

# *Aupouri SF 187*



A478/3

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## *An Archaeological Site Survey of Coastal Dunes South of Te Arai January 1986*

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*Kate Olsen and Mike Hurst  
March 1986*

AUPOURI SF 187

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## 1.0 INTRODUCTION

An archaeological site survey of coastal planting areas in Aupouri SF 187 was carried out between 9-31 January 1986, by K. Olsen and M. Hurst (N.Z.F.S. contracts 19 and 20). This report has been prepared to summarise the results of the survey, and present recommendations concerning site management to the New Zealand Forest Service.

The survey was intended to provide final coverage of coastal areas (see Figs 1 and 2) missed during John Coster's "Aupouri Sand Dunes Archaeological Study" (Coster, 1980, 1983 a to c) before afforestation and roading proceeded, although part of the area was planted in *Pinus sp* during 1985. The longer term objective was to provide site location details to supplement Coster's study project, and to attempt to ensure that no significant sites would be destroyed through forestry activities. At the end of the survey, forestry staff were shown the location of sites on the ground and/or on aerial photographs, for site management purposes.

## 2.0 SURVEY AREA

Aupouri SF 187 is located on the western side of the Aupouri Peninsula on a stretch of unstable sand dune country which spans almost the whole length of the peninsula (see Fig 1). The forest has been established at least in part to stabilise these dunes.

The survey area comprises 2 blocks (see Figs 1 and 2).

1. 500 ha of coastal dunes south of Te Arai (bluff), consisting of a narrow strip 150 m - 1.5 km wide (averaging 400 - 700 m), and 7.5 km long. This will be referred to as the main block, for the purposes of this report. In practise, the original area was extended to cover the coastal strip of proposed Te Arai reserve area (NZFS 6/0/7/1 (0996E): 7.8.85), adding another ca. 100 ha, but a portion to the south in this block was not covered, due to a misunderstanding over the exact area boundaries (see Fig 3).
2. 170 ha of coastal dunes 1.7 km long and 1 km wide. This will be referred to as the Te Kao block throughout this report.

The main block comprises low lying dune country, bounded at the seaward edge by higher foredunes (5 - 12 m ASL), with the occasional dune ridge running east-west, toward the southern end. At this southern end there are fewer streams and wiwi (*Leptocarpus similis/Scirpoides nodosa*) flats, and towards

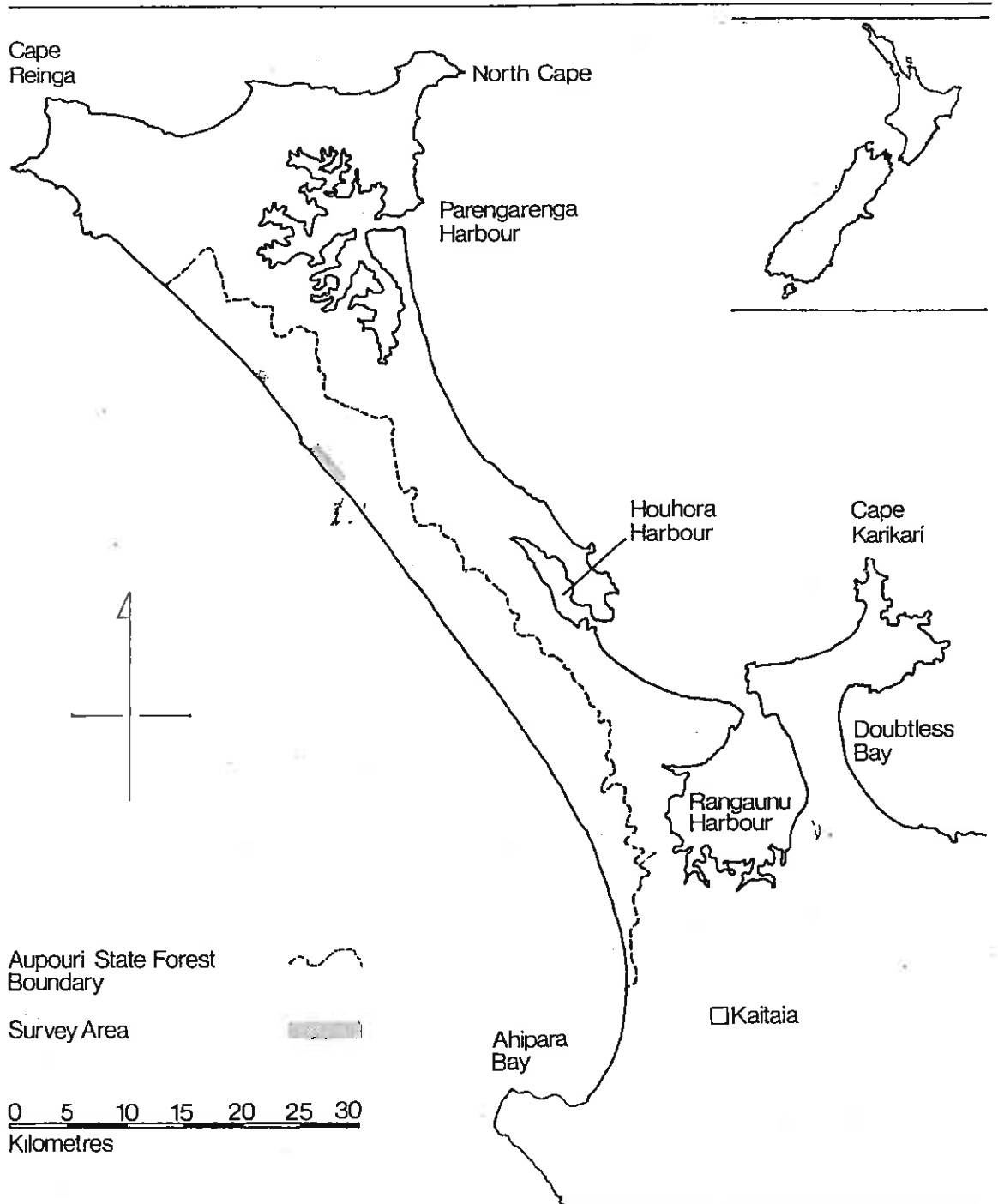


Figure 1

The Aupouri tombolo, showing Aupouri State Forest and extent of the study areas



the extreme south, a band of dense flax and scrub 60 - 100 m behind, and parallel to, the foredunes. Towards the northern part of the main block, the character of the terrain changes. There are more major streams and wiwi flats, and it is generally more low lying. The foredunes tend to be higher. The only 'high ground' to speak of is Wherowhero, a sandstone outcrop 50 m high.

Lupin and marram have been planted as preparatory stabilising vegetation over most of this block, and in places the former is impenetrable. Other vegetation includes spinifex, muehlenbeckia and one or two other unidentified low, scrubby species. *Pinus radiata* was planted between Fishnet Creek and the southern boundary of the survey area in 1985.

The Te Kao block is of quite a different nature. Apart from being higher (20 - 50 m ASL), it has several sandstone ridges running east-west, and numerous patches of bare clay pan. Towards the northern end, it becomes lower lying, changing to hummocky sand dunes. The vegetation is lupin and marram with a band of flax and manuka scrub close to the coast at the southern end. The vegetation is mostly very dense, especially in the gullies and hollows between the sandstone ridges.

For information concerning climate, geology and vegetation refer to Coster (1983a).

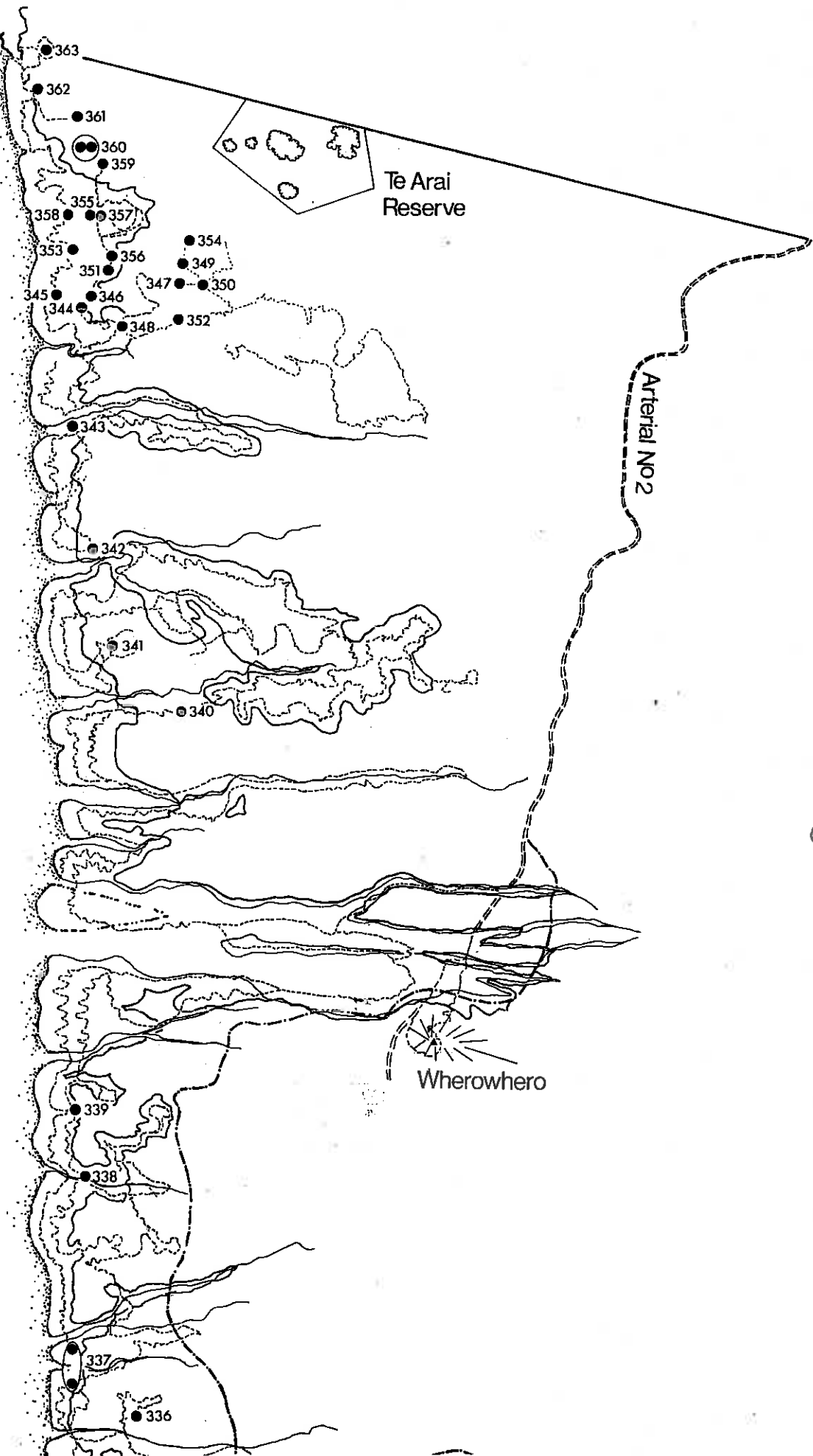
### 3.0 SURVEY METHOD

Prior to the field survey John Coster marked possible and/or known sites onto the aerial photos (NZFS flight 243, 16.1.85. Scale 1:10000) from an earlier aerial photograph series (SN 5622, NZ Aerial Mapping Ltd, 1979). The former set was also checked for possible sites.

Access to the southern area was via Arterial Rd No. 2 from the south or via Te Kao, along Te Ahu and Oromangu roads to Te Wakatehaua (The Bluff), and along the beach. The northern area was visited via Te Kao and the north extension of Arterial Road No. 2.

The survey area was traversed on foot wherever the dense vegetation permitted. It was useful to walk along the foredunes and other dune ridges running east-west, as these were the highest spots for scanning adjacent ground, with or without binoculars. Although often successful, visibility was still restricted by the vegetation and the hummocky nature of the terrain. Patches of thick wiwi and lupin were not investigated as one could walk within 0.50 m of a site and not see it. In reality, the foredunes and the low lying ground immediately inland of them were thoroughly surveyed (see Fig 3), and the interior was covered where possible. Stream beds were checked as well.

Te Arai Bluff

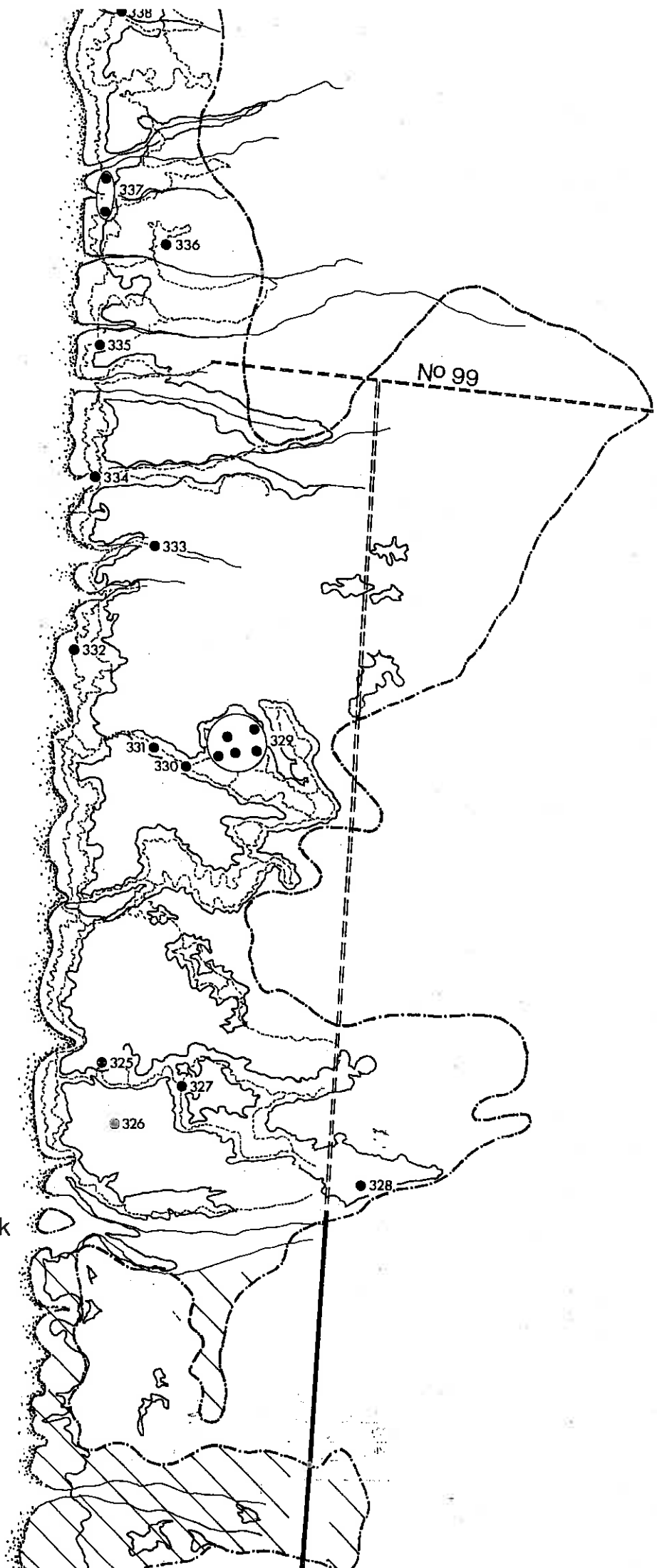


Te Arai Reserve

Arterial No 2

Wherowhero

1



Fishnet Ck

1

# Distribution of archaeological sites Te Arai Aupouri SF 187

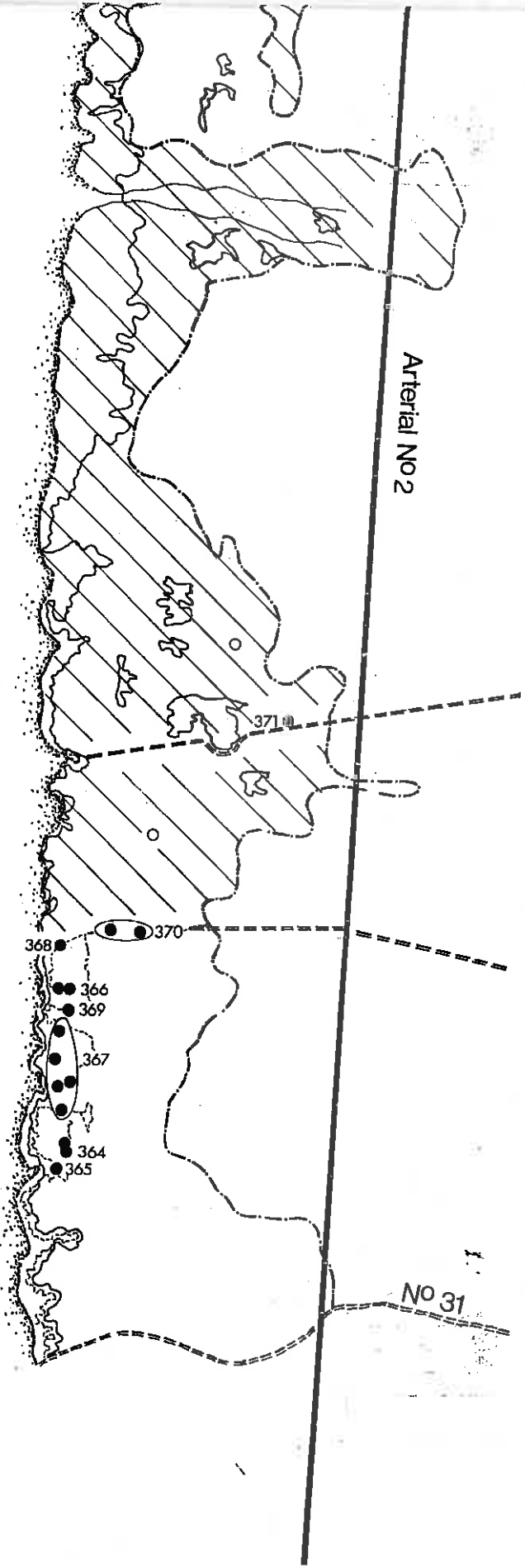
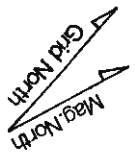
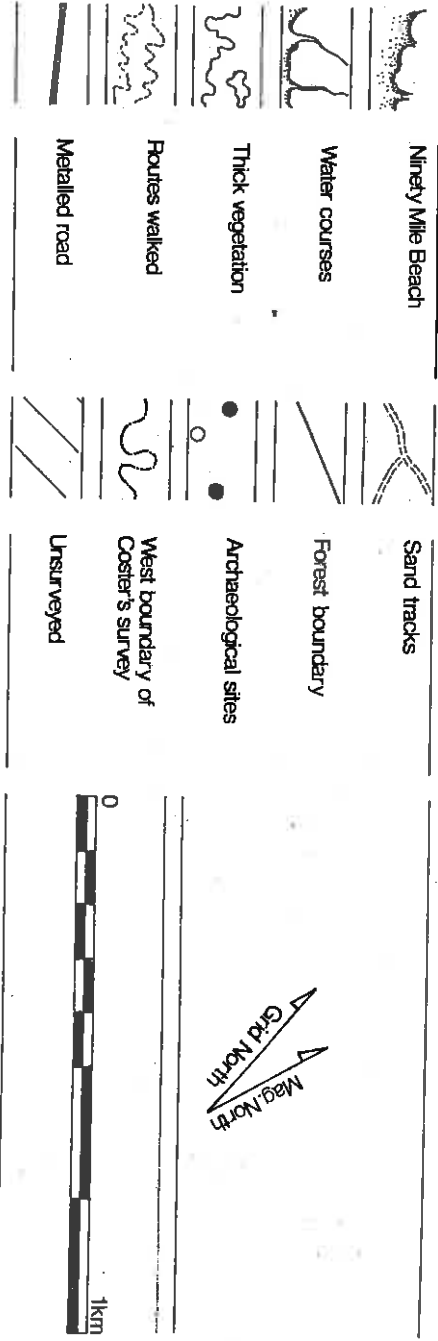


Figure 3

Each site was relocated onto aerial photographs (reference above; photo no's 2, 4, 6-9) at the time of recording. Generally this was not difficult, as the vegetation pattern was much the same in January 1985 as in January 1986, and many of the sites were actually visible on the photos. Sites were described in triplicate (NZFS requirement) according to the specifications of the NZ Archaeological Association site recording scheme. Measurements of a range of shells were taken at each site, and a NZAA site record form was later completed for each site.

#### 4.0 4.1 Introduction

Forty seven new sites were located in the main block of the 1986 Aupouri coastal dune site survey - N3&4/325-371. Two sites were recorded in the Te Kao block, but these had previously been recorded by Coster (N3&4/124, 125) and so will not be referred to again in this report.

#### 4.2 Site Types

All sites were shell middens with little difference in content on the whole. The shell species most commonly encountered was tuatua (*Paphies subtriangulata*), followed by toheroa (*Paphies ventricosa*), while other species such as *Dosinia anus* and scallop (*Pecten novaezelandiae*) were occasionally present.

1. 100% tuatua shells	16	34%
2. 60-90% tuatua shells	24	51%
3. 100% toheroa shells	5	11%
4. 60-90% toheroa shells	1	2%
5. european midden	1	2%
	47	100%

TABLE 1 : Numbers of middens and % of shell types in them, as apparent on surface inspection only.

Those middens in categories 3 and 4 are almost certainly of 20th century origin, which accounts at least partly for the difference in content. The European midden contained only a small amount of shell, but included bottle glass and a piece of an iron bedstead. The remaining middens probably date to the prehistoric or early contact period. Shell in these is frequently burnt and crushed, though each shell mound usually contains nearly as much unburnt shell, either broken or intact. Other middens have only unburnt shell. Those with burnt shell sometimes have a layer of intact \* and/or complete pinkish stained shells beneath.

\* 'Intact' refers to whole valves of shells. 'Complete' means whole articulated valves.

the burnt ones. Fragments of charcoal and broken haangi stones are often other components of the middens.

No bone, stone flakes or other artefacts were found in any of these sites, with the exception of a large obsidian flake at N3&4/363, and half of a possible sandstone grinder at N3&4/326.

#### 4.3 Shell Size

It was interesting to note that although most middens had a few very small and quite large shells, on the whole the most common shell size (tuatua 50 - 60 mm; toheroa 80 - 90 mm) was consistent between most middens, presumably reflecting good eating size. The small shellfish could easily slip into the basket whilst gathering and the large ones may have been sought after. Only in one or two sites, for instance N3&4/329, were there complete middens with shells smaller than average.

#### 4.4 Site Distribution

All sites recorded lie within 500 m of the beach, though most frequently within 250 - 300 m. The terrain they are found on consists of unstable foredunes, plus older unstable dunes often adjacent to low lying and damp wiwi (*Leptocarpus similis*/*Scirpoides nodosa*) flats. Frequently sites are near streams though not always, and it should be borne in mind that streams in this region have dried up and/or changed their courses over the years. Twenty-two of these sites lie less than 800 m south of Te Arai bluff, forming a noticeable cluster. The others are scattered along the length of the survey area, with another concentration at the south of the block (see Fig 3). It is noteworthy that the vegetation at these two cluster areas differs, both from each other and the remainder of the survey area. The northern area is generally lower lying with more wiwi, whilst the southern area at present has a lot of flax, kikuya grass and other unidentified scrubby plants, as well as marram, lupin and spinifex.

#### 4.5 Comparison Between Field Survey and Aerial Photo "Survey"

With reference only to the main survey block, and not including previously recorded and numbered sites, it was interesting to compare the number of sites plotted from low level aerial photos (NZFS 6/187/21/1 filenote 24.6.85) by Coster, for the present survey

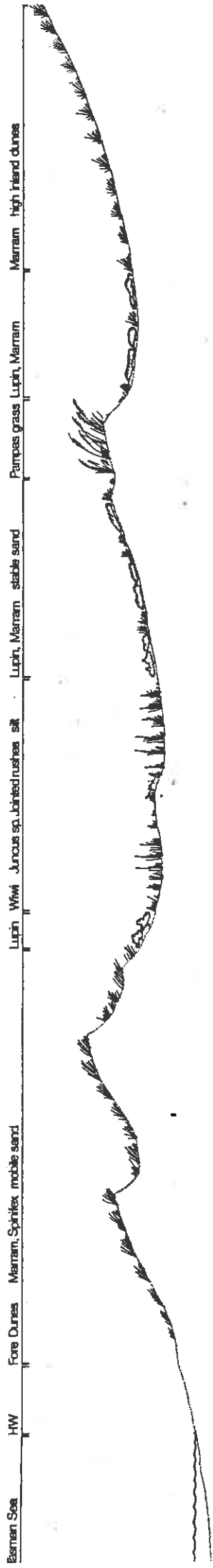


Figure 4  
Landscape cross section (not to scale)

area, to the actual number recorded during fieldwork. It appears that 9 of the 52 marked by Coster were recorded by us, leaving 43 marked but undiscovered during this survey, and 38 new sites unseen until this survey. The dense lupin cover plus moving sand would account for the present invisibility of most of Coster's marked middens.

## 5.0 DISCUSSION

### 5.1 General

Much background research and discussion as to how and why these midden sites originated has been presented in earlier N.Z.F.S. reports (Coster, 1976; 1977; 1983 a and b). The suggestion has been made for the earlier coastal middens (featuring largely tuatua with some toheroa, often burnt) that the coastal sites "are mainly industrial waste from large scale manufacturing processes devoted to the production of dried shellfish for storage." (Coster, 1983c : 187).

No settlement sites were found to suggest that people were living in this area, and these middens yield no evidence that activities other than food processing happened there. Coster found some sites which represented domestic activity areas, such as tool making or retouching, and campsite areas, further inland, but suggests these were of a temporary nature (1983a : 10). These coastal middens must therefore be the result of people visiting the area for the purpose of gathering shellfish, if nothing else. Whilst some of these middens are large enough to relate to large-scale shellfish drying, others are very small and may relate to people travelling on Ninety Mile beach stopping for a meal, as Coster also suggests (1983c : 186).

Only one site (N3&4/363) from the present survey suggests possibly an activity, such as camping, was carried out as well as processing/preparing shellfish. This is strategically located on the dune ridge behind Te Arai (bluff), which because of its height above the land to the south, may have been chosen as suitable for a temporary campsite and/or lookout spot.



## 5.2 Site Location

Sites are frequently located near streams or damp areas suggesting that water was important for the cooking process involved for tuatua and toheroa, or at least for washing. The cluster of sites in the Te Arai area is particularly interesting in this respect. Most of the sites lie on low dunes adjacent to damp wiwi flats which are between 0.50 - 1.00 m below the actual dunes. According to Viv Gregory (pers. comm. 1986), there used to be at least one lake or pond here, and it seems that these sites are located on the former edges of such water sources. It may be that the "lakes" come and go with high or low rainfall. Combined with the shelter provided by the Te Arai dune ridge and the higher foredunes, these lakes or ponds would have been an ideal spot for gathering to process foods or to camp for a night or two.

The particular location of good shellfish beds may have been another reason for the clustering of sites at Te Arai or to the south of the block.

## 5.3 Midden Contents

The reason for the predominance of tuatua shells over all other types remains uncertain. However there are various possibilities :

1. The toheroa population is known to be migratory, at times disappearing from the beach altogether. This is presumed to have occurred in the prehistoric period too, and therefore may account for the lack of toheroa.
2. Tuatua may have been preferred, either for taste, or for qualities required for drying.
3. Tuatua were simply more plentiful.

It would seem that the tuatua populations at least were fairly stable because of the quantity and uniform size range found in the middens. It is not known why only a very few *Dosinia* shells and other varieties are found in these sites.

## 5.4 20th Century Middens

There are several possibilities to explain the toheroa middens, almost certainly all of 20th century origin. Two of these sites consist of shells stacked against a post and paling fence which was put in along the foredunes in early forestry days (1960s), and the remaining three are in stream beds. In all of these the shell

Figures 5 and 6

The dune middens found in the survey generally have the following structure:

They consist of a shell cap atop a remnant dune. The sand has been stabilised by the shell, so the centre of the mound is largely sand. The shell on the sides has eroded out of the original shell cap, giving the appearance of a mound of shell. In the examples below, more sand has become established above the shell cap, and spinifex has stabilised this sand to some degree.

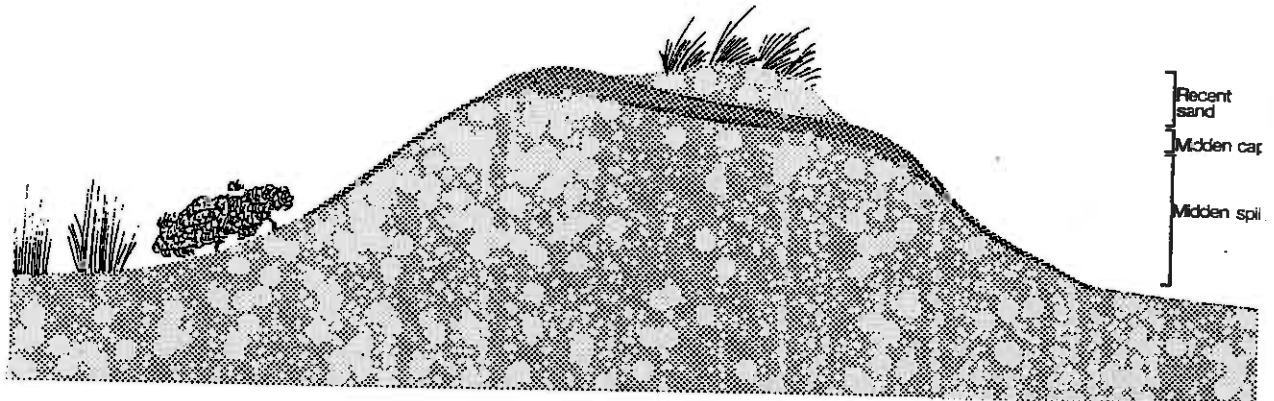


Figure 5  
Dune midden cross section



Figure 6. N3 & 4/327: A good example of a dune midden.

is unburnt and comparatively tough. These middens may have been laid by forestry workers, or as Des Ogle once told John Coster, by "parties of Maoris who came up the beach in trucks 30 - 40 years ago to collect toheroa, shelling them on the spot and leaving the shells behind" (Coster, 1976 :7). Similarly, there was a toheroa factory operating out of Kaitaia in the 1950s - 1960s. Apparently they shelled the toheroa on the beach or in the dunes, near streams.

The midden with European artefacts was down the southern end of the block and may result from a camp or hut site of the World War II era. Aerated water (soft drink) bottles and pieces of iron bed frame and odd pieces of sawn timber point to such a habitation. Being situated close to the beach but within the shelter of dunes this site may have been a fishing hut or musterers hut dating from the time when cattle were driven along the beach south to sales at Kaitaia during the 1940s - 1950s. The cattle are still driven along the beach today.

## 6.0 MANAGEMENT AND RECOMMENDATIONS

### 6.1 Management

The middens in this coastal strip vary in significance in terms of :

- a. degree of deflation and erosion
- b. extent of in situ deposit
- c. variation in contents
- d. precise location

However after surface examination only, it is hard to specify which in fact are more or less significant. There is a good cross section represented, and they all lie within a similar zone to Coster's coastal protection zone to the south. It has been decided to extend this zone up to Te Arai bluff. This will exclude all sites recorded in this survey from afforestation, and include them in the Coastal Protection Zone.

This is felt to be justified because it is certain that many middens lie beneath the present vegetation and/or dunes, firstly, from the nature of the terrain, and secondly, from Coster's site distribution for the rest of the Aupouri Sand Dunes Archaeological Study area (1983a and b).

The limit for *Pinus* planting has been demarcated on aerial photographs which have been deposited at Aupouri HQ. A band of karo will be planted along the line prior to the planting of pines. Paul Tolladay, NZFS, Aupouri, joined the authors in the field to discuss the placement of this line.

6.2 N3&4/363 - Te Arai

This site is the one midden which does have greater archaeological significance than the others recorded in this survey, and it is thought to warrant special management procedures. The site was visited with Paul Tolladay, and it was agreed to plant lupins about half way up the loose, sloping shell scatter, to stabilise the ground, and then to plant karo across the bottom of the slope (see diagram in Appendix I). It is hoped that once the karo grows it will shelter the in situ midden deposit at the top of the site from further wind erosion.

6.3 N3&4/25 - Wherowhero

This site was re-examined by the authors, and discussed with Nicki Conrad, a Kaumatua at Te Kao. He told us there were burials on the eastern slopes of the hill, and that the local people would prefer the hill not to be planted in pines. It is therefore suggested that this site be managed in one of the following ways :-

- a. the natural vegetation is allowed to regenerate, and pines kept off the hill.
- b. it is planted in pohutukawa or other suitable native species.

The discussion as to what course of action is to be followed should be taken in conjunction with Nicki Conrad.

6.4 Recommendations

- 6.4.1 It is recommended that all sites recorded in the 1986 coastal site survey be protected. Sites N3&4/325 - 371.
- 6.4.2 Site N3&4/363 has special management applied, as outlined in Section 6.2 above, and Appendix I.
- 6.4.3 Site N3&4/25 (Wherowhero) should not be planted in pines, but be either left to regenerate in vegetation natural to the area, or be planted in a native species, such as pohutukawa. This option should be discussed with Nicki Conrad of Te Kao.

6.4.4 The Te Kao block (1986 coastal plantings) of the present survey area should be thoroughly surveyed, with a good set of aerial photos for field use. However the lupin is fairly dense over a large part of the area so it may be worth waiting until the lupin has been crushed.

6.4.5 It is suggested that the proposed Te Arai Dune Lakes Ecological Reserve (NZFS 6/0/7/1, 7.8.85 : Bruce Burns) could also be an archaeological reserve, continuing from Coster's coastal zone. Twenty-four of the sites recorded in this survey fall into the proposed reserve area (450 ha). Their presence would enhance the reserve, providing an example of past use of an area by people. If machinery is used in possible weed control (see ref. above) then care should be taken not to damage any of the middens.

6.4.6 Horses are causing some damage to midden sites. While it is recognised as impractical to keep them off all of the coastal sites, it might be possible to fence the area proposed for the Te Arai Dune Lakes Ecological Area (450 ha), and therefore keep the horses off a good number of the sites.

#### 6.5 General Recommendations

In future it would make economic sense to fly low level aerial photographs before undertaking a site survey on sand dune country. The time saved in field/days should cover the cost of the flight.

Site surveying should be undertaken before lupin planting and preferably before marram planting.



## 8.0 SITE CHECKLIST

<u>NZAA Site No.</u>	<u>Grid Reference</u>	<u>Site Type and Description</u>	<u>Photo Reference</u>
N3&4/325	449 132	<u>Midden</u> : 3 remnant dunes with in situ shell caps. 90% tuatua, some toheroa, charcoal, broken haangi stones.	187/5/13
N3&4/326	450 131	<u>Midden</u> : 2 raised dune hummocks with shell caps (1 in situ) and associated scatter. All tuatua, broken haangi stone; $\frac{1}{2}$ a sandstone grinder (?).	187/5/14
N3&4/327	451 133	<u>Midden</u> : large elongate conical mound with in situ shell cap and spill down sides. 99% tuatua, a few large toheroa, broken haangi stones.	187/5/15, 16
N3&4/328	457 134	<u>Midden</u> : bulldozed in making of sandtrack - just a loose scatter of shell, none in situ. Tuatua and haangi stones, broken.	187/5/17, 18
N3&4/329	445 141	<u>Midden</u> : complex of 7 separate mounds. 95% tuatua, 5% toheroa and some Dosinia anus. In situ shell caps.	187/5/19, 20
N3&4/330	444 140	<u>Midden</u> : 2 low lying patches of shell. Tuatua. Largely deflated.	
N3&4/331	443 140	<u>Midden</u> : a very small deflated shell patch. Tuatua.	-
N3&4/332	440 140	<u>Midden</u> : small shell heap, 1 toheroa; tuatua.	-
N3&4/333	440 145	<u>Midden</u> : eroded, in stream bed. No in situ deposit. 70% tuatua, several large toheroa, several Dosinia anus, 2-3 scallops. Some broken haangi stone.	187/5/22

<u>NZAA Site No.</u>	<u>Grid Reference</u>	<u>Site Type and Description</u>	<u>Photo Reference</u>
N3&4/334	436 144	Midden: exposed in north bank of stream, at foot of 5 m high dune. 95% toheroa, some Dosinia anus and 1 large ostrich foot. Probably 20th century origin.	187/85/2
N3&4/335	434 148	<u>Midden &amp; Fence</u> : Post and paling fence parallel to beach. Shell 99% toheroa and scallops, triangle shells and 1 Dosinia anus.	187/85/3, 4, 5, 6
N3&4/336	434 152	<u>Midden</u> : Shell cap (in situ) and scatter on a remnant dune - large. Tuatua, some toheroa, 1 scallop, some Dosinia anus.	-
N3&4/337	432 152	<u>Midden/fence</u> : Post and paling fence and shell - 80% toheroa, 17% tuatua and some Dosinia anus and 2 whelk sp. 20th century origin.	187/85/7, 8
N3&4/338	428 156	<u>Midden</u> : eroded, in stream bed. Toheroa. 20th century origin most likely.	-
N3&4/339	427 158	<u>Midden</u> : deflated shell midden, all tuatua.	-
N3&4/340	422 168	<u>Midden</u> : low shell heap with in situ cap. Mostly tuatua, a few large toheroa, broken haangi stones.	187/85/11, 12
N3&4/341	420 169	<u>Midden</u> : Shell heap with in situ caps. Tuatua and toheroa.	187/85/14, 15
N3&4/342	417 173	<u>Midden</u> : 2 remnant dunes with shell caps on top - in situ, and loose scatter. Tuatua.	187/86/4
N3&4/343	415 173	<u>Midden</u> : eroded; in stream bed - toheroa. 20th century origin.	187/86/5



<u>NZAA Site No.</u>	<u>Grid Reference</u>	<u>Site Type and Description</u>	<u>Photo Reference</u>
N3&4/344	413 176	<u>Midden</u> : Remnant dune with in situ caps and loose shell. Tuatua, broken haangi stones and charcoal.	187/86/6, 7
N3&4/345	412 176	<u>Middens</u> : deflated shell heap in 3 patches. Tuatua, broken haangi stones, charcoal.	187/86/9
N3&4/346	413 177	<u>Midden</u> : a raised remnant dune with 3 in situ caps of shell and loose scatter. 50% toheroa, 50% tuatua. 3 distinct layers in 1 cap.	187/86/10, 11, 12
N3&4/347	415 178	<u>Midden</u> : not inspected.	-
N3&4/348	415 176	<u>Midden</u> : in situ shell cap with scatter. Toheroa and tuatua, charcoal and haangi stones.	187/86/13
N3&4/349	415 179	<u>Midden</u> : remnant dune with in situ cap and loose scatter. Tuatua, toheroa, charcoal, broken haangi stones.	-
N3&4/350	416 179	<u>Midden</u> : low mound with in situ shell cap, and scatter. Tuatua, haangi stone.	-
N3&4/351	413 177	<u>Midden</u> : remnant dune with shell cap and eroded scatter. Tuatua, toheroa, 1 Dosinia anus, charcoal, haangi stone.	187/86/16
N3&4/352	416 177	<u>Midden</u> : small shell exposure. Tuatua only.	-
N3&4/353	412 177	<u>Midden</u> : low spread, with some in situ patches. 99% tuatua, toheroa fragments, 1 Dosinia anus. Broken haangi stones, a nodule of chert-like material. Machine disturbed.	187/86/17, 18, 19

<u>NZAA Site No.</u>	<u>Grid Reference</u>	<u>Site Type and Description</u>	<u>Photo Reference</u>
N3&4/354	414 179	<u>Midden</u> : 2 shell caps on dune mounds. Tuatua (99%), toheroa, large pieces charcoal, broken haangi stones.	-
N3&4/355	411 179	<u>Midden</u> : small remnant dune with in situ shell cap, plus scatter. Tuatua, charcoal and broken haangi stone.	-
N3&4/356	413 178	<u>Midden</u> : 2 patches of shell with some consolidated deposits. Mostly tuatua, with some toheroa.	-
N3&4/357	412 179	<u>Midden</u> : low lying, with mostly tuatua, some toheroa and 1 Dosinia anus. Largely in situ. Charcoal, broken haangi stones.	187/87/2, 3
N3&4/358	411 178	<u>Midden</u> : Thick layer in situ shell eroding out of dune, and scatter. Mostly tuatua, some toheroa.	187/87/0, 1
N3&4/359	411 180	<u>Midden</u> : Small scatter shell and haangi stones. Tuatua.	-
N3&4/360	410 180	<u>Midden</u> : low dune with 2 in situ caps of shell, plus scatter. Tuatua and broken haangi stone.	187/87/4, 5
N3&4/361	410 180	<u>Midden</u> : low mound, partly sand covered. Tuatua, toheroa, 1 Dosinia anus. Broken haangi stone, charcoal.	-
N3&4/362	408 180	<u>Midden</u> : Elongated remnant dune, in situ deposits on sides and scatter. Tuatua (99%), toheroa, some haangi stones.	187/87/10

<u>NZAA Site No.</u>	<u>Grid Reference</u>	<u>Site Type and Description</u>	<u>Photo Reference</u>
N3&4/363	408 181	<u>Midden</u> : Atop a dune ridge, an in situ deposit with scatter. Cultural soil/sand layer visible. Obsidian flake, tuatua, toheroa, charcoal, haangi eroding.	187/87/11, 12, 13, 14, 15, 16.
N3&4/364	470 101	Sand dune ridge with shell cap. Tuatua only.	-
N3&4/365	470 102	<u>Midden</u> : mostly covered by sand, in situ layer with spill. 90% tuatua, rest toheroa.	-
N3&4/366	468 105	<u>Midden</u> : 2 remnant dunes with thick in situ caps plus scatters. Tuatua and toheroa.	-
N3&4/367	469 107	<u>Midden</u> : 5 shell heaps on remnant dunes, with some in situ deposits. Mostly tuatua, some toheroa and Dosinia anus. Broken haangi stones.	187/88/9, 10, 11
N3&4/368	467 106	<u>Midden</u> : Burnt sand, broken bottles and pieces iron bedstead in sand track. 20th century.	-
N3&4/369	468 105	<u>Midden</u> : Deflated patch of shells. All tuatua.	-
N3&4/370	468 107	<u>Midden</u> : 2-3 middens exposed when track put through. Includes some in situ deposit, mostly disturbed. Toheroa, tuatua, charcoal, haangi stones. Exposed in section too.	187/88/13, 14, 15
N3&4/371	467 109	<u>Midden</u> : 2 low mounds, 1 with in situ shell cap, plus scatter. Tuatua, broken haangi stone and charcoal.	-

APPENDIX I - GLOSSARY

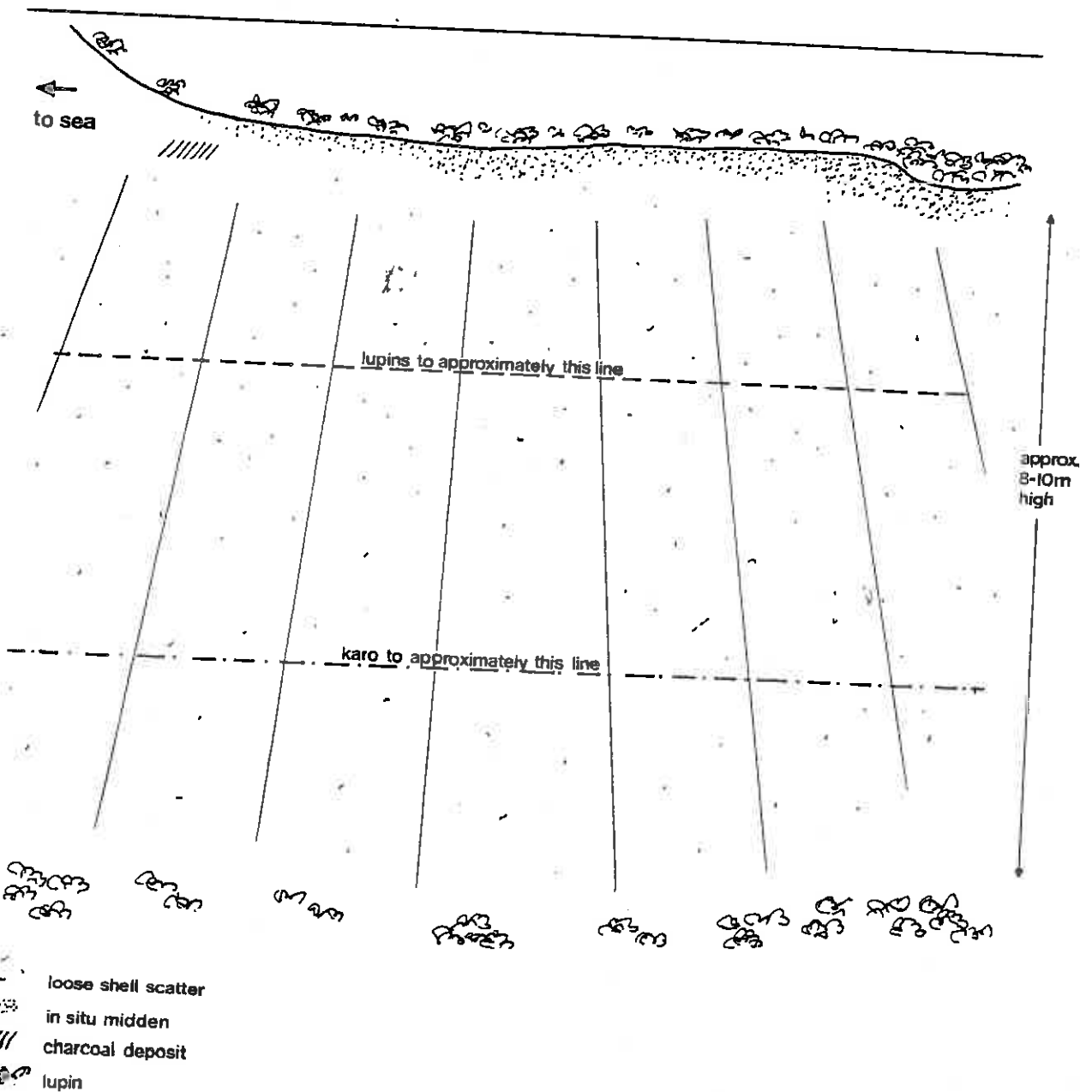
cap(s)	- layer of shell midden over natural sand
chert	- flint like stone
cultural layer	- layer of soils deposited or changed by human activity
deflated	- wind eroded
in situ	- original position
karo	- coastal native shrub-tree
wiwi	- rushes, swamp grasses

APPENDIX II - SITE MANAGEMENT FOR N3&4/363

This site has a lense of cultural sandy/charcoaly deposit exposed in section, plus quite substantial deposits of in situ shell, revealing stratigraphic layering, and haangi apparently in situ as well. It is worthy of special management, as the in situ deposits are eroding constantly.

It was suggested that lupin be planted on the eroding loose shell scatter, to initially stabilise the sand, and that later karo are planted, so that as they grow up they provide a wind break, to hopefully lower the rate of erosion.

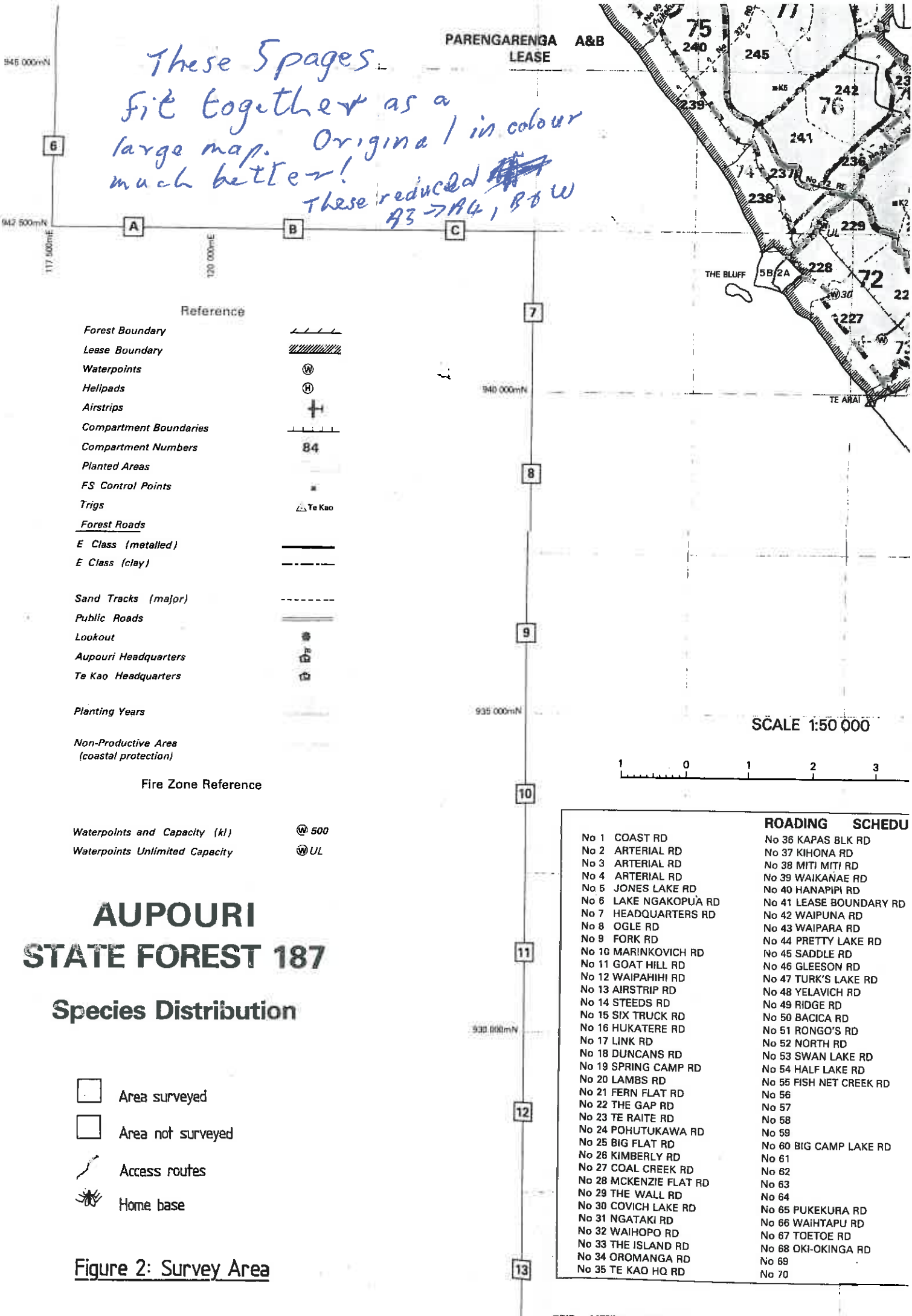
It may be that this would prove to be insufficient, in which case a fence may be better, perhaps brush and manuka. At least a fence would be more immediately protective. To be discussed with forest staff and Conservancy archaeologists.



Sketch plan. Not to scale.

These 5 pages  
 fit together as a  
 large map. Original in colour  
 much better!  
 These reduced  
 A3 → A4, B & W

PARENGARENGA A&B LEASE



Reference

- Forest Boundary
- Lease Boundary
- Waterpoints
- Helipads
- Airstrips
- Compartment Boundaries
- Compartment Numbers
- Planted Areas
- FS Control Points
- Trigs
- Forest Roads
- E Class (metalled)
- E Class (clay)
- Sand Tracks (major)
- Public Roads
- Lookout
- Aupouri Headquarters
- Te Kao Headquarters
- Planting Years
- Non-Productive Area (coastal protection)

Fire Zone Reference

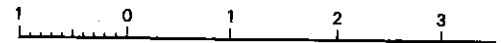
- Waterpoints and Capacity (kl)
- Waterpoints Unlimited Capacity

# AUPOURI STATE FOREST 187

## Species Distribution

- Area surveyed
- Area not surveyed
- Access routes
- Home base

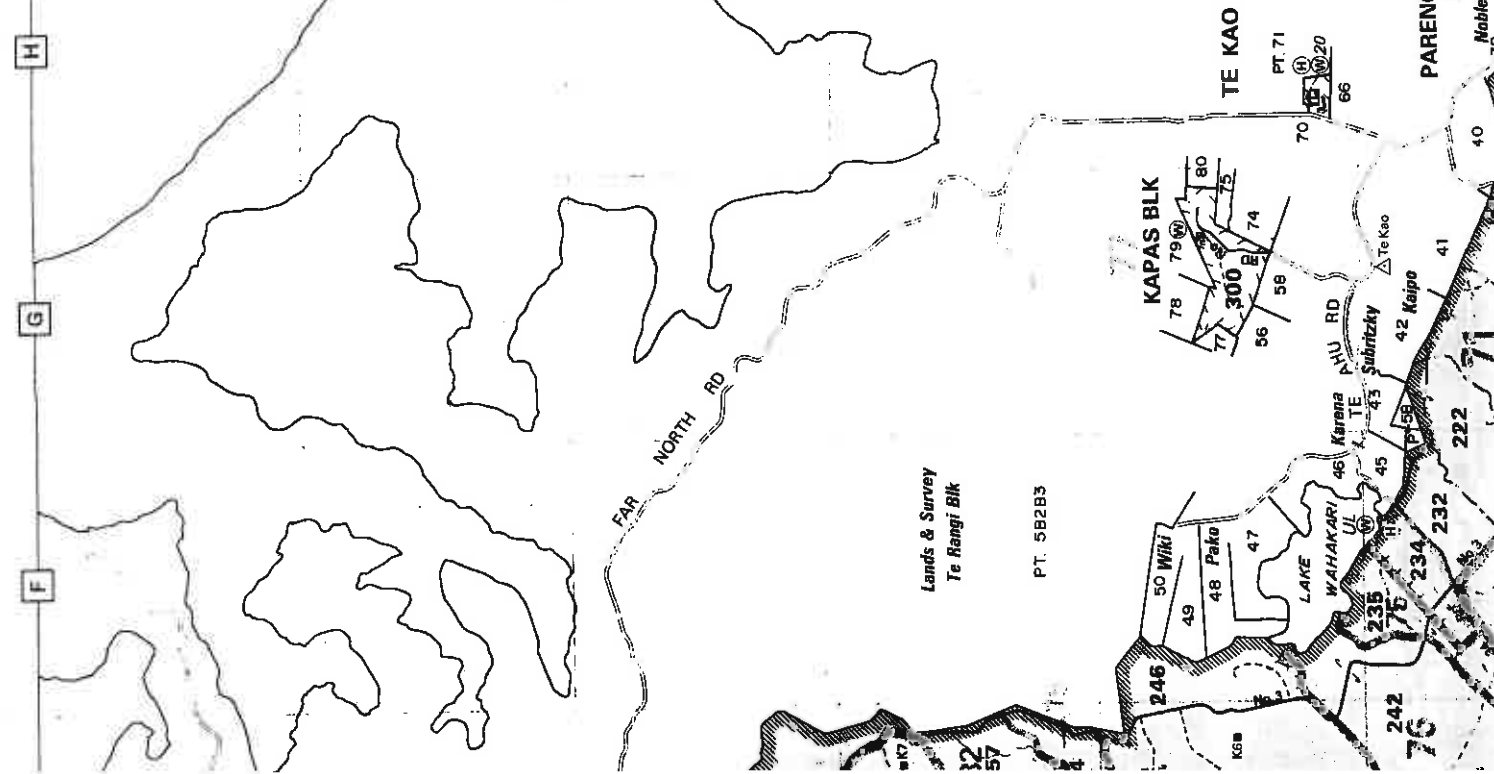
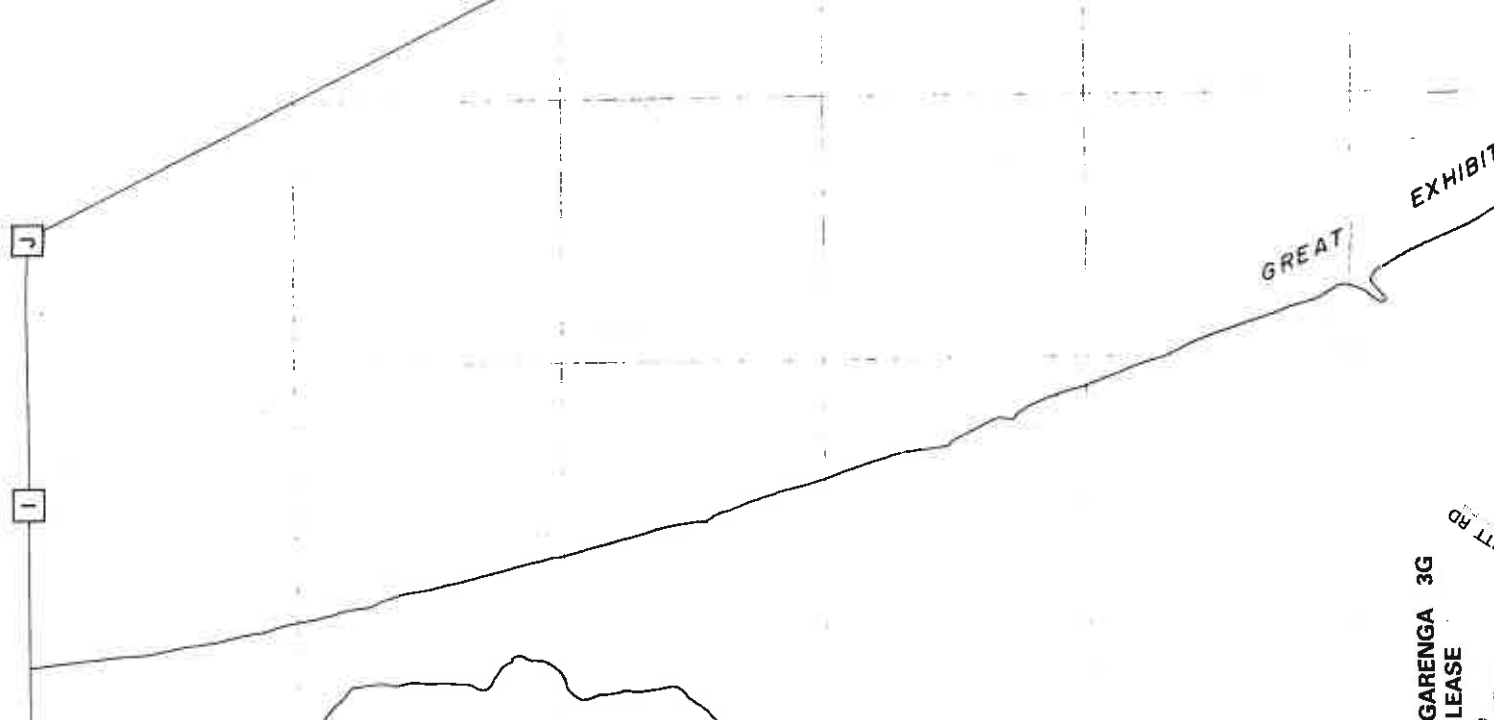
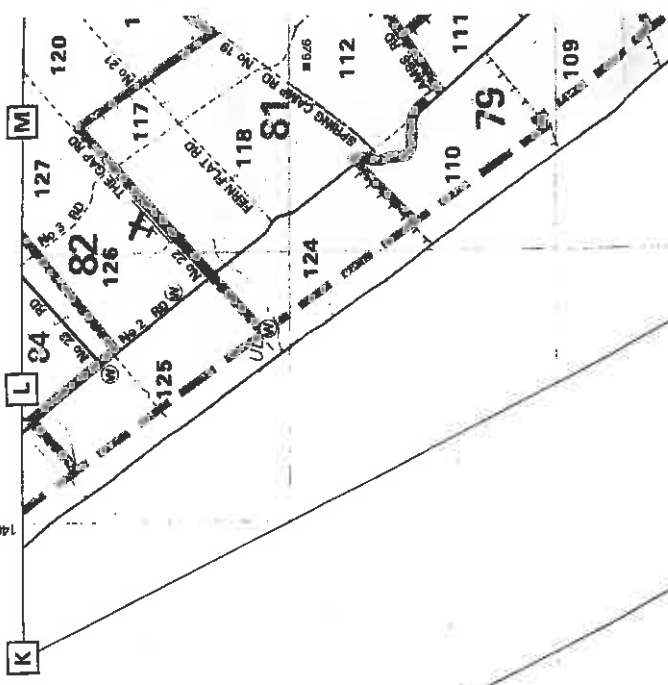
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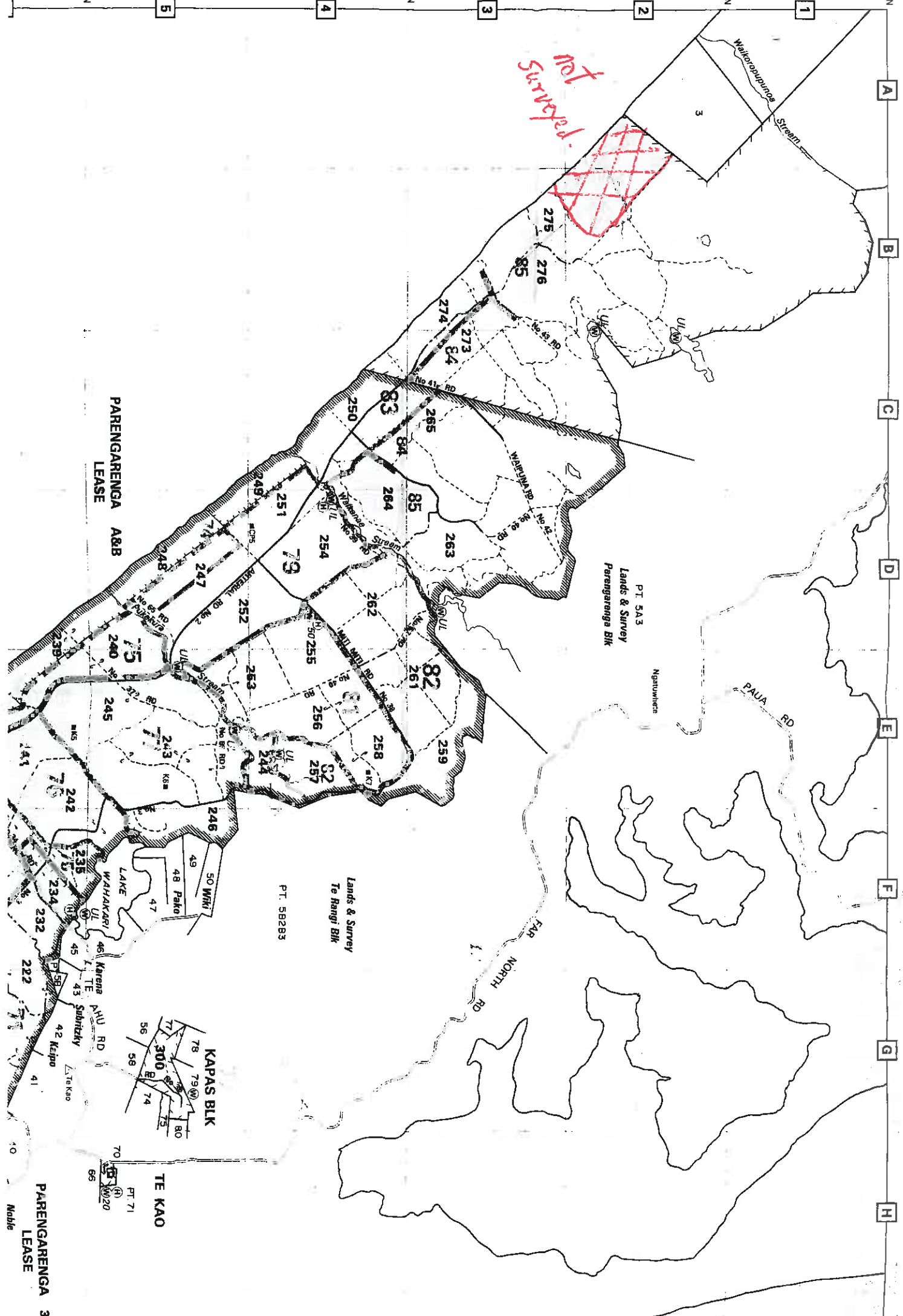


**ROADING SCHEDULE**

No 1 COAST RD	No 36 KAPAS BLK RD
No 2 ARTERIAL RD	No 37 KIHONA RD
No 3 ARTERIAL RD	No 38 MITI MITI RD
No 4 ARTERIAL RD	No 39 WAIKANAE RD
No 5 JONES LAKE RD	No 40 HANAPIPI RD
No 6 LAKE NGAKOPIUA RD	No 41 LEASE BOUNDARY RD
No 7 HEADQUARTERS RD	No 42 WAIPUNA RD
No 8 OGLE RD	No 43 WAIPARA RD
No 9 FORK RD	No 44 PRETTY LAKE RD
No 10 MARINKOVICH RD	No 45 SADDLE RD
No 11 GOAT HILL RD	No 46 GLEESON RD
No 12 WAIPAHIHI RD	No 47 TURK'S LAKE RD
No 13 AIRSTRIIP RD	No 48 YELAVICH RD
No 14 STEEDS RD	No 49 RIDGE RD
No 15 SIX TRUCK RD	No 50 BACICA RD
No 16 HUKATERE RD	No 51 RONGO'S RD
No 17 LINK RD	No 52 NORTH RD
No 18 DUNCANS RD	No 53 SWAN LAKE RD
No 19 SPRING CAMP RD	No 54 HALF LAKE RD
No 20 LAMBS RD	No 55 FISH NET CREEK RD
No 21 FERN FLAT RD	No 56
No 22 THE GAP RD	No 57
No 23 TE RAITE RD	No 58
No 24 POHUTUKAWA RD	No 59
No 25 BIG FLAT RD	No 60 BIG CAMP LAKE RD
No 26 KIMBERLY RD	No 61
No 27 COAL CREEK RD	No 62
No 28 MCKENZIE FLAT RD	No 63
No 29 THE WALL RD	No 64
No 30 COVICH LAKE RD	No 65 PUKEKURA RD
No 31 NGATAKI RD	No 66 WAIHTAPU RD
No 32 WAIHOPO RD	No 67 TOETOE RD
No 33 THE ISLAND RD	No 68 OKI-OKINGA RD
No 34 OROMANGA RD	No 69
No 35 TE KAO HQ RD	No 70

Figure 2: Survey Area





*Not surveyed.*

PARENGARENGA  
LEASE ABB

PT 5A3  
Lands & Survey  
Parengarenga Bk

PT. 5B283  
Lands & Survey  
Te Rangī Bk

KAPAS BLK

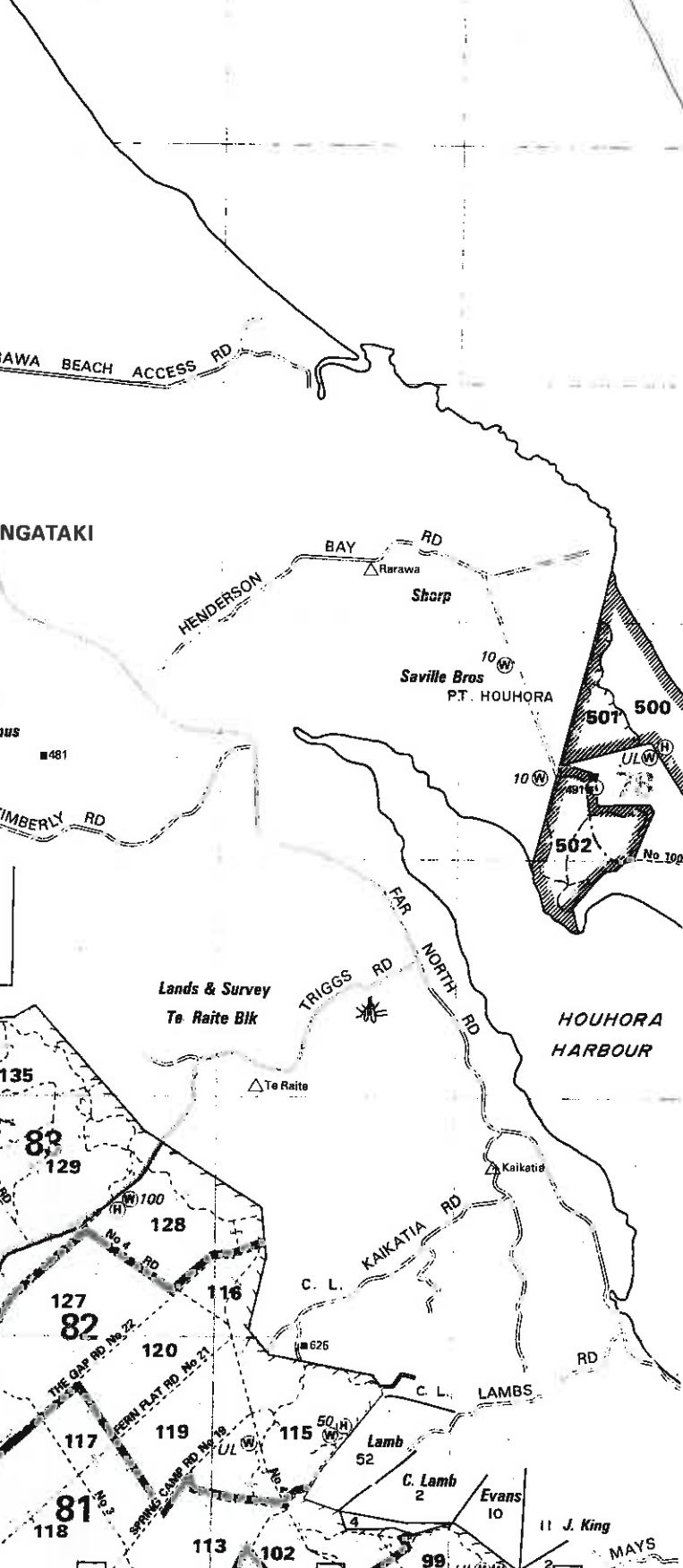
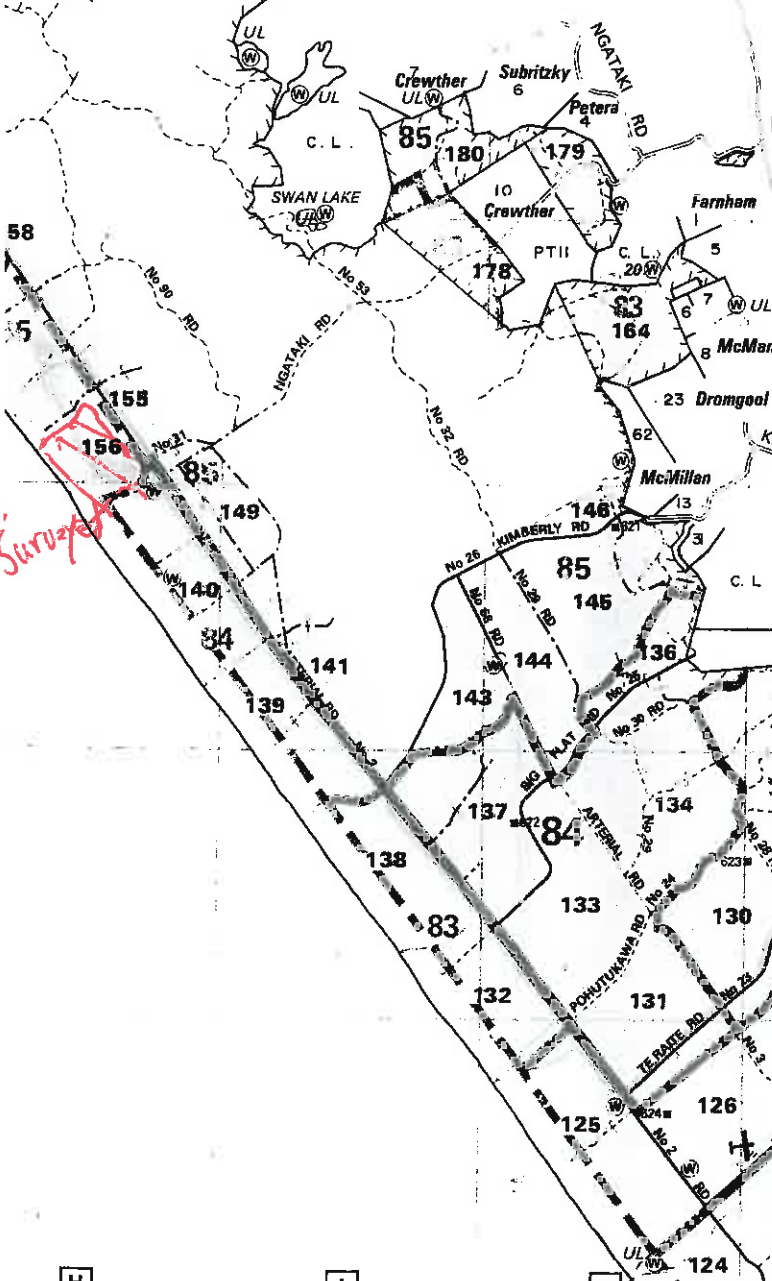
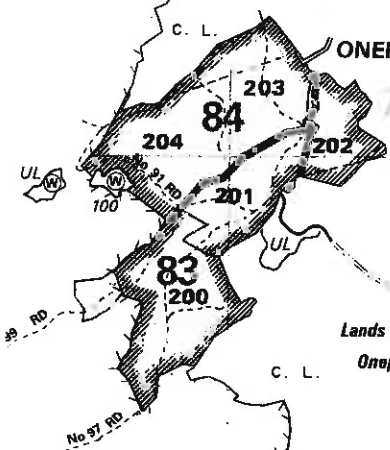
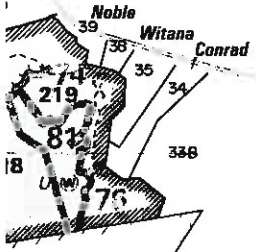
TE KAOK

PARENGARENGA  
LEASE 3A

Noble



PARENGARENGA 3G LEASE

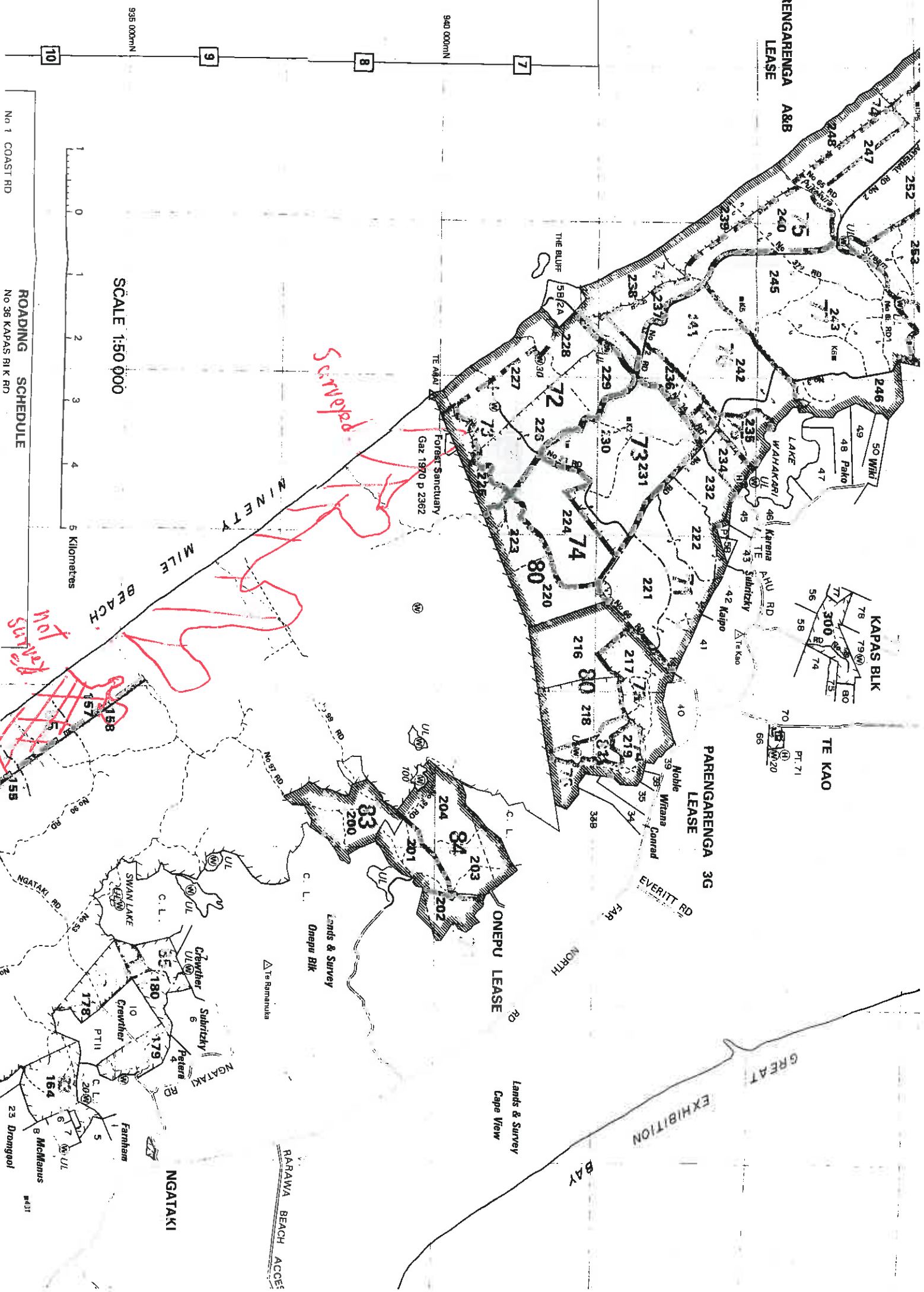


*Surveyed*

H I J K L M

140 000mE

1 000mE



No 1 COAST RD

ROADING SCHEDULE  
No 36 KAPAS BIK RD

SCALE 1:50 000



BEACH

NINETY MILE

Scrubland

Top Kangas

NGATAKI

RARAWA BEACH ACCE

Lands & Survey  
Cape View

EXHIBITION BAY

BAY

GREAT

TE KAO

KAPAS BLK

PARENGARENGA LEASE 3G

RENGARENGA LEASE A8B

#431

23

Drangool

26

NGATAKI RD

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