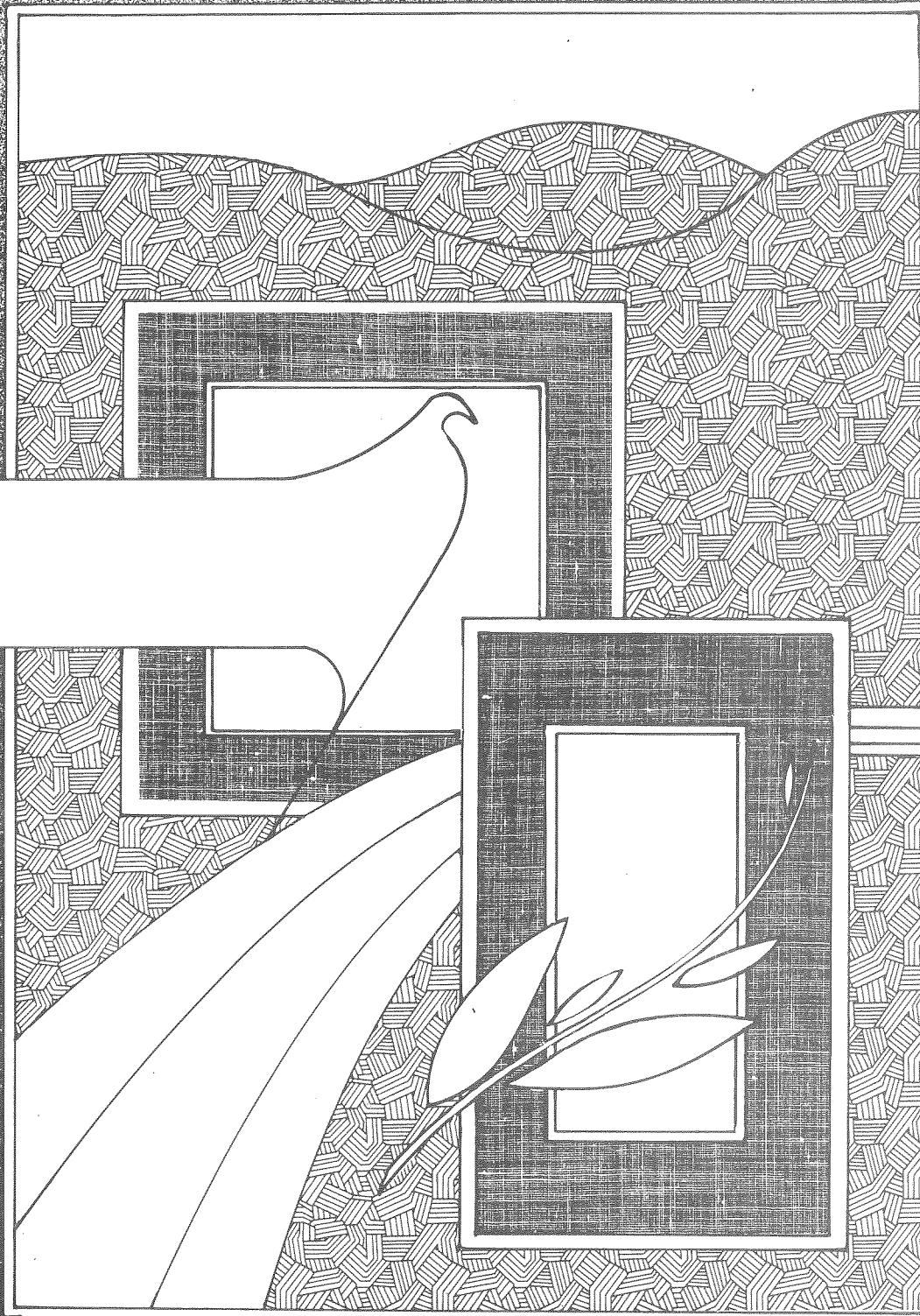


Auckland Conservancy

DEDICATED AREAS REPORT Number 18



Pukewhau Ecological Area &
Todea Barbara Ecological Area



PUKEWHAU ECOLOGICAL AREA AND
TODEA BARBARA ECOLOGICAL AREA



N.Z. FOREST SERVICE
AUCKLAND CONSERVANCY
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September 1985

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Location

Pukewhau Ecological Area is a small reserve covering 33 ha, situated about 4 km south-southwest of Kerikeri. The midpoint of the reserve is at map reference NZMS 1 N11 475523. The area is a remnant of the formerly extensive podocarp hardwood forest and hardwood scrub which covered the region. It is bounded by Waitangi State Forest to the north and east and by blocks of privately owned native bush and farmland to the south and west. The most recent aerial photograph was flown on 11 January 1979 (NZAM survey no. 5337, run D, photograph 7).

Todea Barbara Ecological Area is situated 5 km west of Kerikeri on the east coast of Northland (approximate midpoint at map reference NZMS 1 N11 506565). The area contains the southern most known occurrence of the fern *Todea barbara*. Todea Barbara Ecological Area lies within and bounded on all sides by Waitangi State Forest. All of the land adjacent to the area is covered in radiata pine. The reserve is very small, covering 0.5 ha. The most recent aerial photograph was flown on 11 January 1979 (NZAM survey no. 5337, run B, photograph 8).

Access

Access to Pukewhau Ecological Area is via Waitangi State Forest from either Kerikeri or Paihia. Access from Paihia is gained from Falls Road then via forestry roads through a locked gate. From the forest entrance travel 1 km along Te Puke Road (no. 4), turn left onto Skyline Road (no. 8) and travel 5.8 km to Pukewhau Road (no. 15). Pukewhau Road is best negotiated with a four wheel drive vehicle and the last section up to Pukewhau Trig by walking. Access from Kerikeri is via Kerikeri Inlet Road and forestry roads through a locked gate. Travel 2.5 km via Te Wairoa Road (no. 5), turn right onto Skyline Road, travel 2.5 km to Pukewhau Road. Access into the Ecological Area can be gained from a forestry track, running south along the ridge between the two catchments. The smaller catchment can be circumnavigated using forestry tracks. There are no tracks into the catchments.

Access to Todea Barbara Ecological Area is via Bedford Road (no. 11) in Waitangi State Forest. Bedford Road may be reached, from Kerikeri via the Kerikeri Inlet Road through a locked gate 1.8 km east of Okura Bridge. From Paihia, Bedford Road maybe reached via Wairoa Bay Road, through a locked forestry gate before travelling 10.4 km along Te Wairoa Road (no. 5). There are no walking or access tracks through the area.

Fig. 1: Location Map of Waitangi State Forest showing Boundaries of Ecological Regions and Districts.

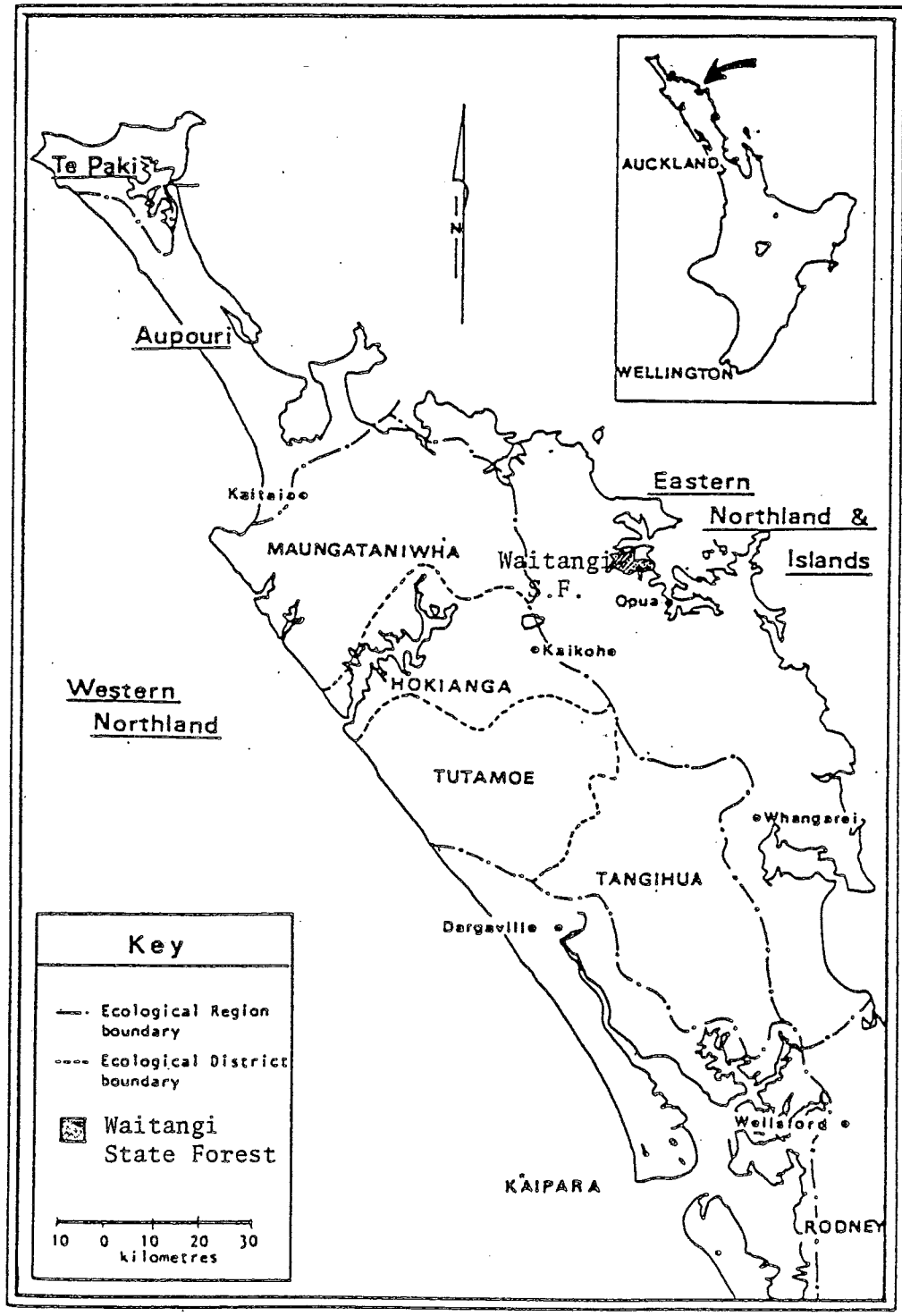
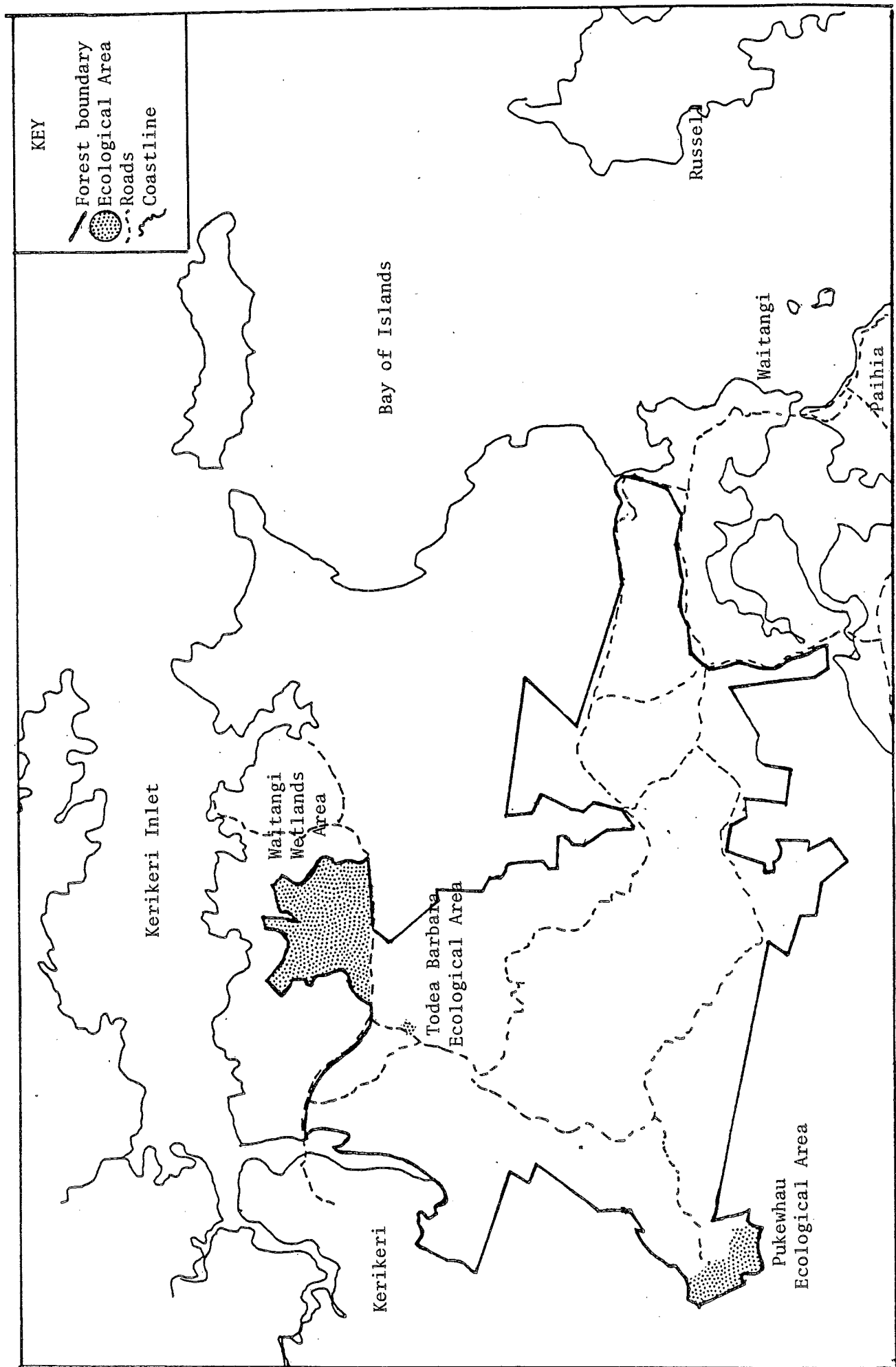


Fig 2 : Location map of Ecological Areas within Waitangi State Forest



History of Gazettal

Recommendations made to reserve Pukewhau Ecological Area were approved in January 1975 with the initial objective of protecting the Kiwi population. Plans to gazette the area were drawn up in October 1976 and final gazettal occurred on 13 April 1978 (N.Z. Gazette no. 19, p. 1082).

Todea barbara fern was first discovered in Waitangi State Forest by A.N. Sexton, a past Conservator in Auckland Conservancy (Rawlings 1971). The area was fenced off and increased to 0.53 hectares in 1976. Plans to gazette the area were drawn in October 1976 and final gazettal occurred on 28 September 1978 (N.Z. Gazette no. 82, p. 2656).

Rationale and Objectives of Designation

The Pukewhau Ecological Area fulfills many of the criteria for the selection of ecological areas as set down by the S.C.C. (1980). The area is unroaded; although it is small it reserves a remnant of the characteristic vegetation type of the area. It has a compact shape and contains the upper reaches of a number of small catchments. The main purpose of designation as stated in the proposal for reserving the area is twofold :

"to provide an indigenous forest remnant in case the adjoining areas on freehold land are destroyed in the course of land development"
(D.W. Guild 1974, N.Z.F.S. file 193/21/4)

and

"to ensure that some bush areas at Waitangi are reserved for preservation of Kiwi habitats"
(K.W. Prior 1977, N.Z.F.S. file 193/21/4).

The reserve has been given an IUCN* classification of IV (Nature Conservation Reserve). The IUCN management objectives of this type of reserve allows the manipulative management techniques to assure the survival of certain species of plants and animals. Scientific research environmental monitoring and educational use are the primary uses associated with this category (IUCN 1978).

Although very small (0.5 ha) in comparison with most ecological reserves, Todea Barbara Ecological Area was set aside to reserve the southernmost known distribution of the rare fern *Todea barbara*. The reserve fulfills several of the criteria for the selection of ecological areas as set down by the S.C.C. (1980). It reserves a unique area of fern. It is unroaded (except on the western boundary) and it has a compact shape. The main purpose of designation as stated in the New Zealand Gazette (N.Z. Gazette no. 82, p. 2656) is :

"to preserve the presence of this fern in its natural state".

The reserve has also been given as IUCN classification of IV (Nature Conservation Reserve).

* IUCN = International Union for the Conservation of Nature and Natural Resources.

Topography

Pukewhau Ecological Area occupies 33 ha on moderately steep rolling hills. Two catchments form the area. The smaller steeper catchment drains to the east. The larger catchment drains to the north-west and drops away steeply from the eastern ridge and in the gully bottoms. The slopes in the rest of the catchment are moderately steep. The altitudinal range of the area is 120 m to 180 m a.s.l.

Todea Barbara Ecological Area is situated within a steep narrow, east-facing gully in Waitangi State Forest. The slope is greater than 35° in many places and the altitudinal range of the area is 20 m to 60 m a.s.l.

Climate

The climate of Northland is subtropical with an airflow which is predominantly from the south-west. Occasionally Northland is affected by tropical cyclonic storms (Town and Country Planning Branch, M.O.W., 1964). The nearest meteorological stations to Pukewhau Ecological Area are at Waitangi State Forest Headquarters, 9.5 km to the east and in Kerikeri, 4.2 km to the north. The nearest stations to Todea Barbara Ecological Area are also Waitangi State Forest Headquarters and Kerikeri, 7.1 km to the south-east and 4.7 km to the west, respectively.

Waitangi Forest Headquarters received a yearly average of 1421 mm of rain during 1962-1980 and Kerikeri received a yearly average of 1682 mm during 1935-1973. Over the period 1962-1980 the average daily maximum temperature at Waitangi Forest Headquarters was 20.1°C and the average daily minimum was 11.1°C with a yearly average of 15.6°C. In Kerikeri over the period 1945-1973 the average maximum daily temperature was 20.1°C and the average minimum daily temperature was 10.0°C with a yearly average of 15.0°C.

Geology

Information on the geology of these ecological areas was derived from Geological Maps compiled for the Department of Lands and Survey by the Geological Survey Unit (1982) and the Town and Country Planning Branch, M.O.W. (1964). The reserves both lie on Waipapa group of sedimentary rocks of greywacke sandstone and argillite mudstone. The rock is hard to very hard and weathers to soft brown sandy clay.

Pedology and Erosion

Information on the pedology of the region was derived from Pedological Maps compiled for the Department of Lands and Survey by the Soil Bureau (1980).

Pukewhau Ecological Area contains steepland soils and soils of rolling and hilly land. The soils to the west are moderately podzolised yellow brown earths, Hukerenui silt loams with yellow subsoil. To the east the soils are strongly leached to weakly podzolised yellow brown earths. Rangiora and Marua soils of silty brown clay loams.

Todea Barbara Ecological Area also contains soils of the rolling land, moderately podzolised yellow brown earths of the Hukerenui Series.

The Land Resource Inventory Worksheet classifies most of the region, including both Ecological Areas as class VI lands (Water and Soil Division, MOWD 1975). This land use capability is based on an eight class system where class VI land has severe limitations to productive use.

In Pukewhau Ecological Area erosion was frequent but on a small scale. Slips were observed along the cut logging track and within the steep gullies. Bare rock was exposed on the almost vertical sides of the main tributaries in the smaller eastern catchment.

Very little erosion was observed in Todea Barbara Ecological Area. The Land Resource Inventory Worksheet records nil to moderate (0-20% area affected) sheet, gully, earthslip and soilslip erosion for both areas (Water and Soil Division, MOWD, 1975).

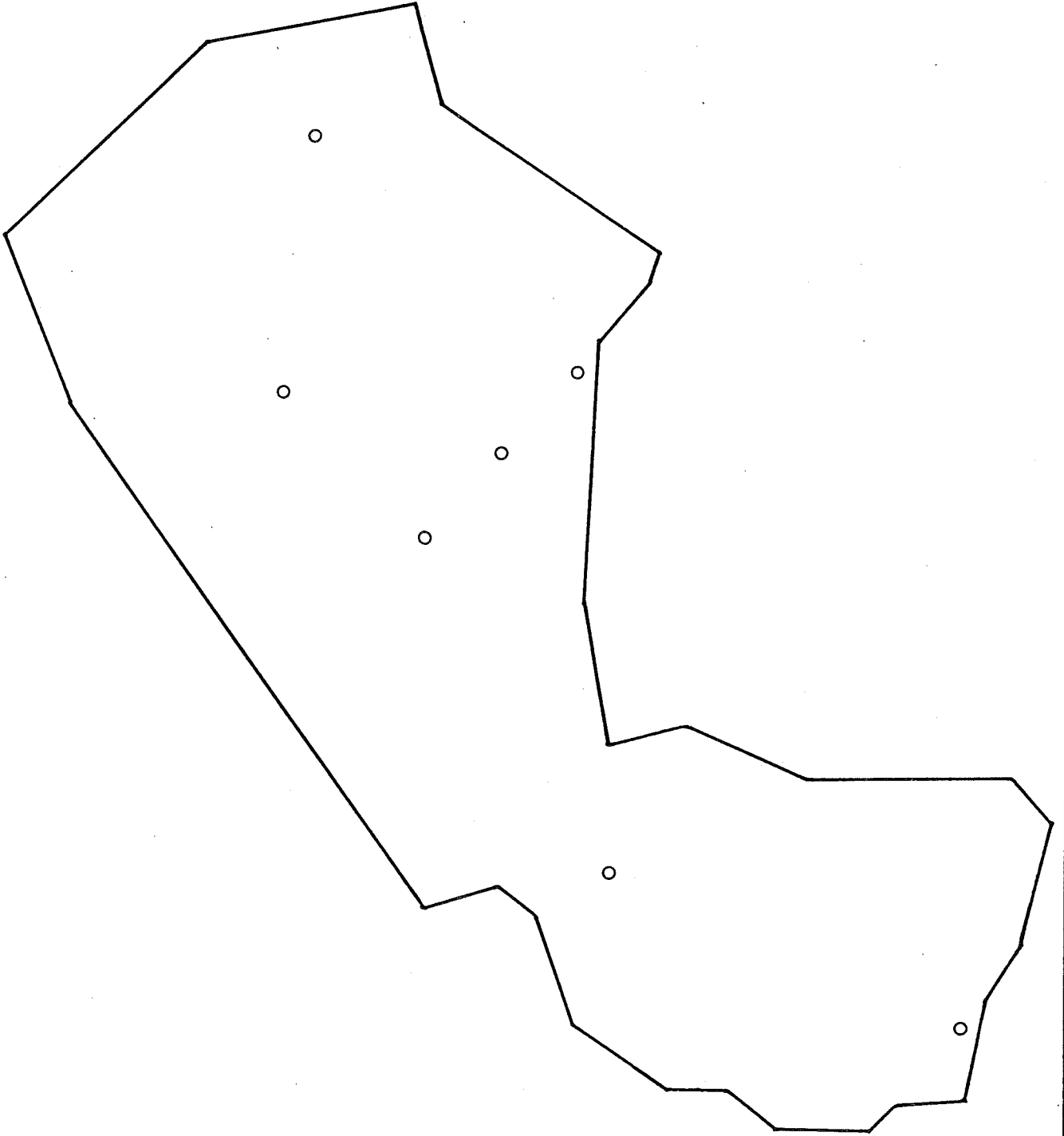
Vegetation

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

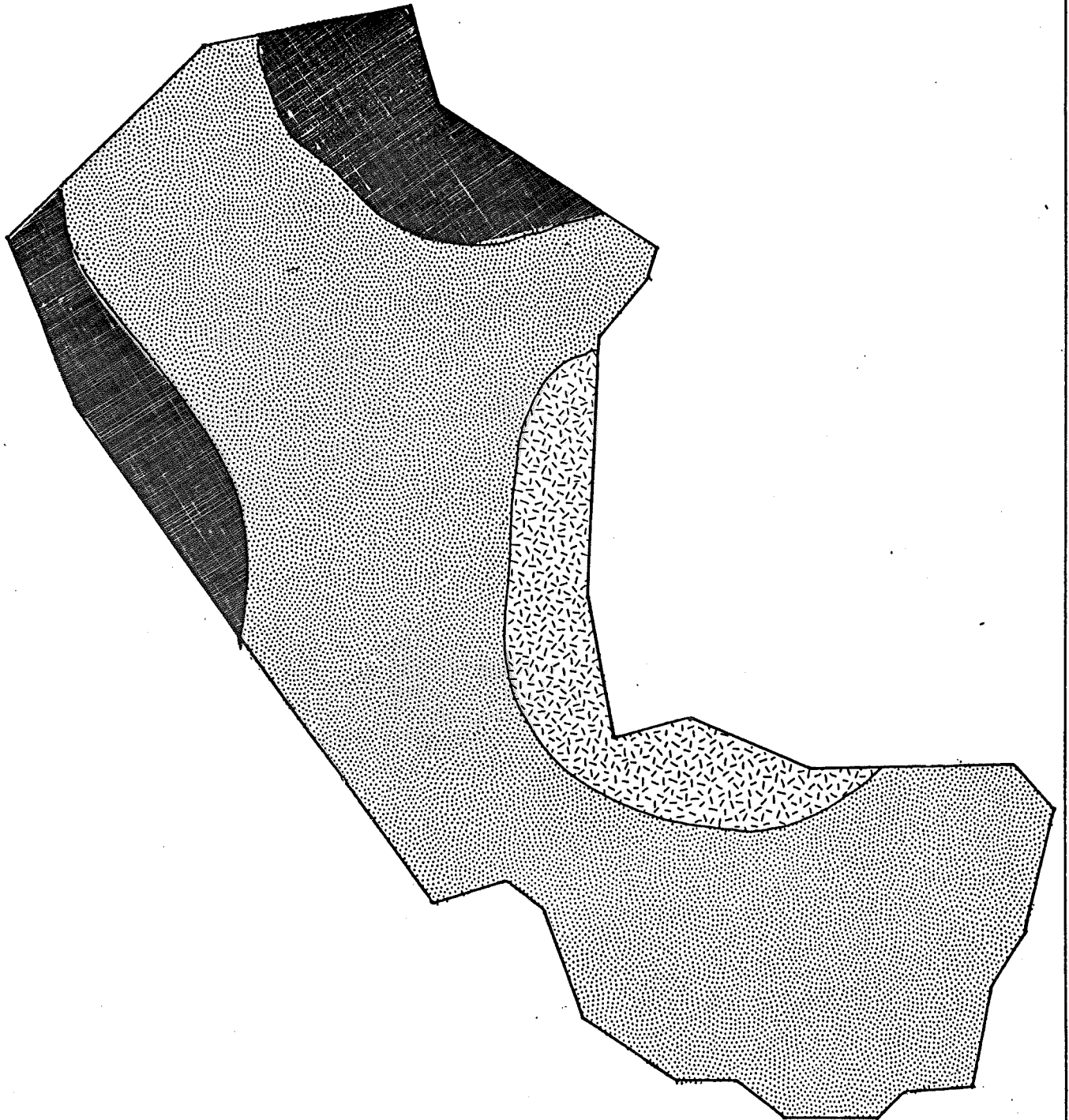
The method used to describe the vegetation is a modified New Zealand Forest Service recce-type description in which vegetation is recorded in the following five tiers :

- Emergents - 5 m above mean canopy height
- Canopy - variable height
- Subcanopy - below canopy to 2 m
- Shrub - 0.5 to 2 m
- Groundcover - below 0.5 m

Information on Pukewhau Ecological Area was gained from 1½ days field work (24th - 25th July 1985). Reports by D.W. Guild and P.J. Thode (NZFS file no. 6/193/21/4) were also used. Information on Todea Barbara Ecological Area was gathered in half a days field work (25th July 1985).

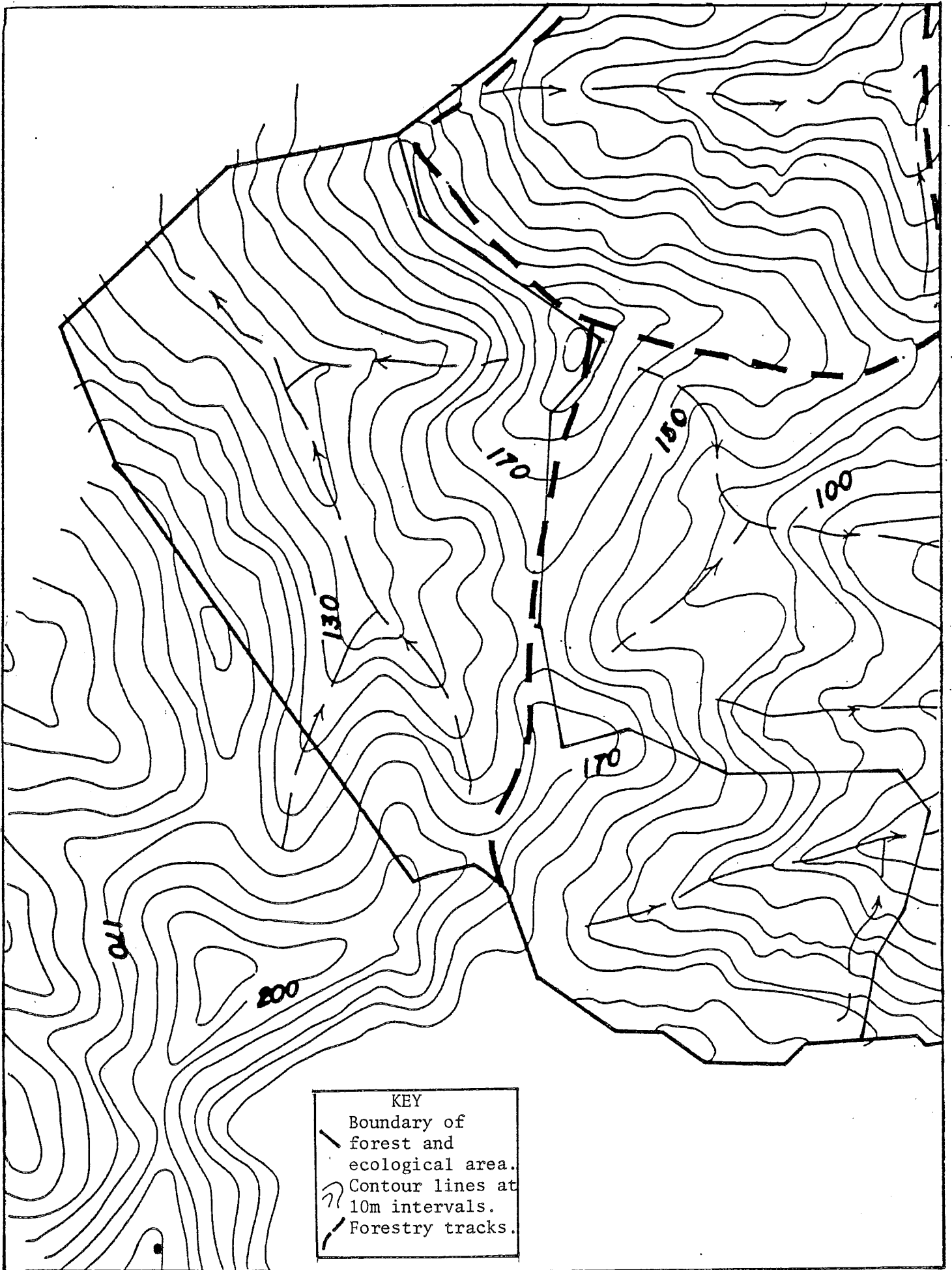


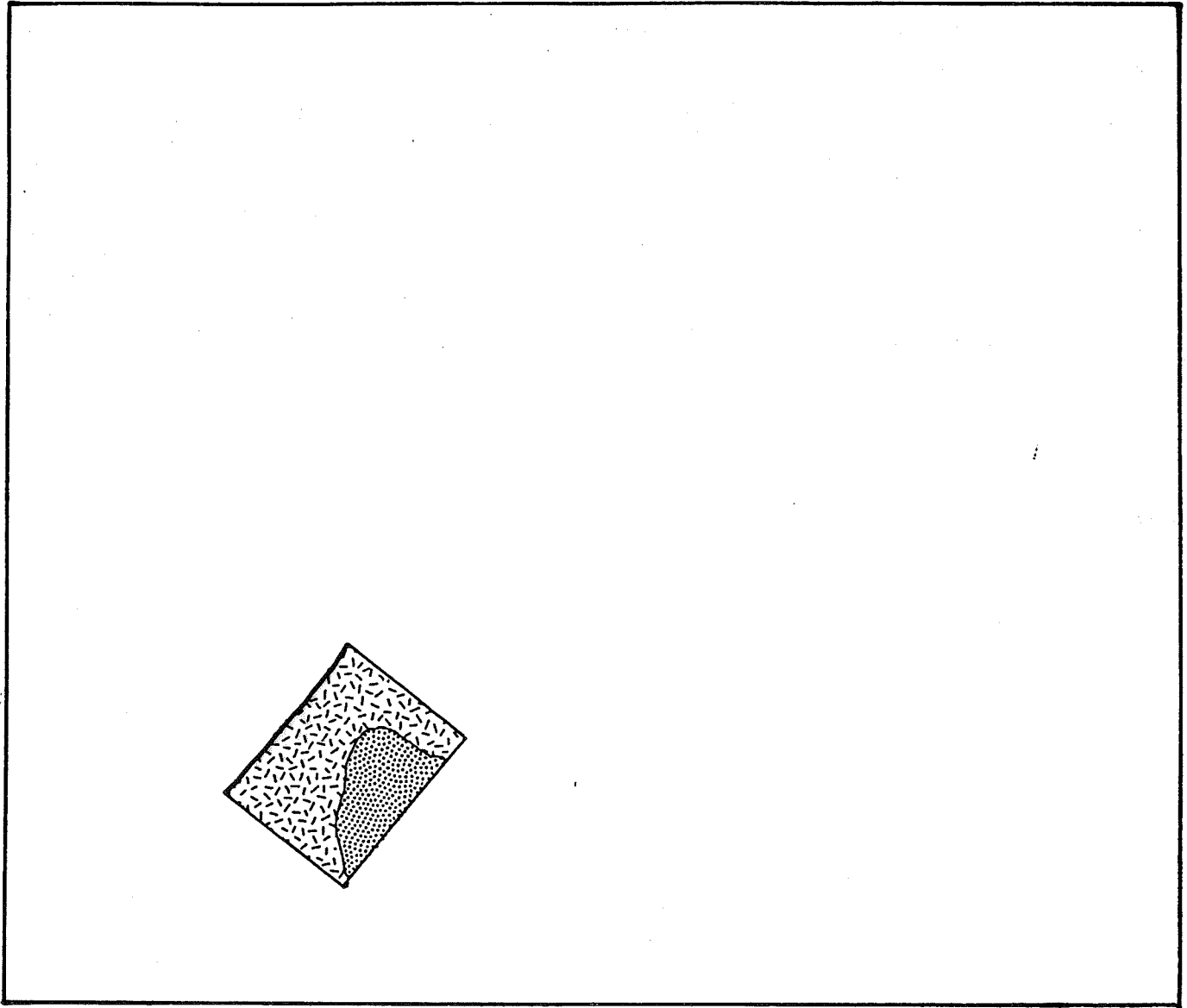
OVERLAY 1
○ Sites of vegetation descriptions.



OVERLAY 2
Vegetation types
Lowland podocarp
hardwood forest.
Lowland softwood
forest dominately
tanekaha.
Regen. manuka scrub

Fig 3 : Pukewhau Ecological Area





OVERLAY 1

Vegetation types



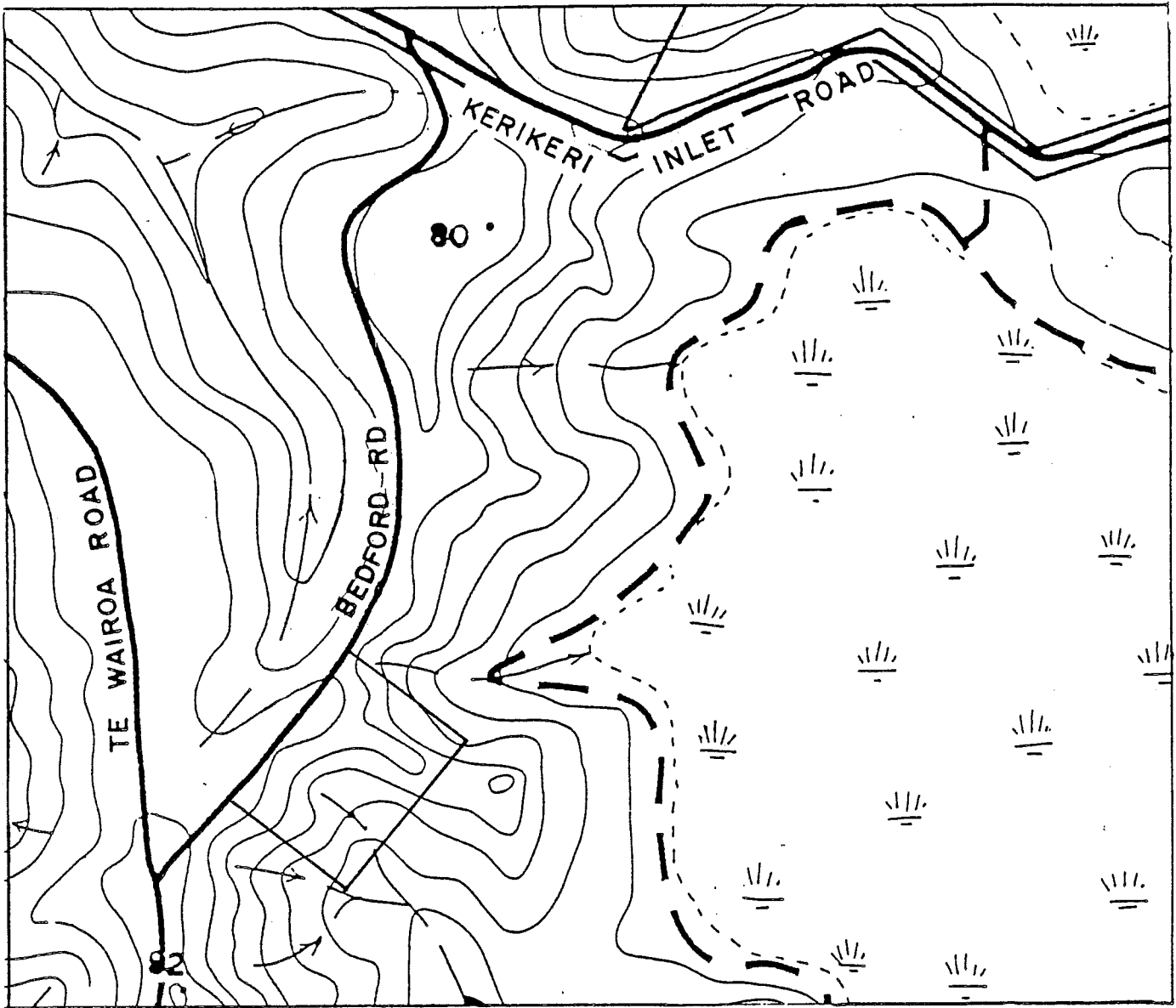
-  Ridge pine plantation
-  Gully pine plantation

Fig 4 : Todea Barbara Ecological Area



KEY

- Ecological Area boundary.
- Contour lines at 10m intervals
- Water course
- Roads

Vegetation descriptions have been grouped into forest types, where possible based on Nicholls (1976) typing. The following types were distinguished :

Pukewhau Ecological Area

1. Lowland podocarp hardwood forest (E2, Nicholls 1976).
2. Lowland softwood forest - dominantly tanekaha (closest to L3, Nicholls 1976).
3. Regenerating manuka scrub.

Tables 1a-c give a detailed stand structure and composition for each type. Overlay 2 of figure 3 shows their distribution within Pukewhau Ecological Area.

1. The first vegetation type is low altitude (less than 300 m) dominantly podocarp-hardwood forest. It is the most extensive forest type present covering most of the gullies and slopes and surrounding the stream beds.

Tanekaha and rimu are characteristic emergents with a few northern rata and occasional kanuka. The canopy is dominated by tarari, tawa, kanuka and tanekaha with puriri and kohekohe associated but in lower numbers.

Ponga dominated the subcanopy with kohekohe and tawa occasionally associated. Rewarewa, nikau and mahoe occurred occasionally. The shrub tier and ground cover contained a mixture of species including seedlings and juveniles of most of the above species. A thick litter layer was present.

2. The second type is a class not normally found in Northland. This vegetation closely resembles Nicholls (1976) type L3, found on the margin of the Hauhungaroa Range. It has abundant trees and poles of tanekaha forming a dense canopy and subcanopy with occasional kanuka. The occasional totara, five finger, mingimingi, hangehange and ponga make up the shrub layer. The ground is covered with abundant seedlings of tanekaha, rimu, miro, towai, totara, rewarewa and matai.
3. On some of the margins, bordering farmland or exotic forest are zones of manuka scrub, *Hakea sericea*, *H. salicifolia* and gorse (generalised stand structure table 1c). These areas reflect clearing of bounding forest and were probably burnt. This is a variable type as the stands represent different stages of regeneration. These areas are usually dominated by 5-6 m tall canopy of manuka with young tanekaha occasionally emergent. The understorey is composed of mingimingi, hangehange, five finger, toro, ponga and prickly and willow leaved hakea. The ground cover is a fairly dense cover of rushes, *Blechnum capense* and *Gleichenia* species.

Todea Barbara Ecological Area

1. Ridge pine plantation with *Todea barbara* fern.
2. Gully pine plantation, no *Todea barbara*.

Tables 2a-b give a generalised stand structure and composition for these two types. Overlay 2 of figure 4 show their distribution within Todea Barbara Ecological Area.

1. The first vegetation type is found on the ridges and has a canopy exclusively composed of radiata pine with the occasional ponga and mamaku in the subcanopy. Hangehange is frequent in the shrub layer with ponga, manuka, tobacco weed and *Todea barbara* fern occurring occasionally. The ground cover was minimal with occasional *Todea barbara* and bracken. The litter was composed of needles.
2. Within the gullies and lower (eastern) boundary the vegetation is denser. The canopy and subcanopy are the same as vegetation type one, except mamaku is more abundant than ponga and *Todea barbara* is absent. In the shrub layer hangehange occurs in higher density than on the ridges. The associated shrub species are mapou, pate and manuka.

Native Fauna

Lists of the native fauna recorded in the 2 Ecological Areas, using both scientific and common names are provided in Appendix 2.

North Island brown kiwi are recorded in and around both areas. Another notable native bird, the pied tit, was also heard in Pukewhau Ecological Area.

The New Zealand Land Inventory Worksheet on Wildlife classifies most of Pukewhau Ecological Area with a wildlife habitat rating of moderate-high. (Department of Lands and Survey 1981).

Introduced Animals and Forests Condition

Of 24 circular 4 m² plots examined in Pukewhau Ecological Area, none contained intact possum pellets. Goat pellets were found in 1 (4%) and along a track by the boundary. No tiers of the forest were noticeably open through browse. Light browse was recorded on five finger, rangiora, ponga, pigeonwood, kohekohe and Kirk's tree daisy.

Of eight circular 4 m² plots examined in the Todea Barbara Ecological Area, intact possum pellets were found in 1 (13%). Although these signs of the presence of browsing animals were evident no browse was observed.

TABLE 1A : GENERALISED STAND STRUCTURE FOR
LOWLAND PODOCARP HARDWOOD FOREST

TIER	← INCREASING DOMINANCE →			
	ABUNDANT	FREQUENT	OCCASIONAL	RARE
EMERGENT 23 m			tanekaha rimu	rata
CANOPY 16-22 m		taraire tawa kanuka	rimu tanekaha	pururi kohekohe towai rewarewa Hall's totara
SUBCANOPY 2-12 m		ponga kohekohe	towai tawa nikau taraire	Hall's totara rewarewa mahoe fivefinger lancewood
SHRUB 0.5-2 m		tawa ponga <i>Olearia rani</i>	kohekohe kiekie <i>Coprosma</i> spp. mingimingi	mapou hangehange pigeonwood
GROUNDCOVER			<i>Unania uncinata</i> kidney fern <i>Gahnia setifolia</i> <i>Hymenophyllum</i> spp. miro tunekaha rimu rewarewa	
EPIPHYTES AND LIANES			mingimingi clinging rata <i>Astelia solandri</i> <i>Collosperum</i> spp. hound's tongue	

DISTRIBUTION: covers most of the Pukewhau Ecological Area except in regenerating areas.

TABLE 1B : GENERALISED STAND STRUCTURE FOR
LOWLAND SOFTWOOD FOREST - DOMINANTELY
TANEKAHA

TIER	← INCREASING DOMINANCE →			
	ABUNDANT	FREQUENT	OCCASIONAL	RARE
EMERGENT			kanuka	rimu tanekaha
CANOPY 8-12 m	tanekaha		kanuka	rimu rewarewa
SUBCANOPY 2-8 m	tanekaha			towai mapou pigeonwood kohekohe toro ponga
SHRUB 0.5-2 m			Hall's totara fivefinger mingimangi hangehange ponga tanekaha	<i>Coprosma spathulata</i> towai miro tawa fivefinger
GROUNDCOVER		<i>Coprosma spathulata</i> tanekaha	towai lancewood mingimangi miro rimu Hall's totara <i>Blechnum</i> spp. rewarewa	
EPIPHYTES AND LIANES			fivefinger kidney fern mingimangi <i>Collospermum microspermum</i>	hound's tongue

DISTRIBUTION: occasionally on slopes in the larger catchment of
Pukewhau Ecological Area.

TABLE 1c : GENERALISED STAND STRUCTURE FOR
REGENERATING MANUKA SCRUB

TIER	← INCREASING DOMINANCE →			
	ABUNDANT	FREQUENT	OCCASIONAL	RARE
EMERGENT			tanekaha	
CANOPY 6 m	manuka			
SUBCANOPY 2-6 m		manuka	mingimangi hangehange ponga prickly hakea willow leaved hakea	
SHRUB 0.5-2m			toro prickly hakea willow leaved hakea mingimangi manuka <i>Coprosma</i> <i>raimoides</i>	
GROUNDCOVER			fivefinger <i>Juncus</i> spp. <i>Blechnum</i> <i>capense</i> <i>Gleichenia</i> spp.	
EPIPHYTES AND CLIMBERS				

DISTRIBUTION: boundaries and ridge slopes in the northern part of
Pukewhau Ecological Area.

TABLE 2A : GENERALISED STAND STRUCTURE FOR
RIDGE PINE PLANTATION WITH TODEA BARBARA FERN

TIER	← INCREASING DOMINANCE →			
	ABUNDANT	FREQUENT	OCCASIONAL	RARE
EMERGENT				
CANOPY 22 m	<i>Pinus radiata</i>			
SUBCANOPY 2-10 m			ponga mamaku	
SHRUB 0.5 m - 2 m			hangehange ponga mamaku woolly nightshade <i>Todea barbara</i>	
GROUNDCOVER			bracken hard fern <i>Todea barbara</i>	
EPIPHYTES AND CLIMBERS				

DISTRIBUTION: ridges, ridge slopes and dryer areas of Todea Barbara Ecological Area.

TABLE 2B : GENERALISED STAND STRUCTURE FOR
GULLY PINE PLANTATION, NO TODEA BARBARA

TIER	← INCREASING DOMINANCE →			
	ABUNDANT	FREQUENT	OCCASIONAL	RARE
EMERGENT				
CANOPY 22 m	<i>Pinus radiata</i>			
SUBCANOPY 2-8 m			hangehange ponga towai	
SHRUB 0.5 - 2 m		hangehange mamaku	<i>Coprosma</i> spp. gorse towai	
GROUNDCOVER			<i>Blechnum</i> <i>filiforme</i> <i>Gahnia setifolia</i> turutu <i>Oplismenus</i> <i>imbecillus</i>	
EPIPHYTES AND LIANES				

DISTRIBUTION: gullies and gully slopes in Todea Barbara Ecological Area.

Rabbits have also been observed on the road bordering the southern side of the Todea Barbara Ecological Area.

Both catchments of Pukewhau Ecological Area were fairly lush and well filled in most tiers usually with a large number and a high diversity of seedlings present. Occasionally fallen canopy trees, particularly tawa were noticed though none were recent.

Todea Barbara Ecological Area is heavily managed pine plantation.

Presence of Exotic Plants

There are several exotic plant species in Pukewhau Ecological Area. Pasture grasses and common weeds occur along the road edges and slips.

In a regenerating area on the eastern side of the larger catchment, 2 species of *Hakea* occur and gorse is very dense in places.

The occasional mist flower plant was found along the water course. This plant has the potential to overgrow the stream bed in open conditions.

The entire 0.53 ha of Todea Barbara Ecological Area is planted in radiata pine and other exotic plants are common.

Introduced species that have the potential to become of concern are gorse (found very densely around the edges) and possibly tobacco weed.

Human History and Influence

There are no archaeological sites recorded by the Auckland Conservancy Archaeologists within Pukewhau Ecological Area. Unconfirmed archaeological sites of maori origin (a midden and several pits) are recorded around and below Todea Barbara Ecological Area but not within the gazetted area.

Paihia, Kerikeri, Bay of Islands region had a fairly dense maori population. Several pa sites have been recorded within the vicinity (Rogers 1961, Shawcross 1966). Much of the Waitangi lands were sold into private ownership by the late 1830's (Turton 1882, Shawcross 1966).

In the late 1940's Sir J.D. Hooker described large tracts of burnt hills within the region where fires used to clear areas for farmland had continued uncontrolled into forests (Cameron 1964).

The land on which the pine plantation was established in the later half of this century was reverting farmland, manuka scrub and gorse with bush gullies and pockets of native bush.

Todea barbara (photographs by L.J. Forester)



The forestry land around Pukewhau trig was cleared and planted in 1975 and the present stand in Todea Barbara Ecological Area was planted in 1965. *Todea barbara* was discovered in 1965 growing abundantly in the areas burnt off in preparation for planting pine (Sexton, pers. comm.).

Recreational Facilities and Opportunities

Both areas are untracked, except for a logging track in Pukewhau Ecological Area between the two catchments, and no huts or other facilities are present.

Todea Barbara Ecological Area is not suitable for tracking because of its small size and the ecological sensitivity of the *Todea barbara* which grows there.

Pukewhau Ecological Area contains several areas of very attractive podocarp hardwood. The potential for tracking for family walks is there, though none are planned and the area is at present inaccessible by private vehicles. Areas in Puketi and Opuia Forests, close to the Bay of Islands, have been developed to provide a wide range of recreational opportunities.

Research Carried Out and Suggested

Several reports have been written on the Pukewhau Ecological Area, three by Forest Service, R.C. Lloyd (1973), D.W. Guild (1974) and P.J. Thode (1976) - and one by R.A. Anderson Wildlife Service, Department of Internal Affairs (NZFS file no. 6/193/21/5). The report by P.J. Thode is the most detailed covering aspects of flora, fauna, topography, access and future developments.

P.J. Thode also wrote an internal report in preparation for gazettal for Todea Barbara Ecological Area (NZFS file no. 6/193/19). This covered the area of the fern, the boundaries of the proposed Ecological Area, associated flora, access and gorse control.

Three kiwi vocalisation surveys have been carried out in Waitangi State Forest over the years 1978 (Corbett, Thode and Reid 1979), 1981-2 (Colbourne and Kleinpaste 1983) and 1985. Both ecological areas were monitored during these studies.

Summary, Discussion and Recommendations

Pukewhau Ecological Area

Pukewhau Ecological Area is a remnant of podocarp hardwood forest and scrub in the south-west corner of Waitangi State Forest. Access can be gained via forestry roads. The 33 ha tract of bush was gazetted in 1975 with two objectives (i) reserving a remnant of vegetation once characteristic of the area and (ii) ensuring that some native bush was reserved for kiwi habitat.

The area is moderately to very steep sedimentary rock of sandstone and mudstone with soils of the Hukerenui, Rangiora and Marua series.

Both possum and goat browse were noted in the area. Browse was light but the potential for damage, particularly by goats is of concern.

Three types of vegetation were identified: lowland podocarp hardwood forest, lowland softwood forest - dominantly tanekaha and regenerating manuka scrub. Three groups of exotics recorded are the potential to cause problems: gorse, *Hakea salicifolia*, *H. sericea* and mist flower.

The area has a history of maori occupation and although no sites have yet been recorded from the area, several pa sites are found nearby.

Apart from internal reports by Forest Service the only research carried out in this area are kiwi vocalisation studies along the boundaries.

Management of the area should be orientated to preventing further deterioration of this remnant of formerly extensive bush.

Priorities of management in descending order for Pukewhau Ecological Area should be :

1. That the effect of possums within the reserve should be assessed and controlled where necessary and practicable;
2. That NZFS keep a regular and strict check on neighbouring goat populations;
3. That self-seeding *Hakea* be ringbarked or removed and the gorse controlled;
4. That the co-operation of adjacent landowners be sought to maintain a forested buffer zone to the south and west; and
5. That several permanent plots representing differing vegetation types be set up to monitor trends.

Todea Barbara Ecological Area

Todea Barbara Ecological Area is a very small (0.5 ha) area within Waitangi State Forest reserved for the protection of the rare fern *Todea barbara*. The reserve represents the southernmost known distribution of this fern.

Access to the area can be gained from Paihia or Kerikeri through forestry roads. The area encompasses a steep east facing gully on sedimentary rock of the Waipapa Group with moderately podzolised earths of the Hukerenui Series.

The vegetation of the area is dominantly radiata pine for commercial use. A distinction between gully and ridge vegetation was drawn, mainly on the basis of the presence of *Todea barbara* which did not occur within the gullies. Gorse, tobacco weed and other exotic species were prevalent, particularly around the boundaries. Introduced animals recorded included possums and rabbits.

The region has a history of maori occupation and early european farming. There are no archaeological sites recorded within the ecological area, though there are several in the vicinity.

Management of the area should be orientated to the protection and perpetuation of the *Todea barbara* fern. Management considerations in order of priority should be :

1. To monitor closely the changes and trends growth and population of *Todea barbara* fern;
2. That methods of removing the pine should be carefully assessed; and
3. That the impact of possums and rabbits should be assessed and controlled if necessary.

Acknowledgements

I would like to thank Lisa Forester and Freek Deuss for their assistance in editing and proof-reading, Lisa also for her valuable assistance in the field.

Appendix 1 : Botanical Species List - Pukewhau Ecological Area
and Todea Barbara Ecological Area

a. Pukewhau Ecological Area

Fern Allies

<i>Lycopodium billardieri</i>	clubmoss
<i>L. deuterodensum</i>	"
<i>Tmesipteris elongata</i> subsp. <i>elongata</i>	
<i>T. elongata</i> subsp. <i>robusta</i>	
<i>T. lanceolata</i>	
<i>T. tannensis</i>	

Ferns

<i>Adiantum fulvum</i>	black maidenhair fern
<i>Anarthropteris lanceolata</i>	
<i>Asplenium bulbiferum</i>	hen and chicken fern
<i>A. flaccidum</i> subsp. <i>flaccidum</i>	hanging spleenwort
<i>A. lucidum</i>	
<i>A. oblongifolium</i>	
<i>A. polydon</i>	
<i>Blechnum chambersii</i>	
<i>B. discolor</i>	crown fern
<i>B. filiforme</i>	
<i>B. fraseri</i>	
<i>B. membranaceum</i>	
<i>Blechnum</i> sp. (<i>B. capense</i> agg.)	kiokio
<i>Cardiomanes reniforme</i>	kidney fern
<i>Cyathea dealbata</i>	ponga
<i>C. medullaris</i>	
<i>Deparia petersenii</i> (= <i>Athyrium japonicum</i>)	
<i>Dicksonia squarrosa</i>	wheki
<i>Gleichenia</i>	
<i>Grammitis ciliata</i>	
<i>G. pseudociliata</i>	
<i>Histiopteris incisa</i>	water fern
<i>Hymenophyllum demissum</i>	filmy fern
<i>H. dilatatum</i>	" "
<i>H. multifidum</i>	" "
<i>H. rarum</i>	" "
<i>H. revolutum</i>	" "
<i>H. sanguinolentum</i>	" "
<i>H. scabrum</i>	" "
<i>Hypolepis dicksonioides</i>	
<i>Lastreopsis glabella</i>	
<i>L. hispida</i>	
<i>Leptopteris hymenophylloides</i>	heruheru
<i>Lindsaea trichomanoides</i>	
<i>Lygodium articulatum</i>	mangemange
<i>Paesia scaberula</i>	ringfern or hard fern
<i>Phymatosorus diversifolius</i>	hound's tongue
<i>P. scandens</i>	
<i>Pneumatopteris pennigera</i>	
<i>Pteridium esculentum</i>	bracken

<i>Pteris tremula</i>	shaking bracken
<i>Pyrrosia serpens</i>	leather leaf fern
<i>Schizaea dichotoma</i>	fan-fern
<i>Tmesipteris elongata</i> subsp. <i>robusta</i>	

Gymnosperms

<i>Dacrycarpus</i> (= <i>Podocarpus</i>) <i>dacrydioides</i>	kahikatea
<i>Dacrydium cupressinum</i>	rimu
<i>Phyllocladus trichomanoides</i>	tanekaha
<i>Podocarpus hallii</i>	Hall's totara
<i>Prumnopitys ferruginea</i> (= <i>Podocarpus</i> <i>ferrugineus</i>)	miro
<i>P. taxifolia</i> (= <i>Podocarpus spicatus</i>)	matai

Dicotyledons

<i>Alseuosmia macrophylla</i>	
<i>Beilschmiedia tarairi</i>	tarairi
<i>B. tawa</i>	tawa
<i>Brachyglottis repanda</i>	rangiora
A <i>Callitriche muelleri</i>	starwort
<i>Carpodetus serrata</i>	putaputaweta
<i>Centella uniflora</i>	
A <i>Cirsium vulgare</i>	scotch thistle
<i>Clematis cunninghamii</i> (= <i>C. parviflora</i>)	
<i>C. paniculata</i>	
<i>Coprosma arborea</i>	mamangi
<i>C. lucida</i>	karamu
<i>C. rhamnoides</i>	
<i>C. spathulata</i>	
<i>C. robusta</i>	karamu
<i>Coriaria arborea</i>	tutu
<i>Corynocarpus laevigatus</i>	karaka
A <i>Digitalis purpurea</i>	foxglove
<i>Dracophyllum latifolium</i>	neinei or spiderwood
<i>D. lessonianum</i>	parantaniwha
<i>Dysoxylum spectabile</i>	kohekohe
<i>Elaeocarpus dentatus</i>	pokaka
<i>Elatostema rugosum</i>	parantaniwha
<i>Epilobium</i> sp.	willow herb
A <i>Erigeron floribundus</i>	broad leaved fleabane
A <i>Eulex europaeus</i>	gorse
A <i>Eupatorium riparium</i>	mist flower
<i>Fuchsia excorticata</i>	fuchsia
<i>Geniostoma ligustrifolium</i>	hangehange
A <i>Gnaphalium spicatum</i>	purple cudweed
A <i>Gonocarpus incanus</i>	
<i>Grammitis billardieri</i>	
A <i>Hakea salicifolia</i>	willow-leaved hakea
A <i>H. sericea</i>	prickly hakea
<i>Hebe stricta</i> var. <i>stricta</i>	koromiko
<i>Hedycarya arborea</i>	pigeonwood
<i>Hoheria populnea</i> var. <i>populnea</i>	lacebark

A <i>Holeus lanatus</i>	Yorkshire fog
<i>Knightea excelsa</i>	rewarewa
<i>Laurelia novae-zelandiae</i>	pukatea
<i>Leptospermum ericoides</i>	kanuka
<i>L. scoparium</i>	manuka
<i>Leucopogon fasciculatus</i> (= <i>Cyathodes fasciculata</i>)	mingimingi
<i>Lotus pedunculatus</i>	
<i>Lycopodium billardieri</i>	
<i>Lygodium articulatum</i>	
<i>Melicutus ramiflorus</i>	mahoe
<i>Metrosideros diffusa</i>	climbing rata
<i>M. fulgens</i>	" "
<i>M. perforata</i>	clinging rata
<i>M. robusta</i>	rata
<i>Mida salicifolia</i>	maire
<i>Myrsine australis</i>	mapou
<i>M. salicina</i>	toro
<i>Nertera depressa</i>	
<i>N. dichondraefolia</i>	
<i>Nestiges lanceolata</i>	white maire
<i>Olearia Furfuracea</i>	akepiro
<i>O. rani</i>	heketara
<i>Pittosporum tenuifolium</i>	matipo
<i>Pomaderris kumeraho</i>	kumerahou
<i>P. phulicifolia</i> var. <i>ericifolia</i>	whatitiri
<i>Pseudopanax arboreus</i> var. <i>arboreus</i>	fivefinger
<i>P. crassifolius</i>	lancewood
A <i>Ranunculus hirtus</i>	
A <i>Rubus cissoides</i>	bush lawyer
<i>Salix</i> sp.	willow
A <i>Senecio diaschides</i>	
<i>S. kirki</i>	kohurangi
<i>S. minimus</i>	fireweed
<i>Shefflera digitata</i>	pate
A <i>Solanum americanum</i>	
A <i>S. mauritianum</i>	woolly nightshade
A <i>S. nigrum</i>	black nightshade
<i>Toronia toru</i>	toru
<i>Vitex lucens</i>	pururi
A <i>Wahlenbergia marginata</i>	
<i>Weinmannia silvicola</i> var. <i>silvicola</i>	towai

Monocotyledons

<i>Acianthus fornicatus</i> var.	
<i>Astelia solandri</i>	
<i>A. trinerva</i>	kauri grass
A <i>Axonopus affinis</i>	narrow-leaved carpet grass
<i>Bulbophyllum pygmaeum</i>	
<i>Collosperrum hastatum</i>	
<i>C. microspermum</i>	
<i>Cordyline australis</i>	cabbage tree
<i>C. banksii</i>	forest cabbage tree
<i>C. pumilio</i>	pigmy cabbage tree
<i>Corybas orbiculatus</i>	spider orchid

<i>C. rivularis</i>	spider orchid
<i>Dianella nigra</i>	turuturu
<i>Earina mucronata</i>	
<i>Ereycinetia bauerinana</i> subsp. <i>banksii</i>	kiekie
<i>Gahnia pauciflora</i>	
<i>G. setifolia</i>	
A <i>Juncus articulatus</i>	jointed rush
A <i>Juncus</i> spp.	rush
<i>Microlaena avenacea</i> (= <i>Ehrhata diplax</i>)	bush rice grass
<i>Oplismenus imbecillus</i>	
<i>Pterostylis trullifolia</i>	green hooded orchid
<i>Rhopalostylis sapida</i>	nikau
<i>Ripogonum scandens</i>	supple jack
<i>Uncinia banksii</i>	hook sedge
<i>U. uncinata</i>	" "
<i>U. zotovii</i>	" "

Appendix 1 : Botanical Species List - Pukewhau Ecological Area
and Todea Barbara Ecological Area

b. Todea Barbara Ecological Area

Fern and Fern Allies

<i>Adiantum cunninghamii</i>	common maidenhair fern
<i>A. fulvum</i>	black " "
<i>Blechnum filiiforme</i>	
<i>B. fraseri</i>	
<i>Blechnum</i> sp. (<i>B. capense</i> agg.)	kiokio
<i>Cyathea dealbata</i>	ponga
<i>C. medullaris</i>	mamaku
<i>Paesia scaberula</i>	ringfern or hard fern
<i>Pteridium esculentum</i>	bracken
<i>Pteris tremula</i>	shaking bracken
<i>Todea barbara</i>	

Gymnosperms

A <i>Pinus radiata</i>	radiata pine
<i>Podocarpus totara</i>	totara

Dicotyledons

A <i>Cirsium vulgare</i>	Scotch thistle
<i>Coprosma areolata</i>	
<i>C. propinqua</i> x <i>robusta</i>	
<i>C. robusta</i>	karamu
A <i>Crepis capillaris</i>	hawksbeard
<i>Entelea arborescens</i>	туру
A <i>Eulex europaeus</i>	gorse
A <i>Epatorium adenophorum</i>	Mexican devil
A <i>E. riparium</i>	mist flower
<i>Geniostoma ligustrifolium</i>	
A <i>Gnaphalium spicatum</i>	purple cudweed
<i>Hedycarya arborea</i>	pigeonwood
<i>Leptospermum scoparium</i>	manuka
<i>Leucopogon fasciculata</i>	mingimingi
<i>Meliccytus ramiflora</i>	mahoe
<i>Myrsine australis</i>	mapou
A <i>Passiflora caerulea</i>	blue-crown passion flower
<i>Pomaderris kumeraho</i>	kumerahou
<i>P. phyllicifolia</i> var. <i>ericifolia</i>	whatitiri
A <i>Senecio bipinnatasectus</i>	Australian fireweed
<i>Shefflera digitata</i>	pate
A <i>Solanum mauritianum</i>	woolly nightshade
A <i>Sanchus oleraceus</i>	sow thistle
<i>Weinmannia silvicola</i>	towai

Monocotyledons

A	<i>Axonopus affinis</i>	narrow leaved carpet grass
	<i>Cordyline australis</i>	cabbage tree
A	<i>Cortaderia selloana</i>	pampas grass
	<i>Dianella nigra</i>	turuturu
	<i>Freycinetia baueriana</i> subsp. <i>banksii</i>	kiekie
	<i>Gahnia setifolia</i>	
	<i>Juncus plantifolius</i>	
	<i>Microlaena avenacea</i>	bush rice grass
	<i>M. stipoides</i>	meadow rice grass
	<i>Oplismenus imbecillus</i>	
A	<i>Paspalum dilatatus</i>	
	<i>Schoenus</i> sp.	
	<i>Uncinia banksii</i>	hooksedge

Appendix 2 : Faunal Species List - Pukewhau Ecological Area
and Todea Barbara Ecological Area

a. Pukewhau Ecological Area

Native Birds

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

Introduced Birds

<i>Acridotheres tristis</i>	myna
<i>Gymnorhina hypoleuca</i>	white backed magpie
<i>Turdus merula</i>	blackbird

Introduced Mammals

<i>Capra hircus</i>	goat
<i>Trichosurus vulpecula</i>	possum

b. Todea Barbara Ecological Area

Native Birds

<i>Apteryx australis mantelli</i>	N.I. brown kiwi
<i>Ardea novaehollandiae</i>	white faced heron
<i>Circus approximans</i>	harrier
<i>Gerygone igata</i>	grey warbler
<i>Ninox novaeseelandiae</i>	morepork
<i>Prothemadera novaeseelandiae</i>	tui
<i>Rhipidura fuliginosa</i>	fantail
<i>Zosterops lateralis</i>	silveryeye

Introduced Birds

Fringilla coelebs
Lophortyx californicus
Phasianus colchicus
Platycercus eximius
Turdus merula

chaffinch
 californian quail
 phesant
 eastern rosella
 blackbird

Molluscs

Rhytida greenwoodi

Introduced Mammals

Trichosurus vulpecula
Oryctolagus cuniculus

possum
 rabbit

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