

Egmont Ecological Region

Survey Report for the New Zealand Protected Natural Areas Programme



Department of Lands and Survey

Egmont Ecological Region

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CONTENTS		PAGE
1	Introduction	1
2	Survey Methodology	3
3	Character of the Egmont Ecological Region	4
3.1	Geology, Boundary and Land Systems	4
3.1.1	Outline	4
3.1.2	Lava Flows	4
3.1.3	Volcaniclastic Fans	5
3.1.4	Ash-mantled Ring Plains	5
3.1.5	Ash-mantled Uplifted Marine Terrace	6
3.1.6	Coastal Deposits	6
3.2	Climate and Bioclimatic Zones	8
3.2.1	Climate	8
3.2.2	Bioclimatic Zones	8
3.3	Vegetation and Flora	10
3.4	Wildlife	13
4	Existing Protected Natural Areas	14
5	Priority Natural Areas	18
	Acknowledgements	33
	References Cited	34
APPENDICES		
I	Checklist of existing protected natural areas	38
II	Checklist of study areas	42
III	Checklist of ecological classes	50
IV	Checklist of ecological units	56
V	Vegetation types in the Egmont Ecological Region	62
VI	Definitions of landforms	71
VII	Definitions of hydrological classes	72
VIII	Common plant names used in text	73
IX	Select bibliography for Egmont Ecological Region	75
FIGURES		
1	Egmont Ecological Region-Location	2
2	Land Systems and Bioclimatic Zones	7
3	Vegetation Relationships in the Coastal to Lower-montane Zones	11
4	Existing Protected Natural Areas	17
5	Priority Natural Areas	85
TABLES		
1	Percentage of Land System in Each Bioclimatic Zone in Existing Protected Natural Areas	15
2	Pre- and Post-European Vegetation of the Egmont Ecological Region	16
3	Summary of Priority Natural Areas	18

1 INTRODUCTION

The objective of the Protected Natural Areas programme is to assist in implementing the policy expressed in the Reserves Act 1977, to ensure:-

"... the preservation of representative samples of all classes of natural ecosystems and landscapes which in the aggregate originally gave New Zealand its own recognisable character."

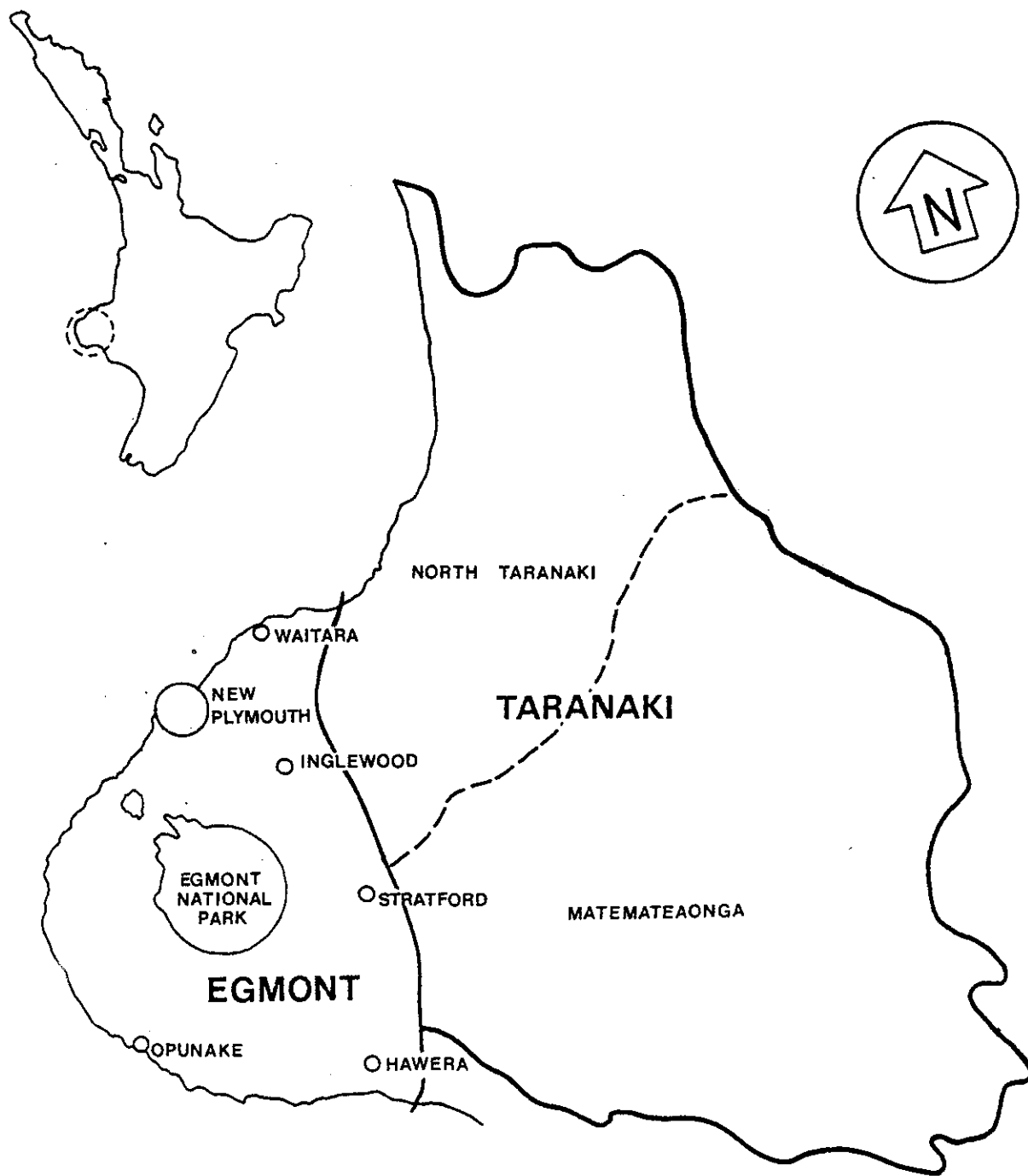
Section 3(1)(b)

To provide the necessary framework for assessing New Zealand's biological diversity, the country has been divided into 84 ecological regions, each with closely related characteristics of climate, landform, soils and biological features (Simpson, 1982). The Egmont Ecological Region includes the volcanoes of Taranaki (Mount Egmont, Pouakai and Kaitake) and the surrounding ash-mantled ring plains which form an ecologically distinct region.

The Egmont Ecological Region was chosen for early survey because its existing protected natural areas, including Egmont National Park and the network of scenic reserves and wildlife refuges, does not adequately represent the nature of the landscape or ecosystems of the region (Clarkson and Boase, 1982). The area outside the national park, which contains all coastal and semi-coastal lands, has been intensively developed for a long period of time so that little opportunity remains to protect representative areas. Those areas that do remain are coming under increasing pressure for agricultural and horticultural use.

The aim of the survey was to discover the extent of remaining native vegetation communities and faunal habitats, and on the basis of this information to propose representative examples suitable for conservation.

EGMONT ECOLOGICAL REGION LOCATION



0 10 20 30 40 50 60 70km.

2 SURVEY METHODOLOGY

The methodology used was that described in Law *et al.* (1984).

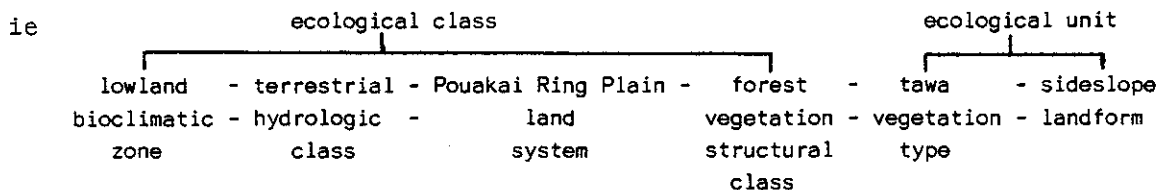
An initial reconnaissance was carried out and existing ecological information was compiled (Appendix IX). Following this the region was subdivided into 13 major land systems (see Section 3.1) and 7 bioclimatic zones (see Section 3.2). Although only 5 bioclimatic zones are outlined in Law *et al.* (1984) it was decided that 2 additional zones were necessary to fully describe the climatic variation expressed in the vegetation of this region.

The land system, bioclimatic zone, hydrologic class (eg, terrestrial, palustrine) and vegetation structural class (eg, forest, reedland) were combined to give a set of ecological classes which describe the broad ecological patterns of the region (Appendix III). Those classes adequately protected within Egmont National Park were excluded from the survey.

Over 120 natural areas were studied. In general, only forest remnants larger than 3ha were surveyed unless they contained an unusual vegetation type or there were no larger remnants in that ecological class. Owing to time constraints only the largest of similar areas within an ecological class was surveyed in detail.

Existing information on the fauna of the region was used for the purposes of this study. Limited personnel and lack of time precluded any further work.

The vegetation in the study areas and existing protected natural areas was classified into vegetation types using major canopy species. These vegetation types (eg, tawa forest, raupo reedland) were combined with the specific landform (eg, sideslope, swamp) to produce a set of ecological units for each ecological class (Appendix IV)



The ecological units provided the framework for selecting priority natural areas for conservation. If an ecological unit was not adequately represented in existing protected natural areas, the best example(s) of this unit has been recommended. These were chosen after evaluation on the basis of size, shape, degree of modification, diversity, representativeness, the presence of rare or special features and buffering. The recommended priority natural areas are described in Section 5.

The evaluation procedure of assigning numerical rankings outlined in Law *et al.* (1984) was used only as a guide in determining priority areas since some factors were not considered to be sufficiently weighted. Survey data and maps at a scale of 1:50,000 are held by the Commissioner of Crown Lands, Department of Lands and Survey district office, New Plymouth.

3 CHARACTER OF THE EGMONT ECOLOGICAL REGION

3.1 GEOLOGY, BOUNDARY AND LAND SYSTEMS

3.1.1 Outline

The Egmont Ecological Region includes the andesitic volcanoes of Egmont, Pouakai and Kaitake, the associated Pouakai and Egmont ring plains and an area of ash covered uplifted marine terrace in the north-east.

The eastern boundary between the Egmont Region and the adjacent Taranaki Region was adapted from the Geological Map of New Zealand, Sheets 7 (Hay, 1967) and 10 (1959), and approximately follows the longitudinal line 174 20' (see Fig. 1). It is the interface between the dissected mudstones and sandstones of the Taranaki upland to the east which are sedimentary in origin, and the area to the west constructed by volcanic activity. Many native plant distributions reflect the differences in parent material (Clarkson and Boase, 1982). Together the geology and plant distributions were the main criteria originally used to delineate the ecological regions (B.D. Clarkson, pers. comm.).

For the purpose of this study the volcanic region was subdivided into 13 land systems on the basis of geomorphological characteristics which could be recognised in the field. These fall into five classes; lava flows, volcanoclastic fans, ash-mantled ring plains, ash mantled uplifted marine terraces and coastal deposits. The geological and soil references for the boundaries of each of the land systems and a brief description of its characteristics are given below within the five geomorphological classes.

3.1.2 Lava Flows - five separate lava flows are recognised, all of hornblende andesite.

Sugar Loaf Andesite (Hay, 1967)

- Paritutu and the offshore Sugar Loaf Islands which are the site of earliest volcanic activity in the Taranaki region approximately 1.75 million years B.P.

Kaitake Andesite (Hay, 1967)

- This andesite is exposed on ridge crests and stream exposures on the Kaitake Range which is an extinct eroded volcano approximately 500,000 years old.

Pouakai Andesite (Hay, 1967)

- The eroded remains of a volcano formed approximately 250,000 years B.P. which is exposed above the treeline on the Pouakai Range.

Egmont Andesite (Hay, 1967; Neall, 1979)

- Includes the cone of Mount Egmont and Fanthams Peak where volcanic activity started approximately 70,000 years B.P. and has continued until recent times, and the younger Pukeiti cone (formed approximately 20,000 years ago).

German Hill Andesite (Hay, 1967)

- A cumuldome on the lower northeastern flanks of Mount Egmont which is completely cleared of native vegetation.

3.1.3 Volcaniclastic Fans - volcanic mudflows (ie lahar deposits) and debris flows caused by the collapse of a volcanic cone.

Lahar Deposits

- Includes the Pungarehu, Warea and Opuia Formations (Neall, 1979). Volcanic mudflow (lahar) deposits are characterised by visible surface mounds which are composed mainly of andesitic breccia. Near the coast the mounds are separated by large areas of flat ground (intermound areas) but above 100m a.s.l. the mounds are larger and compounded, with few intermound areas.

Debris Flows

- Includes the following debris flow deposits, in order of decreasing age: Kahui Debris Flows, Ngatoro Formation, and Maero Debris Flows; and also the alluvial deposits of the Hangatahua Gravels (Neall, 1979).

The debris flows are both dry and water-based volcanic flows which have been less extensive but more numerous than the lahars. The deposits are multiple, thin and seldom extend more than 15km from source. The Hangatahua Gravels are flood deposits that mostly postdate A.D. 1500 (Neall, 1979).

3.1.4 Ash-mantled Ring Plains

Pouakai Ring Plain

- Includes the Maitahi Lahars (Grant-Taylor, 1964; Hay, 1967). Eltham lahars (Grant-Taylor, 1964; Hay, 1967) and Katikara Formation (Neall 1979). The Pouakai Ring Plain has a more dissected landscape than the younger Egmont Ring Plain. Below 200m a.s.l. the original surface is largely unmodified and there are extensive planar interfluves. Above 200m a.s.l. the original surface has been eroded to produce an irregularly ridged landscape.

Stratford Formation and Lepperton Lahars

- Stratford Formation (Grant-Taylor and Kear, 1970) and Lepperton Lahars (Grant-Taylor, 1964; Hay, 1967). This land system is the oldest section of the Egmont Ring Plain and is characterised by planar seaward dipping interfluves with a very thick covering of tephra on the Lepperton Lahars and a moderately thick (averaging 2-5m thick) covering of tephra on the Stratford Formation.

Opunake Formation (Grant-Taylor and Kear, 1970)

- This is a younger part of the Egmont Ring Plain characterised by a planar, seaward dipping surface with shallowly incised streams, except near the coast where vertically cliffed, deeper channels occur. The surface is usually mantled by a thin (less than 2m) covering of tephra except close to the south-east of Egmont National Park where overlying tephra deposits thicken to 7m.

Eltham Peat (Franks, 1985)

- Peat deposits formed on the eastern edge of the Egmont Ecological Region when volcanic deposits blocked westward draining river systems.

3.1.5 Ash-mantled Uplifted Marine Terrace

Uplifted Marine Terrace

- Includes areas mapped as the Brunswick Formation (Fleming, 1953), Ngarino Formation (Hay, 1967; Dickson *et al.*, 1974) and the Rapanui Formation (Fleming, 1946; 1953) which are Quarternary uplifted marine terraces covered with a layer of Egmont derived tephra. These formations extend to the north-east into the North Taranaki Ecological District.

3.1.6 Coastal Deposits

Coastal Sands

- Includes the Mosston soils belonging to the yellow brown sands group and Castlecliff soils classed as recent soils (Palmer *et al.*, 1981) which form late to middle Holocene aged sand dunes at the top of coastal cliffs and behind high water mark.

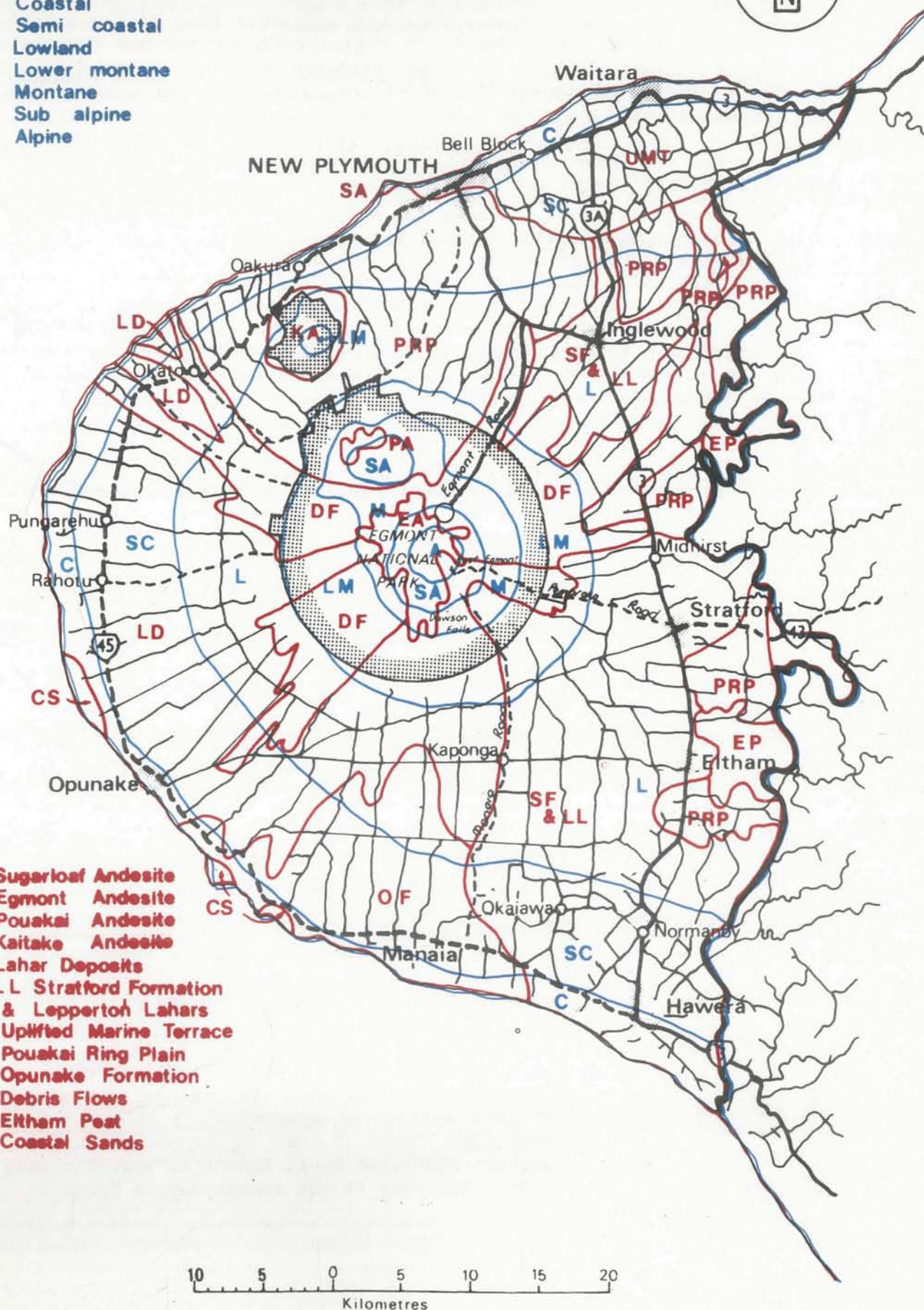
EGMONT ECOLOGICAL REGION

BIOTIC ZONES LAND SYSTEMS



- C Coastal
- SC Semi coastal
- L Lowland
- LM Lower montane
- M Montane
- SA Sub alpine
- A Alpine

- SA Sugarloaf Andesite
- EA Egmont Andesite
- PA Pouakai Andesite
- KA Kaitake Andesite
- LD Lahar Deposits
- SF&LL Stratford Formation & Lepperton Lahars
- UMT Uplifted Marine Terrace
- PRP Pouakai Ring Plain
- OF Opunake Formation
- DF Debris Flows
- EP Eltham Peat
- CS Coastal Sands



3.2 CLIMATE AND BIOCLIMATIC ZONES

3.2.1 Climate

Accurate long term climatic data are available from four weather stations in the region which are administered by the New Zealand Meteorological Service. These stations are: New Plymouth, New Plymouth Aerodrome, Stratford Demonstration Farm and Manaia Demonstration Farm (New Zealand Meteorological Service, 1973). Some climatic data have been collected for a shorter period from Egmont National Park at the Stratford Mountain House, Dawson Falls Tourist Lodge and the North Egmont Visitor Centre (Coulter, 1976).

Temperature and rainfall, which are directly related to the topography of the region, are the major factors which interact to provide the range of climatic conditions reflected by the vegetation pattern. The normal temperature (as defined by the New Zealand Meteorological Service, 1973) is 13.4 C near the coast at New Plymouth (49m a.s.l.) and has been estimated using the lapse rate (a decrease in air temperature of approximately 6 C per 1000m) as being -1.97 C at the summit of Mount Egmont (Clarkson, 1981).

Rainfall increases more or less parallel with the contours of the land from about 1500mm per annum near the North Taranaki coast and about 1200mm near the South Taranaki coast to about 6500mm at 1000m a.s.l. and probably to about 8000mm at 2000m a.s.l. A number of other climatic factors are also important with regard to the vegetation including relative humidity, sunshine hours and wind (as well as salt-laden coastal winds).

3.2.2 Bioclimatic Zones

For the purpose of this survey the Egmont Region was subdivided into seven bioclimatic zones on the basis of indicator plant species distributions. These are described below:-

- Coastal zone: A strip approximately 1km inland from the coast in which the vegetation is often exposed to salt-laden winds.
- Semi-coastal zone: Extends from the coastal zone to approximately 10km inland and to an altitude of approximately 150m a.s.l. which is the distributional limit of kohekohe (*Dysoxylum spectabile*).
- Lowland zone: Characterised by the dominance of tawa (*Beilschmiedia tawa*). The upper limit of the zone coincides with the reduced abundance of this species at approximately 450m a.s.l. The upper limit of tawa is depressed on the western flanks of Mount Egmont to approximately 350m a.s.l. due to the recent debris flows.

- Lower-montane zone: The upper limit of this zone is marked by the upper limit of tree-sized rimu (*Dacrydium cupressinum*) at approximately 760m a.s.l. The dominant vegetation in the lower montane zone is rimu-rata/kamahahi forest.
- Montane zone: Forest dominated by kamahahi (*Weinmannia racemosa*) and Hall's totara (*Podocarpus hallii*) extending up to the treeline at approximately 1095m a.s.l. on Mount Egmont and 1066m a.s.l. on the Pouakai Range (Clarkson, 1981).
- Sub-alpine zone: The scrub and shrubland zone dominated by leatherwood (*Brachyglottis rotundifolia* var. *elaeagnifolia*) with the upper limit (the shrubline) at approximately 1280m a.s.l.
- Alpine zone: All areas above the shrubline, including red tussock tussockland, mossfield and herbfield.

3.3 Vegetation and Flora

The earliest available accounts of the vegetation of the Egmont Ecological Region are those of the first European travellers and settlers (Dieffenbach, 1843; Buchanan, 1869; Kitchingman, 1955). At this time the Maori people had modified most of the vegetation in a coastal strip extending 4-5km from the coast with small pocket clearings as far inland as Stratford. This strip was mostly covered in bracken fernland, flax (*Phormium tenax*) and scrub of mixed canopy - dominated by stunted karaka and kohekohe, cabbage tree, rangiora, ngaio, flax and taupata. With increasing distance from the coast the trees were less stunted and other species such as mahoe and pigeonwood were evident in the vegetation. Swampy depressions contained raupo and flax. The steep coastal cliffs supported vegetation much the same as today - taupata-flax shrubland and herbfields. It is not known what vegetation covered the coastal sands, but it is thought to have been mostly dominated by spinifex and pingao.

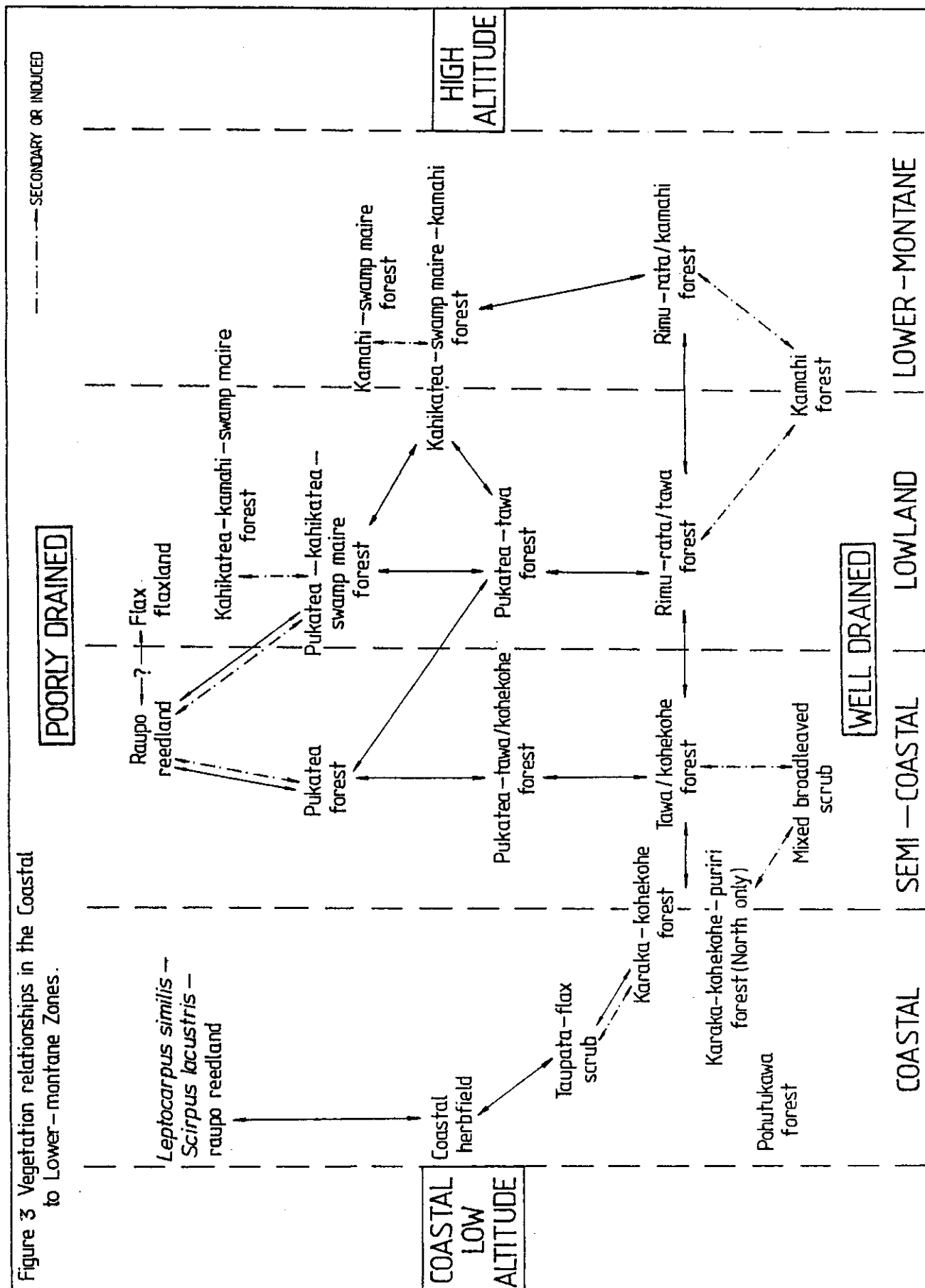
The arrival of European settlers to the region in the 1840s brought rapid and widespread clearance of land for farming. The Egmont Forest Reserve (all that land within a radius of 6 miles (9.6km) of the summit) was created in 1881. With increasing pressure on land for development the reserve was designated national park in 1900. The Kaitake Range was added later. By this time most of the lowland and semi-coastal forest on the ring plain had been cut and burnt and drainage works were being carried out.

The pattern of the vegetation that was so quickly devastated can be pieced together from early records and from the small isolated patches of secondary vegetation remaining today. The most obvious pattern was the altitudinal sequence. Within a short distance the vegetation changed from coastal scrub to alpine moss and herbfield. Overlying this pattern were differences in the species composition due to differences of substrate and drainage.

On well drained sites in the semi-coastal and lowland zones tawa was the dominant canopy species. Karaka, kohekohe and puriri were frequent in the semi-coastal forest (below approximately 150m a.s.l.), with kohekohe forming a sub-canopy. Swampy depressions and poorly drained stream banks carried pukatea forest with tangles of kiekie and supplejack in the undergrowth.

In the lowland zone tall rimu and rata were emergent above the tawa. Today, however, most of the remnants have been logged. Canopy associates of the tawa included rewarewa, hinau, pukatea and kamahi - especially on stream margins. Swamp forests were common, particularly on the lahar deposits and debris flows. Swamp maire, pukatea and kamahi were the dominant species. Kahikatea was more abundant on the less fertile swampy sites and was dominant in the forest on the peat deposits in the east of the region. Local pockets of podocarp forest (matai and/or totara) still remain on rich alluvial river terraces but this type was probably never very extensive.

Figure 3 Vegetation relationships in the Coastal to Lower-montane Zones.



Above 450m a.s.l. tawa was replaced by kamahi as the dominant species in the canopy, still with emergent rimu and rata. Occasional canopy associates included hinau, maire and rewarewa. Nearly all of this type and all higher altitude vegetation types remain today protected within Egmont National Park, and are described in detail in Clarkson (1981; 1985, in prep.).

The vegetation of the scenic and allied reserves in the region is also described in detail in Clarkson and Boase (1982). Data from these surveys forms the basis of Appendix I.

Data from these earlier surveys and the present survey have been combined to produce the descriptions of the vegetation types of the region (Appendix V).

The relationships of the coastal, lowland and lower montane vegetation types recognised by the present survey are shown in Fig 3 and the plot data collected is lodged at the New Plymouth office of the Department of Lands and Survey.

A checklist of the higher plants of the region has been compiled by A.P. Druce (1973; 1984). The total of 667 species includes 5 species and 4 varieties which are apparently endemic to the area. Of these, one species (*Crassula* sp. (b) (aff. *Crassula debilis*), is confined to the coastal area while the others are protected within Egmont National Park (A.P. Druce, pers. comm).

Six rare or endangered species are known from this region. *Euphorbia glauca* is only known from several small, isolated colonies on sand dunes and rocky places in the Egmont Ecological Region. The sand daphne *Pimelea arenaria* and *Ranunculus recens*, a small buttercup, are only found in coastal turf at several locations in this region. Cook's scurvy grass (*Lepidium oleraceum*) which once flourished along rocky parts of the New Zealand coast is now confined in the region to the Sugar Loaf Islands and elsewhere in New Zealand to a few offshore islands.

Forest species at risk, which are found in this region include *Dactylanthus taylori* (wood rose), *Metrosideros carminea* and *Marattia salicina* (king fern).

The western Taranaki coast is the only North Island locality for *Gnaphalium trinerve*, *Hebe elliptica* var. *elliptica*, and *Oreomyrrhis* sp. unnamed (Druce, 1972).

A significant number of species have restricted distributions within the Egmont Ecological Region due to the small size, number and isolated nature of vegetation remnants. Recent biogeographic research on the relationship between numbers of bird species and area of habitat has suggested that if the area of available habitat is reduced by 90% the variety of bird species able to survive in the remaining 10% will ultimately be halved. While it is not known to what extent plants conform to these predictions it draws attention to the fact that as habitat area is reduced, the number of species will ultimately be decreased (Kelly, 1980). Very so little of the coastal, semi-coastal and lowland native vegetation remains, so it can be assumed that many species have already disappeared from this region.

3.4 Wildlife

Seventy-six bird species (53 indigenous and 23 adventive) regularly occur in the Egmont Ecological Region (Cotton, 1985).

Specific information about bird species in natural areas outside Egmont National Park is available from several surveys carried out by a Fauna Survey Unit for the Wildlife Service. The National Park has been surveyed by the Department of Lands and Survey (Cotton and Molloy, in press).

Several bird species have a very limited distribution within the region. These include the Australian bittern (recorded from 3 sites), the spotless crane (recorded from 6 sites) and the fernbird (recorded from one site in Egmont National Park). All of these species live in wetlands and it is probable that they were previously more widespread but now have a restricted range due to the clearance and drainage of their habitat (Table 2).

The New Zealand goshawk, New Zealand quail, North Island thrush, little spotted kiwi, kakapo, brown teal, yellow-crowned parakeet, banded rail, an extinct species of swan, crow and duck, three extinct species of rail and at least nine species of Moa are known in the region from subfossil remains (Foley, 1980) while the huia and takahe were known to the Maori people prior to European settlement (Smith, 1949). A further 10 bird species have vanished from the region since (Cotton and Molloy, in press). These include the stitchbird, laughing owl, saddleback, Cook's petrel, black petrel, bush wren and blue duck, all of which are now either extinct or rare throughout New Zealand. The kokako (also rare), robin and kaka are all still found in the Taranaki Ecological Region immediately to the east. One of the major factors thought to have contributed to the disappearance of many species has been the clearance of much of the Egmont Region's lowland forest (Table 2).

Several bird species breed along the coast and on the Sugar Loaf Islands. These include reef herons, which are uncommon south of Raglan, and red-billed gulls, which do not breed elsewhere on the west coast between Manawatu and Waikato.

A survey of freshwater fish was carried out by the Taranaki Catchment Commission as part of a fresh water biological study (Taranaki Catchment Commission, 1984). A total of 26 species were identified including two (the short-jawed kokopu and the giant kokopu) which are listed in the Red Data Book of New Zealand (Williams and Given, 1981) as having indeterminate status. The study also included a survey of macroinvertebrates.

Terrestrial invertebrate studies in the region have mainly been confined to Egmont National Park. There have been several surveys of the insect fauna (see Appendix IX) which show that Egmont National Park has several endemic species as well as being the only North Island locality for several others.

No detailed surveys of the reptiles of the region have been carried out. However, the goldstripe gecko which is confined to Taranaki and Mana Island (Williams and Given, 1981) has been recorded from several localities (D.G. Wilkinson, New Plymouth, pers. comm., 1984).

4 EXISTING PROTECTED NATURAL AREAS

Existing protected natural areas (ie Egmont National Park, scenic and allied reserves, conservation covenants and wildlife refuges) which contain native vegetation are shown in Fig. 4 and listed in Appendix I along with the vegetation and habitat types. The majority of areas protected outside the national park are very small and isolated. More than 60% of the scenic and allied reserves are smaller than 5ha, and over half are smaller than 3ha. Many of the reserves include areas of pasture and exotic plantations.

Table 1 shows the percentage of each land system and bioclimatic zone which is currently protected.

From Table 1 it can be seen that the total area within the alpine, subalpine and montane zones, and a significant part of the lower-montane zone is protected (within Egmont National Park). Lowland, semi-coastal and coastal habitats, however, are all inadequately represented in reserves. All land systems except Kaitake Andesite which is protected within the national park, are either totally unrepresented or have less than 1% in protected areas. Kelly (1980) suggests that reservation of 10% of the original area of each broad landscape or habitat class is reasonable in order to retain the original character of the countryside.

Table 2 shows the area (in hectares) and percentage of vegetation classes within each land system and bioclimatic zone c. 1840, the area and percentage of each remaining today, and the area and percentage protected. In some land systems there are no natural areas left within a bioclimatic zone, for example, in the semi-coastal zone of the Stratford Formation and Lepperton Lahars. There is very little opportunity for protection of any areas within the coastal and semi-coastal zones of any land system. Any remaining natural areas within these two bioclimatic zones must therefore have a very high priority for reservation.

Within the lowland zone there is still opportunity to protect significant areas within the Lahar Deposits and the Debris Flows, while there are very few areas remaining in other land systems. However, in no landsystem is it possible to protect 10% of a broad habitat class, as less than this remains. Most possibilities for protection occur in the lower-montane zone. While there appears to be sufficient area reserved at present, there are some vegetation types which are not adequately protected, eg swamp maire forest.

TABLE 1 : % OF LAND SYSTEM - BIOCLIMATIC ZONES PROTECTED IN EXISTING

PROTECTED NATURAL AREAS

BIOCLIMATIC ZONES	LAND SYSTEMS												MEAN TOTAL FOR ALL LAND SYSTEMS
	UMT	EA	PA	KA	PRP	SF.LL	OP	LD	DF	EP	CS	SA	
Coastal	<1				<0.01	0	0	0	0	0	0	0	<1
Semi Coastal	<1			75	<1	0	0	<1	<1				<1
Lowland				70	1	<1	0	0	<1	0			2
Lower Montane		100		100	56	23		95	78				76
Montane		100	100		100	100		100	100				100
Sub-alpine		100						100	100				100
Alpine		100											100
MEAN TOTAL FOR ALL BIOCLIMATIC ZONES	<1	100	100	74	12	1	0	14	35	0	0	0	13% of Region

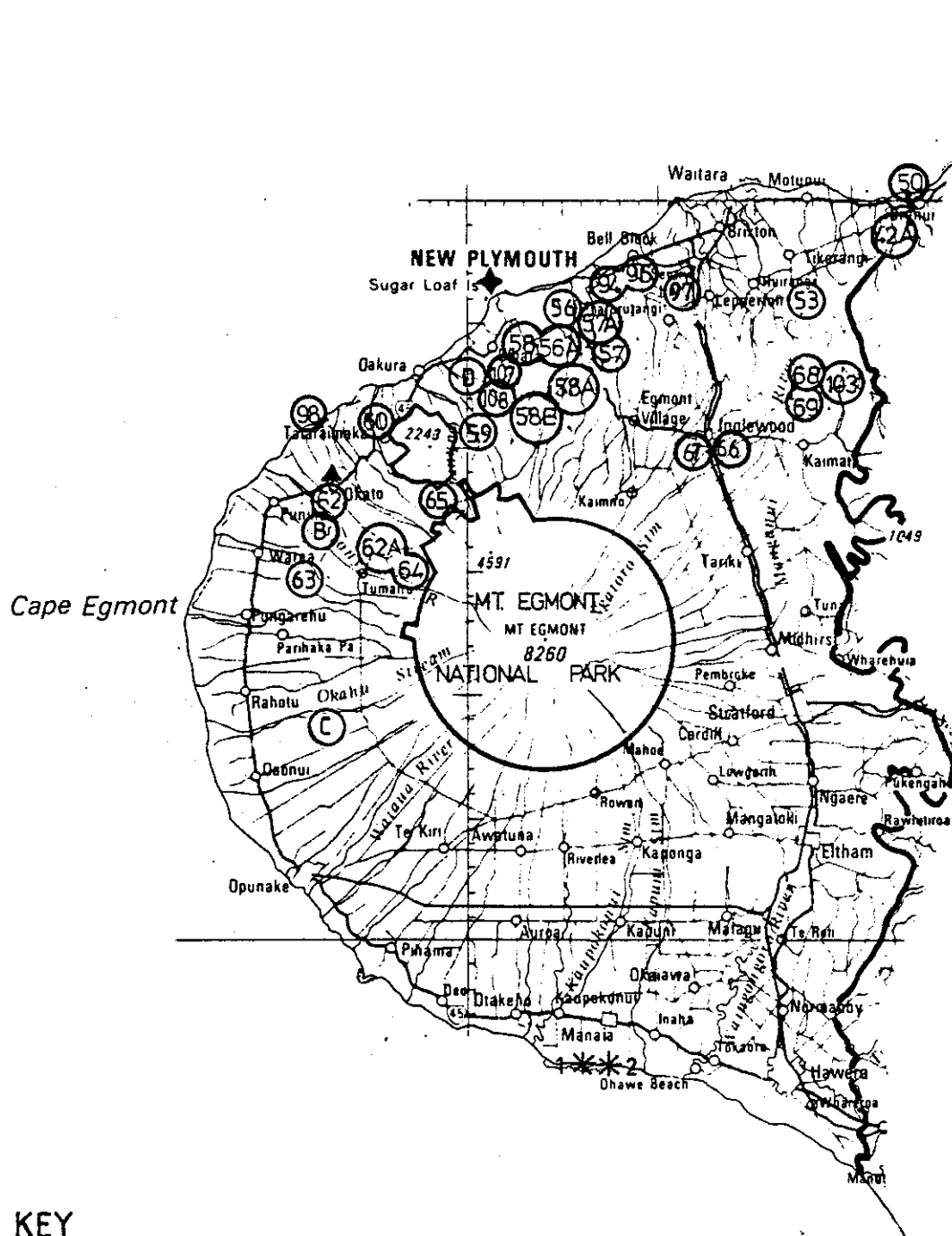
TABLE 2: Pre and Post-European Vegetation of the Egmont Ecological Region

	Uplifted Marine Terrace			Egmont Andesite			Pouakai Andesite			Kaiteke Andesite			Pouakai Ring Plain			Stratford Formation & Lepperton Leihers			Opunake Formation			Leihers Deposits			Eltham Peat			Debris Flows			Coastal Sands			
	1840	P	R	1840	P	R	1840	P	R	1840	P	R	1840	P	R	1840	P	R	1840	P	R	1840	P	R	1840	P	R	1840	P	R	1840	P	R	
FOREST*	Coastal	5	+	+																														
		1000	12	12																														
	Semi-coastal	40	+	+						10	5	5	16	+	+	5	0	0	25	+	0	20	+	+	+	+	+	+	+	+	+	+	+	
		7960	70	24						320	145	140	9030	130	70	3270	0	0	5030	2	0	12800	65	5										
Lowland									76	53	53	47	<1	<1	63	+	+	19	+	0	32	1	0	50	+	0	37	2	+					
									2400	1680	1680	26110	375	300	40820	105	74	3780	2	0	20950	800	0	2145	30	0	10650	475	35					
Lower-montane									13	13	13	6	4	3	3	1	1				11	11	11											
									400	400	400	3620	2370	2040	2050	470	470				7450	7420	7370											
Montane																																		
Coastal	15	0	0																															
	2980	0	0																															
Semi-coastal	13	+	+						+	5	5	3	+	+	10	0	0	16	0	0	14	0	+											
	2590	3	3						125	120	2780	8	8	8	6530	0	0	3210	0	0	8800	0												
Lowland									0	+	0	1	+	+	+	0	0																	
									0	20	0	550	200	200		0	0																	
Sub-alpine																																		
Coastal	9	0	0																															
	1780	0	0																															
Semi-coastal	13	0	0						1	0	0	5	0	0	10	0	0	16	0	0	4	0	0											
	2590	0	0						30	0	0	2780	0	0	6530	0	0	3210	0	0	2600	0	0											
WETLAND Δ	5	+	+																															
	1000	20	12																															
(Red Tussock) TUSsockLAND																																		
SANDFIELD																																		
HERBFIELD																																		
Sub-alpine																																		
TOTALS	100	+	+																															
ha	19900	105	51																															

Note: Top figure is % area of land system
 Lower figure is actual area in hectares
 P = Present at December 1984
 R = Reserved at December 1984

* includes swamp forests
 Δ includes all wetlands except swamp forests
 () proposed scientific reserves

EXISTING PROTECTED NATURAL AREAS



KEY

- ⑥ Scenic Reserve
- ▲ Recreation Reserve
- Ⓐ Conservation Covenant
- ◆ Wildlife Refuge
- * Proposed Scientific Reserve

5 PRIORITY NATURAL AREAS

Forty-eight priority natural areas have been recommended for preservation. Because there are so few areas protected in the coastal, semi-coastal and lowland zones and so little left to protect (see Table 2), all recommended areas must have a high priority for reservation. These areas have been ordered so that the better examples (in terms of size or quality) and the most threatened (because of land use change or grazing by stock) are listed first. Each priority natural area is briefly described below. Table 3 below summarises the areas according to bioclimatic zone, and includes the land system, grid reference, area in hectares and category for protection.

TABLE 3 SUMMARY OF PRIORITY AREAS

BIOCLIMATIC ZONE	LAND SYSTEM	AREA, NAME AND NUMBER	AREA (HA)	PAGE NO	MAP REF
COASTAL	UMT	Waitara Estuary (W47)	2	28	B
	UMT	Waipu Lagoons (W48)	4.5	21	A
	SF & LL	Rifle Range Rd Lakes (136)	4	27	M
	LD	Stent Rd (SL5)	0.5	20	D
	LD	Puketapu Rd (138)	1	30	K
	PRP	Tank Farm Ponds (W67)	2	26	A
	PRP	Oakura Swamp (2)	2	25	C
	SLA	Paritutu Sugar Loaf Islands (SL6)	5	23	A
	CS	Oaonui Beach (158)	35	31	I
	CS	Oeo Cliffs (160)	0.5	32	K
10 sites			56.5		
SEMI-COASTAL	UMT	Dorset Rd (W31)	6	21	A
	UMT	Townsend Rd (74)	6	21	A
	UMT	Bushy Park (W66)	12	28	B
	UMT	Lepperton Bush (W39)	4	29	B
	UMT	Mangamiemi Bush (W50)	6	28	A
	UMT	Tarurutangi Bush (W29)	4	29	A
	PRP	Umutekai Bush (W36)	28	22	A
	PRP	Omata Bush (W21)	10	25	A
	PRP	Clarke Rd Swamp (W56)	2	25	B
	KA	Weld Rd (1)	11	31	E
	LD	Warea Rd (C9)	2	23	D
	LD	Swampy Bush (W3)	25	24	I
	LD	Taungatara Bush (W7)	12	27	K
	DP	Opua Rd (59)	7	30	J
14 sites			135		

BIOCLIMATIC ZONE	LAND SYSTEM	AREA, NAME AND NUMBER	AREA (HA)	PAGE NO	MAP REF
LOWLAND	LD	Looney's Lake (W10)	7	28	J
	PRP	Carrington Rd B (19)	10	26	H
	PRP	Carrington Rd C (10)	100	26	E
	KA	Surrey Hill (7)	20	32	E
	LD	Kaweora Bush (W14)	80	20	J
	LD	Cold Creek Bush (W11)	350	21	J
	DF	Buried Forest (24)	0.5	22	H
	DF	Alfred Rd (85)	150	22	F
	DF	Mangatete Stream Bush (W17)	160	25	H
	DF	Horse Bush Remnant (W16)	50	26	J
	DF	Stony River Terrace (21)	10	24	H
	DF	Kahui Rd (155)	7	24	H
	DF	Norfolk Rd B (78)	7	24	G
	DF	Tariki Bush (87)	4	29	G
	DF	Dudley Rd A (86)	7	29	F
	DF	Puniho Rd Bog (156)	0.5	30	H
	SF & LL	Maketawa Stream (W25)	13	27	G
	SF & LL	Fraser Rd (104)	5	31	M
	EP	Cross Rd Swamp (SL4)	20	20	G
	OF	Rowan Rd (118)	2	32	L
20 sites			1003		
LOWER-MONTANE	DF	Norfolk Rd A (110)	350	22	F
	DF	Dudley Rd B (W26)	25	30	F
	PRP	Carrington Rd A (11)	250	27	E
	PRP	Mangorei Rd (14)	60	31	E
4 sites			685		

The total area of the priority areas recommended for protection is 1912.5 hectares which represents only a very small fraction of the ecological region. If all areas recommended were protected this would add 0.2% of the coastal zone, 0.2% of the semi-coastal zone and 0.5% of the lowland zone. This would still mean that 1% of the coastal and semi-coastal zones were protected, and 2.5% of the lowland zone.

The recommended priority natural areas are the best remaining examples of the particular habitats which originally gave the region its character. Many of the study areas were excluded on the basis of poor condition and questionable viability. Some of these areas may be worthy of consideration for conservation covenants or protected private land as there are so few natural areas remaining in the coastal, semi-coastal and lowland zones, particularly in the south of the region. Study areas are listed in Appendix II.

Cross Road Swamp Lowland N119 875645
No. SL4 Eltham Peat

The only remnant of swamp maire-kahikatea swamp forest remaining on peat deposits in the region. Although the forest is at present in excellent condition it is currently being drained and cleared. The parasitic shrub *Loranthus micranthus* recorded here, has only been found in a few localities elsewhere on the ring plain (B.D. Clarkson, pers. comm.).

Ecological unit : Swamp maire - kahikatea forest - swamp
Size : < 20 hectares
Altitude : 325 metres

Stent Road Coastal N118 372719
No. SL5 Lahar Deposits

A small area of coastal herbfield adjacent to the sea at the end of Stent Road. Uncommon species occur here including *Oreomyrrhis* sp. (unnamed) and *Plantago triandra* var. (*P. masonae*).

Ecological unit : Coastal herbfield
Size : < 0.5 hectares
Altitude : 0

Kaweora Bush Lowland N118 540505
No. W14 Lahar Deposits

A large remnant bisected by Wiremu Road which includes the range of vegetation types associated with the topography and drainage of the lahar deposits. Altitudinal and successional gradients are also evident. Tawa forest covers the lahar mounds at lower altitude with pukatea-kamahi-swamp maire forest in the swampy intermound areas. Above approximately 250m a.s.l. pukatea declines in abundance. In the north-eastern sector above Wiremu Road the vegetation is at an earlier stage of succession with kamahi prominent in the canopy. The undergrowth is generally in good condition throughout. A small tussockland swamp adjoins the south-eastern edge of the forest.

Ecological units : Tawa forest - lahar mounds
 : Pukatea-kamahi-swamp maire forest -
 : intermound areas
 : Kahikatea-swamp maire-kamahi forest -
 : intermound areas
 : Kamahi-tawa forest - lahar mounds
 : Toetoe-raupo-karamu tussockland - swamp
Size : 80 hectares
Altitude : 200-270 metres

Cold Creek Bush Lowland N118 590505
No. W11 Lahar Deposits

A very large remnant adjoining Egmont National Park which has a varied topography including lahar mounds, large intermound areas and fluves. The bush has been logged and cleared in places and the margins are being affected by stock grazing. However most of the forest is in good condition due to its large size.

Ecological units : Kamahi-swamp maire forest - intermound areas
 : Kamahi-swamp maire-pukatea forest -
 intermound areas
 : Kahikatea-kamahi-swamp maire/*Coprosma*
 tenuicaulis treeland -- swamp
Size : 350 hectares
Altitude : 275-425 metres

Waipu Lagoons Coastal N109 713950
No. W48 Uplifted Marine Terrace

Two irregularly shaped ponds with raupo, flax and *Eleocharis sphacelata* on the edges. The Australasian bittern, recorded here, is only known from two other sites in Taranaki, W67 and Barrett Lagoon Scenic Reserve. It is thought that these birds move between the three areas. The ponds are also a valuable habitat for other wildlife including grey teal and Australian coot both of which are uncommon in the region. The present designation of this area is local purpose reserve which affords no protection to the vegetation or wildlife.

Ecological units : Raupo reedland - lake edge
 : Flax flaxland - lake edge
 : *Eleocharis sphacelata* reedland - lake edge
Size : 4.5 hectares
Altitude : 50 metres

Townsend Road Semi-coastal N109 725925
No. 74 Uplifted Marine Terrace

A small remnant of semi-coastal forest on a ridge, sideslope and fluve. The main canopy species are kohekohe and puriri on the ridge and sideslope with pukatea frequent on the fluve.

Ecological units : Kohekohe-puriri forest - sideslope and ridge
 : Pukatea forest - fluve
Size : 6 hectares
Altitude : 30 metres

Dorset Road Bush Semi-coastal N109 715895
No. W31 Uplifted Marine Terrace

A poorly drained hollow and adjacent sideslope with a canopy predominantly of pukatea in association with tawa and kohekohe. The bush edge is partially fenced and the undergrowth and canopy are in very good condition. A small area of *Carex* sedgeland overtopped by scattered *Coprosma tenuicaulis* occurs on the western edge.

Ecological units : Pukatea forest - sideslope
 : Pukatea forest - swamp
 : *Coprosma tenuicaulis*/*Carex* sedgeland - swamp
Size : 6 hectares
Altitude : 100 metres

Buried Forest Lowland N118 540660
No. 24 Debris Flows

Fossilised tree stumps which were engulfed by the Kahui Debris Flows are exposed in the banks of the Waiweranui Stream at this location. This is the geological type section for the Kahui Debris Flows (see Neall, 1979 p. 16). The bank is mostly covered with toetoe and kiekie, with a small area of tawa-rewarewa forest adjoining the northern bank.

Size : 0.5 hectares
Altitude : 350 metres

Alfred Road Lowland N109 685735
No. 85 Debris Flows

A large remnant adjoining the national park, most of which has been logged resulting in secondary kamahi forest. A strip along the western edge has been clearfelled resulting in younger regenerating kamahi forest. Swamp maire and kahikatea are frequent in poorly drained stream channels.

Ecological units : Kamahi forest - interfluve
 : Kamahi-swamp maire forest - fluve
 : Kamahi forest - fluve
Size : 150 hectares
Altitude : 380-480 metres

Norfolk Road A Lower-montane N119 755670
No. 110 Debris Flows

A large piece of forest adjoining the national park. Contains two main forest types; kamahi forest on the drier interfluves and kamahi-swamp maire forest on the poorly drained interfluves and fluves. To the south of Mangamawhete Stream is an unlogged area of rimu/kamahi forest. The boundaries are unfenced but due to its large size the inner parts of the forest are in good condition.

Ecological units : Kamahi forest - interfluve
 : Kamahi forest - fluve
 : Kamahi-swamp maire forest - interfluve
 : Kamahi-swamp maire forest - fluve
 : Rimu/kamahi forest - interfluve
Size : 350 hectares
Altitude : 500 metres

Umutekai Bush Semi-coastal N109 710883
No. W36 Pouakai Ring Plain

Two large remnants of swamp forest in excellent condition. There are three main forest types; kahikatea-pukatea forest, kahikatea forest, and tawa-rewarewa forest (Clarkson, 1982). Although mainly unfenced, the forest is generally too wet to allow stock access and the undergrowth is consequently in excellent condition. This forest type was previously common in other poorly drained, fertile areas but no other remnants of this type now remain. This is the only known locality for *Athyrium japonicum* in the region (B.D. Clarkson, pers. comm.).

Ecological units : Kahikatea-pukatea forest - swamp
 : Kahikatea forest - swamp
 : Tawa-rewarewa forest -sideslope
 : Raupo reedland - swamp
Size : 28 hectares
Altitude : 110 metres

Paritutu and Sugar Loaf Islands Coastal N108 595920

No. SL 6 Sugar Loaf Andesite

Five offshore islands east of New Plymouth which are the marine eroded remnants of an old volcanic centre, and Paritutu which is an old volcanic plug.

The most common vegetation type is taupata scrub in association with flax, boxthorn and emergent karo and cabbage trees. On Moturoa Island there is a small area of karo forest (5m tall) with emergent pohutukawa (adventive).

On the rock outcrops various uncommon herbs occur including *Chenopodium allanii* and on Moturoa and Saddleback Islands Cook's scurvy grass (*Lepidium oleraceum*) which is listed in Williams and Given (1981) as being vulnerable.

Black-backed gulls, red-billed gulls, white-fronted terns, little blue penguins, reef herons, diving petrels, fleshy-footed shearwaters and white-faced storm petrels breed on the islands making them a very valuable wildlife habitat (Wildlife Service Fauna Survey Unit, 1981).

At present two of the islands, Moturoa and Saddleback, are designated Wildlife Refuges while Mataroa, Pararaki and Motuotamatea and Paritutu are part of Paritutu Centennial Park. This however affords no protection to the vegetation.

Ecological units	:	Taupata scrub - offshore island
	:	Karo forest - offshore island
	:	(<i>Chenopodium allanii</i>) rockfield - offshore island
	:	Taupata scrub - volcanic plug
	:	Flax flaxland - volcanic plug
	:	(<i>Chenopodium allanii</i>) rockfield - volcanic plus
Size	:	5 hectares
Altitude	:	0 metres

Warea Road Semi-coastal N118 426693

No. C9 Lahar Deposits

Semi-coastal forest on lahar mounds and intermound areas. There are two forest types; secondary kahikatea forest (with karaka, matai, rewarewa and tawa) and a small area of secondary kohekohe forest. This remnant is unfenced and the undergrowth is being affected by grazing. Although very small this is one of the few remnants of this vegetation type in the semi-coastal lahar deposits.

Ecological units	:	Kahikatea forest - lahar mounds
	:	Kahikatea forest - intermound area
	:	Kohekohe forest - intermound area
Size	:	2 hectares
Altitude	:	100 metres

Swampy Bush

Semi-coastal N118 440515

No. W3

Lahar Deposits

A relatively large remnant of semi-coastal tawa-pukatea forest on lahar mounds, intermountain areas and fluvies. The remnant includes several separate pieces and is unfenced. Other canopy species include kohekohe, nikau, pigeonwood and mahoe.

Ecological units : Tawa-pukatea forest - intermound areas
: Tawa-pukatea forest - lahar mounds
: Tawa-pukatea forest - fluves
Size : 25 hectares
Altitude : 180 metres

Stony River Terraces

Lowland N118 540677

No. 21

Debris Flows

A series of different aged terraces of the Stony River which support tutu shrubland, tutu-manuka scrub and on the oldest terrace kamahi forest. Many species normally found at higher altitude are found in this disturbed habitat, for example *Colobanthus affinis*. Patches of manuka scrub and degraded kamahi forest adjoin the southern terraces on the interfluvium.

Ecological units	:	Tutu shrubland - river terrace
	:	Tutu-manuka scrub - river terrace
	:	Kamahi forest - river terrace
	:	Kamahi forest - interfluv
Size	:	10 hectares
Altitude	:	325-425 metres

Kahui Road

Lowland N118 538610

No. 155

Debris Flows

Secondary swamp forest adjoining Egmont National Park which contains kamahi, swamp maire and kahikatea. The undergrowth is in good condition.

Ecological units : Kamahi-swamp maire forest - fluve
 : Kamahi-swamp maire forest - interfluve
 Size : 7 hectares
 Altitude : 425 metres

Norfolk Road B

Lowland N109 832773

No. 78

Debris Flows

One of the better remaining remnants of tawa forest on the ring plain. Tawa is the dominant canopy species on the steep sideslope with pukatea increasing in importance on the lower slope and on the fluve. The area is fenced with good regeneration and undergrowth.

Ecological units : Tawa forest - sideslope
: Pukatea forest - fluve
Size : 7 hectares divided by track
Altitude : 200 metres

Oakura Swamp Coastal N108 550855

No. 2 Pouakai Ring Plain

A small poorly drained hollow vegetated with flax and raupo. Spotless crake, which are uncommon on the ring plain, were recorded here (S.A. Cotton and J. Molloy, pers. comm.).

Ecological units : Raupo reedland - swamp
 : Flax flaxland - swamp
 Size : 1 hectare
 Altitude : 7 metres

Omata Bush Semi-coastal N108 610875

No. W21 Pouakai Ring Plain

Two convergent gullies and the ridge between them. The forest in the gullies has a canopy dominated by pukatea with occasional supplejack and pate. The understorey is in good condition and consists of dense tangles of supplejack, kiekie and young pukatea. On the drier hill slopes and ridge the canopy is mainly of tawa, puriri and kohekohe with emergent rewarewa.

Ecological units : Pukatea forest - fluve
 : Rewarewa/tawa-puriri - sideslope
 Size : 10 hectares
 Altitude : 40 metres

Clarke Road Swamp Semi-coastal N109 826878

No. W56 Pouakai Ring Plain

A small remnant of secondary swamp forest, dominated by swamp maire in association with pukatea in the south and *Carex* spp. to the north. Because of its swampy nature this area is impenetrable to stock and is in very good condition. To the north the water table is even higher and a raupo reedland occurs with patches of open water. On a drier hillslope to the east there is a very small pocket of forest with a mixed canopy of rewarewa, kahikatea, rimu and karaka. Spotless crake have been recorded in this remnant (Wildlife Service, Fauna Survey Unit, 1981).

Ecological units : Raupo reedland - swamp
 : Swamp maire/*Carex* treeland - swamp
 : Swamp maire-pukatea forest - swamp
 : Rewarewa-pukatea-kahikatea-rimu forest -
 sideslope
 Size : 2 hectares
 Altitude : 150 metres

Mangatete Stream Bush Lowland N118 545690

No. W17 Debris Flows

A large remnant adjoining Egmont National Park which has been logged but still contains many large emergent rata. The canopy is dominated by kamahi with hinau as a common associate. With succession tawa will become important in the canopy at lower altitude.

Ecological units : Rata/kamahi forest - fluve
 : Rata/kamahi forest - interfluve
 Size : 160 hectares
 : 325-450 metres

Horse Bush Remnant Lowland N118 570540
No. W16 Debris Flows

Tawa-kamahi forest covers most of this area which has been logged. Pukatea-swamp maire-kamahi forest occurs along the swampy fluves and on poorly drained patches of the hummocky interfluves. An area of young secondary growth adjoins the eastern margins. Although presently unfenced the undergrowth is in fair condition.

Ecological units : Tawa-kamahi forest - interfluve
 : Pukatea-swamp maire-kamahi forest -
 : interfluve
 : Pukatea-swamp maire-kamahi forest -
 : fluve
 Size : 50 hectares
 Altitude : 340-400 metres

Tank Farm Ponds Coastal N108 600890
No. W67 Pouakai Ring Plain

Two small ponds with areas of raupo, flax and *Eleocharis sphacelata* along the edges. Bird species which are relatively uncommon in Taranaki have been recorded here including Australasian bitterns, little egrets, little black shags, spur-winged plovers and New Zealand shovelers (Wildlife Service) pers. comm.

Ecological units : Raupo-reedland - lake edge
 : Flax flaxland - lake edge
 : *Eleocharis sphacelata* reedland -
 : lake edge
 Size : 2 hectares
 Altitude : 25 metres

Carrington Road B Lowland N108 533706
No. 19 Pouakai Ring Plain

A remnant of tawa forest on a sideslope and interfluve with kamahi forest on the lower sideslope and fluve. Hinau is frequent in the canopy with tawa. The forest on the upper slopes and interfluve is being grazed but around the fluve the forest has good undergrowth owing to its inaccessability.

Ecological units : Tawa forest - interfluve
 : Tawa forest - sideslope
 : Kamahi forest - fluve
 Size : 10 hectares
 Altitude : 275-350 metres

Carrington Road C Lowland N108 596765
No. 10 Pouakai Ring Plain

A large remnant on the lower flanks of the Pouakai Range very close to the national park boundary. The area has been logged and is now dominated by kamahi with occasional emergent rata. A small area of young second-growth kamahi forest occurs on the margin adjoining Carrington Road and there is a very small patch of manuka scrub in the north-east.

Ecological units : Rata/kamahi forest - fluve
 : Rata/kamahi forest - interfluve
 : Kamahi forest - interfluve
 : Manuka scrub - interfluve
 Size : 100 hectares
 Altitude : 350-450 metres

Rifle Range Road Lakes Coastal N129 865242

No. 136 Stratford Formation and Lepperton Lahars

Two lakes with scattered native vegetation - mainly raupo and *Scirpus lacustris* around the edges. A large number of birds including black shags, white-faced herons, pied stilts and the uncommon cattle egret have been recorded here. These lakes are an important wildlife habitat.

Ecological units : Raupo reedland - lake edge
 : *Scirpus lacustris* reedland - lake edge
 Size : 4 hectares
 Altitude : 100 metres

Maketawa Stream Lowland N109 788745

No. W25 Stratford Formation and Lepperton Lahars

Four small remnants of lowland tawa forest and swamp forest linked by the riparian vegetation of the Maketawa Stream. Mostly fenced and in good condition to the west of State Highway 3, but unfenced and grazed to the east. The swamp forest is dominated by swamp maire and pukatea with kiekie common in the undergrowth. Emergent rewarewa and rata, kamahi and hinau are canopy associates in the tawa forest.

Ecological units : Tawa forest - interfluve
 : Tawa forest - fluve
 : Swamp maire-pukatea forest - seepage swamp
 Size : 13 hectares in total
 Altitude : 150 metres

Carrington Road A Lower-montane N108 625755

No. 11 Pouakai Ring Plain

A very large forest remnant adjoining the national park to the north-east of the Pouakai Range. The remnant includes areas that have previously been clearfelled and have now regenerated to kamahi forest with some logged areas of rata/kamahi forest. The boundaries are unfenced but due to its large size most of the forest is in good condition.

Ecological units : Rata/kamahi forest - interfluve
 : Rata/kamahi forest - fluve
 : Kamahi forest - interfluve
 : Kamahi forest - fluve
 Size : 250 hectares
 Altitude : 480 metres

Taungatara Bush Semi-coastal N118 513426

No. W7 Lahar Deposits

Semi-coastal forest on lahar mounds and intermound areas in which the canopy is mainly of tawa in association with pukatea, kahikatea and mahoe. The boundaries are unfenced and consequently the undergrowth has been damaged by cattle grazing.

Ecological units : Tawa-pukatea forest - lahar mounds
 : Tawa-pukatea forest - intermound areas
 Size : 12 hectares
 Altitude : 100 metres

Looney's Lake

Lowland N118 520540

No. W10

Lahar Deposits

A semi-natural lake which is partly surrounded by raupo and *Carex* spp. Spotless crake have been recorded here, as well as other native waterfowl. Small bush remnants on and near the margin contain swamp maire, pukatea, and tawa as dominant canopy species (Wildlife Service, Fauna Survey Unit, 1981).

Ecological units : Raupo reedland - lake margin
 : *Carex* sedgeland - lake margin
 : Swamp maire-kamahi forest - swamp
 : Pukatea-tawa forest - intermound area
 Size : Lake and surrounds 3 hectares and 4 hectares
 of bush in 5 pieces
 Altitude : 250 metres

Waitara Estuary

Coastal N109 798998

No. W47

Uplifted Marine Terrace

Small areas of native vegetation remain near the mouth of the Waitara River. These are dominated by raupo, *Scirpus lacustris*, *Leptocarpus similis* and *Plagianthus divaricatus* with occasional taupata, cabbage tree, koromiko and flax. Also an important wildlife habitat.

Ecological units : Raupo-*Scirpus lacustris* reedland -
 mudflats
 : *Leptocarpus similis* - *Scirpus lacustris*
 rushland - mudflats
 Size : 2 hectares
 Altitude : 0 metres

Bushy Park

Semi-coastal N109 839927

No. W66

Uplifted Marine Terrace

Two separate bush remnants with a canopy predominantly of tawa. Other canopy trees include puriri and kohekohe with pukatea in the poorly drained gullies. The boundaries are unfenced and the understorey and ground cover are being grazed in the more accessible areas.

Ecological units : Tawa forest - sideslope
 : Pukatea forest - flume
 Size : 12 hectares
 Altitude : 100 metres

Mangamiemi Remnant Bush

Semi-coastal N109 722918

No. W50

Uplifted Marine Terrace

Semi-coastal forest on a ridge and sideslopes. The main canopy species are puriri, kohekohe, tawa, karaka, rimu and rewarewa. Pukatea also occurs in the canopy on the east facing sideslope. The bush is fenced and the undergrowth is in good condition.

Ecological units : Puriri-kohekohe forest - ridge
 : Puriri-kohekohe forest - sideslope
 Size : 6 hectares
 Altitude : 95 metres

Tarurutangi Bush Semi-coastal N109 733890

No. W29 Uplifted Marine Terrace

Secondary pukatea swamp forest in a poorly drained hollow. This remnant is unfenced but due to its wetness stock only graze the edges and most of it is in excellent condition. Other canopy trees include kahikatea, tawa and mahoe.

Ecological unit : Pukatea forest - swamp
Size : 4 hectares
Altitude : 125 metres

Lepperton Bush Semi-coastal N109 775910

No. W39 Uplifted Marine Terrace

A small remnant of semi-coastal forest on a gentle hill and fluve. The remnant contains two forest types - kohekohe forest on the dry hill top, and tawa forest on the lower slopes and fluve. Other canopy trees include pukatea (particularly in the fluve), titoki and rewarewa. The remnant has been grazed in the past but is now fenced and is regenerating well.

Ecological units : Kohekohe forest - hilltop
 : Tawa forest - sideslopes
 : Tawa forest - fluve
Size : 4 hectares
Altitude : 150 metres

Tariki Bush Lowland N109 822727

No. 87 Debris Flows

A small remnant of tawa forest on stream banks. The canopy is tall (possibly primary) and the forest is in good condition for most part as the boundaries are mostly fenced. Some exotics occur throughout, including wandering Jew, *Selaginella kraussiana* and blackberry. *Clematis vitalba* (planted?) occurs on the margin near the house.

Ecological units : Tawa forest - fluve
 : Tawa forest - sideslope
Size : 4 hectares
Altitude : 250 metres

Dudley Road A Lowland N109 722730

No. 86 Debris Flows

Three small adjacent stands of regenerating kamahi-swamp maire forest with frequent kahikatea. The area has been partly drained but still remains damp underfoot. The boundaries have recently been fenced and the undergrowth is in good condition.

Ecological unit : Kamahi-swamp maire forest - swampy
 : interfluve
Size : 7 hectares (in 3 parts)
Altitude : 400 metres

Dudley Road B Lower-montane N109 724707
No. W26 Debris Flows

An area predominantly covered in kamahi forest on a north sloping planar interfluvium adjoining the national park. This remnant has been logged and is unfenced, however, most of the forest appears to be little affected by grazing. On the northern edge there is a poorly drained area with swamp maire, kahikatea and young rimu in the canopy.

Ecological units : Kamahi forest - interfluvium
: Kamahi-swamp maire forest - fluvium
Size : 25 hectares
Altitude : 450 metres

Opua Road Semi-coastal N118 497500
No. 59 Debris Flows

Three separate pieces of semi-coastal tawa forest. Other canopy trees are pukatea, with kahikatea occurring frequently around the edges. Although unfenced and in poor condition, it has a high priority for protection as it is the largest remnant remaining on this land system in the semi-coastal zone.

Ecological unit : Tawa-pukatea forest - interfluvium
Size : 7 hectares
Altitude : 140 metres

Puketapu Road Coastal N128 506355
No. 138 Lahar Deposits

A steep south-facing coastal cliff vegetated in taupata scrub with occasional emergent karaka. Other canopy species include kawakawa and flax (*Phormium tenax*). Due to its steepness this remnant is in very good condition. Also an area of coastal herbfield towards the headland with *Euphorbia glauca*, *Pimelea urvilleana*, *Ranunculus recens*, *Oreomyrrhis* sp. (unnamed). This area is also known to provide a habitat for the moth *Lythria peronata* (Dr K.J. Fox, pers. comm.).

Ecological units : Coastal herbfield - coastal cliffs
: Karaka/taupata-flax-kawakawa scrub - coastal cliffs
Size : 2 hectares
Altitude : 0.20 metres

Puniho Road Bog Lowland N118 528673
No. 156 Debris Flows

A small swampy area adjacent to Puniho Road. The main canopy species are manuka, *Gleichenia dicarpa*, *Baumea tenax* and *B. rubiginosa*. There are frequent sphagnum hummocks with the native sundew *Drosera binata* and several species of orchid growing on them.

Ecological units : Manuka-*Gleichenia dicarpa*-*Baumea rubiginosa* shrubland - bog
Size : 0.5 hectares
Altitude : 300 metres

Oaonui Beach Coastal N118 387498
No. 158 Coastal Sands

This is the only significant remaining area of coastal sand dunes. Marram grass, spinifex, lupin, sedges and rushes form the predominant vegetation in the main dune area which has been retired from grazing. The Taranaki Catchment Commission has carried out extensive soil conservation works in the area to prevent the spread of sand onto adjoining productive dairy pasture. There is an urupa near the middle of the area. This is an important wildlife habitat due to the presence of a black-backed gull colony; several uncommon bird species such as the reef heron and variable oyster catcher have also been recorded here.

Ecological units : Marram grassland - sand dune
: Lupin scrub - sand dune
Size : 35 hectares
Altitude : 0 metres

Mangorei Road Lower-montane N108 637737
No. 14 Pouakai Ring Plain

A north-east sloping interfluvium of rata/kamahia forest situated between two tributaries of the Mangorei Stream. The boundaries are unfenced but the streams prevent stock from gaining access. This remnant extends into the lowland zone in which the canopy also includes occasional tawa and pukatea.

Ecological unit : Rata/kamahia forest - fluvium
: Rata/kamahia forest - interfluvium
Size : 60 hectares
Altitude : 550 metres

Fraser Road Lowland N129 882355
No. 104 Stratford Formation and Lepperton Lahars

A small isolated remnant of tawa forest which is in poor condition with canopy gaps, no understorey or ground cover. However, it has a high priority for protection as it is the best of the very few remaining remnants on this land system.

Ecological unit : Tawa-mahoe forest - interfluvium
Size : 5 hectares
Altitude : 175 metres

Weld Road Semi-coastal N108 529797
No. 1 Kaitake Andesite

Semi-coastal forest and scrub adjoining the national park to the north-west of the Kaitake Range. Includes two separate fluviums and adjacent sideslopes dominated by pukatea and a south-west facing sideslope of regenerating scrub dominated by pukatea, kohekohe and kawakawa. The undergrowth of the forest on the fluviums is in excellent condition as the sideslopes are too steep for stock to gain access.

Ecological units : Pukatea-tawa forest - sideslope
: Pukatea-tawa - fluvium
: Pukatea-kohekohe-kawakawa scrub - sideslope
Size : 11 hectares
Altitude : 250 metres

Surrey Hill Lowland N108 575815
No. 7 Kaitake andesite

A strip of tawa-pukatea forest between the boundary of the national park on the Kaitake Range and the Oakura River. While there is sufficient of this vegetation type already reserved, the protection of this land would allow for more efficient land management, employing the river as a natural boundary. The forest is younger than that in the national park and also includes a small area of earlier successional rewarewa/mamaku forest.

Ecological units : Tawa-pukatea forest - sideslope
 : Rewarewa/mamaku forest - sideslope
Size : Approximately 20-30 hectares
Altitude : 250 metres

Rowan Road Lowland N119 703390
No. 118 Opunake Formation

A very small remnant of tawa forest which also has mahoe and pukatea in the canopy. The canopy is wind damaged on the edges and there is no undergrowth due to extensive past grazing. However, this is the best remaining forest remnant in the Opunake Formation.

Ecological unit : Tawa forest - interfluve
Size : 2 hectares
Altitude : 250 metres

Oeo Cliffs Coastal N136 541332
No. 160 Coastal sands

Cliff tops with *Pimelea urvilleana* which is the habitat for the moth *Lythria perornata*. This species of moth is elsewhere found at an altitude of approximately 1380m a.s.l. on Mt Ruapehu (Dr K.J. Fox, Manaia, pers. comm.).

Ecological unit : Coastal herbfield
Size : 0.5 hectares
Altitude : 5 metres

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APPENDICES

Appendix I CHECKLIST OF EXISTING PROTECTED NATURAL AREAS

Egmont National Park (After Clarkson, 1985 in prep)

DESCRIPTION	BIOCLIMATIC ZONE	VEGETATION AND HABITATS	LAND SYSTEM
KAITAKE RANGE	Semi-coastal	Tawa-pukatea/kohekohe forest	Kaitake Andesite
		Mamaku scrub	Kaitake Andesite
	Lowland Lower-montane	Tawa-hinau forest	Kaitake Andesite
		Kamahia forest	Kaitake Andesite
POUAKAI RANGE	Lowland Lower-montane	Kamahia-tawa forest (logged)	Pouakai Ring Plain
		Kamahia forest (logged)	Pouakai Ring Plain
	Montane	Rimu-rata/kamahia forest	Pouakai Ring Plain
		Rata forest	Pouakai Ring Plain
		Mixed broadleaved scrub	Pouakai Ring Plain
		Kamahia-Hall's totara forest	Pouakai Ring Plain
	Sub-alpine	Rata forest	Pouakai Ring Plain
		Kamahia-kaikawaka forest	Pouakai Ring Plain
		Leatherwood shrubland and scrub	Pouakai Andesite
		Red tussock tussockland & tussock herbfield	Pouakai Andesite
		Mire	Pouakai Andesite
MOUNT EGMONT	Lower-montane	Rimu/kahikatea/kamahia forest	Debris Flows
		Rata/kamahia forest	Debris Flows
		Rimu-rata/kamahia forest	Lahar Deposits
			Debris Flows
	Montane	Rimu-rata/mahoe forest	Lahar Deposits
			Lahar Deposits
		Mire	Stratford Formation and Lepperton Lahars
			Lahar Deposits
	Montane	Hall's totara-kamahia forest	Lahar Deposits
		Hall's totara-kaikawaka / broadleaved shrubs	Debris Flows
		Mire	Egmont Andesite

	Kamahi-toro forest	Debris Flows
	Rata/kamahi forest	Debris Flows
	Kanuka forest	Debris Flows
	Hall's totara-kamahi forest (with kanuka)	Stratford Formation and Lepperton Lahars
	Hall's totara/broadleaved shrubs Mire	Lahar Deposits
	Lake	Lahar Deposits
	Leatherwood scrubland shrubland	Lahar Deposits
Sub-alpine		Debris Flows
		Egmont Andesite
		Egmont Andesite
		Lahar Deposits
		Debris Flows
Alpine	Red tussockland	Egmont Andesite
	Herbfield (incl. herbfield, moss-herbfield and cushion-plantfield)	Lahar Deposits
	Moss-herbfield mosaic	Debris Flows
	Rockfield	Debris Flows
	Gravelfield	Egmont Andesite
	Stonefield	Egmont Andesite
	Boulderfield	Egmont Andesite

NAME	AREA (ha)	GRID.REF.	LAND SYSTEM	BIOCLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS
Awa te take Pa Historic Reserve	27	N109 855916	Uplifted Marine Terrace	Semi-coastal	River terrace and steep bluffs above Waitara River	1) <u>Pukatea-kohekohe forest</u> . 2) <u>Rewarewa/kohekohe-karaka forest</u> . 3) <u>Bracken-inkweed/cockfoot-meadow rice grass grassland</u> . 4) <u>Rewarewa-mamaku/Machaetina sinclairii-toetoe sedgeland</u> . 5) <u>Pukatea-mamaku/lacebark/toetoe treeland</u> . 6) <u>Pasture</u> .
Onaero River Scenic Reserve	12	N109 995294	Uplifted Marine Terrace	Coastal	Steep cliffs and terrace above	1) <u>Rewarewa/karaka-kowhai forest</u> . 2) <u>Pukatea forest</u> . 3) <u>Raupo reedland</u> . 4) <u>Pasture</u> .
Sentry Hill Redoubt Scenic Reserve	3.5	N109 767943	Uplifted Marine Terrace	Semi-coastal	Hillslope, swamp and pond	1) <u>Mamaku-mahoe/gorse scrub</u> . 2) <u>Juncus articulatus-Carex virgata rushland</u> . 3) <u>Gorse/pasture</u> . 4) <u>Pond</u> .
Katere Scenic Reserve	2.3	N109 691930	Uplifted Marine Terrace	Semi-coastal	A small steep bank on the eastern side of Mangaone Stream	1) <u>Karaka-titoki forest</u> 2) <u>Bracken-fennel/Yorkshire fog-prairie grass grassland</u> . 3) <u>Gorse-bracken shrubland</u> . 4) <u>Flax/niggerhead-raupo/Juncus reed-tussockland</u> . 5) <u>Pasture</u> . 6) <u>Radiata pine plantation</u> .
Mataro Scenic Reserve	12.5	N109 923976	Uplifted Marine Terrace	Semi-coastal	Moderately steep slopes above the Onaero River	1) <u>Rewarewa-tawa-pukatea forest</u> 2) <u>Pasture</u>

Bowden Scenic Reserve	1.6	N109 715934	Uplifted Marine Terrace	Semi-coastal	Gentle sideslopes above Mangaone Stream	1) <u>Karaka-titoki forest.</u>
						2) <u>Flowering maple.</u>
						3) <u>Cultivated trees.</u>
						4) <u>Pasture - grazed.</u>
						5) <u>Pasture - rank.</u>
						6) <u>Alder/Carex treeland.</u>
Blue Rata Scenic Reserve	12.8	N118 517688	Debris Flows	Lowland	Narrow strip of flat land on boulder strewn river terraces	1) <u>Rata/kamahitawa forest.</u>
						2) <u>Rewarewa/whetia/gorse scrub.</u>
						3) <u>Whetia-karamu/Juncus-Carex/</u> <u>Yorkshire fog shrubland.</u>
Corbett Lake Scenic Reserve	4.2	N108 504707	Debris Flows	Lowland	A small lake and surrounding native vegetation	1) <u>Tawa-hinai forest.</u>
						2) <u>Pukatea forest.</u>
						3) <u>Kamahitawa swamp mairi/</u> <u>niggerhead treeland.</u>
						4) <u>Rimu-kahikatea forest.</u>
						5) <u>Lake.</u>
William Corbett Scenic Reserve	2	N108 504707	Debris Flows	Semi-coastal	Flat river terrace adjacent to Kaihihi Stream	1) <u>Kohokohe-titoki-matai forest</u>
						2) <u>Bracken-gorse-Japanese</u> <u>honeysuckle fernland.</u>
						3) <u>Poplar.</u>
						4) <u>Bracken-Japanese honeysuckle</u> <u>Yorkshire fog fern-grassland</u>
						5) <u>Pasture.</u>
Everett Park Scenic Reserve	77.1	N109 850850	Stratford Formation and Lepperton Lahars	Lowland	Flat terrace adjacent to the Manganui River	1) <u>Kahikatea/tawa forest.</u>
						2) <u>Bracken fernland.</u>
						3) <u>River cliffs.</u>
						4) <u>Pasture.</u>
Rimutauteka Scenic Reserve	3	N109 874840	Stratford Formation and Lepperton Lahars	Lowland	Small hill	1) <u>Tawa/mamaku forest.</u>
						2) <u>Mahoe scrub.</u>
						3) <u>Bracken/cockfoot grass-</u> <u>fernland.</u>

NAME	AREA (ha)	GRID.REF.	LAND SYSTEM	BIOCLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS
Makara Scenic Reserve	2.0	N109 858812	Stratford Formation and Lepperton Lahars	Lowland	River cliffs and adjacent flat above Manganui River	1) <u>Tawa/kamahahi forest.</u> 2) <u>Kamahahi/bracken fernland.</u> 3) Pasture.
Joe Gibbs Scenic Reserve	1.9	N109 781795	Stratford Formation and Lepperton Lahars	Lowland	North facing hillslope and flat on opposite side of the Kurapete Stream	1) <u>Tawa forest.</u> 2) <u>Planted trees/bracken- wandering Jew-blackberry fernland.</u> 3) <u>Lawsoniana-macrocarpa plantation.</u> 4) <u>Alder/barberry exotic scrub.</u> 5) Pasture.
P.G. Nops Scenic Reserve	1.6	N109 778792	Stratford Formation and Lepperton Lahars	Lowland	River terraces of Kurapete Stream and a tributary	1) <u>Tawa-kamahahi-pukatea forest.</u> 2) <u>Planted trees/wandering Jew.</u> 3) <u>Yorkshire fog-browntop grassland.</u>
Pukeiti Rhododendron Trust Private Scenic Reserve	349	N108 575745	Pouakai Ring Plain	Lowland Lower-montane	A small volcanic cone and adjacent sideslopes of Pouakai Range	1) <u>Kamahahi forest.</u> 2) <u>Radiata pine-kamahahi forest</u> 3) Stream beds. 4) Gardens.
Meeting of the Waters Scenic Reserve	27	N109 690862	Pouakai Ring Plain	Semi-coastal	Flat terraces adjacent to Waiwakaiho River and Araheke Stream	1) <u>Matai/tawa forest.</u> 2) <u>Mixed B.L. shrubland.</u> 3) <u>Mixed B.L. forest-shrubland.</u> 4) Exotic shrub. 5) <u>Titoki-tawa forest.</u> 6) <u>Totara/tawa forest.</u> 7) <u>Thuka plicata plantation.</u> 8) <u>Willow.</u>

Ratapihipihi Scenic Reserve	22.5	N108 622866	Pouakai Ring Plain	Semi-coastal	Gully and side- slopes	1) <u>Tawa-pukatea/kohekohe forest.</u> 2) <u>Macrocarpa.</u> 3) Pasture.
Barrett Lagoon Scenic Reserve	12	N108 621876	Pouakai Ring Plain	Semi-coastal	Lake and adjacent flat and sideslope	1) <u>Pukatea-tawa/kohekohe forest.</u>
Huatoki Scenic Reserve	15.9	N109 652885	Pouakai Ring Plain	Semi-coastal	Plats and sideslopes adjacent to Huatoki Stream	1) <u>Tawa-pukatea-rewarewa forest.</u> 2) <u>Bracken-inkweed-gorse</u> fernland.
Welbourn Scenic Reserve	5	N109 664896	Pouakai Ring Plain	Semi-coastal	Gully and adjacent sideslopes	1) <u>Rewarewa-pukatea/kohekohe</u> forest. 2) Pasture.
Pukatarata- Parihamore Historic Reserve	4.9	N109 667913	Pouakai Ring Plain	Semi-coastal	Two pa sites adjacent to Te Henui Stream	1) <u>Kohekohe forest.</u> 2) <u>Titoki forest.</u> 3) <u>Akeake-tarata/woolly night-</u> shade-kawakawa treeland. 4) <u>Macrocarpa</u> plantation. 5) Pasture.
Ian Allen Scenic Reserve	3.4	N108 631817	Pouakai Ring Plain	Semi-coastal	Planar interfluvium and adjacent stream	1) <u>Tawa-rimu-miro forest.</u> 2) <u>Tawa/laurel-raurekau</u> treeland. 3) <u>Cocksfoot-Yorkshire fog</u> grassland.
Te Koru Pa Historic Reserve	2.7	N108 571828	Pouakai Ring Plain	Semi-coastal	Hill adjacent to Oakura River	1) <u>Rewarewa/mamaku-kohekohe</u> forest. 2) Riverbanks. 3) Pasture.

NAME	AREA (ha)	GRID.REF.	LAND SYSTEM	BIOCLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS
Patua Scenic Reserve	1.6	N108 508796	Pouakai Ring Plain	Semi-coastal	Steep gully	1) Pukatea-rewarewa/kamahi- kohekohe-mahoe forest. 2) <u>Planted natives/bracken</u> fernland.
Cantlop Scenic Reserve	1.3	N108 664884	Pouakai Ring Plain	Semi-coastal	Gully and sideslopes	1) <u>Pukatea/kohekohe forest.</u> 2) <u>Exotic scrub.</u> 3) Pasture.
Maitahi Scientific Reserve	0.7	N108 462812	Pouakai Ring Plain	Semi-coastal	Coastal cliffs	1) <u>Karaka-taupata/flax treeland.</u> 2) <u>Taupapa-flax-gorse flax</u> shrubland. 3) <u>Flax-gorse shrub-flaxland.</u> 4) <u>Raupo-flax-karamu-toetoe</u> <u>flax-reedland.</u> 5) <u>Boxthorn-taupata/flax-gorse</u> <u>scrub.</u> 6) Pasture.
Huthnace Scenic Reserve	0.6	N109 664845	Pouakai Ring Plain	Semi-coastal	Flat interfluv	1) <u>Tawa-pukatea forest.</u> 2) Nursery area. 3) Garden area.
Tapuinikau Pa Historic Reserve	3.5	N118 430680	Lahar Deposits	Semi-coastal	Lahar mounds and intermound area	1) <u>Rewarewa/kohekohe-karara</u> forest. 2) <u>Kohekohe forest.</u> 3) <u>Rangiora scrub.</u>

Recreation Reserves

Okato	2	N108 464748	Debris Flows	Semi-coastal	Interfluv	1) Rata-rewarewa/tawa forest. 2) Pukatea/kohekohe forest.
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Proposed Scientific Reserves

Normanby Road		N129 682285	Opunake Formation	Coastal	Coastal cliffs	1) Taupata-flax flax-shrubland. 2) Coastal herbfield.
Sutherland Road		N129 703285	Opunake Formation	Coastal	Coastal cliffs	Taupata-flax flax-shrubland.

Conservation Covenants

Brown HJ & MET	2	N108 643827	Pouakai Ring Plain	Semi-coastal	Planar interfluv	Tawa-pukatea forest.
Thomson JW	2	N108 635871	Pouakai Ring Plain	Semi-coastal	Fluv and sideslopes	Pukatea forest.
Smiths RK & DG	4.3	N108 642833	Pouakai Ring Plain	Semi-coastal	Planar interfluv	Rimu-kahikatea/rewarewa forest.
Hopkins FJ	1.6	N108 439735	Lahar Deposits	Semi-coastal	Intermound area	Kahikatea forest.
Hopkins EG	1.8	N118 440560	Lahar Deposits	Semi-coastal	Intermound area	Kahikatea forest.

NAME	AREA (ha)	GRID. REF.	LAND SYSTEM	BIOCLIMATIC ZONE	PHYSICAL FEATURES	VEGETATION AND HABITATS
<u>Wildlife Refuges</u>						
Saddleback and Moturoa Islands	5	N108 600920	Sugar Loaf Andesite	Coastal	Two offshore islands	1) Taupata scrub. 2) Rockfield with native herbs including Cooks Scurvy Grass. 3) Karo forest.

APPENDIX II CHECKLIST OF STUDY AREAS - OTHER THAN PRIORITY AREAS

DESCRIPTION	GRID REF	VEGETATION TYPE
<u>COASTAL</u>		
<u>Lahar Deposits</u>		
No 157 Bayly Road 0.5 ha	N118 365675	coastal herbfield
<u>Pouakai Ring Plain</u>		
No 2 Okato Swamp 1 ha	N108 476756	raupo reedland flax flaxland
<u>SEMICOASTAL</u>		
<u>Lahar Deposits</u>		
No 57 Kaweora Road 3 ha	N118 528484	tawa forest
No 50 Waiteka Road 4 ha	N118 483423	kahikatea/tawa-pukatea forest
No 39 Kahui Road 4 ha	N118 419584	pukatea-tawa forest
No 23 Kekeua 10 ha	N118 433665	tawa forest
<u>Pouakai Ring Plain</u>		
No W22 Mangawhererangi Bush 2 ha	N108 609865	pukatea forest
No 76 Egmont Road 3 ha	N109 728850	kohekohe-mahoe forest
No 13 Dover Road 10 ha	N108 498732	tawa forest pukatea forest
<u>Opunake Formation</u>		
No 66 Nopera Road 2 ha	N128 551374	tawa forest
<u>Uplifted Marine Terrace</u>		
No W41 Lepperton Swamp 1 ha	N109 792912	raupo reedland <u>Carex</u> sedgeland
No W42 Kairau Road 2.5 ha	N109 778954	tawa-pukatea forest
No W40 Richmond Road 3 ha	N109 783921	tawa forest
No W45 Lower King Road 3 ha	N109 728907	tawa forest
No W38 Lepperton Bush II 4 ha	N109 783909	tawa forest pukatea forest
No W27 Clearview Road 4 ha	N109 768889	tawa-pukatea-puriri forest pukatea forest
No W64 Bertrand Road 4 ha	N109 832934	tawa-kohekohe-puriri forest pukatea forest

LOWLANDDebris Flows

No 96	Durham Road	4 ha	N109 757770	kamahi forest
No 18	Saunders Road	5 ha	N108 495714	tawa forest
No 17	Oxford Road	7 ha	N108 483718	tawa forest
No 107	Derby Road	13 ha	N119 774653	kamahi-swamp maire
No W12	Mangahume Bush	80 ha	N118 580525	tawa-kamahi forest

Lahar Deposits

No 58	Ihaia Road	4 ha	N118 504503	tawa-pukatea forest
No 63	Auroa Road	4 ha	N118 635510	kamahi-swamp maire forest kamahi-swamp maire/ <u>Carex secta</u> treeland
No 68	Kaweora Road B	4 ha	N118 527491	tawa-pukatea forest
No 65	Eltham Road	5 ha	N118 552465	tawa-pukatea forest
No 20 & 22	Puniho Road	6 ha	N109 482682	kahikatea-pukatea forest
No 13	Waiteka Road	8 ha	N118 561600	tawa-pukatea forest
No W6	Clement Bush	8 ha	N118 540498	tawa-pukatea forest
No W9	Upper Ihaia Road	15 ha	N118 535557	kamahi forest
No 113	Manaia Road	20 ha	N119 710540	tawa-kamahi forest
No 27	Parihaka Road	20 ha	N118 475615	tawa-pukatea forest
No W8	Oaonui Stream Bush	150 ha	N118 575535	kamahi forest

Pouakai Ring Plain

No 16	Dover Road	20 ha	N108 545720	tawa-kamahi forest kamahi forest
No 83	Korito Stream	14 ha	N109 655750	kamahi-tawa forest
No 8	Plymouth Road	30 ha	N108 607770	kamahi forest
No 15	Kaitikari Stream Bush	10 ha	N108 518733	tawa forest
No W54	Mangaone Bush	2.5 ha	N109 887841	tawa forest

Stratford Formation and Lepperton Lahars

No 103	Mountain Road	3 ha	N129 871385	rewarewa/mahoe forest
No W52	Kaimate	5 ha	N119 846502	tawa forest
No 101	Cornwall Road	7 ha	N109 858808	tawa forest

Kaitake Andesite

No 151	Timaru Stream	8 ha	N108 545756	tawa-kamahi forest
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Lowland Peat

No 100 Orua Road	10 ha	N119 935500	tawa-pukatea forest
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LOWER MONTANEDebris Flows

No 111 Surrey Road	25 ha	N119 770650	kamahi-swamp maire forest
No 127 Denbigh Road	40 ha	N119 769639	kamahi-swamp maire forest
			kamahi-tawa forest
			kamahi forest

Lahar Deposits

No 114 Mangawhero Road	10 ha	N118 649516	rata/kamahi forest
No 123 Radner Road	40 ha	N119 751612	kamahi-swamp maire forest

Pouakai Ring Plain

No 84 Maude Road	14 ha	N109 660735	kamahi forest
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CHECKLIST OF ECOLOGICAL CLASSES

ECOLOGICAL CLASS NAME				CONSERVATION VALUE				PROTECTED AREA STATUS		
Bioclimatic Zone	Hydrologic Class	Land System	Vegetation Structural Class	Number or Extent in District	Significant Ecological Class (Yes/No)	Ecological Class, formerly rare and substantially modified (Yes/No)	Ecological Class apparently confined to the district (Yes/No)	Total Area (ha)	Number of Areas	Adequacy of Protection
COASTAL	palustrine	U.M.T.	reedland	3	no	no	no	0.3	1	poor
	palustrine	U.M.T.	flaxland	1	no	no	no	0	0	nil
	palustrine	U.M.T.	forest	1	yes	no	no	0.2	1	poor
	palustrine	P.R.P.	reedland	2	no	no	yes	0	0	nil
	palustrine	P.R.P.	flaxland	3	no	no	yes	0	0	nil
	palustrine	S.F. & L.L.	reedland	1	no	no	yes	0	0	nil
	estuarine	U.M.T.	rushland	1	no	no	no	0	0	nil
	estuarine	U.M.T.	reedland	1	no	no	no	0	0	nil
	terrestrial	U.M.T.	forest	1	yes	yes	no	11.2	2	poor
	terrestrial	U.M.T.	scrub	0	yes	yes	no	0	0	nil
	terrestrial	U.M.T.	fernland	0	yes	yes	no	0	0	nil
	terrestrial	O.F.	shrub-flaxland	3	yes	yes	yes	0	0	nil
	terrestrial	O.F.	herbfield	2	yes	yes	yes	0	0	nil
	terrestrial	O.F.	scrub	1	yes	yes	yes	0	0	nil
	terrestrial	O.F.	forest	0	yes	yes	yes	0	0	nil
	terrestrial	L.D.	herbfield	2	yes	yes	yes	0	0	nil
	terrestrial	L.D.	forest	0	yes	yes	yes	0	0	nil
	terrestrial	L.D.	scrub	0	yes	yes	yes	0	0	nil
	terrestrial	L.D.	fernland	0	yes	yes	yes	0	0	nil
	terrestrial	D.F.	forest	0	yes	yes	yes	0	0	nil
	terrestrial	D.F.	fernland	0	yes	yes	yes	0	0	nil
	terrestrial	D.F.	scrub	0	yes	yes	yes	0	0	nil
	terrestrial	S.F. & L.L.	forest	0	yes	yes	yes	0	0	nil
	terrestrial	S.F. & L.L.	scrub	0	yes	yes	yes	0	0	nil
	terrestrial	S.F. & L.L.	fernland	0	yes	yes	yes	0	0	nil
	terrestrial	P.R.P.	forest	0	yes	yes	yes	0	0	nil

terrestrial	P.R.P.	scrub	0	yes	yes	0	0	nil
terrestrial	P.R.P.	fernland	0	yes	yes	0	0	nil
terrestrial	P.R.P.	flax-shrubland	1	yes	yes	+	1	poor
terrestrial	P.R.P.	treeland	1	yes	yes	+	1	poor
terrestrial	P.R.P.	flax-reedland	1	no	no	+	1	poor
terrestrial	C.S.	grassland?	0	yes	yes	0	0	nil
terrestrial	S.L.A.	scrub	6	yes	no	5	6	poor
terrestrial	S.L.A.	rockland	6	yes	no	1	6	poor
terrestrial	S.L.A.	forest	1	yes	no	+	1	poor
SEMI-COASTAL								
palustrine	U.M.T.	reedland	1	no	no	0	0	nil
palustrine	U.M.T.	sedgeland	3	no	no	0	0	nil
palustrine	U.M.T.	flaxland	1	yes?	yes?	0	0	nil
palustrine	U.M.T.	forest	4	yes	yes	0	0	nil
palustrine	P.R.P.	reedland	4	no	no	+	1	poor
palustrine	P.R.P.	forest	5	yes	yes	+	2	poor
palustrine	P.R.P.	sedgeland	0	no	no	0	0	nil
palustrine	L.D.	sedgeland	0	yes	yes	0	0	nil
palustrine	L.D.	forest	0	yes	yes	0	0	nil
palustrine	D.F.	sedgeland	0	no	no	0	0	nil
palustrine	D.F.	forest	0	yes	yes	0	0	nil
terrestrial	U.M.T.	forest	10	yes	yes	23.5	4	poor
terrestrial	U.M.T.	scrub	2	yes	yes	3.2	2	poor
terrestrial	U.M.T.	sedgeland	1	no	no	11.9	1	poor
terrestrial	U.M.T.	fernland	0	yes	yes	0	0	nil
terrestrial	P.R.P.	forest	19	yes	yes	69	11	poor
terrestrial	P.R.P.	scrub	2	yes	yes	7.0	2	poor
terrestrial	P.R.P.	fernland	0	yes	yes	0	0	nil
terrestrial	L.D.	forest	8	yes	yes	5	2	poor
terrestrial	L.D.	scrub	1	yes	yes	+	1	poor
terrestrial	L.D.	fernland	0	yes	yes	0	0	nil
terrestrial	S.F. & L.L.	forest	2	yes	yes	0	0	nil
terrestrial	S.F. & L.L.	scrub	0	yes	yes	0	0	nil
terrestrial	S.F. & L.L.	fernland	0	yes	yes	0	0	nil
terrestrial	O.F.	forest	1	yes	yes	0	0	nil
terrestrial	O.F.	scrub	0	yes	yes	0	0	nil
terrestrial	O.F.	fernland	0	yes	yes	0	0	nil
terrestrial	D.F.	forest	4	yes	yes	4.5	2	poor

ECOLOGICAL CLASS NAME				CONSERVATION VALUE				PROTECTED AREA STATUS		
Bioclimatic Zone	Hydrologic Class	Land System	Vegetation Structural Class	Number or Extent in District	Significant Ecological Class (Yes/No)	Ecological Class, formerly common, now rare and substantially modified (Yes/No)	Ecological Class apparently confined to the district (Yes/No)	Total Area (ha)	Number of Areas	Adequacy of Protection
LOWLAND	terrestrial	D.F.	scrub	0	yes	yes	yes	0	0	nil
	terrestrial	D.F.	fernland	0	yes	yes	yes	0	0	nil
	terrestrial	K.A.	forest	2	yes	yes	yes	140	1	adequate
	terrestrial	K.A.	scrub	2	yes	yes	yes	120	1	adequate
	terrestrial	K.A.	fernland	0	yes	yes	yes	0	0	nil
	palustrine	L.D.	reedland	1	no	no	yes	0	0	nil
	palustrine	L.D.	forest	6	yes	yes	yes	0	0	nil
	palustrine	L.D.	treeland	2	no	no	yes	0	0	nil
	palustrine	L.D.	tussockland	1	no	no	yes	0	0	nil
	palustrine	L.D.	scrub	1	no	no	yes	0	0	nil
	palustrine	D.F.	forest	5	yes	yes	yes	1.1	1	poor
	palustrine	D.F.	scrub	1	yes	yes	yes	0	0	nil
	palustrine	D.F.	treeland	1	no	no	yes	0.9	1	poor
	palustrine	S.F. & L.L.	forest	1	yes	yes	yes	0	0	nil
	palustrine	E.P.	forest	2	yes	yes	no	0	0	nil
	palustrine	P.R.P.	forest	0	yes	yes	yes	0	0	nil
	terrestrial	P.R.P.	forest	9	yes	yes	yes	500	2	inadequate
	terrestrial	P.R.P.	scrub	0	no	no	yes	0	0	nil
	terrestrial	P.R.P.	fernland	0	no	no	yes	0	0	nil
	terrestrial	L.D.	forest	10	yes	yes	yes	0	0	nil
terrestrial	L.D.	scrub	0	yes	yes	yes	0	0	nil	
terrestrial	L.D.	fernland	0	no	no	yes	0	0	nil	
terrestrial	O.F.	forest	1	yes	yes	yes	0	0	nil	
terrestrial	O.F.	scrub	0	yes	yes	yes	0	0	nil	

ECOLOGICAL CLASS NAME				CONSERVATION VALUE				PROTECTED AREA STATUS		
Bioclimatic Zone	Hydrologic Class	Land System	Vegetation Structural Class	Number or Extent in District	Significant Ecological Class (Yes/No)	Ecological Class, formerly common, now rare and substantially modified (Yes/No)	Ecological Class apparently confined to the district (Yes/No)	Total Area (ha)	Number of Areas	Adequacy of Protection
ALPINE	terrestrial	P.R.P.	shrubland	3	yes	no	yes	all	1	adequate
	terrestrial	P.R.P.	tussockland	1	yes	no	yes	all	1	adequate
	terrestrial	E.A.	tussockland	1	yes	no	yes	all	1	adequate
	terrestrial	E.A.	herbfield	1	yes	no	yes	all	1	adequate
	terrestrial	E.A.	rockfield	1	yes	no	yes	all	1	adequate
	terrestrial	E.A.	gravelfield	1	yes	no	yes	all	1	adequate
	terrestrial	E.A.	stonefield	1	yes	no	yes	all	1	adequate
	terrestrial	E.A.	boulderfield	1	yes	no	yes	all	1	adequate
	terrestrial	E.A.	herbfield	1	yes	no	yes	all	1	adequate
	terrestrial	D.F.	moss-herbfield	1	yes	no	yes	all	1	adequate
	terrestrial	D.F.	tussockland	1	yes	no	yes	all	1	adequate
	terrestrial	D.F.	herbfield	1	yes	no	yes	all	1	adequate
	terrestrial	L.D.	herbfield	1	yes	no	yes	all	1	adequate
	terrestrial	L.D.	tussockland	1	yes	no	yes	all	1	adequate

CHECKLIST OF ECOLOGICAL UNITS

Ecological Class(es)		Ecological Units			
Bioclimatic Zone	Hydrologic Element	Land System	Vegetation Structural Class/ Cover Classes	Vegetation Type	Landform Type
COASTAL	palustrine	U.M.T.	reedland	raupo	lake edge
	palustrine	U.M.T.	reedland	raupo	swamp
	palustrine	U.M.T.	reedland	<i>Eleocharis sphacelata</i>	lake edge
	palustrine	U.M.T.	flaxland	flax	lake edge
	palustrine	U.M.T.	forest	pukatea	swamp
	palustrine	P.R.P.	reedland	raupo	lake edge
	palustrine	P.R.P.	reedland	raupo	swamp
	palustrine	P.R.P.	reedland	<i>Eleocharis sphacelata</i>	lake edge
	palustrine	P.R.P.	flaxland	flax	lake edge
	palustrine	P.R.P.	flaxland	flax	swamp
	palustrine	S.F. & L.L.	reedland	raupo	lake edge
	palustrine	S.F. & L.L.	reedland	<i>Scirpus lacustris</i>	lake edge
	estuarine	U.M.T.	rushland	<i>Leptocarpus similis</i>	mudflat
	estuarine	U.M.T.	reedland	raupo- <i>Scirpus lacustris</i>	mudflat
	terrestrial	U.M.T.	forest	karaka	sideslope
	terrestrial	O.F.	scrub	karaka-taupata/flax	coastal cliff
	terrestrial	O.F.	shrub-flaxland	flax-taupata	coastal cliff
	terrestrial	O.F.	herbfield	<i>Coprosma acerosa</i>	coastal cliff
	terrestrial	L.D.	herbfield	<i>Cotula</i> sp	coastal cliff top
	terrestrial	P.R.P.	flax-shrubland	taupata-flax-gorse	coastal cliff
	terrestrial	P.R.P.	treeland	karaka-taupata/flax	coastal cliff
	terrestrial	P.R.P.	flax-reedland	raupo-flax	swamp
	terrestrial	S.A.	scrub	taupata	offshore island
	terrestrial	S.A.	rockland	<i>Chenopodium allanii</i>	offshore island

SEMI-COASTAL

palustrine	U.M.T.	reedland	raupo	swamp
palustrine	U.M.T.	sedgeland	Carex	swamp
palustrine	U.M.T.	flaxland	flax	seepage swamp
palustrine	U.M.T.	forest	pukatea	fluve
palustrine	U.M.T.	forest	pukatea	swamp
palustrine	P.R.P.	reedland	raupo	swamp
palustrine	P.R.P.	reedland	<i>Scirpus lacustris</i> -raupo	lake margin
palustrine	P.R.P.	forest	pukatea	swamp
palustrine	P.R.P.	forest	swamp maire	swamp
palustrine	P.R.P.	forest	kahikatea-pukatea	swamp
palustrine	P.R.P.	forest	kahikatea	swamp
palustrine	P.R.P.	sedgeland	Carex	swamp
terrestrial	U.M.T.	forest	tawa	sideslope
terrestrial	U.M.T.	forest	tawa	interfluve
terrestrial	U.M.T.	forest	tawa	fluve
terrestrial	U.M.T.	forest	kohekohe	ridge
terrestrial	U.M.T.	forest	puriri-kohekohe	sideslope
terrestrial	U.M.T.	forest	puriri-kohekohe	ridge
terrestrial	U.M.T.	forest	pukatea	sideslope
terrestrial	U.M.T.	forest	karaka-titoki	fluve
terrestrial	U.M.T.	forest	karaka-titoki	interfluve
terrestrial	U.M.T.	forest	mahoe-rangiora	cliff face
terrestrial	U.M.T.	scrub	mamaku-mahoe	cliff face
terrestrial	U.M.T.	scrub	<i>Machaderina sinclairii</i>	cliff face
terrestrial	U.M.T.	sedgeland	tawa	sideslope
terrestrial	P.R.P.	forest	pukatea	interfluve
terrestrial	P.R.P.	forest	pukatea	lower sideslope
terrestrial	P.R.P.	forest	kohekohe	sideslope
terrestrial	P.R.P.	forest	matai/tawa	river terrace
terrestrial	P.R.P.	forest	totara/tawa	river terrace
terrestrial	P.R.P.	forest	mahoe	river terrace
terrestrial	P.R.P.	scrub	tawa-pukatea	lahar mound
terrestrial	L.D.	forest	tawa-pukatea	intermound area
terrestrial	L.D.	forest	kohekohe	lahar mound
terrestrial	L.D.	forest	kahikatea	intermound area
terrestrial	L.D.	scrub	rangiora	lahar mound
terrestrial	L.D.	forest	tawa	interfluve
terrestrial	S.F. & L.L.	forest		

Ecological Class(es)			Ecological Units		
Bioclimatic Zone	Hydrologic Element	Land System	Vegetation Structural Class/ Cover Classes	Vegetation Type	Landform Type
LOWLAND	terrestrial	S.F. & L.L.	scrub	rewarewa/mahoe	interfluv
	terrestrial	O.F.	forest	karaka-titoki	interfluv
	terrestrial	O.F.	forest	tawa	interfluv
	terrestrial	D.F.	forest	tawa	interfluv
	terrestrial	D.F.	forest	kohekohe	river terrace
	terrestrial	D.F.	forest	pukatea	interfluv
	terrestrial	D.F.	forest	tawa-pukatea	interfluv
	terrestrial	K.A.	forest	kohekohe-rewarewa-tawa	sideslope
	terrestrial	K.A.	forest	pukatea	sideslope
	terrestrial	K.A.	scrub	mamaku	sideslope
	terrestrial	K.A.	scrub	pukatea-kohekohe-kawakawa	sideslope
	palustrine	L.D.	reedland	raupo	swamp
	palustrine	L.D.	forest	kamahi-swamp maire	swamp
	palustrine	L.D.	forest	pukatea	swamp
	palustrine	L.D.	forest	pukatea	intermound area
	palustrine	L.D.	forest	kahikatea-pukatea	swamp
	palustrine	L.D.	treeland	kamahi-swamp maire/ <i>Carex secta</i>	swamp
	palustrine	L.D.	treeland	kahikatea-kamahi-swamp maire/ <i>Coprosma tenuicaulis</i>	swamp
	palustrine	L.D.	tussockland	toetoe-raupo-karamu	swamp
	palustrine	L.D.	scrub	swamp maire	swamp
	palustrine	D.F.	forest	kamahi-swamp maire	fluv
	palustrine	D.F.	forest	kamahi-swamp maire	interfluv
	palustrine	D.F.	forest	pukatea	fluv

palustrine	D.F.	treeland	kamahi-swamp maire/ <i>Carex secta</i>	lake edge
palustrine	D.F.	scrub	manuka	swamp
palustrine	S.F. & L.L.	forest	kamahi-swamp maire	interfluve
palustrine	S.F. & L.L.	forest	swamp maire-pukatea	swamp
palustrine	E.P.	forest	kahikatea-pukatea-	
			swamp maire	swamp
terrestrial	P.R.P.	forest	kamahi	fluve
terrestrial	P.R.P.	forest	kamahi	sideslope
terrestrial	P.R.P.	forest	kamahi	interfluve
terrestrial	P.R.P.	forest	rata/kamahi	fluve
terrestrial	P.R.P.	forest	rata/kamahi	interfluve
terrestrial	P.R.P.	forest	rata/kamahi	sideslope
terrestrial	P.R.P.	forest	tawa	fluve
terrestrial	P.R.P.	forest	tawa	sideslope
terrestrial	P.R.P.	forest	tawa	river terrace
terrestrial	P.R.P.	forest	tawa-kamahi	fluve
terrestrial	P.R.P.	forest	tawa-kamahi	sideslope
terrestrial	L.D.	forest	tawa-kamahi	lahar mound
terrestrial	L.D.	forest	tawa-kamahi	fluve
terrestrial	L.D.	forest	tawa-kamahi	interfluve
terrestrial	L.D.	forest	tawa	lahar mound
terrestrial	L.D.	forest	tawa-pukatea	lahar mound
terrestrial	L.D.	forest	tawa-pukatea	intermount area
terrestrial	L.D.	forest	pukatea	intermount area
terrestrial	O.F.	forest	tawa	interfluve
terrestrial	S.F. & L.L.	forest	tawa-kamahi	fluve
terrestrial	S.F. & L.L.	forest	tawa-kamahi	interfluve
terrestrial	S.F. & L.L.	forest	tawa	fluve
terrestrial	S.F. & L.L.	forest	tawa	interfluve
terrestrial	S.F. & L.L.	forest	kahikatea/tawa	river terrace
terrestrial	S.F. & L.L.	scrub	tutu	cliff face
terrestrial	S.F. & L.L.	fernland	bracken	interfluve
terrestrial	E.P.	forest	tawa	sideslope
terrestrial	E.P.	forest	tawa	interfluve
terrestrial	D.F.	forest	kamahi	fluve
terrestrial	D.F.	forest	kamahi	interfluve
terrestrial	D.F.	forest	kamahi	river terrace
terrestrial	D.F.	forest	rata/kamahi	fluve
terrestrial	D.F.	forest	rata/kamahi	interfluve
terrestrial	D.F.	forest	terr rata/kamahi-tawa	river terrace

Ecological Class(es)				Ecological Units	
Bioclimatic Zone	Hydrologic Element	Land System	Vegetation Structural Class/ Cover Classes	Vegetation Type	Landform Type
LOWLAND	terrestrial	D.F.	forest	kamahi-tawa	fluve
	terrestrial	D.F.	forest	kamahi-tawa	interfluve
	terrestrial	D.F.	forest	tawa	sideslope
	terrestrial	D.F.	forest	tawa	fluve
	terrestrial	D.F.	forest	tawa	interfluve
	terrestrial	D.F.	forest	pukatea	interfluve
	terrestrial	D.F.	forest	pukatea	hollow
	terrestrial	D.F.	shrubland	tutu	river terrace
	terrestrial	D.F.	scrub	tutu-manuka	river terrace
	terrestrial	D.F.	scrub	manuka	river terrace
	terrestrial	K.A.	forest	tawa	sideslope
	terrestrial	K.A.	forest	tawa	fluve
	terrestrial	K.A.	forest	rewarewa/mamaku	sideslope
LOWER MONTANE	palustrine	L.D.	scrub	manuka	swamp
	palustrine	L.D.	sedgeland	Carex	swamp
	palustrine	L.D.	flaxland	flax	swamp
	palustrine	D.F.	scrub	manuka	swamp
	palustrine	D.F.	sedgeland	Carex	swamp
	palustrine	D.F.	forest	kamahi-swamp maire	fluve
	palustrine	D.F.	forest	kamahi-swamp maire	interfluve
	palustrine	D.F.	forest	kamahi-swamp maire	swamp
	palustrine	D.F.	forest	kahikatea-rimu/kamahi	fluve
	palustrine	D.F.	forest	kahikatea-rimu/kamahi	interfluve
	terrestrial	P.R.P.	forest	rimu-rata/kamahi	interfluve
	terrestrial	P.R.P.	forest	kamahi	sideslope
	terrestrial	P.R.P.	forest	kamahi	interfluve

terrestrial	P.R.P.	forest	rata/kamahi	fluve
terrestrial	P.R.P.	forest	rata/kamahi	interfluve
terrestrial	P.R.P.	scrub	mahoe	sideslope
terrestrial	L.D.	forest	kamahi	interfluve
terrestrial	L.D.	forest	rimu-rata/kamahi	fluve
terrestrial	L.D.	forest	rimu-rata/kamahi	interfluve
terrestrial	L.D.	forest	rimu-rata/mahoe	fluve
terrestrial	L.D.	forest	rimu-rata/mahoe	interfluve
terrestrial	L.D.	forest	rata/kamahi	fluve
terrestrial	L.D.	forest	rata/kamahi	interfluve
terrestrial	S.F. & L.L.	forest	rimu-rata/mahoe	fluve
terrestrial	S.F. & L.L.	forest	rimu-rata/mahoe	interfluve
terrestrial	D.F.	forest	rata/kamahi	fluve
terrestrial	D.F.	forest	rata/kamahi	interfluve
terrestrial	D.F.	forest	kamahi	fluve
terrestrial	D.F.	forest	kamahi	interfluve
terrestrial	D.F.	forest	rimu-rata/kamahi	fluve
terrestrial	D.F.	forest	rimu-rata/kamahi	interfluve
terrestrial	K.A.	forest	kamahi	sideslope

APPENDIX V

VEGETATION TYPES IN THE EGMONT ECOLOGICAL REGION

These descriptions were compiled using data from Clarkson and Boase (1982), Clarkson (1981; 1985; in prep.) and the current survey.

Flax tussockland - swamp

Occurs in the coastal and semi coastal zone to an altitude of approximately 20 metres - mainly on the edge of stream channels, swamps and ponds. Associates include emergent *Coprosma robusta*, and cabbage trees, with *Carex virgata*, *Baumea rubiginosa* and *Blechnum minus* occurring around the edges. The groundcover is mainly flax litter and bare ground with occasional patches of open water.

A similar vegetation type occurs in Egmont National Park at 804m a.s.l. on the northern shore of Lake Dive. There flax occurs in association with *Carex virgata* and herbs such as everlasting daisy, lanternberry and *Gonocarpus aggregatus*.

Raupo reedland

Occurs on poorly drained, fertile areas from sea level to 250m a.s.l. The canopy is usually dominated by raupo with occasional *Carex* spp (mainly *Carex secta*, *C. virgata*) and emergent cabbage trees, *Coprosma robusta*, flax, fuchsia and toetoe. Where the swamp is partially drained or grazed, exotic species such as *Lotus pedunculatus* and *Juncus articulatus* become common in the groundcover. Elsewhere they are sparse.

Most areas of this vegetation type have been induced by the clearance of swamp forest.

Eleocharis sphacelata sedgeland

This vegetation type occurred at two sites on the edge of small pools in the coastal zone. Occasional associates include flax, *Baumea rubiginosa*, and *Carex virgata*. Scattered individuals of *Eleocharis sphacelata* occur further inland in raupo reedlands and *Carex* sedgelands, but not as a dominant part of the vegetation.

Carex tussockland-swamp

This vegetation type, found on poorly drained forest margins up to 150m a.s.l., is induced by degradation of swamp forest. The main species of *Carex* are *C. virgata* and *C. secta*. Associates include emergent *Coprosma tenuicaulis* and flax with occasional raupo, *Eleocharis sphacelata* and *Juncus* spp. (*J. gregiflorus*, *J. articulatus*).

Lowland mire

Manuka/*Gleichenia dicarpa* - *Baumea rubiginosa* shrubland at Puniho Bog. Scattered manuka overtop a lower canopy of rushes (mostly *Baumea rubiginosa*, *B. tenax*, sedges and the umbrella fern *Gleichenia dicarpa*. Sphagnum hummocks which occur in the more poorly drained areas support the native sundew *Drosera binata* and orchids (*Microtis unifolia*, *Prasophyllum colensoi*).

Lower montane mires in Egmont National Park

Potaema Bog (670m a.s.l.) has a sparse cover of manuka overtopping scattered flax (*Phormium tenax*), *Astelia grandis* and a mixture of rushes and sedges, the most common being *Lepidosperma australe* and *Baumea rubiginosa*. At the edge *Gahnia xanthocarpa* is dominant overtopped by manuka and lancewood, which gives way to shrubby kamahi forest and finally to the surrounding rimu-rata/kamahi forest.

Norfolk Road Bog (548m a.s.l.) is similar to Potaema Bog, but flax is less important and there is more *Gleichenia dicarpa*.

York Road Bog (548m a.s.l.) is better drained than both Potaema and Norfolk Road Bogs so that manuka forms a more or less continuous canopy over *Gahnia xanthocarpa*.

Denbeigh Road Bog (570m a.s.l.) is more fertile than the other mires and is dominated by flax, *Gahnia xanthocarpa* and *Astelia grandis*.

Mangawhero Bog (750 a.s.l.) is dominated by *Carex secta* and flax overtopped by scattered manuka.

A network of small mires has developed in the many shallow depressions on the surface of the debris flows on the western flanks of Mt Egmont. These are mostly composed of scattered manuka overtopping *Baumea rubiginosa*.

Montane Mires

Red tussock tussockland also covers the high peaks and poorly drained tops of the Pouakai Range in the subalpine zone (Pouakai Andesite), and is predominant in the Ahukawakawa Swamp - a peat mire in the montane zone between the Pouakai Range and Mt Egmont. These poorly drained tussocklands at lower altitude are floristically different from the red tussock tussockland in the alpine zone on Mount Egmont, containing plants associated with poorer drainage such as sphagnum moss, *Carex coriacea*, *C. echinata* and *Juncus* spp. Also present are plants not found on Mount Egmont such as *Schoenus pauciflorus* and *Bulbinella hookeri*.

Estuarine vegetation

The only significant remnant of native estuarine vegetation remaining is a small area at the Waitara Estuary. This consists of a mosaic of shrubs (*Plagianthus divaricatus*, *Coprosma robusta*, taupata), sedges (*Leptocarpus similis*, *Scirpus lacustris*) raupo, flax and toetoe.

Coastal herbfield and shrubland

This vegetation type occurs immediately adjacent to the coast in very exposed situations on the Lahar Deposits and Opunake Formation land systems. Common species include *Coprosma acerosa*, *Hebe elliptica* var. *elliptica*, *Cotula* spp. and a number of native herbs restricted to this habitat.

Taupata scrub

Taupata scrub up to 2 metres high occurs on the offshore sugarloaf islands. Other species in the canopy include flax and boxthorn with emergent karo and cabbage trees. The groundcover is mainly scattered weeds (e.g. *Solanum nigrum*); ferns (*Asplenium terrestre* subsp. *maritimum*, *A. oblongifolium*), and *Dichondra repens*.

Karo forest

A small area of karo forest approximately five metres high on the southeast side of Moturoa Island. A small number of pohutukawa are emergent above the canopy. The groundcover is sparse and consists of patches of *Asplenium terrestre* subsp. *maritimum* and *A. oblongifolium*.

Taupata-flax tussock-shrubland

This vegetation type occurs on the steep coastal cliffs of the north and south Taranaki coastlines. The canopy is predominantly of taupata and flax (*Phormium tenax*) with occasional kawakawa, hangehange and mahoe. Gorse and boxthorn occur in the more modified parts of this vegetation type.

Karaka-titoki forest

This vegetation type occurs on riverbanks at two locations on the Uplifted Marine Terrace (Katere Scenic Reserve and Bowden Scenic Reserve). Kohekohe, mahoe, puriri, pukatea and mamaku are minor components of the canopy. Titoki is also found at a number of other locations - mostly alluvial riverbanks in association with tawa and pukatea.

Kohekohe Forest

Forest with kohekohe prominent in the canopy occurs from sea level to approximately 150m a.s.l. in the Uplifted Marine Terrace, Pouakai Ring Plain and Lahar Deposits land systems on sideslopes, ridges and lahar mounds.

Common canopy associates may include one or several of the following - rewarewa, karaka, tawa, titoki, mahoe, pukatea and lancewood. Kawakawa is usually the most common species in the understorey with young kohekohe, raurekau, mahoe and supplejack.

The groundcover includes *Blechnum filiforme*, *B. chambersii*, *Lastreopsis glabella*, *Pteris macilenta*, hen and chicken fern and *Pneumatopteris pennigera*.

Kohekohe-puriri forest

Puriri occurs as a canopy component in kohekohe forest in the coastal and semi-coastal zones of the Uplifted Marine Terrace, Pouakai Ring Plain and Kaitake Andesite Land systems, on sideslopes and ridges north of 39 09'S. Other canopy associates include tawa, karaka and rewarewa with a subcanopy of kohekohe. All remaining remnants have been subject to modification by grazing animals and this is reflected in the predominance of kawakawa in the shrub layer and the fern *Blechnum filiforme* in the ground cover. Other species sometimes found in the shrub layer include raurekau, hangehange and supplejack. *Blechnum chambersii*, *Pneumatopteris pennigera*, *Oplismenus imbecillus* and *Pteris macilenta* occur in the groundcover at some places.

River cliff vegetation

On the steep cliffs adjoining rivers the most commonly occurring plants are: *Machaerina sinclairii*, *Phormium tenax*, kiekie, toetoe, shrubs (including rangiora, tutu, *Rhabdothamnus solandri*) and occasional trees - mainly rewarewa and mamaku.

Tutu scrub/shrubland-river terrace vegetation

There are a series of river terraces adjacent to the Stony River which are vegetated with scrub and shrubland at various stages of regeneration. On the terrace immediately adjacent to the river the shrubland canopy is predominantly tutu with occasional manuka, kanuka, koromiko and toetoe. This is interspersed with patches of herbs (mainly *Colobanthus affinis*).

On the second terrace manuka becomes increasingly common in the canopy. The understorey consists of young kamahi, mamaku, raurekau, mahoe and pate with a groundcover of *Uncinia ferruginea*, kiekie and *Phymatosorus diversifolius*. On the third terrace occasional kamahi and emergent terrestrial rata occur over a canopy predominantly of manuka.

Bracken fernland

This vegetation type occurs in the initial stage of regeneration after cultivated land has been abandoned. Bracken forms a dense cover of fronds up to 1.5 metres high. If left undisturbed broadleaved species (e.g. kamahi, raurekau, koromiko) regenerate through the bracken.

Manuka Scrub

Manuka scrub is a pioneer community which has developed where forest has been cleared from well drained areas. At later stages of succession species such as kamahi, raurekau, rimu and miro regenerate through the canopy of manuka.

Rewarewa/mamaku forest

Secondary forest which has regenerated after clearfelling, which if undisturbed, will eventually revert to tawa forest. Rewarewa is emergent above a canopy dominated by treeferns, with future canopy species (kamahi, tawa, hinau) in the undergrowth.

Tawa forest

Forest dominated by tawa approximately 20m high is found on all land systems on well drained sites (ridges, sideslopes, riverbanks, flumes, interflumes, lahar mounds and intermound areas), generally up to an altitude of 450m a.s.l. but lower on recent debris flows. Other canopy species which commonly occur in this vegetation type include rewarewa, hinau, pigeonwood, mahoe and kamahi. Pukatea becomes prominent with poorer drainage, and species such as puriri, kohekohe and karaka occur in the semi-coastal zone. The understorey is comprised mainly of raurekau, mahoe, supplejack, young tawa, pigeonwood and kiekie in the lowland remnants, while kohekohe forms a subcanopy in the semi-coastal remnants with occasional nikau and frequent kawakawa in the lower understorey. Ferns are the most common plants in the groundcover (hen and chicken, *Blechnum chambersii*, *B. filiforme*, *B. discolor*, *Asplenium oblongifolium*, *Pteris macilenta*, *Lastreopsis hispida*); with frequent hooked sedges and climbing ratas.

In a few locations on rich alluvial terraces podocarps are emergent above the tawa canopy. At Meeting of the Waters on the Waiwhakaiho River the podocarps are mostly matai and totara with some rimu and kahikatea, whereas kahikatea is the emergent podocarp at Everett Park Scenic Reserve on the Manganui River.

Tawa-pukatea forest

This forest type occurs on the semi-coastal and lowland zones of volcaniclastic fans - i.e. on debris flows where the terrain is hummocky, on lahar mounds where the mounds are small and on fairly well drained intermound areas. Tawa and pukatea occur as co-dominants in the canopy which may also contain pigeonwood, mahoe or kohekohe (semi-coastal only). Pukatea is predominant in poorly drained areas while tawa is predominant where drainage is better. Understorey species include mahoe, raurekau, kawakawa, supplejack, hangehange and in semi-coastal areas - kohekohe. The groundcover is comprised mostly of *Blechnum filiforme*, *B. chambersii*, hen and chicken fern, *Lastreopsis hispida* and hooked sedges.

Pukatea forest

Occurs on stream margins and poorly drained sites in the lowland and semi-coastal zones. Pukatea is dominant in the canopy which in nearly all cases is secondary and characteristically of very even height. Occasional canopy associates are tawa, kahikatea, kiekie, mahoe, kamahi and swamp maire. The undergrowth commonly consists of dense tangles of kiekie and supplejack with pole pukatea, pate and hangehange. Kohekohe also occurs in the understorey in the semi-coastal zone. The groundcover is usually of scattered hen and chicken fern, *Astelia* spp and hooked sedges, interspersed with areas of open water and mud.

Lowland tawa-kamahi and kamahi-tawa forest

This forest type includes kamahi forest in all stages of regeneration towards rimu-rata/tawa forest. It occurs on interfluves, fluves, sideslopes, lahar mounds and intermound area in the Pouakai Ring Plain, Debris Flows, Lahar Deposits and Stratford Formation and Lepperton Laharsland systems. Other canopy species include hinau, pukatea, lancewood, rewarewa, rimu, miro and toro. Occasional emergent rata remain in some remnants. The understorey is diverse with the most commonly occurring species being mahoe, pigeonwood, hangehange, tree ferns (wheki, Smith's, mamaku) and climbers (supplejack, kiekie and *Blechnum filiforme*). The groundcover is mainly of ferns (crown fern, *Blechnum fluviatile*, hen and chicken fern, *Lastreopsis hispida*, *Pneumatopteris pennigera*) with bush rice grass, hooked sedges and climbing ratas (*Metrosideros fulgens* and *M. diffusa*).

Lowland kamahi forest

In the lowland zone this forest is predominantly secondary - having regenerated after past forest clearance. Remnants occur on sideslopes, and interfluves on the Pouakai Ring Plain and Debris Flows. Other species found in the canopy include hinau, tawa, young miro and lancewood with toro at higher altitudes. Occasional emergent rata and rewarewa also occur. The understorey is comprised mainly of mahoe, pigeonwood, tree ferns (wheki, mamaku, Smith's) and the climbers supplejack, *Metrosideros* spp and *Parsonsia capsularis*. Common groundcover species are the ferns *Blechnum filiforme*, *Histiopteris incisa*, *Lastreopsis hispida* and *Hymenophyllum demissum* in association with bush rice grass, hooked sedges and *Metrosideros* spp. Some primary kamahi forest occurs in the lowland zone on fluves and river terraces with poor soils.

Kamahi-swamp maire swamp forest

Occurs on the Debris Flows, Stratford Formation and Lepperton Lahars, and Lahar Deposits in the lowland and lower-montane zones. This forest type has regenerated on poorly drained interfluves, fluves and intermound areas after past forest clearance. The canopy is mixed with the most common species being kamahi and swamp maire with occasional associates of

hinau, young rimu, lancewood, toro and putaputaweta. The understorey is diverse with the main species being kiekie and supplejack. Also occurring are hangehange, raurekau, mahoe, wheki, pigeonwood and *Coprosma tenuicaulis*. The groundcover commonly contains hen and chicken fern, kiekie, hooked sedges and *Carex* spp.

On the Lahar Deposits in the lowland zone local treelands occur in very poorly drained intermound areas. These include kahikatea-kamahi-swamp maire/*Coprosma tenuicaulis* and kamahi-swamp maire/*Carex secta*.

At one semi-coastal location on the Pouakai Ring Plain a small swampy interfluvium contains swamp maire forest (with no kamahi but frequent pukatea) and swamp maire/*Carex* treeland.

Kamahi-swamp maire-pukatea swamp forest

A variation on the above type occurs in the lowland zone on the Lahar Deposits. Here pukatea is a major canopy component on the poorly drained intermound areas.

Swamp maire-pukatea swamp forest

On two poorly drained sites in the lowland and semi-coastal zone, forest with a canopy predominantly of swamp maire and pukatea occurs. The understorey is predominantly of kiekie and supplejack and the groundcover is dominated by *Carex* sp., hooked sedges and ferns (*Blechnum capense* agg.).

Swamp maire-kahikatea swamp forest

Forest with a canopy predominantly of swamp maire and kahikatea occurs at one site on the poorly drained Eltham Peat. Other canopy species are hinau, rimu and tawa. The understorey is variable with the most common species being supplejack, kiekie and raurekau. The undergrowth is dominated by ferns (hen and chicken fern, *Histiopteris incisa*, *Blechnum capense* agg.) with bush rice grass and hooked sedge.

Kahikatea-pukatea-swamp forest

This vegetation type occurs on poorly drained peat deposits. The canopy is composed of variable amounts of kahikatea, pukatea and swamp maire with some areas of pure kahikatea. The understorey consists of a dense tangle of the climbers supplejack and kiekie, with raurekau, hangehange, *Coprosma tenuicaulis*, and young canopy species. The groundcover is predominantly of ferns (hen and chicken, *Blechnum capense* agg., *Histiopteris incisa*) and *Astelia* spp.

Kahikatea forest

A dense stand of secondary kahikatea occurs on the semi-coastal Lahar Deposits. There is a subcanopy of kohekohe with occasional karaka and supplejack. The shrub layer consists mostly of *Coprosma areolata* with some wheki, mahoe and kawakawa. *Oplismenus imbecillus* and scattered *Blechnum filiforme* dominate the groundcover which is depleted due to stock grazing and trampling.

Lower-montane kamahi forest

On Kaitake Andesite within Egmont National Park primary kamahi forest occurs on the peaks and upper slopes above 450m a.s.l. This type is best considered as a steep-land variant of the rimu-rata/kamahi forest. The kamahi are 7m high, multileadered and wind-shaped. Smith's tree fern, pigeonwood, toro and hinau are all common canopy associates with occasional scattered emergent miro. The understorey is comprised mostly of Smith's tree fern and lowland peppertree, and the dominant ground cover species are bush rice grass, hooked sedges and *Blechnum fluviatile*.

Kahikatea-rimu/kamahahi forest

This vegetation type occurs in Egmont National Park on the eastern debris flow in the lower montane zone. Tall kahikatea and rimu grown in dense stands over a canopy of kamahahi. Understorey trees include pokaka and near the park boundary, a large amount of swamp maire. The groundcover is dominated by *Astelia fragrans* with *A. grandis* and *Gahnia xanthocarpa*.

Rimu-rata/kamahahi forest

Primary rimu-rata/kamahahi forest covers the greater part of the lower-montane zone in Egmont National Park and occurs as remnants adjacent to the park boundary. In Egmont National Park emergent rimu (25m tall) and associated epiphytic rata are scattered throughout. In most of the remnants outside the park however, the emergent rimu and rata have been removed by logging. The canopy is predominantly of kamahahi with associates of mahoe, hinau and miro. The main understorey species are mahoe, kamahahi, toro, tree ferns (Smith's and wheki), raurekau, *Coprosma lucida* and supplejack. Common groundcover species are bush ricegrass, hooked sedges, crown fern, hen and chicken fern and *Hymenophyllum demissum*.

Rimu-rata/mahoe forest

This vegetation type occurs only in Egmont National Park in the lower montane zone on the Lahar Deposits land system.

The canopy is dominated by mahoe with emergent rimu and less frequent rata. Canopy associates include putaputaweta, kaikomako, broadleaf, pigeonwood, mountain peppertree and tree ferns (mainly Smith's). The most common understorey plants are *Coprosma tenuifolia*, raurekau, pate and hangehange. The important groundcover species are bush rice grass, hooked sedges, crown fern, hen and chicken fern and *Hymenophyllum demissum*.

Rata forest

This forest type occurs within the national park on the south-western slopes of the Pouakai Range in the lower montane zone. Due to forest fires caused by the Newall eruption, rata seedlings became established between logs and on the bare ground. The result is a forest dominated by tall rata with occasional toro and kamahahi also occurring in the canopy.

Rata-kamahahi forest and rata/kamahahi-tawa forest

These forest types cover areas where northern rata has established terrestrially. Terrestrial rata which are known locally as blue rata due to the colour of the wood, occur on the Debris Flows caused by the Newall eruptions adjacent to the Stony River. Within Egmont National Park terrestrial rata occur in association with small diameter kamahahi. Outside the park the rata are emergent over a canopy of kamahahi-tawa and rewarewa-tawa.

Kamahahi-toro forest

On the western slopes of Mount Egmont within the national park, toro replaces rata and kamahahi in the canopy on the Debris Flows above 500m. In some places toro forms thickets of small diameter trees with little or no understorey.

Kamahi-Hall's totara forest

Montane forest which occurs between 760m and 1100m a.s.l. on Mount Egmont and the Pouakai Range. This forest is dominated by kamahi at lower altitudes and with occasional emergent miro. Hall's totara and broadleaf become increasingly important with increasing altitude. The understorey is dominated by mountain peppertree and toro. The tufted lily *Astelia fragrans*, mountain peppertree seedlings and ferns (*Blechnum* sp. *Lomaria latifolia*, *B. fluviatile* and *Leptopteris superba*) are common in the groundcover.

A variation of this forest type occurs around Dawson Falls on the Lahar Deposits and Stratford Formation and Lepperton Lahars land systems. In this area kanuka is present in the canopy as a result of the Burrell eruption.

On the northwest side of Mount Egmont the treeline is depressed due to destruction by the recent Maero debris flow and montane forest is only barely represented.

Hall's totara-kaikawaka/broadleaved shrubs

This forest type occurs above the upper limit of kamahi on Mount Egmont - approximately 1100m a.s.l., in the montane zone. The canopy reflects the history of volcanic disturbances at this level with varying amounts of Hall's totara, kaikawaka and broadleaf present. These species overtop leatherwood, *Pseudopanax colensoi* and *P. simplex*.

Leatherwood scrub and shrubland

This vegetation type occurs in the subalpine zone, covering most of the top of the Pouakai Range from approximately 1200m a.s.l. and forming a belt 800-1000m wide around Mount Egmont between 1100m and 1400m a.s.l. Leatherwood (*Brachyglottis rotundifolia* var. *B. elaeagnifolia*) forms a tight-knit canopy approximately 2.5m high with associates of the mountain five-fingers (*Pseudopanax simplex*, *P. colensoi*), inaka, koromiko (*Hebe stricta* var. *egmontiana*), *Coprosma 'taylorae'* and *C. pseudocuneata*. With increasing altitude the shrubs become shorter and other species such as cassinia, *Hebe odora*, *Myrsine divaricata* and inaka become more prominent. The ground is mostly covered with litter, occasional tufts of *Astelia* sp. (unnamed; aff. *A. nervosa*) and small herbs.

Red tussock tussockland

Occurs as a narrow alpine belt approximately 500m wide between 1400m and 1700m a.s.l. on the Egmont Andesite, but is absent from the recent debris fans on the north-western slopes at this altitude. Red tussock between 75cm and 120cm tall dominates the canopy with silver tussock an important associate. At the lower limit of the belt shrubs (eg *Hebe odora*, *Cassinia vauvilliersii* var., inaka) are scattered among the tussocks. The ground is carpeted with many small herbs, grasses and sedges.

Alpine Herbfield inc. herbfield, mossfield, moss-herbfield and cushion-plantfield.

Above the upper limit of red tussock (approximately 1600m a.s.l.) on the eastern slopes of Mt Egmont the ground is completely carpeted by small plants less than 15cm high.

In the true herbfield herbs are the predominant growth form, including the mountain daisies. *Celmisia gracilentia* var., *C. glandulosa* var. *latifolia* and everlasting daisy (*Helichrysum* sp, unnamed, "*H. alpinum*" of Cockayne, 1928), *Anisotome aromatica* and *Forstera bidwillii* var. *densifolia*.

On the western side of Mt Egmont moss-herbfield and mossfield extend down to virtually 1000m a.s.l., marking the course of former debris flows. Mosses (mostly *Racomitrium* spp.) are dominant in these vegetation types, with those plants already noted in the true herbfield also present but in much lower numbers. Scattered through the moss-herbfield and mossfield at the lower levels are circular patches of red tussock surrounded by mountain tutu forming a successional mosaic on these recent surfaces. Cushion-plantfield is dominated by cushion plants e.g. comb sedge (*Oreobolus pectinatus*).

Alpine gravelfield, stonefield, boulderfield and rockfield

Above 1600m a.s.l. on Mt Egmont the plant cover becomes patchy, the dominant surface being bare substrate; the above terms are assigned dependent on the size of the substrate particles as follows: gravel (2-20mm diameter), stones (20-200mm diameter), boulders (greater than 200mm diameter), rock (residual lava or rock).

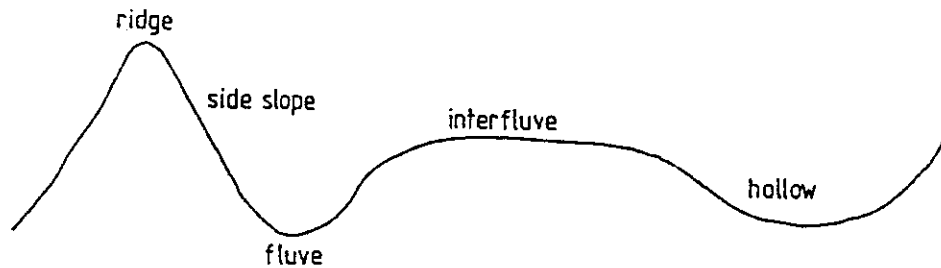
The most extensive substrate type is gravelfield and most common is (blue tussock) gravelfield which occurs mainly between 1700 and 1900m a.s.l. Species common on the mobile "scree" stonefields include everlasting daisy and *Epilobium glabellum*. Boulderfields occur mainly at the bases of old lava flow exposures and in valley and ravine bottoms. Mosses carpet the lower portions of the boulders with many different herbs, grasses and ferns growing in the sheltered hollows between them. Rockfield is found throughout the alpine zone, lichens and mosses grow on the rock surface with a few herbs in the cracks and crevices.

APPENDIX VI

DEFINITIONS OF LANDFORMS

- after Selby (1970) and Neall (1979)

- a) fluve: a linear depression of any size, along which flows at some time, a drainage-way.
- b) interfluve: a planar interstream area, forming a divide of higher terrain between two drainage ways.
- c) sideslope: a hill slope unit on which the drainage lines are predominantly parallel.
- d) ridge: an acute-angled top of a divide between two drainage-ways.
- e) swamp: poorly drained area in which permanent standing water is a feature.
- f) seepage swamp: swamp zone on hillside.
- g) river terrace: an alluvial terrace formed when a river incises into its own valley fill.
- h) hollow: the concave zone of accumulation and transportation on lower hillslopes and valleys, sometimes containing a watercourse.



- i) lahar mound: circular mound of unsorted breccia and conglomerate deposited by volcanic mudflows or debris avalanches.
- j) intermound area: flat or slightly undulating area between lahar mounds.

APPENDIX VII

HYDROLOGIC CLASSES (after Law et. al. 1984)

Six descriptive categories used in classifying the influence of water on the character of the biotic elements.

- | | | |
|-------------|---|---|
| Terrestrial | - | habitat in which water is not a significant influence. |
| Palustrine | - | wetland community/habitat which may or may not have free standing water present. |
| Lacustrine | - | lake community lacking persistent emergent vegetation. |
| Riverine | - | flowing fresh water. |
| Estuarine | - | habitat with salt or brackish water, partially enclosed but permanently open to the sea with diurnal or less frequent inundation. |
| Marine | - | salt water environment. |

APPENDIX VIII

COMMON PLANT NAMES USED IN TEXT

akeake	<i>Dodonaea viscosa</i>
alder	<i>Alnus glutinosa</i> *
barberry	<i>Berberis glaucocarpa</i> *
blackberry	<i>Rubus fruticosus</i> *
boxthorn	<i>Lycium ferocissimum</i> *
bracken	<i>Pteridium esculentum</i>
broadleaf	<i>Griselinia littoralis</i>
brown top	<i>Agrostis tenuis</i> *
bush rice grass	<i>Microlaena avenacea</i>
cabbage tree	<i>Cordyline australis</i>
cassinia	<i>Cassinia vauvilliersii</i> var.
climbing rata	<i>Metrosideros</i> spp.
cocksfoot	<i>Dactylis glomerata</i> *
Cook's scurvy grass	<i>Lepidium oleraceum</i>
crown fern	<i>Blechnum discolor</i>
everlasting daisy	<i>Helichrysum</i> sp. (aff. <i>H. bellidioides</i>)
fennel	<i>Foeniculum vulgare</i>
flax	<i>Phormium tenax</i>
fuchsia	<i>Fuchsia excorticata</i>
gorse	<i>Ulex europaeus</i> *
Hall's totara	<i>Podocarpus hallii</i>
hangehange	<i>Geniostoma ligustrifolium</i>
hen and chicken fern	<i>Asplenium bulbiferum</i> s.s
hinau	<i>Elaeocarpus dentatus</i>
hooked sedges	<i>Uncinia</i> spp.
inaka	<i>Dracophyllum longifolium</i> var.
inkweed	<i>Phytolacca octandra</i> *
Japanese honeysuckle	<i>Lonicera japonica</i> *
kahikatea	<i>Dacrycarpus dacrydioides</i>
kaikawaka	<i>Libocedrus plumosa</i>
kaikomako	<i>Pennantia corymbosa</i>
kamahi	<i>Weinmannia racemosa</i>
kanuka	<i>Leptospermum ericoides</i>
karaka	<i>Corynocarpus laevigatus</i>
karamu	<i>Coprosma robusta</i>
karo	<i>Pittosporum crassifolium</i>
kawakawa	<i>Macropiper excelsum</i>
kiekie	<i>Freycinetia baueriana</i> ssp. <i>banksii</i>
kohekohe	<i>Dysosyllum spectabile</i>
koromiko	<i>Hebe stricta</i>
kowhai	<i>Sophora microphylla</i>
lancewood	<i>Pseudopanax crassifolius</i>
lanternberry	<i>Luzuriaga parviflora</i>
laurel	<i>Lauris nobilis</i> *
lawsoniana	<i>Chamaecyparis lawsoniana</i> *
leatherwood	<i>Brachyglottis rotundifolia</i> var. (<i>B. elaeagnifolia</i>)
lowland peppertree	<i>Pseudowintera axillaris</i>
macrocarpa	<i>Cupressus macrocarpa</i> *
mahoe	<i>Melicytus ramiflorus</i>
mamaku	<i>Sphaeropteris medullaris</i>
manuka	<i>Leptospermum scoparium</i>
marram grass	<i>Ammophila arenaria</i> *
matai	<i>Prumnopitys taxifolia</i>

meadow rice grass
 miro
 mountain peppertree
 mountain tutu
 ngaio
 nikau
 pate
 pigeonwood
 pingao
 pohutukawa
 pokaka
 pukatea
 puriri
 putaputaweta
 radiata pine
 rangiora
 rata (northern)
 raupo
 raurekau
 red tussock
 rewarewa
 rimu
 silver tussock
 Smith's tree fern
 sphagnum moss
 spinifex
 supplejack
 swamp maire
 tarata
 taupata
 tawa
 titoki
 toetoe
 toro
 totara
 tutu
 umbrella fern
 wandering Jew
 wheki
 Yorkshire fog

Microlaena stipoides
Prumnopitys ferruginea
Pseudowintera colorata
Coriaria pteridoides
Myoporum laetum
Rhopalostylis sapida
Schefflera digitata
Hedycarya arborea
Desmoschoenus spiralis
Metrosideros excelsa
Elaeocarpus hookerianus
Laurelia novae-zelandiae
Vitex lucens
Carpodetus serratus
*Pinus radiata**
Brachyglottis repanda
Metrosideros robusta
Typha orientalis
Coprosma grandifolia
Chionochloa rubra
Knightia excelsa
Dacrydium cupressinum
Poa laevis
Alsophila smithii
Sphagnum cristatum
Spinifex sericeus
Ripogonum scandens
Syzygium maire
Pittosporum eugenioides
Coprosma repens
Beilschmiedia tawa
Alectryon excelsus
Cortaderia spp.
Myrsine salicina
Podocarpus totara
Coriaria arborea
Gleichenia dicarpa
*Tradescantia fluminensis**
Dicksonia squarrosa
*Holcus lanatus**

*adventive

APPENDIX IX

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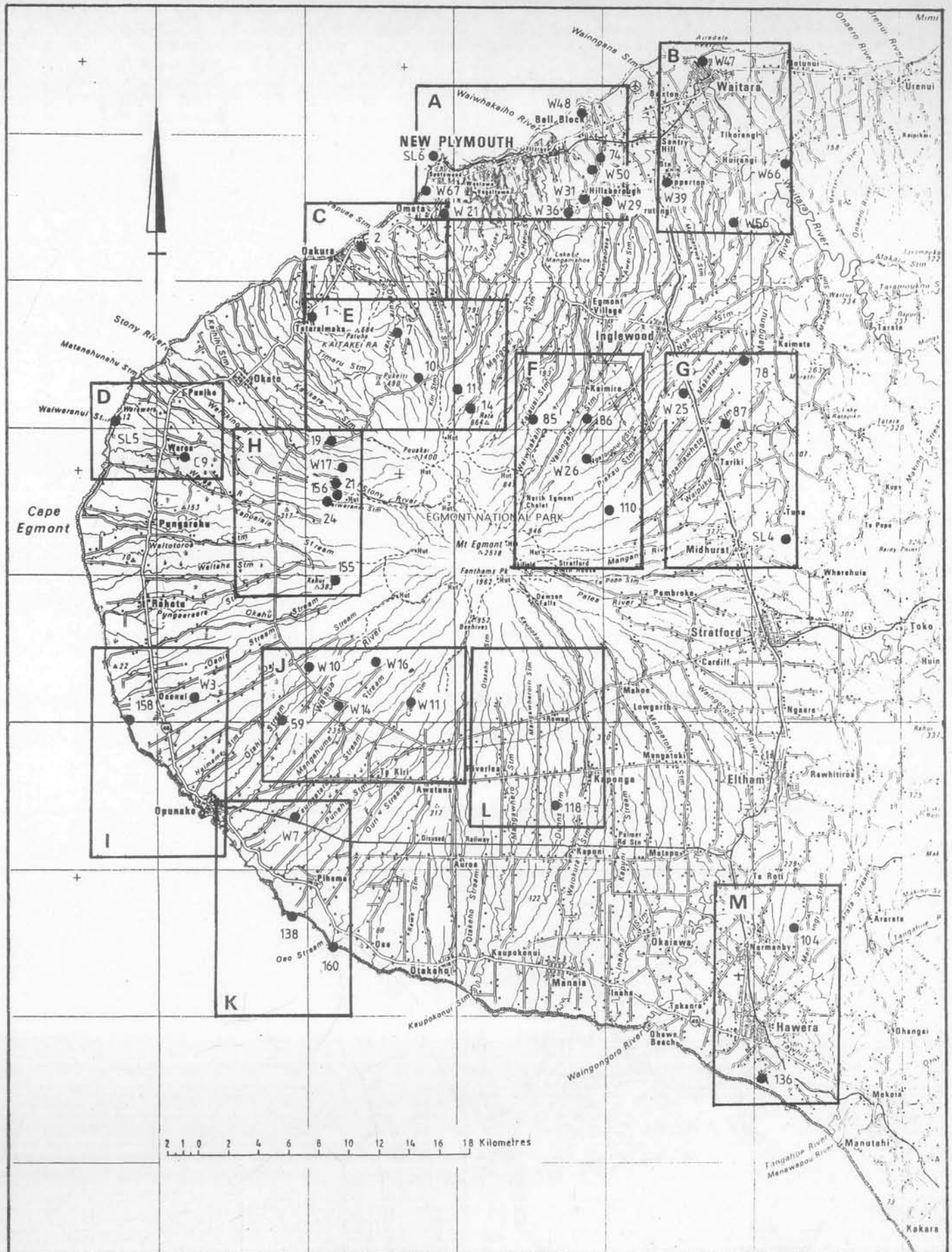
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Fig 5

PRIORITY NATURAL AREAS





Waitara

B

W 47

Bayly No. 2

82

MAIN

MO
Sch.

Brixton

KAIRAU

TE AREI

WATARA

Sentry Hill

Lepperton Junction

Lepperton

W 39

Huranga

FAULL RD

Tikorangi

BERTRAND

Tikorangi

W 66

W 56

SCALE 1:50 000

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