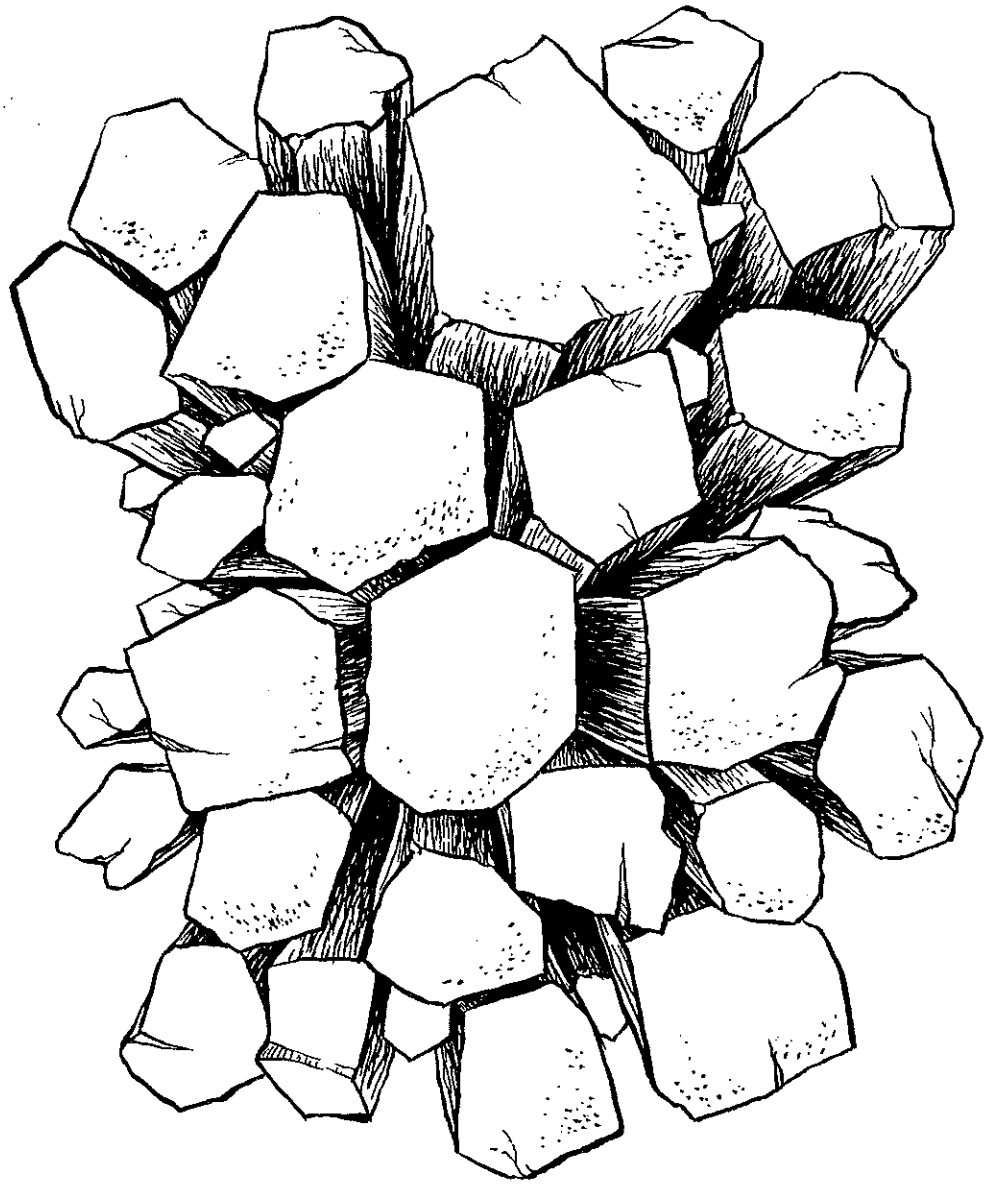
Parakawai Quarry Geological Area



ROCK FORMATION – PARAKAWAI QUARRY

Auckland Conservancy
DEDICATED AREAS REPORT No. 2

ODC. no. 627.4

PARAKAWAI QUARRY GEOLOGICAL AREA

NZ FOREST SERVICE
AUCKLAND CONSERVANCY
CPO Box 39
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(This is unpublished internal report)

Bruce Burns
May 1984

PARAKAWAI QUARRY GEOLOGICAL AREA

C O N T E N T S

Location

The Parakawai Quarry Geological Area is a small reserve (68 ha) centred upon two quarry faces and surrounding a section of the Wharekirauponga Stream (midpoint map ref NZMS 260 T12 616334). It lies within the Waihi Ecological District (Simpson 1982, BRC 1983) and within and on the bo of the Maratoto Block of the Coromandel State Forest Park, 30 kilometres southeast of Thames (Fig 1). The Otahu Ecological Area is nearby (Fig 2). M of the land adjacent to the Geological Area is within the State Forest Park and is covered in scrub and forest. Land adjacent on the northern boundary is scrub-covered farmland whilst across the Lignite Stream to the northwest, 92 ha of *Pinus radiata* were planted between 1977 and 1979 (Parakawhai Forest, Smith and Carter 1982) . Eucalypts have also been planted in this region. The most recent aerial photograph was flown on the 10th January 1983 and is NZAM SN 8163 V18.

Access

Access to the quarry is gained via Quarry Road off Provincial State Highway 25 between Waihi and Whangamata. Quarry Road follows the Otahu River and then the Wharekirauponga Stream into the centre of the Geological Area.

History of Gazettal

The area was proposed for gazettal as a Geological Area by D.N.B. Skinner of the NZ Geological Survey after a visit to the area in 1976 (Skinner 1976). This proposal was approved by the Minister of Forests and gazettal occurred on the 14th August 1980 (NZ Gazette No. 94 Page 2408).

Rationale and Objectives of Designation

The Parakawai Quarries were operated up until 1967 by H.G. Leach and Co Ltd. for the Thames County Council. The exposed faces caused by this work are of scientific and general interest as they show cross-sections of volcanic structures. The rock columns exposed are of andesite, remnants of the lava left in the vent of an extinct volcano and are approximately 20 million years old. Skinner (1976) has lamented the lack of structures demonstrating the 30 million year volcanic history of the Coromandel Peninsula. As such, the Parakawai Quarries have geological importance for the entire region.

Skinner (1976) has also assessed the suitability of the aggregate left in the quarries.

> 'The rock itself is of good base course or even top course quality with adequate reserves. However it would be necessary to remove a large quantity of overburden in order to open a suitable safe quarry face. The disposal of this spoil should be a major consideration if quarrying is to be permitted.'

He concludes that to re-open the quarry would destroy a site of scientific interest. Also overburden from quarrying would be a major problem. Dumping overburden in the nearby stream would destroy its currently high aesthetic and recreational values.

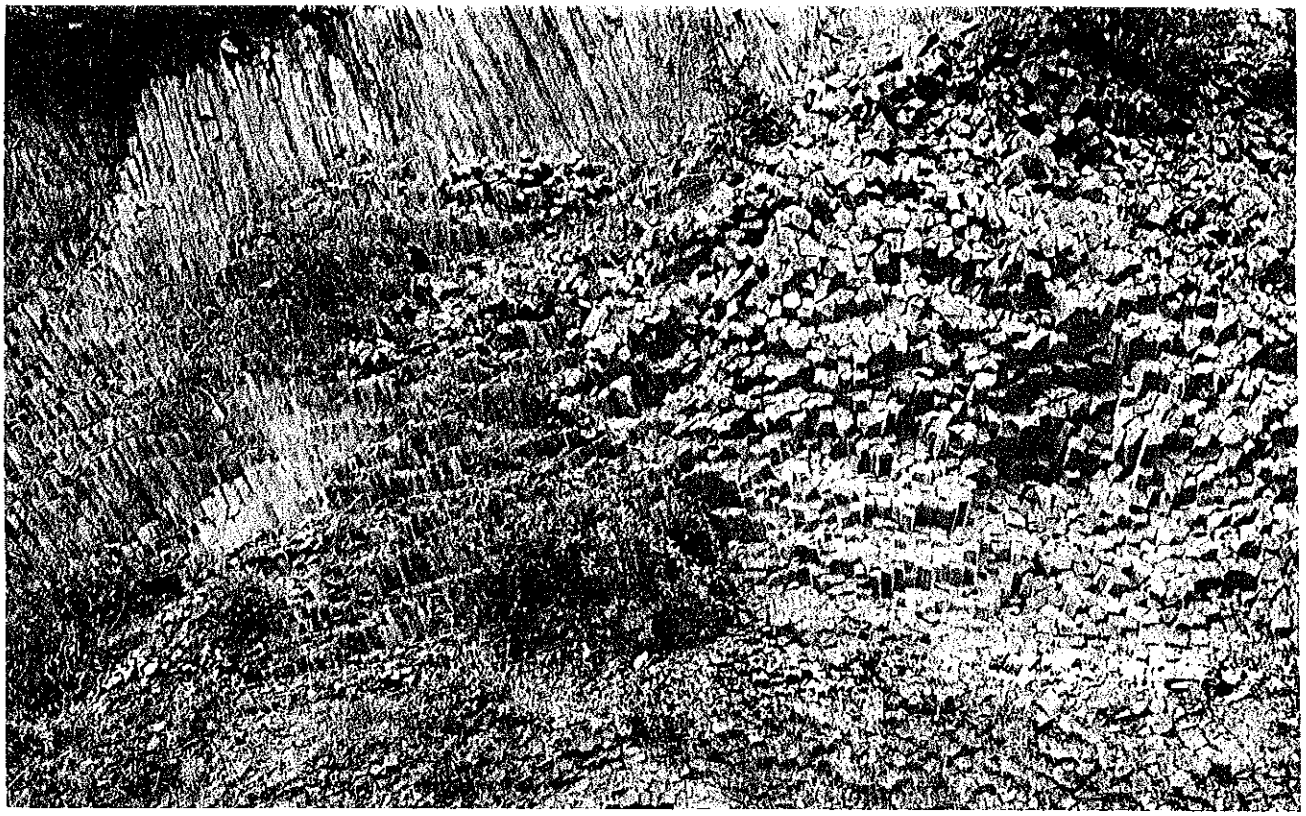


Photo 1 : Parakawai Quarry Face showing columnar rock columns of lava.
(photo by P. de Jager)

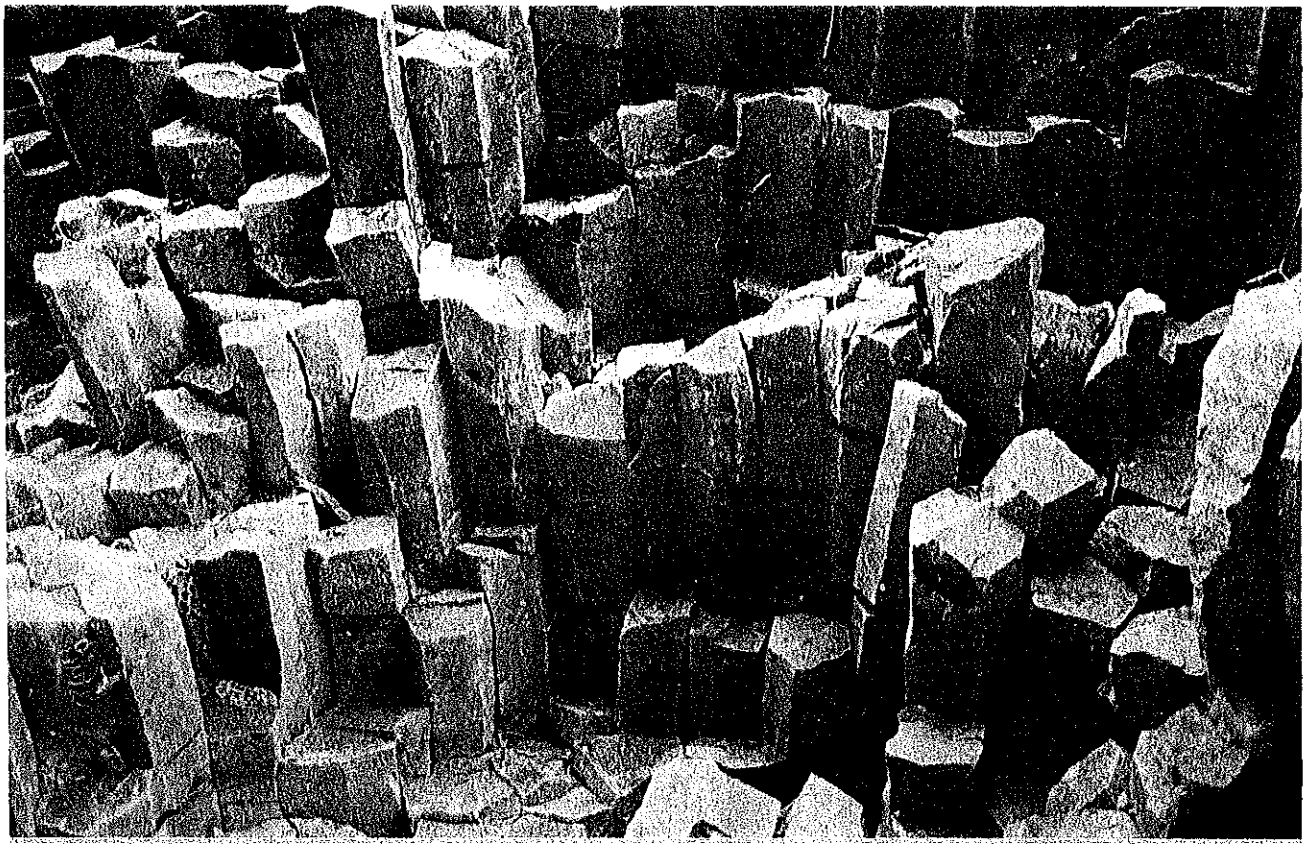
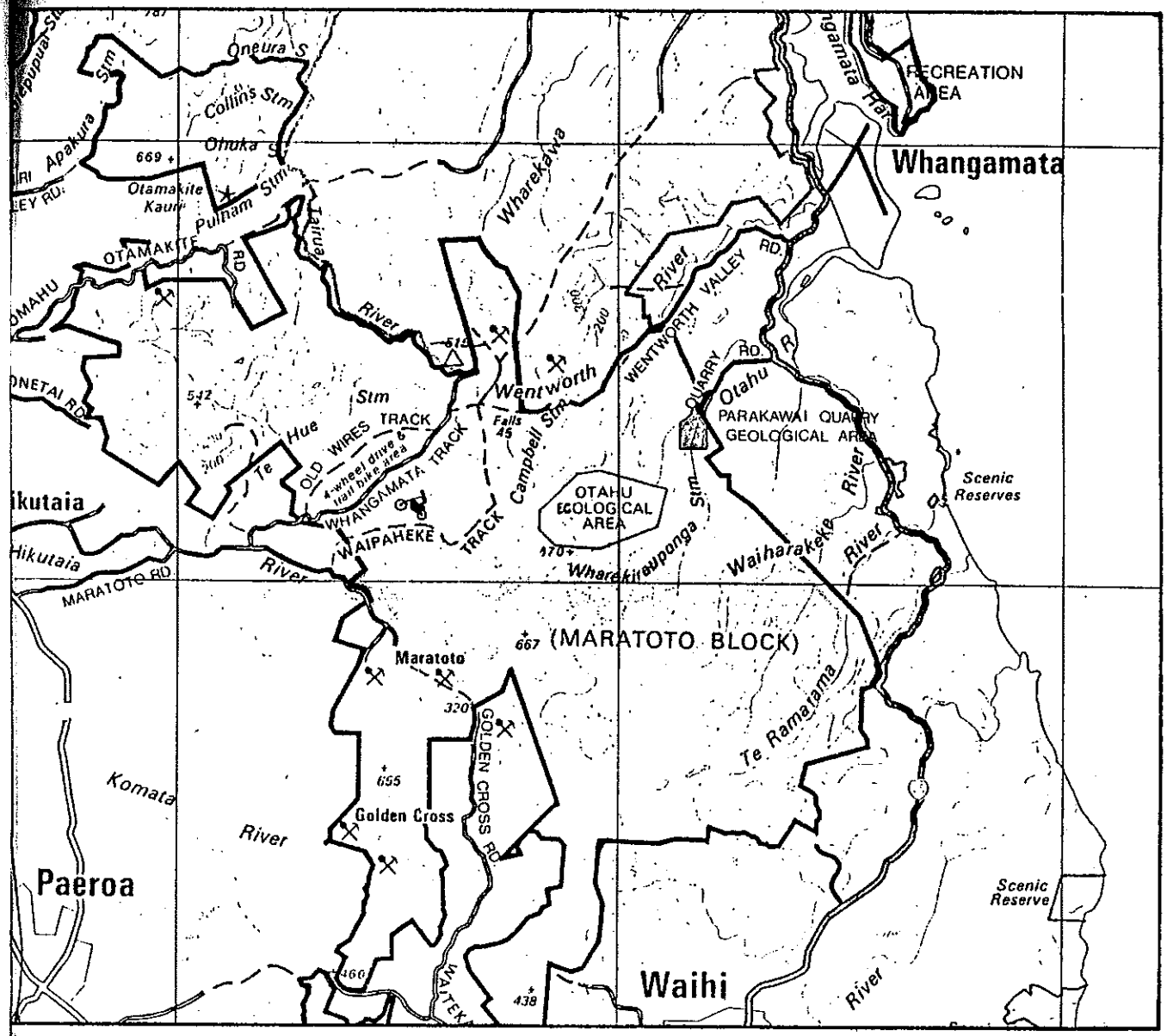


Photo 2 : Close up of polygonal rock columns.
(photo by P. de Jager)



1: Location Diagram - Parakawai Quarry Geological Area

ed on NZMS 274 Coromandel State Forest Park, 1:150,000, 1st Edition 1979,
, Government Printer)

ogical Area

e Forest Park Boundary

The Parakawai Quarry has thus been dedicated as a Geological Area:

> '... to reserve an area of an almost unique columnar, volcanic feature of scientific interest' (NZFS 1978)

The reserve has an IUCN* classification of III (natural landmark, NZFS for IUCN 1984). Areas of this type are designated to protect and preserve nationally significant features because of their special interest or unique characteristics such as geological formations or historic sites.

(IUCN 1978)

Climate

Discussions of climate on the Coromandel are given in Burns (1983) and Maunder (1974). The closest meteorological station exists at Tairua State Forest Headquarters. This station has recorded a mean annual rainfall of 1823 mm, a mean daily minimum temperature of 9.8°C and a mean daily maximum of 19.1°C.

(NZ Met. Serv. 1973)

Topography

The Parakawai Quarry Geological Area is situated in the lower reaches of the Wharekirauponga Stream Valley and has an altitudinal range between 40 and 160 m a.s.l. The area is composed of moderately steep to steep valley sides with, in the north-west, a flat river terrace. Slopes are generally between 21° and 35° (Water and Soil Division, MOWD 1975).

Geology

The description of the quarry is given under 'Rationale and Objectives of Designation'. Apart from these, the basal rock types of the reserve are minden rhyolites on the eastern side of the valley, and Beeson's Island volcanics on the western. The latter are hypersthene andesite flows, breccia and fluviatile sediments (NZ Geological Survey 1967).

Pedology and Erosion

There are two types of soils in the reserve and, as with the rock types, the Wharekirauponga Stream divides one from the other. On the western slopes is a Whangamata gravelly sandy loam hill soil. This is a strongly leached yellow brown loam formed from Whangamata ash over rhyolite and andesite, the ash being of variable depth (0.5 - 1.5 m) depending on the slope. The eastern side of the valley has Aroha steepland soils. These are sandy or clay loam skeletal soils of medium to low natural fertility derived from andesitic rock (Eyre 1977, Water and Soil Division, MOWD, 1975).

The Land Resource Inventory Worksheet (Water and Soil Division, MOWD, 1975) classifies the western side of the reserve class VI and the eastern, class VII land. No obvious erosion is present in the reserve.

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

Vegetation

The following vegetation description is derived from a day's field inspection in which six site descriptions were taken. Site descriptions involve a modified recce-plot approach in which the vegetation structure and composition are described in up to five tiers - emergents, canopy, subcanopy (from beneath the canopy to 2m high), shrub (2m to 0.5m) and groundcover ($\lesssim$ 0.5m). A more detailed discussion of the method is contained in Burns (1983).

The vegetation of Parakawai Quarry Geological Area is a mix of regenerating vegetation types differing in height and stage of development. These differences must in part be due to various episodes of modification throughout the history of the quarry site.

There are two types of vegetative cover represented in the reserve. Most of the area supports a *kanuka/manuka scrub while some hardwood forest grows on the river flats to the north-west.

A number of variations in height and associated species of the kanuka/manuka scrub type occur throughout the reserve. On the eastern slopes of the valley with their low fertility soils, the manuka canopy is only 2-3 m tall with occasionally emergent rewarewa, kohuhu, ~~akeake~~ and fivefinger. The groundcover is dense with manuka seedlings and *Schoenus tendo*. A number of radiata pines have invaded this low scrub type.

On the western side of the Wharekirauponga Stream and in the southern corner, the canopy is 10 m tall and consists of kanuka, rewarewa, kohuhu and fivefinger. Beneath this are subcanopy and shrub layers of towai, mingimingi, fivefinger, rangiora and karamu. The groundcover consists of *Schoenus tendo*, kiokio and maidenhair fern with mangemange the predominant scrambler.

Further up the western slopes, the canopy consists of 3-4 m high manuka with towai, kanuka and kohuhu. Rewarewa and toru are occasionally emergent at approximately 6 m tall. *Pseudopanax discolor*, mingimingi, towai and manuka make up the subcanopy with mingimingi, rewarewa seedlings and kumeraho represented in a sparse shrub layer. Groundcover is dense however with *Gleichenia dicarpa*, kiokio, and *Lycopodium deuterodensum*. There are no epiphytes or scramblers present.

There is a small kauri stand (4-5 trees) in one of the shallow gullies of the western slope. Beneath the 18 m kauri canopy the subcanopy consists of towai, mapou, toru, kohuhu, kanuka and heketara. Karapapa forms the shrub tier with kiokio, hookgrass and bush rice grass as a sparse groundcover.

The hardwood forest on the north-western river flats has a 20m high canopy of towai, rewarewa, mahoe, tawa and occasional kanuka (Nicholls 1976, type P9). The subcanopy and shrub tiers are comprised of mamaku, ponga, mahoe, kawakawa, pigeonwood, hangehange and nikau with *Blechnum filiforme* and *Oplismenus hirtellus* as groundcover. Supplejack is a common liane through this type. Occasionally kanuka is dominant in the canopy and where this occurs, karapapa, Kirk's daisy and *Astelia trinervia* form a dense shrub and groundcover,

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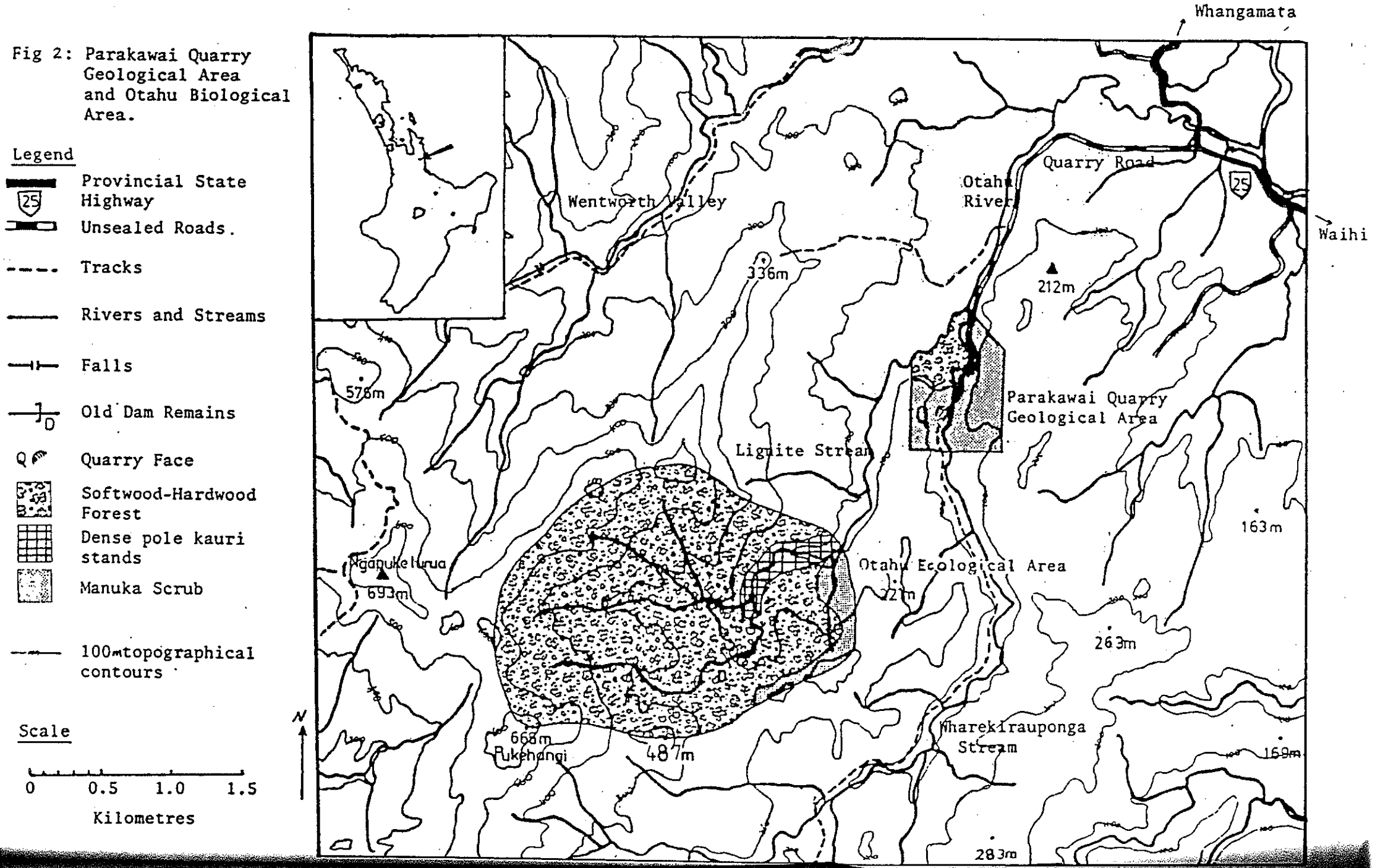
* A botanical species list incorporating common and scientific names is given as Appendix 1.

Fig 2: Parakawai Quarry Geological Area and Otahu Biological Area.



Introduced Animals and Forest Condition

Of twenty 4 m^2 circular plots examined throughout the Geological Area, three (15%) contained intact goat droppings whilst two (10%) had intact possum pellets. An area of pig rooting was present on the river flats. Sheep from a neighbouring farm gain access along the roadway. Anderson (1983) reports that goats are sometimes plentiful and possums are present. A current hunting programme in the Maratoto Block by NZFS hunters should reduce the threat of goat damage in the reserve.

Although signs of the presence of browsing mammals were evident, little direct browse was observed. Possums had lightly browsed five-finger while goats had chewed bracken, towai, karapapa, kiokio and nikau seedlings.

Because of the absence of seedlings of canopy trees and the low nutrient status of the soils on the eastern side of the valley, these sites will probably remain indefinitely in a manuka scrub cover. To the west, however, the areas of scrub contain many seedlings and saplings of forest trees e.g. kauri, towai. It is probable that regeneration of a forest cover will eventually occur here. There are few dead trees anywhere in the reserve and generally the vegetation is dense and apparently healthy.

Presence of Exotic Plants

There are many exotic plant species present in the reserved area. Pasture grasses and common weeds occur along the road and in front of the quarry faces where there are open areas. In the eastern scrub region there are several self-established *Pinus radiata* whilst in the western scrub, the occasional *Hakea salicifolia* can be found.

Native Fauna

Extract from Anderson (1983):-

> 'Native bird species observed within the Geological Area included NZ pigeon, tui, welcome swallow, kingfisher, silvereye, grey warbler, North Island fantail, shining cuckoo, bellbird, black shag and reported North Island brown kiwi. Introduced bird species included blackbird, redpoll and chaffinch. The most significant find was that of a colony of Paua slugs, at the site of the old quarry. This slug *Schizoglossa worthyae* is up to 22 mm long and 15 mm wide, with a small shell or 'cap' which sits upon the back of the slug. The shell resembles a paua shell, hence the name. The only other site on the Coromandel Range that these slugs were reported from was the Moehau Ecological Area. The Paua slug is known only from the North Island, and is nowhere common.'

During fieldwork, Helm's butterfly *(Dodonidia helmsi)* was observed (W. Richards - pers comm). This occurs in forest clearings, breeds on sedge, is on the wing only during January and February and is infrequently seen (Miller 1971).

History and Human Influence

There is no evidence of Maori use of the site (John Coster pers. comm.).

Prospecting was carried out in the upper reaches of the Wharekirauponga Stream in the early 1890's. By 1896, a number of claims taken out had been amalgamated as the Royal Standard Gold Mining Company of England. These claims were located immediately below the junction of the Wharekirauponga and Edmonds Streams. The company spent a considerable amount of money developing the claim. A tramway 8 km long was constructed between Otahu inlet and the claim and water races were constructed before the quality of the reefs was ascertained. These turned out to be poor, consequently the development was a financial disaster and work ceased in 1897 before mining had even started. (Slane and White 1980). The path of this old tramway is now a track which starts from the road end near the quarry faces and follows the Wharekirauponga Stream to what is left of the old mine workings. The remains of the tramway river crossing are also present within the Geological Area.

I am uncertain when quarrying was started from the Parakawai faces. A nearby quarry was gazetted as a quarry reserve in 1959 (NZ Gazette 1959, p. 744). Rock was quarried from the now-reserved faces until 1967 when the work was being carried out by H.G. Leach and Co for the Thames County Council (Skinner 1976).

Smith and Carter (1982) have reported the unlawful taking of rock from the quarry sites by Forest Service personnel and others:-

> 'Rock from this site has been used to construct a picnic day shelter in Parakawai Forest and at the Headquarters of Tairua Forest. Private individuals have removed material for walls and Amoco have used material to improve the ford.'

Logging and/or fire have probably affected all vegetation of the Area; the manuka scrub presents the best evidence of past burning.

There is a large mound (20 m high) of loose rocks on the river flats, possibly old tailings from the quarry. On the southern side of this mound is a concentration of shell remains perhaps a European time 'midden'.

No prospecting or mining licences have been sought for the Geological Area itself. To the south, however, prospecting is being carried out over 1052 ha in the upper Wharekirauponga catchment above the old mine workings. (Amoco P.L. 31546, Johnston 1982). This company applied in 1980 to open up the old tramway track up the Wharekirauponga Stream for four-wheel drive access to the prospect area. This was turned down because of recreational and aesthetic values (Johnston 1982).

Recreational Facilities and Opportunities

The Parakawai Quarry Geological Area offers a number of recreational opportunities especially for day visitors and is well-used. The road end allows parking space for up to approximately six cars. From here, trampers use the Wharekirauponga Stream track and can examine the old mine workings. The grassed areas in front of the quarry faces form

Photo 3 : (right) View of Wharekirauponga Stream and scrub on the eastern side of the Geological Area. (photo by P. de Jager)

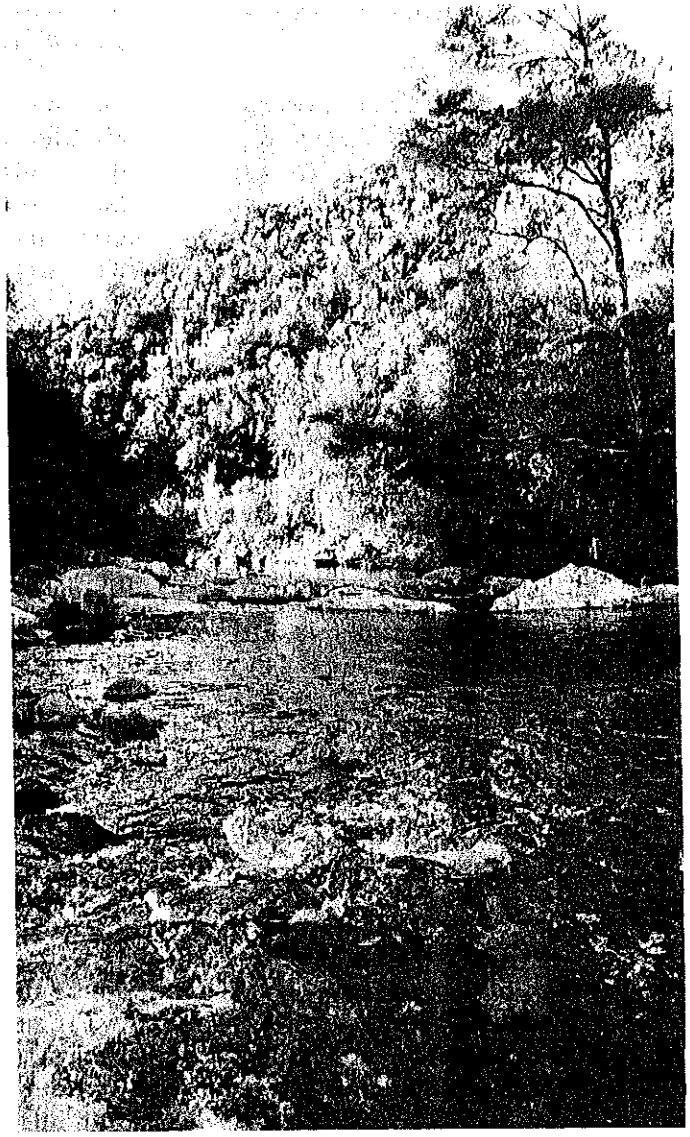
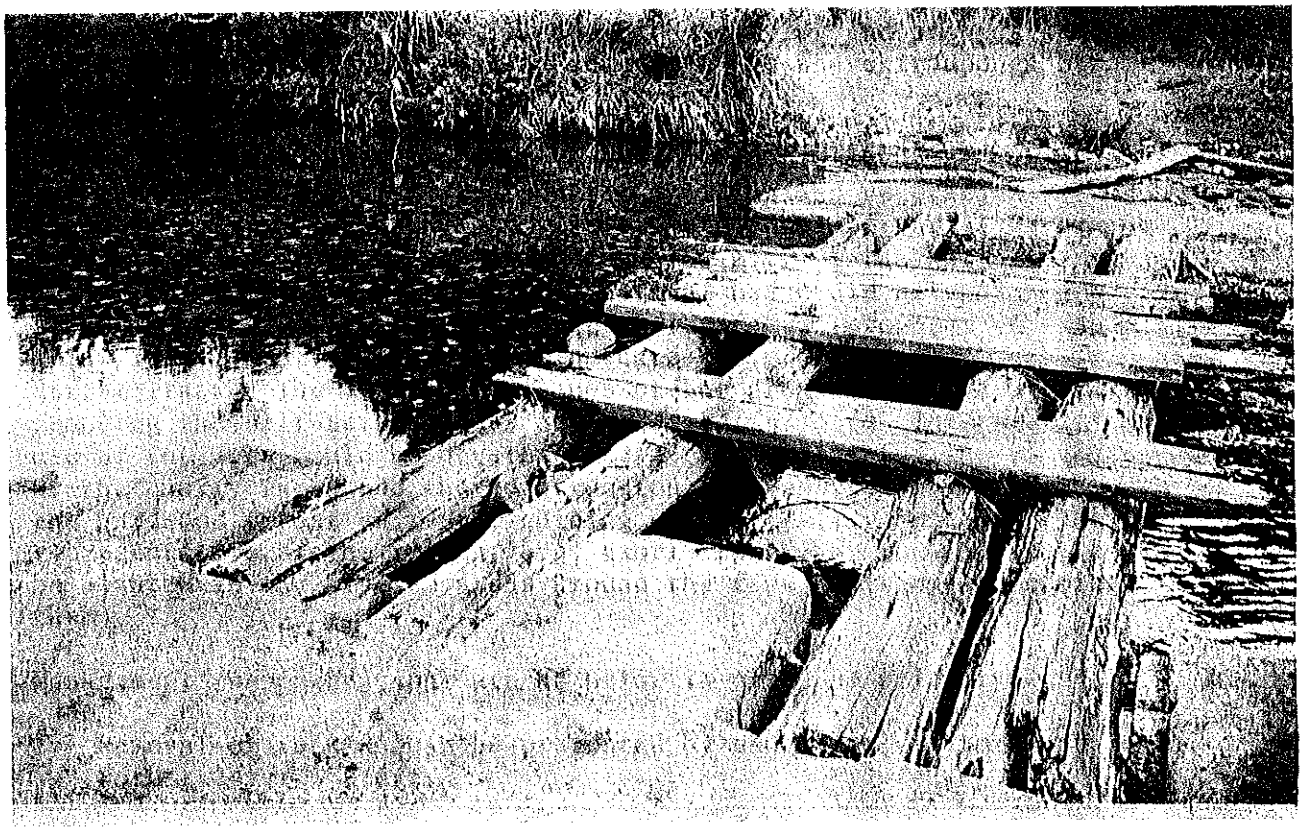


Photo 4 : (below) Remains of tramway and road ford beside the quarry faces. (photo by P. de Jager)



ideal picnic sites. Two shallow swimming holes have been formed in the river where rocks have been moved into weirs.

The Parakawhai Youth Camp exists near to the reserve (map ref. NZMS 260 T12 619345). This is administered by the NZ Forest Service but appears to have been unused for some time. The camp consists of a grazed paddock with several fireplaces, two pit toilets and a stone and concrete shelter. Holder et al (1983) recommend that: 'the Forest Service liaise more fully with the other organisers of this venture to encourage the use of the facilities. Upgrading of the landscape is desparately required ...'

Smith and Carter (1982) report that Tairua Forest allows permit type camping near the quarry. Holder et al (1983) suggest that the congested carpark area, where camping occurs, requires a site development plan to include the lower flats by the Wharekirauponga River.

Summary, Discussion and Recommendations

The Parakawai Quarry Geological Area (68 ha) contains two quarry faces which expose features of geological interest and it is the preservation of these faces which is the primary objective of this reserve. A sign explaining their significance has been proposed (filenote 6th June 1978, file 6/149/19/3, text given as Appendix 2).

The Geological Area forms part of the Wharekirauponga Valley and is divided in two by the road and the Wharekirauponga Stream. The vegetation of the reserve is mostly kanuka/manuka scrub with rewarewa, towai, toru and fivefinger common associates. Self-established *Pinus radiata* occurs in the eastern scrub area whilst infrequent *Hakea salicifolia* occur on the western slopes. A small zone of hardwood forest occurs on the north-western river flats comprised predominantly of tall towai, rewarewa, mahoe, tawa and kanuka. There is a small group of kauri on the western slopes. Many common bird species have been recorded in the Geological Area as well as Helm's butterfly and the uncommon paua slug. There is evidence for the presence of goats, pigs and possums but their impact has apparently been slight. The reserve has been subject to a long history of influence and modification from a variety of agents : from tramway and road construction to a period of quarrying and probably logging and fire. The Area is used for day trips and picnics and by trampers for parking and gaining access to the Wharekirauponga Stream track.

As the primary objective of the reserve is to preserve the quarry sites, the enhancement of the recreational facilities and vegetation values would not conflict. The area has some interpretational potential with road access and parking available and the proximity of the Wharekirauponga Track and old mine workings. Recreational use could be enhanced by the provision of picnic tables near the quarry faces (proposed in file 6/149/19/3)and erecting a sign to indicate the start of the Wharekirauponga Stream Track. The vegetation values of the area would be improved by removing the self-seeded pines and *Hakea salicifolia*. Interpretational use of the area could be developed by a sign explaining the significance of the quarry faces and the construction of a short loop track through the hardwood forest as a self-guiding nature trail. Specimen trees representative of the region; e.g. kauri, tanekaha, towai, rimu; could be planted in the cleared areas around the faces (without obscuring them).

Management recommendations are as below in order of priority:-

1 Removal of rock should be prevented by educating visitors and local Forest Service staff.

2 The interpretational and recreational potential of the Area should be better utilised for example by:-

- erecting a sign to explain the significance of the exposed rock formations (this could well serve point 1 at the same time)
- providing picnic tables
- constructing a self-guiding nature trail
- signposting the Wharekirauponga Stream track
- planting some specimen trees
- developing the carpark area to include the lower flats (Holder et al. 1983).

3 The self-seeded pines and *Hakea* should be removed from the scrub areas.

APPENDIX 1 : BOTANICAL SPECIES LIST - PARAKAWAI QUARRY GEOLOGICAL AREA

Common names are in brackets after the scientific e.g. *Agathis australis* (kauri).

Ferns and Fern Allies

Adiantum cunninghamii	(maidenhair fern)
Anarthropteris lanceolata	
Asplenium bulbiferum	(hen and chicken fern)
A. flaccidum	(hanging spleenwort)
A. oblongifolium	(shining spleenwort)
A. polyodon	
Blechnum capense	(kiokio)
B. filiforme	
B. membranaceum	
Cyathea dealbata	(ponga)
C. medullaris	(mamaku)
Dicksonia squarrosa	(wheki)
Doodia media	
Gleichenia dicarpa	(swamp umbrella fern)
Grammitis billardieri	
Histiopteris incisa	
Hymenophyllum dilatatum	(filmy fern)
Lastreopteris hispida	
Lindsaea linearis	
Lycopodium cernuum	
L. deuterodensum	
L. volubile	
Lygodium articulatum	(mangemange)
Paesia scaberula	(hard fern or ring fern)
Phymatasorus diversifolium	
P. scandens	(fragrant fern)
Pneumatopteris pennigera	
Polystichum richardii	
Pteridium acquilinum var. esculentum	(bracken)
Pteris tremula	
Tmesipteris elongata	
Trichomanes reniforme	(kidney fern)

Conifers

Agathis australis	(kauri)
Dacrydium cupressinum	(rimu)
Phyllocladus trichomanoides	(tanekaha)
Pinus radiata	(pine)
Podocarpus hallii	(Hall's totara)
Prumnopitys ferruginea	(miro)

Dicot Trees, Shrubs and Climbers

Alectryon excelsus	(titoki)
Alseuosmia macrophylla	(karapapa)
Aristotelia serrata	(makomako)
Belschmiedia tawa	(tawa)

Brachyglottis repanda	(rangiora)
Carmichaelia aligera	
Carpodetus serratus	(putaputaweta)
Clematis paniculata	(puawhananga)
Coprosma lucida	(karamu)
C. robusta	(karamu)
Coriaria arborea /	(tutu)
Cyathodes fasciculata	(mingimingi)
C. juniperina	(mingimingi)
Dodonaea viscosa	(akeake)
Dysoxylum spectabile	(kohekohe)
Gaultheria sp.	
Geniostóma rupestre var. crassum	(hangehange)
Hakea salicifolia	
Hebe spp.	
Hedycarya arborea	(pigeonwood)
Knightia excelsa	(rewarewa)
Laurelia novae-zelandiae	(pukatea)
Leptospermum ericoides	(kanuka)
L. scoparium	(manuka)
Litsaea calicaris	(mangaeo)
Macropiper excelsum	(kawakawa)
Melicytis ramifloris	(mahoe)
Metrosideros diffusa	(climbing rata)
M. perforata	(climbing rata)
Myrsine australis	(mapou)
Nestegis lanceolata	(white maire)
Olearia rani	(heketara)
Parsonsia spp.	
Persoonia toru	(toru)
Pittosporum huttonianum	
P. tenuifolium	(kohuhu)
Pomaderris kumeraho	(kumeraho)
P. phylicifolia	(tauhinu)
Pseudopanax arboreum	(five-finger)
P. crassifolium	(lancewood)
P. discolor	
Rhabdothamnus solandri	(waiuatua)
Rubus cissoides	(bush lawyer)
Rubus sp.	(blackberry)
Senecio kirkii	(Kirk's daisy)
Vitex lucens	(puriri)
Weinmannia silvicola	(towai)

Dicot Herbs

Cirsium vulgare	(thistle)
Cytisus scoparius	(broom)
Nertera dichondraefolia	
Senecio jacobea	(ragwort)

Monocotyledons

Astelia banksii	
A. trinervia	(kauri grass)
Bulbophyllum pygmaeum	

Carex dissita	
Collospernium hastatum	
Cordyline banksii	
Cortaderia spp.	(pampas grass)
Dianella nigra	(blueberry)
Drymoanthus adversus	
Earina autumnalis	
E. mucronata	
Ehrhata diplax	(bush rice grass)
Freycinetia baueriana subsp banksii	(kiekie)
Gahnia setifolia	
Machaerina sinclairii	
Morelotia affinis	
Oplismenus hirtellus	
Rhopalostylis sapida	(nikau)
Ripogonum scandens	(supplejack)
Schoenus tendo	
Uncinia uncinata	(hookgrass)

(Total species = 110)

APPENDIX 2 : PROPOSED SIGN FOR QUARRY

Volcanic Geological Formations

'The rock columns you can see in this old quarry are of andesite; remnants of the lava left in the vent of an extinct volcano. They are approximately 20 million years old and are some of the little remaining evidence of volcanic activity in the Coromandel. The formation of these columns is similar to the Giant's Causeway in Ireland.'

File Note 6th June 1978

Auckland Conservancy File 6/149/19/3

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