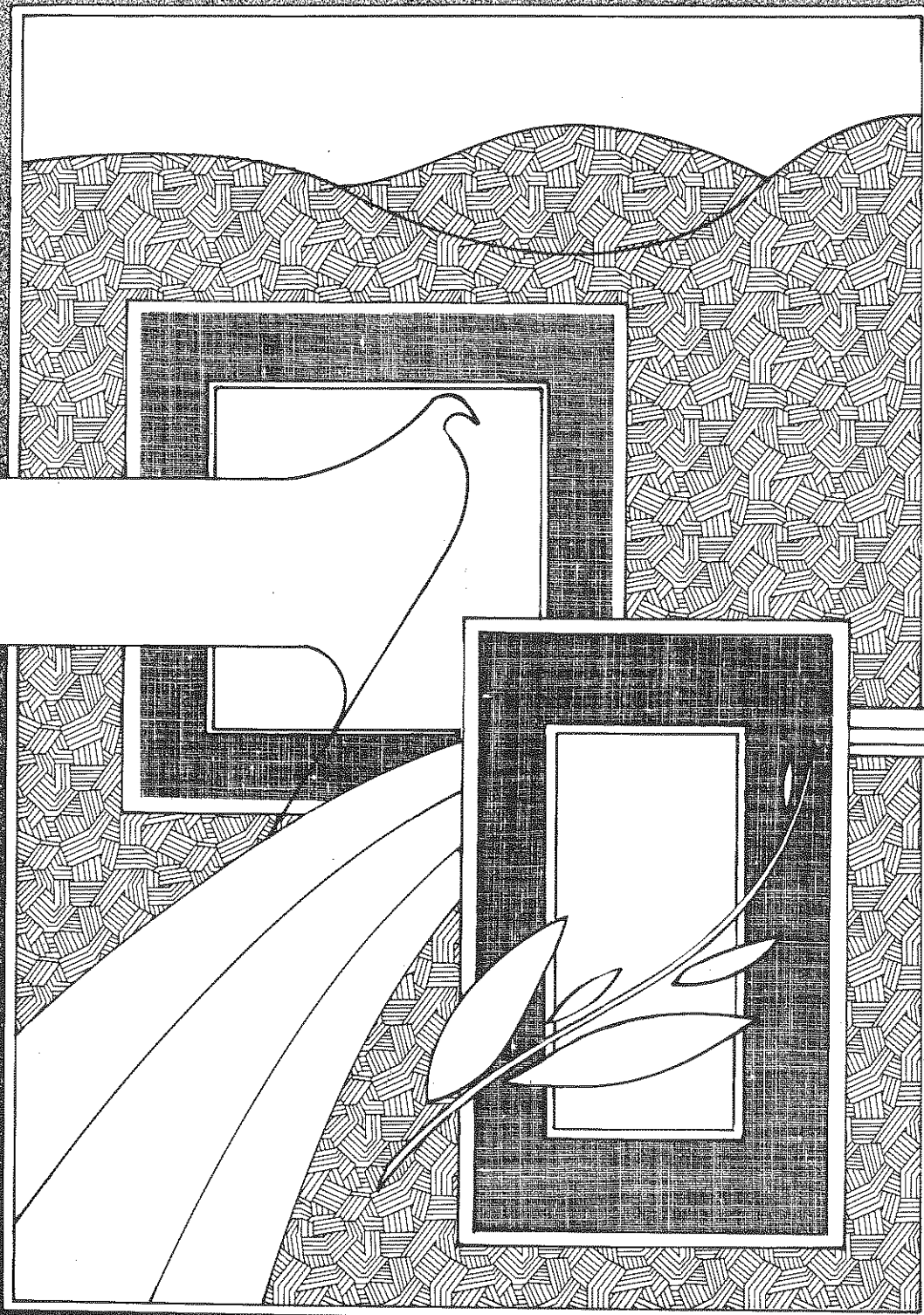


Auckland Conservancy

DEDICATED AREAS REPORT Number 11



Waikare
Ecological
Area



WAIKARE ECOLOGICAL AREA (PROPOSED)



NZ FOREST SERVICE
AUCKLAND CONSERVANCY
CPO Box 39
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March 1985

WAIKARE ECOLOGICAL AREA (PROPOSED)

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Location

The proposed Waikare Ecological Area is situated about 20 km southeast of Russell on the east coast of Northland in Russell Forest (mid-point at approximate map ref. NZMS 1 N16 756371). Russell Forest (Russell Survey District) is one of 17 indigenous forests in Northland State Forest Park. Located in the upper Waikare River catchment, the proposed Ecological Area is a region of indigenous forest in the Eastern Northland Ecological District (Simpson, 1982) (Fig. 1). After gazettal Waikare will be the largest of three small Ecological Areas within this district. Two others, Pukewhau and Todea Barbara Ecological Areas (gazetted 13.4.78, NZ Gazette Page 1082; and 28.9.78, N.Z. Gazette page 2656) cover only 33.8 ha and 0.53 ha respectively, whilst the proposed Ecological Area in Waikare has a total area of 185 ha. There are 22 Scenic Reserves in the Eastern Northland Ecological District with kauri components. Approximately one-third of their combined area is contained in the Ngaiotonga Scenic Reserve, which covers 1008 ha and is located 6 km northeast of Russell Forest (Woodward, G.A., 1981).

Access

The easiest access to the area is gained from the upper part of Papakauri Road off the Russell Road. At the boundary of Russell State Forest, Papakauri Road becomes a vehicle track and unauthorised vehicular access is restricted by a locked gate. Beyond this point the road is rough and suitable for four-wheel drive vehicles only. Several kilometres along this vehicle track the entrance of a walking track to the proposed Ecological Area is found. This runs down a ridge known locally as Killer Ridge and up a spur to a high point on the north-eastern boundary of the proposed reserve (see Fig. 2).

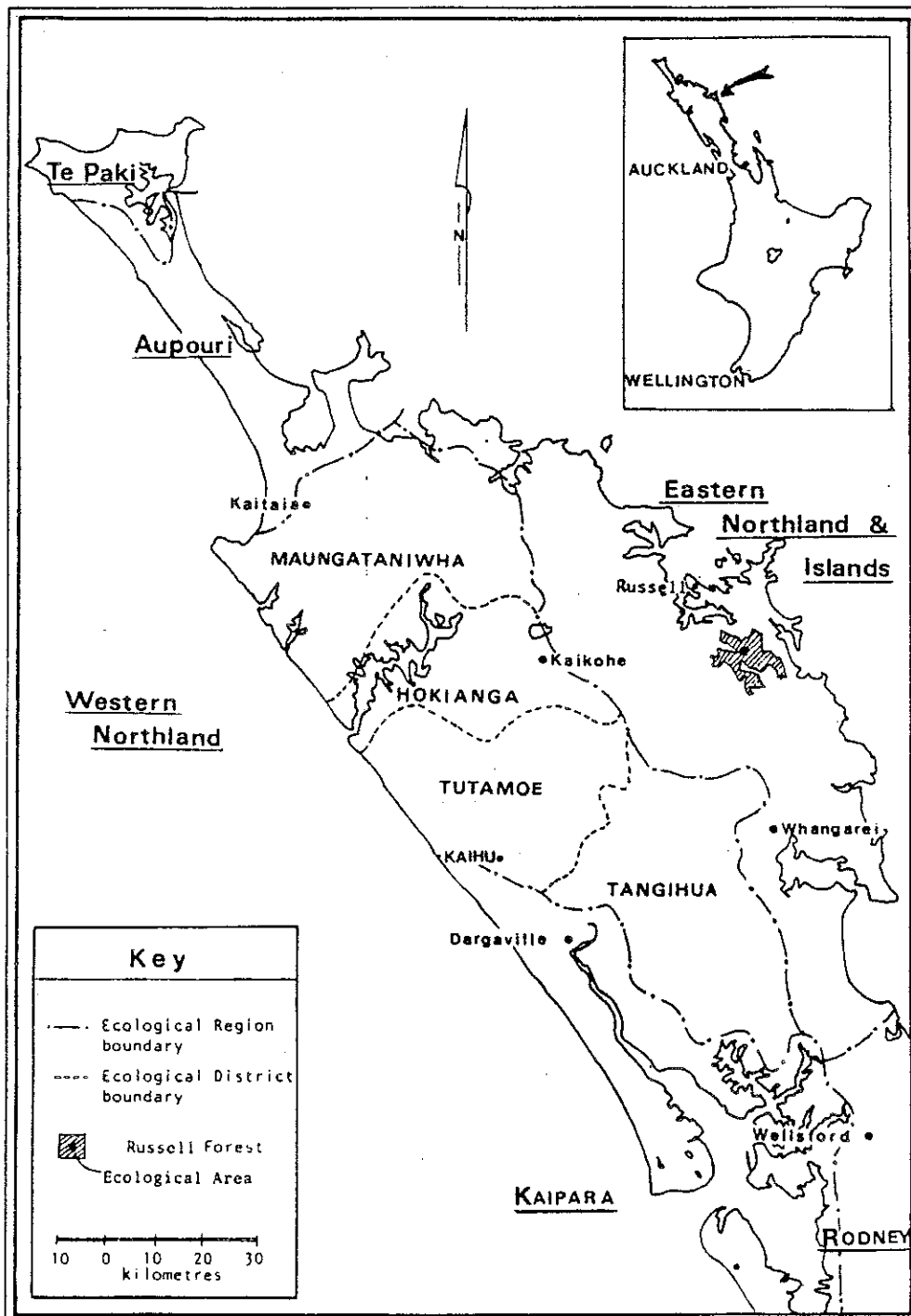
History of Reservation

J. Nicholls (scientist, F.R.I. Rotorua) originally recommended that all the Waikare catchment within State Forest, approximately 1400 ha, be made a Scientific Reserve (Nicholls, 1980). After discussion with Auckland Conservancy, the final proposal put to the Scientific Coordinating Committee (now the State Forests Scientific Reserve Advisory Committee) was for a sub-catchment of 185 ha to be reserved (Sutherland, 1982). This proposal was considered and approved by the Committee on 27 May 1982. It has also been approved in principle by the Minister of Forests and is awaiting final gazettal.

Rationale and Objectives of Designation

The proposed reserve meets some of the criteria set down by the Scientific Coordinating Committee (S.C.C.) (1980) for the selection of Ecological Areas. It has a compact shape with its boundaries defined by natural features, covers a complete sub-catchment and is unroaded.

Fig 1 : Location Map of Proposed Waikare Ecological Area Showing Boundaries of Ecological Regions and Districts.



(Based on Ecological Regions and Districts - 2nd Edition

(Biological Resources Centre, 1983))

The area also has high vegetation values as it is one of the few substantial remnants of mature kauri forest in the Eastern Northland and Islands Ecological Region. However, the S.C.C. recommends a 1000 ha minimum size for Ecological Areas, and the proposed reserve does not represent the full range of land forms, vegetation, soil sequences and animal communities available in the area.

The objective in reserving the proposed Ecological Area as stated in Sutherland's proposal (1982) is: -

'to set aside the tract of mature kauri forest which exists in the upper reaches of the Waikare Catchment. This area is the only substantial remnant of old growth forest in the Bay of Islands.' (Sutherland, 1982)

Climate

The climate of Northland is subtropical with a predominantly south-westerly airflow. Eastern Northland is subject to periodic cyclonic storms with subsequent disturbances to forest structure. The proposed Ecological Area has a mean annual rainfall of between 2000 and 2400 mm (N.Z. Met. Service, 1973). The mean daily maximum and minimum temperatures are approximately 19.5°C and 9.9°C.

The New Zealand Forest Service maintains a rain gauge at Puhipuhi Forest which is adjacent to and south of Russell Forest. Meteorological Stations are located north of Russell Forest at Waitangi Forest and to the south at Glenbervie Forest.

Topography

The proposed reserve consists of steep finely-dissected hill country forming a sub-catchment in the headwaters of the Waikare River. The southern boundary of the proposed Ecological Area extends beyond the sub-catchment and part of the way down the main arm of the river.

Slopes are variable from 26° to over 35° (Water and Soil Division, Ministry of Works and Development, 1975). The reserve has an altitudinal range of circa 75 m to 398 m a.s.l.

In contrast to the steepness of most of the proposed reserve, a level central basin of circa 50 ha occurs at approximately 120 m a.s.l.

Geology

The rock types of the proposed Waikare Ecological Area are sandstone and mudstone (greywacke and mesozoic argillite) i.e. medium to dark grey, fine to medium grained sandstone inter-bedded with grey to black mudstone and minor siliceous, igneous and calcareous rocks (Department of Lands and Survey, 1981). This greywacke basement extends down the eastern side of Northland and is the oldest geological structure in Northland (Ballance and Williams, 1982).



Looking east across Waikare Ecological Area. Waikare River flows right-left behind the boundary ridge in the middle-distance (Photo by J. Beachman).

The proposed Ecological Area lies in a belt of cherty greywacke (i.e. siliceous marine deposits) which contains mercury and manganese bearing rocks (N.Z. Geological Survey, D.S.I.R., 1961).

Pedology and Erosion

The proposed Waikare Ecological Area has Te Ranga steepland soils which are derived from greywacke. The soils are composed of light brown clay loam and stony clay loam. Steepland soils have a moderately high fertility with shallow topsoils liable to rapid sheet and slip erosion under pastoral use, and are mostly under indigenous forest. (Town and Country Planning Branch, Ministry of Works, 1964). The land has been classified as class VII-VII (Water and Soil Division, Ministry of Works and Development, 1975), indicating a high erosion potential. There is no sign of erosion in the proposed reserve, however, in the greater area of the upper Waikare catchment there are at least four large slips (larger than 30 m x 30 m).

Vegetation

A list of the plant species recorded using both common and scientific names is provided in Appendix 1.

The method used to describe the vegetation is a modified NZFS recce-type description in which the vegetation is recorded in a number of tiers. The five tiers used are canopy emergents, canopy (heights variable), sub-canopy (from beneath canopy height down to 2m), shrub (2 m down to 50 cm) and groundcover (50 cm to ground level). These site descriptions are grouped subjectively into types based as closely as possible on those classified by Nicholls (1976).

Information for the following description was gained from 10 days field work (the 15th, 17th-20th, 23rd-25th, 28-29th of November).






The vegetation of the proposed Waikare Ecological Area is dense and is a complex mix of regenerating and mature forest with scattered large kauri.

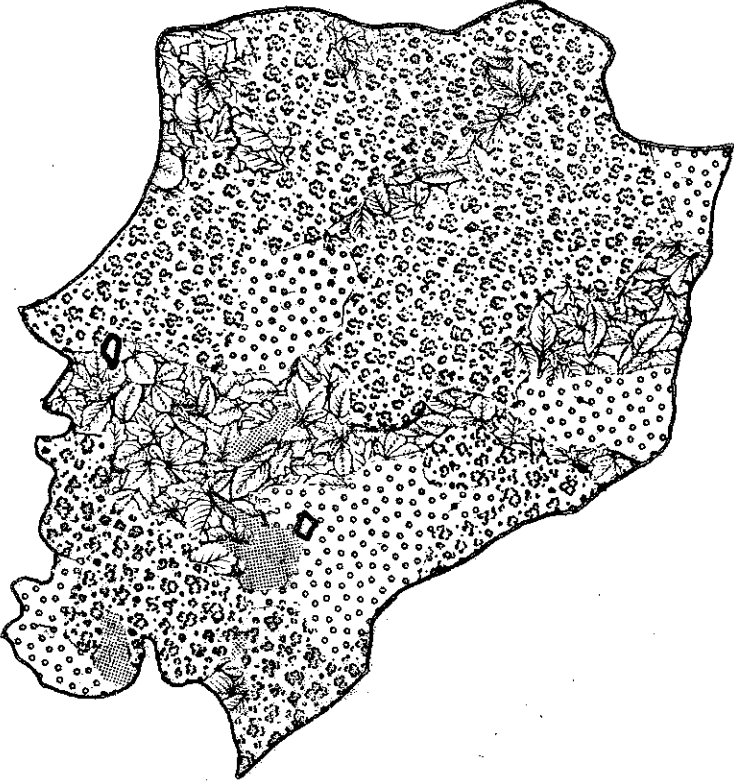
Four main types were identified (see Overlay 1, Fig. 2):

1. a type dominated by large kauri with a podocarp-hardwood understory;
2. a kauri-podocarp-hardwood association with occasional kauri among rimu, tanekaha, kanuka and others (B2, Nicholls 1976);
3. regenerating forest dominated by kanuka with scattered emergent kauri and a high diversity of species; and
4. a rimu-taraire-tawa association with towai, kohekohe and other species (E2, Nicholls 1976).

The first forest type covers most of the ridges in the proposed Ecological Area. Large kauri are emergent (up to 25 m in height) or forming a high open canopy overtopping Hall's totara, tanekaha, rimu, rewarewa and kanuka. Kauri, rimu, Hall's totara, miro and tanekaha occur in all

FOREST TYPES
(Overlay 1)

	Kauri Forest
	Kauri Podocarp Hardwood
	Regenerating forest
	Rimu-Taraire-Tawa Association
	Clearing



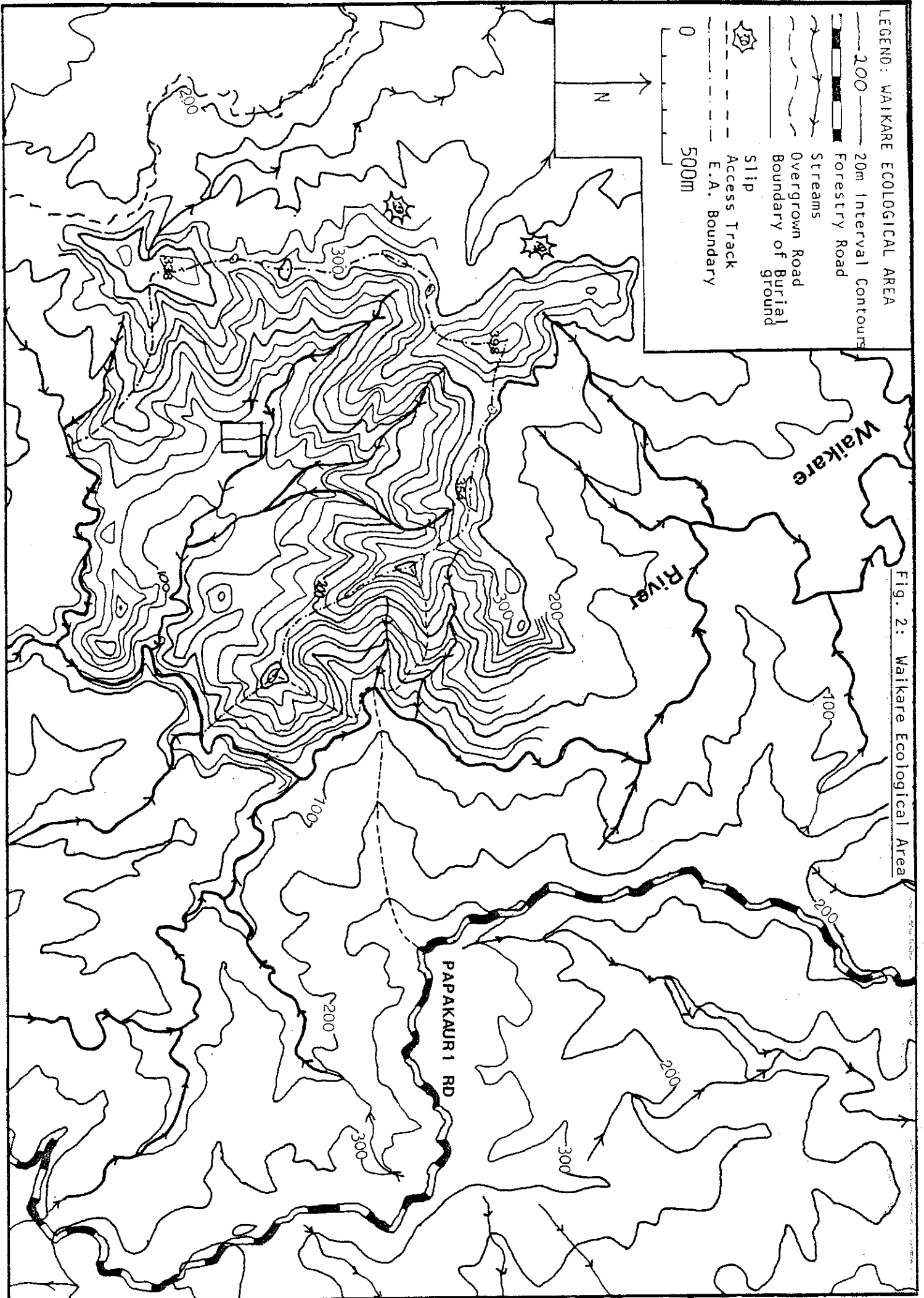


Fig. 2: Waikare Ecological Area

stages of growth. As well as podocarps, the sub-canopy contains neinei, rewarewa, lancewood, mapou and mairehau. While the shrub layer is very open, with scattered young ponga, mapou, mingimingi and korokio taranga, the ground cover is fairly dense, comprising *Uncinia* spp., kidney fern, *Astelia trinervia*, kiokio, piupiu, *Blechnum fraseri* and mingimingi. On some spurs dense kauri/tanekaha pole stands occur. In general, kauri rickers appear on ridge tops while the larger kauri are found on the sides of ridges.

The second forest type comprises scattered kauri of varying ages associated with a wide variety of other podocarp and hardwood species. This association tends to be found in drier areas. Totara appears to be the most common emergent species in this vegetation type while a dense canopy of up to 17 m consists of species such as tawa, towai, taraire, rewarewa and tanekaha. The moderately dense sub-canopy comprises kohekohe, ponga, pigeonwood, mapou, tanekaha, tawa and taraire. Typical shrub species are kohekohe, *Coprosma grandifolia* and mingimingi, while ponga and nikau are occasionally present. Ground cover species associated with these drier sites include *Blechnum* spp., *Hymenophyllum demissum* and bush rice grass. A diverse range of lianes and epiphytes are also present with common species being mangemange, climbing ratas, supplejack, kiekie and *Collospermum hastatum*.

In the south-eastern corner of the proposed Ecological Area is an area of scrub probably regenerating after disturbance by logging or fire. A low even 5-7 m kanuka canopy is interrupted by emergent rimu and kauri up to 10 m in height. Ponga, wheki, mingimingi, karamu, tanekaha, *Olearia rani* and the occasional *Cordyline* sp. form a dense sub-canopy. The shrub tier contains mairehau and hangehange with a dense ground cover made up of a large diversity of species, particularly the seedlings of tanekaha, rimu, miro, totara, taraire, pigeonwood and makamaka. Less abundant species are *Blechnum capense*, pigfern, *Lycopodium volubile* and *Uncinia uncinata*. Lianes and epiphytes are almost absent.

Associated with this regenerating scrub is a clearing with bracken, *Uncinia* spp., and *Gahnia* spp. Introduced adventives are incorporated in the dense ground cover.

Other small open tracts were found on a ridge above the southern boundary of the proposed reserve and these have been invaded by a similar association of native and exotic species.

The fourth vegetation category identified is a rimu-taraire-tawa association. It occurs in the damper parts of the proposed Ecological Area. This category has been divided into two sub-types:

The first sub-type is found in the central basin at circa 100 m a.s.l. and is about a hectare in extent. This area is extremely wet and swampy. The vegetation is characterised by emergent kahikatea up to 20 m in height with a 12 m to 15 m canopy of smaller kahikatea with the occasional northern rata. Underneath this, wheki, rimu, nikau, miro, tawa, taraire, pukatea, hangehange and towai form a dense sub-canopy. Shrub species include kohekohe and kanono while kiekie, parataniwha, kohekohe, hen and chicken fern and *Blechnum* spp. form a patchy ground cover. Lianes

and epiphytes are most commonly supplejack, kiekie, *Collospermum hastatum* and *Phymatosorus scandens*.

The second sub-type covers most of the central basin as well as gullies and ridge saddles. Towai is occasionally emergent while taraire, totara, rimu, tawa, puriri and rewarewa are constituents of a 6 m to 12 m canopy. The fairly dense sub-canopy comprises mahoe, nikau, ponga, wheki, and kanono. The ground cover is occasionally extremely dense comprising a high diversity of species. These usually include kiekie, young nikau, *Blechnum* spp. and hen and chicken fern. Lianas and epiphytes are abundant with such species as kiekie, supplejack, *Metrosideros perforata*, *Collospermum hastatum*, *Phymatosorus scandens* and *Asplenium* spp. being common.

Metrosideros carminea, a rare liane, was seen on a narrow rocky section of the northern boundary ridge. *Pittosporum pimelioides*, a rare Northland shrub and *Loxoma cunninghamii*, a fern of localised distribution are found near the proposed Ecological Area (P.J. Bellingham, Forest Service botanist, pers. comm.).

Introduced Animals and Forest Condition

Scientific names for the plants and animals mentioned below are included in Appendices 1 and 2.

Of 36 circular 4 m² plots examined in the proposed Ecological Area possum pellets were present in eight (22 %); rat pellets were found in one plot and goat pellets in another. Mustelid, cattle and pig droppings were seen in the course of the field inspection, and pig rootings and wallows were also encountered. Four goats were seen on the upper end of the Papakauri Road.

Figs, goats and cattle are not present in large numbers in the proposed reserve. The most common form of damage was done by possums. For example, partly eaten fern heads were found on the ground in several places. Heavy browse was recorded on five finger at one site, and a 5 m tree of uncertain species (possibly also five finger) was completely defoliated. Medium browse was recorded on kanono saplings, where the main stem was often chewed off or broken. This type of damage is typical of cattle or goats. Medium browse was also noted at some sites on taraire saplings, *Meliccytus macrophyllus* and kohekohe. Light browse was recorded on makamaka, *Astelia trinervia* and Kirk's tree daisy.

Ten rat traps were set over four nights at 25 m intervals along the eastern boundary ridge. No animals were caught although some traps were disturbed, possibly by possums.

At the sites with a kanuka scrub canopy, seedlings of podocarps and hardwoods were plentiful. Along with the young kauri present, this suggests that a kauri-podocarp-hardwood forest type will probably become established in these areas. The three other forest types had numerous seedlings of canopy trees. In all four forest types the shrub tier was fairly open. Shrubs such as Kirk's tree daisy and kanono often showed browse damage, suggesting that the openness of this tier may be attributable to introduced browsing animals.

Presence of Exotic Plants

Exotic plants were only encountered on the main arm of the Waikare River and in the two clearings shown on the Overlay for Fig. 2. Several exotic grasses and weeds such as *Senecio* spp. and *Lotus* spp. occurred in the clearings.

Native Fauna

A list of native fauna using both scientific and common names is provided in Appendix 2.

Russell State Forest has been classified by Ogle (1982) as a 'high value forested habitat' which is the Wildlife Service's second highest ranking.

Kaka, as well as North Island brown kiwi are present in the area. Both of these birds have limited distributions in New Zealand. No native parakeets were seen during this study. Eastern rosellas appeared to be common. In 1979 a New Zealand falcon was recorded for Russell State Forest while North Island kokako were last recorded in 1940 (Ogle, 1982). In Russell State Forest the diversity of native forest birds appears to be lower than in other forests in Northland (Ogle, 1982). This may be related to climatic differences.

Low numbers of kauri snails were recorded by Ogle (1982) in Russell State Forest, but no evidence of them was seen during this study.

Freshwater crayfish and freshwater shrimps as well as red-finned bully and freshwater limpets were seen in the Waikare River. Little is known about invertebrates in the proposed Ecological Area.

Recreation Facilities and Opportunities

The proposed reserve is untracked and no huts or other facilities exist. At times, private goat or pig hunters may use the area.

A national walkway passes within a kilometre of the proposed reserve, along Papakauri Road (Fig. 2). This part of the North Cape to Bluff trunk route will eventually extend from Russell to Whangarei. The northern end of the track starts at Ngaiotonga Scenic Reserve, 13 km east of Russell, and climbs to Te Ranga trig before crossing to Papakauri Road. It then follows the forest road to the ford over the Papakauri Stream where there is a camping area with a recently constructed shelter as well as a fireplace and toilet (map ref NZMS 1 N16 781403). The walkway then follows the forest road passing the access track to the proposed Ecological Area (see Access section) and climbs to Pukemoremore trig 2 km south-east of the proposed reserve. The final portion of the track crosses to Punaruku Road.

Human History and Influence

In 1923 a block of 1.7 ha (described as Waikare 14B3) was portioned from the block Waikare 14B (Russell Survey District) for a burial ground (Maori Land Court, pers. comm.). Block 14B is now part of Russell Forest and block 14B3 is in the proposed Ecological Area. It is uncertain whether human remains are deposited there.

The bulk of Russell Forest was worked for large diameter kauri by 1900. The most recent major logging operator was the Kauri Timber Company, whose operations ceased in late 1949. Fires followed many early workings, but due to the proposed Ecological Area's remoteness, parts of the area have escaped these influences (R.C. Lloyd, 1965).

A belt of mercury and manganese containing rock underlies Russell State Forest (see Geology section). Consequently there have been several applications for prospecting licences covering areas which include the proposed reserve. On 12 February 1982 Amoco Minerals NZ Limited applied for an exploration licence covering 387 square kilometres including the bulk of Russell Forest.

On 10 September 1982 an exploration licence (no. 33215) was granted to Canyon Resources Pty Ltd. The licence was for two years, and the proposed reserve is in the area involved (182.9 square kilometres).

Section 3 of the second schedule of the exploration licence stated: 'All samples shall be taken by hand means and each sample shall not exceed 5 kilograms' (Ministry of Energy 1982).

A prospecting licence was applied for by Canyon Resources Pty Ltd on 23 August 1983. The area involved is 3287 ha of Russell Forest, including the proposed Ecological Area.

Research Carried Out

In 1983 M. Ahmed of Auckland University sampled approximately one hectare of the proposed Waikare Ecological Area as a part of his PhD thesis on the dendrochronology and ecology of kauri.

Summary, Discussion and Recommendations

The proposed Waikare Ecological Area is part of a major second growth kauri forest under Forest Service administration. Although Waikare has been logged, the proposed Ecological Area contains 25 ha of mature kauri, and a further 20 ha of second growth stands. In addition, a substantial area of northern hardwood forest remains. A small stand of kanuka scrub is also present. The proposed Ecological Area has high vegetation values in the context of the Eastern Northland Ecological District, as it is the only substantial remnant of old growth forest in the area (Sutherland, 1982). Enlargement of the area to encompass the whole of the Waikare River catchment within Russell Forest, in line with J. Nicholls' (1980) original recommendation, is desirable in order to meet the criteria for selection of Ecological Areas set by the S.C.C. (1980). Also, *Pittosporum pimelioides* and *Loxoma cunninghamii* would be contained in the enlarged Ecological Area.

The Waikare catchment is steep and has the potential for earth slips, however no slips were encountered within the proposed Ecological Area.

Regeneration of canopy species appears to be abundant, however damage by possums is evident. Browsing by goats and feral cattle as well as pig rooting were also seen.

Russell State Forest has been classified by Ogle (1982) as a 'high value forested habitat' which is the Wildlife Service's second highest ranking. Waikare contains kaka which Ogle (1982) suggested could be seriously endangered in Northland. Faunal information specific to the proposed Ecological Area is sparse.

Although the area is compact in that it covers a complete sub-catchment it also includes part of the main arm of the Waikare River on its southern border.

Access to the proposed reserve is difficult. The National Walkway development connecting Russell to Whangarei passes the access walking track to the proposed Ecological Area, however the area is still remote in terms of access. Walkway development would therefore probably have little impact on the proposed reserve.

Based on the above discussion, the following management recommendations are made in order of priority.

1. That the original proposal to include the entire Waikare Catchment as the Ecological Area be approved.
2. That the influence of possums on forest condition be monitored.
3. That a more thorough assessment of wildlife and wildlife habitats in the proposed reserve be undertaken.

Acknowledgements

We wish to acknowledge a number of people who provided invaluable assistance both in the field and in the production of the manuscript. At Russell Forest a number of Forest Service staff, especially Wally Pita and Pieta Simons, gave advice and help during field work. We also wish to thank Peter Bellingham for his assistance in plant identification and for helpful discussion. Freek Deuss, Bruce Burns, Piet Nieuwland, John Halkett and John Beachman are also gratefully acknowledged for their advice and comments on the manuscript. In addition we wish to thank the staff at Kaikohe and Auckland offices for their assistance and encouragement.

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Appendix 1 : Botanical Species List - Waikare Ecological AreaFerns and Fern Allies

<i>Adiantum fulvum</i>	black maidenhair
<i>Anarthropteris lanceolata</i>	lance fern
<i>Asplenium bulbiferum</i>	manamana, hen and chicken fern
<i>A. flaccidum</i> var. <i>flaccidum</i>	raukatauri, hanging spleenwort
<i>A. lamprophyllum</i>	
<i>A. oblongifolium</i>	shining spleenwort
<i>A. polyodon</i>	
<i>Blechnum chambersii</i>	
<i>B. discolor</i>	piupiu, crownfern
<i>B. filiforme</i>	climbing sweetfern
<i>B. fraseri</i>	Fraser's hardfern
<i>B. sp. (B. capense</i> agg.)	kiokio
<i>Cardiomanes reniforme</i>	kidney fern
<i>Ctenopteris heterophylla</i>	
<i>Cyathea dealbata</i>	ponga, silver fern
<i>C. medullaris</i>	mamaku, black tree fern
<i>Dicksonia lanata</i>	
<i>D. squarrosa</i>	wheki
<i>Gleichenia cunninghamii</i>	tapuwae kotuku, umbrella fern
<i>Grammitis billardieri</i>	strap fern
<i>Histiopteris incisa</i>	swamp fern
<i>Hymenophyllum demissum</i>	filmy fern
<i>H. dilatatum</i>	"
<i>H. ferrugineum</i>	"
<i>H. flabellatum</i>	"
<i>H. flexuosum</i>	"
<i>H. multifidum</i>	"
<i>H. rarum</i>	"
<i>H. revolutum</i>	"
<i>H. sanguinolentum</i>	piripiri
<i>H. scabrum</i>	filmy fern
<i>Hypolepis rufobarbata</i>	
<i>H. rugosa</i>	
<i>H. tenuifolia</i>	thin leaved pigfern
<i>Lastreopsis glabella</i>	
<i>L. hispida</i>	
<i>Leptopteris hymenophylloides</i>	heruheru, crepefern
<i>Lindsaea trichomanoides</i>	
<i>Lycopodium deuterodensum</i>	club moss
<i>L. volubile</i>	"
<i>Lygodium articulatum</i>	mangemange
<i>Paesia scaberula</i>	ringfern, hardfern, pigfern
<i>Phymatosorus diversifolius</i>	kowaowao, maratata, hounds tongue
<i>P. scandens</i>	moki, fragrant fern
<i>Pneumatopteris pennigera</i>	pakauroharoha
<i>Pteridium esculentum</i>	bracken
<i>Pteris tremula</i>	shaking bracken
<i>Pyrrosia serpens</i>	leather-leaf fern
<i>Rumohra adiantiformis</i>	climbing shield fern

Fern and Fern Allies (continued)

<i>Schizaea dichotoma</i>	fan fern
<i>Tmesipteris elongata</i>	
<i>T. lanceolata</i>	
<i>T. sigmatifolia</i>	
<i>T. tannensis</i>	
<i>Trichomanes elongatum</i>	filmy fern
<i>T. venosum</i>	filmy fern

Gymnosperms

<i>Agathis australis</i>	kauri
<i>Dacrycarpus dacrydioides</i>	kahikatea
<i>Dacrydium cupressinum</i>	rimu
<i>Libocedrus plumosa</i>	kawaka, cedar
<i>Phyllocladus trichomanoides</i>	tanekaha
<i>P. glaucus</i>	toatoa
<i>Podocarpus hallii</i>	Hall's totara
<i>P. totara</i>	totara
<i>Prumnopitys ferruginea</i>	miro
<i>P. taxifolia</i>	matai

Dicotyledons

<i>Ackama rosaeifolia</i>	makamaka
<i>Alectryon excelsus</i>	titoki
<i>A. macrophylla</i>	karapapa
<i>A. banksii</i> x <i>A. macrophylla</i> (<i>'A. quercifolia'</i> - type)	N.Z. honeysuckle
<i>Aristotelia serrata</i>	wineberry, makomako
<i>Beilschmiedia tarairi</i>	taraire
<i>B. tawa</i>	tawa
<i>Brachyglottis repanda</i>	rangiora
<i>Clematis paniculata</i>	puawananga
<i>C. parviflora</i>	
<i>Coprosma arborea</i>	mamangi
<i>C. grandifolia</i>	kanono
<i>C. lucida</i>	karamu
<i>C. rhamnoides</i>	
<i>C. robusta</i>	karamu
<i>C. spathulata</i>	
<i>Corokia buddleioides</i>	korokio
<i>Corynocarpus laevigatus</i>	karaka
<i>Cyathodes fasciculata</i>	mingimingi
<i>C. juniperina</i>	mingimingi
<i>Dracophyllum latifolium</i>	neinei
<i>Dysosyllum spectabile</i>	kohekohe
<i>Elatostema rugosum</i>	parataniwha
<i>Geniostoma rupestre</i> var. <i>crassum</i>	hangehange
<i>Gnaphalium gymnocephalum</i>	

Dicotyledons (continued)

<i>Griselinia lucida</i>	puka, shining broadleaf
<i>Hedycarya arborea</i>	pigeonwood
<i>Hoheria populnea</i> var. <i>populnea</i>	houhere, lacebark
<i>Hydrocotyle</i> sp.	
<i>Ixerba brexioides</i>	tawari
<i>Knightia excelsa</i>	rewarewa
<i>Laurelia novae-zelandiae</i>	pukatea
<i>Leptospermum ericoides</i>	kanuka
<i>L. scoparium</i>	manuka
<i>Lophomyrtus bullata</i>	ramarama
<i>Macropiper excelsum</i>	kawakawa
<i>Melicope simplex</i>	
<i>Melicytus macrophyllus</i>	large-leaved mahoe
<i>M. ramiflorus</i>	mahoe
<i>Metrosideros albiflora</i>	climbing rata, akatea
<i>M. carminea</i>	"
<i>M. diffusa</i>	"
<i>M. fulgens</i>	" , akakura
<i>M. perforata</i>	" , akatorotoro
<i>M. robusta</i>	northern rata
<i>Muehlenbeckia australis</i>	
<i>Myrsine australis</i>	mapou, red matipo
<i>M. salicina</i>	toro
<i>Nertera depressa</i>	
<i>N. dichondraefolia</i> s.s	
<i>Nestegis lanceolata</i>	white maire
<i>Olearia furfuracea</i>	
<i>O. rani</i>	heketara
<i>Parsonsia</i> sp.	
<i>Phebalium nudum</i>	maire hau
<i>Pittosporum cornifolium</i>	karo
<i>P. tenuifolium</i>	kohuhu
<i>Pseudopanax arboreus</i>	five finger
<i>P. crassifolius</i>	lancewood
<i>P. edgerleyi</i>	raukawa
<i>Pseudowintera axillaris</i>	horopito
<i>Ranunculus hirtus</i>	
<i>Rhabdothamnus solandri</i>	waiu-atua
<i>Rubus australis</i>	bush lawyer
<i>R. cissoides</i>	"
<i>Schefflera digitata</i>	pate
<i>Senecio kirkii</i>	Kirk's tree-daisy
<i>Toronia toru</i>	toru
<i>Vitex lucens</i>	puriri
<i>Weinmannia silvicola</i> var. <i>silvicola</i>	towai

Monocotyledons

<i>Acianthus fornicatus</i> var. <i>sinclairii</i>	
<i>Astelia solandri</i>	kowharawhara, perching lily
<i>A. trinervia</i>	kauri grass
<i>Bulbophyllum pygmaeum</i>	
<i>Carex</i> spp.	
<i>Collospermum hastatum</i>	perching lily
<i>Cordyline banksii</i>	ti ngahere

Monocotyledons (continued)

<i>Corybas orbiculatus</i>	
<i>Dianella nigra</i>	turutu, blueberry
<i>Dendrobium cunninghamii</i>	epiphytic orchid
<i>Drymoanthus adversus</i>	"
<i>Earina autumnalis</i>	Easter orchid
<i>E. mucronata</i>	epiphytic orchid
<i>Freycinetia baueriana</i> spp. <i>banksii</i>	kiekie
<i>Gahnia lacera</i>	
<i>G. pauciflora</i>	
<i>G. setifolia</i>	
<i>G. xanthocarpa</i>	toi-kiwi
<i>Libertia pulchella</i>	native iris
<i>Microlaena avenacea</i>	bush rice grass
<i>Oplismenus imbecillis</i>	
<i>Pterostylis banksii</i>	
<i>P. graminea</i> var. <i>rubricaulis</i>	
<i>Rhopalostylis sapida</i>	nikau
<i>Ripogonum scandens</i>	supplejack
<i>Rytidosperma</i> spp.	
<i>Scirpus</i> sp.	
<i>Uncinia banksii</i>	hook grass
<i>U. uncinata</i>	"
<i>U. zotovii</i>	"

Introduced Plants

<i>Cirsium vulgare</i>	Scotch thistle
<i>Digitalis purpurea</i>	fox glove

Appendix 2 : Faunal Species List - Waikare Ecological Area

Native Birds

<i>Apteryx australis mantelli</i>	N.I. brown kiwi
<i>Chalcites lucidus</i>	shining cuckoo
<i>Circus approximans</i>	harrier
<i>Gerygone igata</i>	grey warbler
<i>Halcyon sancta</i>	kingfisher
<i>Hemiphaga novaeseelandiae</i>	N.Z. pigeon
<i>Nestor meridionalis</i>	N.I. kaka
<i>Ninox novaeseelandiae</i>	morepork
<i>Petroica macrocephala</i>	pied tit
<i>Prothemadera novaeseelandiae</i>	tui
<i>Rhipidura fuliginosa</i>	fantail
<i>Zosterops lateralis</i>	silveryeye

Introduced Birds

<i>Acridotheres tristis</i>	myna
<i>Fringilla coelebs</i>	chaffinch
<i>Hirundo neoxena</i>	welcome swallow
<i>Platycercus eximius</i>	eastern rosella
<i>Turdus merula</i>	blackbird

Other Native Fauna

<i>Gobiomorphus huttoni</i>	redfined bully
<i>Paranephrops planifrons</i>	freshwater crayfish
<i>Paratya curvirostris</i>	freshwater shrimp
<i>Latia neritoides</i>	freshwater limpet

Introduced Mammals

<i>Bos taurus</i>	feral cow
<i>Capra hircus</i>	goat
<i>Sus scrofa</i>	pig
<i>Trichosurus vulpecula</i>	brush-tailed possum

Common rats (*Rattus rattus*) as well as mice (*Mus musculus*), mustelids and feral cats (*Felis catus*) are almost certainly in the area. These species are present throughout Northland (Ogle 1982).