ssp. <i>neoxena</i>	welcome swallow		PL
<i>Larus dominicanus</i> ssp. <i>dominicanus</i>	black-backed gull; karoro	PL	P
<i>Larus novaehollandiae</i> ssp. <i>scopulinus</i>	red-billed gull; tarapunga	P	P
<i>Limosa lapponica</i>	bar-tailed godwit	PL	
<i>Morus serrator</i>	Australasian gannet; takapu	P	
<i>Nestor meridionalis</i> ssp. <i>septentrionalis</i> (Richard Gillies, pers. comm.)	North Island kaka		R
<i>Ninox novaeseelandiae</i>	morepork; ruru		P
<i>Phalacrocorax carbo</i> ssp. <i>novaehollandiae</i>	black shag; kawau	P	P
<i>Phalacrocorax melanoleucos</i> ssp. <i>brevirostris</i>	little shag; kawaupaka	PL	PL
<i>Phalacrocorax sulcirostris</i> (OSNZ)	little black shag	R	
<i>Phalacrocorax varius</i> ssp. <i>varius</i>	pied shag; karuhiruhi	PL	PL
<i>Platalea regia</i>	royal spoonbill; kotuku-ngutupapa		R
<i>Porphyrio porphyrio</i> ssp. <i>melanotus</i>	pukeko		PL
<i>Porzana pusilla</i> ssp. <i>affinis</i>	marsh crane; koitareke	E	E
<i>Porzana tabuensis</i> ssp. <i>plumbea</i>	spotless crane; puweto	E	E
<i>Prosthemadera novaeseelandiae</i> ssp. <i>novaeseelandiae</i>	tui		P
<i>Rhipidura fuliginosa</i> ssp. <i>placabilis</i>	North Island fantail; piwakawaka		PL
<i>Stercorarius parasiticus</i>	Arctic skua	R	
<i>Sterna albobriata</i>	black-fronted tern; tarapiroe	R	
<i>Sterna caspia</i>	Caspian tern; taranui	P	
<i>Sterna nereis</i> ssp. <i>davisae</i>	New Zealand fairy tern	R	
<i>Sterna striata</i> ssp. <i>striata</i>	white-fronted tern; tara	P	
<i>Tadorna variegata</i>	paradise shelduck; putangitangi		PL
<i>Todiramphus sanctus</i>	kingfisher; kotare		PL
<i>Vanellus miles</i>	spur-winged plover	P	PL
<i>Zosterops lateralis</i>	silveryeye; tauhou		P
Introduced			
<i>Acridotheres tristis</i>	myna		PL
<i>Alauda arvensis</i>	skylark		P
<i>Anas platyrhynchos</i>	mallard		PL
<i>Callipepla californica</i>	California quail		PL

BIRDS		HARBOUR/ ESTUARY	MAINLAND
Introduced			
<i>Carduelis carduelis</i>	goldfinch		P
<i>Carduelis chloris</i>	greenfinch		P
<i>Carduelis flammea</i>	redpoll		P
<i>Cygnus atratus</i>	black swan		PL
<i>Emberiza citrinella</i>	yellowhammer		PL
<i>Fringilla coelebs</i>	chaffinch		PL
<i>Gymnorhina tibicen</i>	Australian magpie		PL
<i>Passer domesticus</i>	house sparrow		PL
<i>Pavo cristatus</i>	peafowl		PL
<i>Phasianus colchicus</i>	pheasant		PL
<i>Platycercus eximius</i>	eastern rosella		P
<i>Prunella modularis</i>	dunnock; hedge sparrow		P
<i>Sturnus vulgaris</i>	starling		PL
<i>Synoicus ypsilophorus</i>	brown quail		P
<i>Turdus merula</i>	blackbird		PL
<i>Turdus philomelos</i>	song thrush		PL
<hr/>			
REPTILES ²¹		HARBOUR/ ESTUARY	MAINLAND
Native			
<i>Cyclodina aenea</i>	copper skink		R
<i>Cyclodina ornata</i>	ornate skink		R
<i>Naultinus elegans elegans</i>	Auckland green gecko		R
<hr/>			
FISH ²²		HARBOUR/ ESTUARY	MAINLAND
Native			
<i>Aldrichetta forsterii</i>	yelloweyed mullet	PL	
<i>Anguilla dieffenbachii</i>	long-finned eel	P	P
<i>Anguilla australis</i>	short-finned eel	P	P
<i>Galaxias fasciatus</i>	banded kokopu	P	P
<i>Galaxias maculatus</i>	inanga	P	P
<i>Gobiomorphus basalis</i>	Cran's bully		P
<i>Gobiomorphus cotidianus</i>	common bully	P	P
<i>Gobiomorphus gobioides</i>	giant bully	P	P
<i>Gobiomorphus buttoni</i>	redfin bully	P	P
<i>Mugil cephalus</i>	grey mullet	P	
<i>Retropinna retropinna</i>	common smelt	P	P
<hr/>			
Introduced			
<i>Cyprinus carpio</i>	European (koi) carp		P
<i>Gambusia affinis</i>	mosquitofish		PL
<i>Scardinius erythrophthalmus</i>	rudd		R

²¹ All reptile records are from the DOC Bioweb Herpetofauna Database.

²² All fish records are from NIWA (2006).

FRESHWATER INVERTEBRATES		HARBOUR/ ESTUARY	MAINLAND
<i>Parenebrops planifrons</i>	koura; freshwater crayfish		PL
LANDSNAILS ²³		HARBOUR/ ESTUARY	MAINLAND
<i>Amborhytida dunniae</i> (Brook, pers. comm.)			R
<i>Austroiotula arewa</i>			R
<i>Basimocella</i> 'Nth maculata'			R
<i>Delos coresia</i>			R
<i>Egestula egesta</i>			R
<i>Flammulina perdita</i>			R
<i>Mocella eta</i>			R
<i>Phenacobelix giveni</i>			R
<i>P. pilula</i>			R
<i>Pbrixgnathbus moellendorffi</i>			R
<i>Paralaoma caputspinulae</i>			R
<i>Sinployea parva</i>			R
<i>Tberasiella cebnde</i>			R
<i>Tbalassobelix ziczag</i>			R
<i>Tornatellides subperforata</i>			R
<i>Tornatellinops novoseelandica</i>			R

²³ All landsnail species, except for *Amborhytida dunniae*, were recorded in 1993 by R. Parrish on small, near-shore islands off Hukatere and Puketotara Peninsulas, (SSBI Q08/H056, Q09/H020, Q09/H019, Q08/H057).

8.8 GLOSSARY OF TERMS

Biodiversity

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 part; this includes diversity within species, between species and of ecosystems.

Buffer

A zone surrounding a natural area which reduces the effects of external influences on the natural area. For example, shrubland or exotic plantations surrounding an indigenous remnant provide physical protection to it by reducing changes in wind and light, reducing the chance of weed infestation and providing a corridor for the movement of wildlife into and out of it, so that it is less isolated. Vegetation is often considered a buffer to waterways—riparian vegetation and wetlands protect both water quality and habitat from influences arising on the surrounding land.

Community

An association of populations of plants and animals which occur naturally together in a common environment.

Diversity and Pattern

Diversity is the variety and range of species of biological communities, ecosystems and landforms. Pattern refers to changes in species composition, communities and ecosystems along environmental gradients.

Ecological District

A local part of New Zealand where geological, topographical, climatic and biological features and processes, including the broad cultural pattern, interrelate to produce a characteristic landscape and range of biological communities.

Ecological Region

A group of adjacent Ecological Districts which have diverse but closely related characteristics, or in some cases a single very distinctive Ecological District.

Ecological unit

Vegetation type occurring on a particular landform or soil or rock type.

Ecosystem

Any inter-related and functioning assemblage of plants, animals and substrates (including air, water and soil) on any scale including the processes of energy flow and productivity (Myers *et al.* 1987).

Endemic

Occurring naturally in, and restricted to, a particular country, region or locality.

Exotic

Introduced to New Zealand; not indigenous.

Forest

Woody vegetation in which the cover of trees and shrubs in the canopy is > 80% and in which tree cover exceeds that of shrubs. Trees are woody plants > 10 cm diameter at breast height (dbh) and shrubs are woody plants < 10 cm dbh. Tree ferns > 10 cm dbh are treated as trees (Atkinson 1985).

Habitat

The part of the environment where a plant or animal lives. It includes both the living and non-living features of the area.

Hemiparasite

A parasite which lives on and derives part of its nourishment from its host, but also conducts photosynthesis, for example mistletoe species and mida.

Indigenous

Native to New Zealand. This includes species which occur naturally in New Zealand *and* other places (e.g. migratory bar-tailed godwits which return to New Zealand from Siberia every summer). Species which only occur in New Zealand are 'endemic'.

Landform

A part of the land's surface with distinctive naturally formed physical characteristics e.g. hillslope, gully, ridge top, etc.

Linkages/Corridors

An area of habitat which links two or more other habitat areas. Depending on the habitat type, this a linkage or corridor can comprise indigenous vegetation (e.g. forest, shrubland), exotic vegetation (e.g. pine forest), aquatic habitat (e.g. a farm pond) or any other feature which assists the movement of indigenous species between habitat patches. Where a linkage exists between habitats the opportunities for genetic exchange within a species are greater, which enhances the viability of that population. For many species, in particular mobile fauna such as birds, a corridor does not have to be continuous to be utilisable. Small remnants can act as stepping stones between two larger habitats.

Locally uncommon

Plants that are considered rare within Otamatea ED (Northland) which are either naturally uncommon or have become uncommon due to loss of habitat and modification.

Natural area

A tract of land which supports natural landforms and predominantly native vegetation or provides habitat for indigenous species; identified as a unit for evaluation of ecological quality and representativeness and has potential to be ecologically significant.

Naturalness

The degree to which a habitat is modified and disturbed by human activity or introduced plants and animals and what natural values are retained despite these factors i.e. to what extent native species are functioning according to natural processes.

Rarity

This is a measure of commonness and may apply to entire ecosystems through to single species. It may refer to the conservation status of a species (see Appendix 8.3) or habitat type in any one of the following ways: formerly common but now rare; confined to a limited geographic area; at the limit of its range; or with a contracting or fragmented range.

For example, old-growth alluvial swamp forests are an extremely rare ecosystem type in Northland, and indeed nationally, even though they contain no species which are regarded as rare in themselves.

Reedland

Reedlands comprise 20-100% cover of reeds, which are tall erect herbs emergent from shallow water, having branched leaves or stems that are either hollow or have very spongy pith, e.g. raupo, *Baumea articulata* and lake clubrush (Johnson & Gerbeaux 2004, adapted from Atkinson 1985).

Regionally significant

Assessed by the Department of Conservation (Northland Conservancy) to be either rare or threatened within the Northland Region.

Representativeness

The extent to which an area represents or exemplifies the components of the natural diversity of a larger reference area (in this case, the reference area is the part of Otamatea ED which falls within Northland Conservancy boundaries). This implies consideration of the full range of natural ecosystems and landscapes that were originally found in the reference area and how well they are represented in today's environment. The reference period for 'original' land cover used for this study was the immediate pre-human era (late Holocene).

The identification and evaluation of the key representative natural areas in all Ecological Districts is the principal objective of the PNA Programme (Myers *et al.* 1987).

Riparian protection

Riparian vegetation performs important protective functions to streams such as shading, sediment control, primary production and provision of habitat linkages/corridors. Without riparian protection water temperature can rise depleting the available oxygen and leading to the death of aquatic life. Leaf litter and woody debris enters into the nutrient cycle of the stream providing food for the first consumer in the food web, e.g. mayflies, caddisflies and stonefly. Riparian vegetation acts as a filter for non-point source water discharges.

Rushland

Rushlands comprise 20-100% cover of rushes, which are *Juncus* spp. that have stiff, erect stems or similarly non-flattened leaves (Johnson & Gerbeaux 2004, adapted from Atkinson 1985).

Scrub

Refers to early successional communities dominated by or with a > 50% component of exotic species such as gorse, woolly nightshade, hakea, wilding pine etc. This definition differs from Atkinson (1985), in which scrub is structurally defined rather than compositionally defined. In this study, scrub refers to vegetation dominated by exotic species. Low woody vegetation in which the indigenous component is > 50% is termed 'shrubland'.

Secondary vegetation

Indigenous vegetation established after destruction or disturbance of the previous vegetation and which is essentially different from the original vegetation.

Shrubland

Vegetation in which the cover of shrubs and trees in the canopy is > 80% and in which shrub cover exceeds that of trees. Trees are woody plants > 10 cm diameter at breast height (dbh) and shrubs are woody plants < 10 cm dbh. Tree ferns > 10 cm dbh are treated as trees. This definition includes both 'scrub' and

'shrubland' cf. Atkinson (1985). These had to be amalgamated, as 'scrub' adopts another meaning in this study.

Site

An area of habitat or habitats identified during the field survey phase of the PNAP. Some small habitats occurring in close geographical proximity, with similar characteristics and functions, have been grouped and addressed as one site, e.g. small forest remnants and farm ponds in the within same catchment.

Succession

Succession is the dynamic process whereby one plant community changes into another, involving the immigration and local extinction of species, coupled with changes in the relative abundance of different plants (Crawley 1997). Change may be due to natural or human-induced factors, or both. Primary succession refers to the colonisation of a bare surface by vegetation (e.g. the greening of new volcano after it erupts out of the sea). Secondary succession refers to the process of colonisation and change after original vegetation has been destroyed, e.g. by fire, human-induced land clearance etc.

Successional

Describes a plant community in the process of succession.

Survey no.

A sequential number given to each site (e.g. Q09/001). The first letter and two figures refer to the NZMS 260 topographical map sheet which covers the site.

Sustainability

The long-term ecological viability of a natural area. This is related to the size and shape of the area as well as to threats from introduced pests.

Treeland

Vegetation in which the cover of trees in the canopy is 20-80%, 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 (Atkinson 1985), e.g. 'totara treeland' refers to a common type in Otamatea ED Northland in which sparse totara trees form the canopy over an understorey of mainly exotic grasses. Treeland is mainly induced by grazing.

Vegetation type

The most detailed vegetation descriptive name, defined by the composition of dominant canopy species, in order of abundance (e.g. taraire-puriri-kahikatea) and the structure of the vegetation e.g forest, treeland, shrubland, reedland, etc.

Viability

The ability of an area's natural communities to maintain themselves in the long-term in the absence of particular management efforts to achieve this. Regeneration and vigour of species within these communities and stability of communities and processes contribute to viability.

Wetland

An area of land that is permanently or intermittently waterlogged and supports flora and fauna adapted to wet conditions. Wetland is used as a broad definition for several types of aquatic systems e.g. ponds, lakes, swamps, bogs, ephemeral wetlands, saltmarshes, mangroves, etc.

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