

WELLINGTON LAND DISTRICT

**COASTAL RESERVES
INVESTIGATION
AND PROPOSALS**

REPORT ON
MANAWATU COUNTY



Coastal Reserves Investigation

Manawatu County

Planning Team

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Index

Page

PREFACE

INTRODUCTION

1 & 2

INVESTIGATION

Part I - The Land

- | | |
|---|----------|
| (a) Geology, Physiography | 3 & 4 |
| (b) Soils, Climate and Agriculture | 4, 5 & 6 |
| (c) Forestry, Forest Parks & Vegetation | 6 & 7 |
| (d) History of Coastal Lands | 7 & 8 |
| (e) Wildlife | 8 |
| (f) Conflicts of Interest | 8 & 9 |

Part II - The Ocean

- | | |
|---|-------------|
| (a) The Marine Geology & Topography | 10 |
| (b) Ocean Classification, Character & Quality | 10 & 11 |
| (c) Marine Life | 11, 12 & 13 |
| (d) Recreation | 14 & 15 |

Part III - The Reserve Proposals

15 - 36

(Includes Proposal 3 - Tangimoana Regional Park)

BIBLIOGRAPHY

37

APPENDIX

- 1) Native Species of the Manawatu Sand Country
- 2) New Zealand Historic Places Trust Report
- 3) Wildlife Report on Puke-Puke Lagoon
- 4) Annual Records of Bird Sightings Rangitikei Estuary
- 5) Annual Records of Bird Sightings Manawatu Estuary

PLANS

Following Page

- | | |
|---------------------------------|----|
| 1) Manawatu County - Locality | 2 |
| 2) Manawatu County | 2 |
| 3) Manawatu County - Study Area | 16 |
| Proposal 1 | 18 |
| Proposal 2 | 20 |
| Proposal 3 | 21 |

Preface

The objective of the Department of Lands and Survey's National Coastal Investigation is the stocktaking of New Zealand's Coastal fringe with a view to reservations for both preservation and public enjoyment.

The first step in the investigation is the undertaking of critical analysis of the coast on a county basis from field observations and extensive research. Consideration has been given to a wide range of natural features, historic associations, likely and possible utilisation and relativity to important features such as urban areas and transport systems.

An Inventory of coastal areas is necessary because of the pressures of conflicting interests on the coast. The results of the initial study lead to specific recommendations for reservation of land along the coast to achieve the following aims:

- (a) To provide public access to and along the coast
- (b) To preserve the quality of the coast for future generations.
- (c) To provide a well-balanced hierarchy of reserves along the coast for public recreation.
- (d) To preserve any natural, historical, scenic, scientific or other special features.
- (e) To preserve habitat for species of waterfowl, wildlife and marinelife.

Any investigation should recognise the interrelationship between land and water. The Ocean is often the major reason for attracting people to the coast, and whether or not directly mentioned in the report, the ocean is therefore an integral part of the coastal resource.

Recreation on the coastal fringe is one of many land uses which has an impact on water quality and fauna & flora. This needs to be taken into account when considering reserve proposals as there may be areas which should be included in reservations or which must be considered as part of an integrated management plan. Similarly, the use of management techniques such as water classification should be related to proposed recreational uses along the coast.

The significance of a proposal relates to its relative importance, overall quality, and degree of use of the area.

- (a) Local - where the use of the area will in the main be by residents of the county or immediate locality.
- (b) Regional - where a significant proportion of the use is or will be from outside the county or immediate locality
- (c) National - where the area is of such importance and attraction that it will be used by people from throughout New Zealand; or so unique or possessed of such historic or other values that its preservation is in the national interest.

These significance ratings are defined in planning terms and should not necessarily be considered to reflect financial or administrative responsibility.

The urgency for action will depend upon the pressures on the area and a priority rating is indicated as follows:

(i) High Priority

- (a) Areas generally of easy access where public use is high in the near future ; or
- (b) Areas which have a particularly important significance and which should be protected by reservation because of likely loss to the public or the nation; or
- (c) Areas of medium rating which should eventually be acquired but where subdivision is imminent and the area is in immediate danger of being lost; or
- (d) Areas that are strategic from the point of view of providing public access.

(ii) Medium Priority

Areas which would attract use if available as reserve but where there is no great danger of being lost through subdivision or other development. These areas would, to a lesser degree, have some of the features of high priority areas.

(iii) Low Priority

Areas which have long term potential as reserves but where acquisition is not necessary within the next few years.

This study is a re-evaluation of the initial Coastal Reserve Investigation completed in 1968. This report was done within a regional context and is not expected to define final proposal details such as boundary lines, fencing etc. which would be negotiated when under detailed consideration. Any input from other government departments, private organisations or individuals was most appreciated and continued criticism of the report is needed in order to evolve a workable and satisfactory coastal programme.

Introduction

The Manawatu County Coastline is typical of the entire coast of the region that bears its name. Its 21 km length is a continuous stretch of wide sandy beach backed by actively eroding dune country. Three sealed roads run to the beach from State Highway No.1. providing excellent access to the coast. This physical setting has led to the establishing of 3 beach settlements in the county.

- (i) Foxton Beach located at the mouth of the Manawatu River is the largest urban area in the County and has a large safe swimming beach adjacent. It is growing at a steady pace but has ample residential sections in the area to expand over the next 20 years. Over half of the residents are permanent.
- (ii) Himatangi Beach sited in the middle of the County is the smallest settlement but growing rapidly with 2 new subdivisions recently drawn up. The vast majority of houses are summer baches and most of these are owned by Wellington area people. The town lies adjacent to a large beach though not as good as Foxton Beach.
- (iii) The third settlement at Tangimoana is set 1 km back from the beach along the Rangitikei River. Permanent resident population has dropped 27.5 per cent in recent years and little growth is planned. This area is within a proposed regional park complex that if established should give some impetus to more development. Its role in the Regional Park will be discussed in Proposal 3.

Manawatu County is agriculturally oriented to fat lambing and dairying which are the dominant pastoral uses on soils and physiography of a sandy nature. This is, however, the only County which has attempted both through Lands and Survey farming and private efforts to make the active young dune country productive grassland. Counties to the north and south have all but surrendered their coastal dune lands to the pine plantations of the Forest Service. This dominance of agriculture within the County will increase in the future and must be a factor in any proposal for reserves on the coast that involve potential farm lands or the maintenance inland of already reclaimed lands.

The overall population of Manawatu County was 6,622 in 1976 which is generally stable in terms of previous census. The pressure on the coastal lands is not generally expected to be from within the County (such as the development at Foxton Beach) but from Wellington and Palmerston North Cities. Both are within an hour and a half of the coast and represent a considerable combined population (approx.400,000). The pattern is as yet not fully understood but it appears that Wellington people make up the majority of bach owners while Palmerston North residents come to the coast on day trips. This is probably the result of a desire to "get away" from the immediate vicinity to another region for any lengthy holiday or a retreat. This theory may have some basis in that work on the East Coast in Masterton County shows a large number of bach owners to be from Palmerston North. This situation, if true, throws a different light on estimates of the popularity of a Regional Park at Tangimoana .

At all three beach settlements there are existing reserves which satisfy the immediate coastal reserve needs although two issues remain unresolved. One is the provision of continuous public access along the County's length and the associated management considerations, and the other, the proposal of a Regional Park near Tangimoana. The first area of esplanade reserve will be handled in the general context of the overall County investigation while the second question of a regional park will be dealt with in depth in a separate section attached to this report.

For the purpose of inventory and for general information the coastline of Manawatu County can be divided into the following sections on the basis of topography and tenure:-

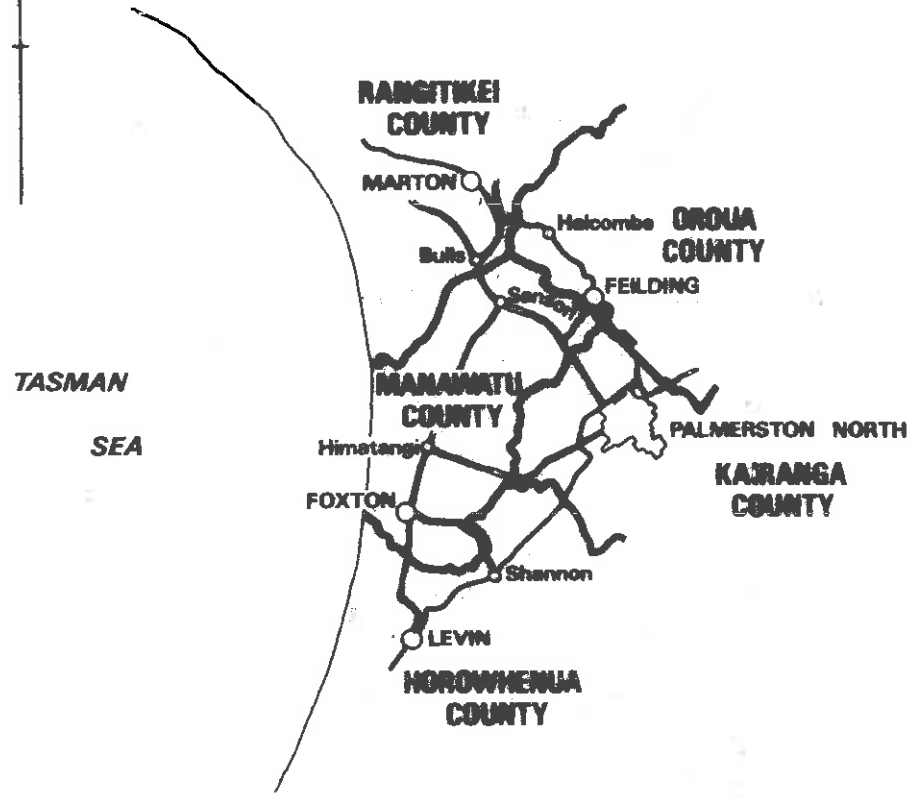
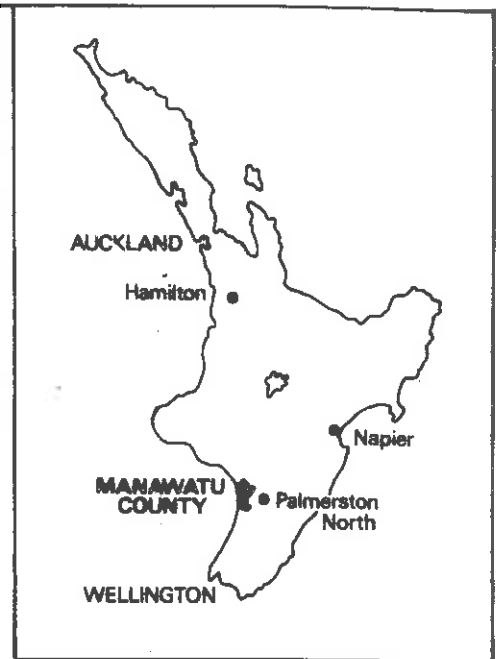
21 km	of beach
11.5 km	of privately owned land
9.5 km	of publicly owned land
3 km	of developed beaches
18 km	of undeveloped beaches

Map 1

COASTAL RESERVE SURVEY

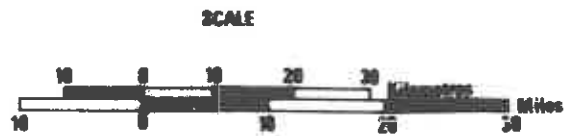
MANAWATU COUNTY

LOCALITY



TASMAN SEA

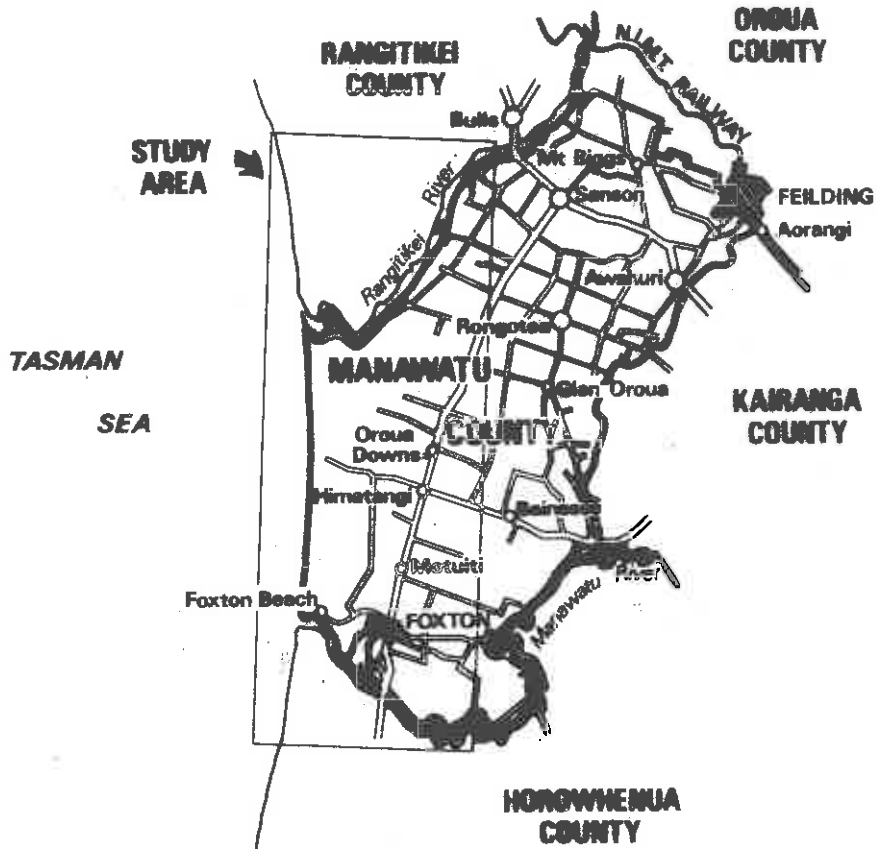
REFERENCE
Roads 
Railways 



Map 2

COASTAL RESERVE SURVEY

MANAWATU COUNTY

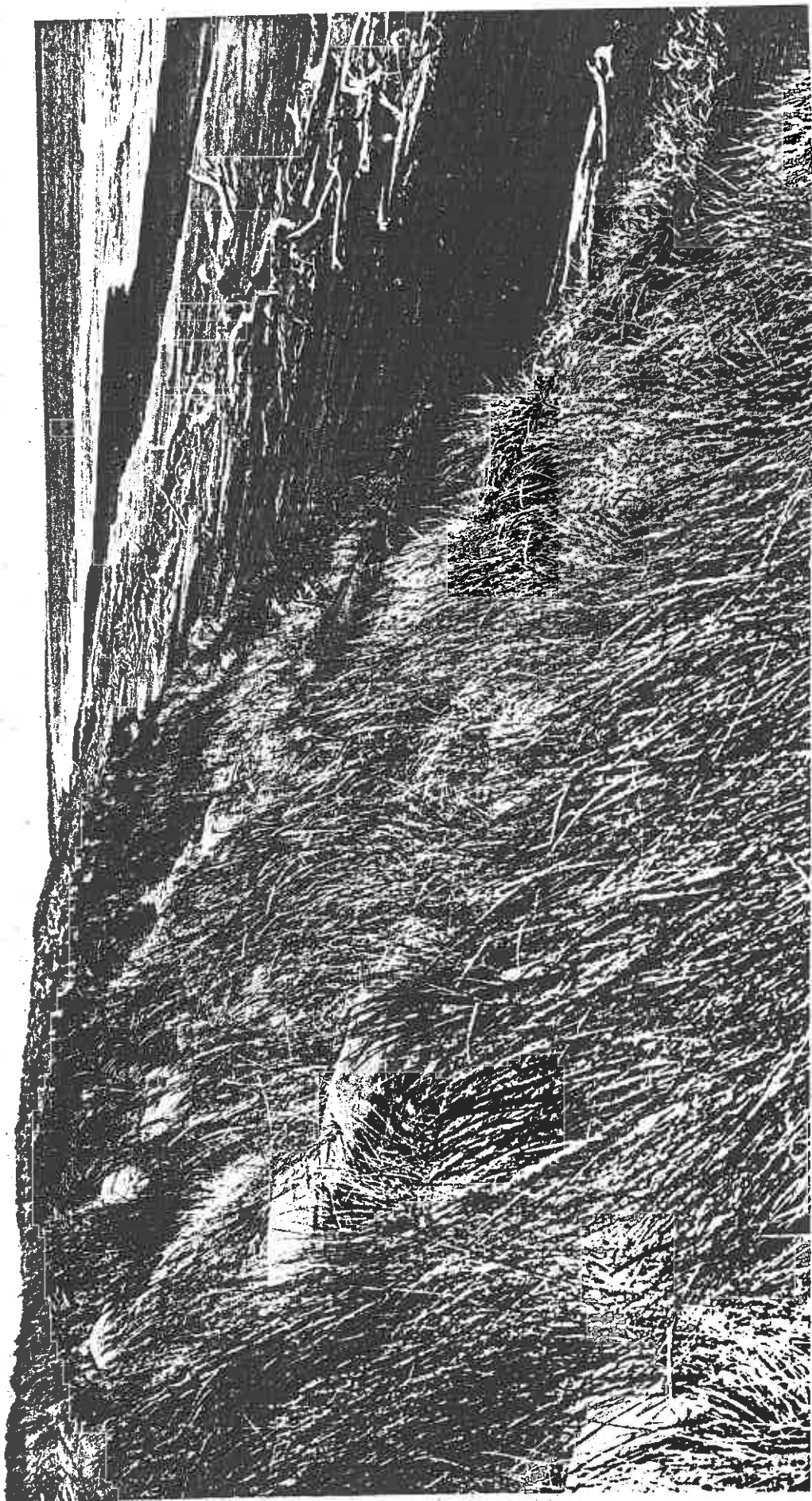


REFERENCE

- Roads
- Railways

SCALE





Part 1: THE LAND

(a) Geology and Physiography

The Geology of Manawatu County is extremely simple as the entire County lies in a zone of quaternary rock of the most recent series. These base rocks manifest themselves as sand dunes nearest the coast, with areas of river terraces and river silt inland along the main rivers, i.e. the Rangitikei, Oroua and Manawatu. The deposits have been worn from the inland Hawera series of basal conglomerate, volcanic sand, dune sand and marine sand as well as Tertiary aged sandstones and mudstones of the central ranges. These surface deposits overlay on old Mesozoic marine geosyncline that has been raised by folding and faulting as well as relative ocean level drop to establish the present coastline.

The surface of the County has been formed since the end of the last glaciation (C.10,000 years ago) by a combination of a rising coast and the landward movement of the sand dunes formed along the Coast. The process of landward migration of the dunes has not always been at a uniform rate, so that it is possible to divide the area up into four different 'phases' which are different ages and can be recognised on the ground by their different soils. The most recently formed dunes nearer the coast still possess areas of sand hills, plains and peaty swamps which give a good indication of the pre-European vegetation and the early conditions in the genesis of the soils of the farmed areas nearby.

Between the Rangitikei and Manawatu Rivers the surface of the land takes the form of an elongated dome, the crest of which ranges in altitude between 10 metres and 50 metres just east of the Foxton-Sanson Highway. The land rises gently from the coast to this crest and then falls away inland to the margin of the flats and terraces of the Oroua and Manawatu Rivers at a height between 7 and 33 metres above sea level.

This low overall relief of the sand country is obscured by the alteration of dunes and sand plains, which affects the drainage and plays an important part in the formation of different soils. Basically each dune consists of two parallel east-to-south-east trending wings up to 3 km in length united in their eastern end to form an apex, which is generally the highest part of the dune. The land enclosed by the dune is a flattish sand plain, which slopes up eastwards towards the apex. Near the apex the water table is low, but westwards, as the surface of the sand plain becomes lower, the water table is closer to the surface. At the extreme west of the sand plain and at the foot of the next dune the water table is usually at the surface. Where the flow

of the surface water away from the sand plain is restricted by encircling dunes, peaty swamps, ponds or lakes are formed. The wet areas have considerable wildlife value and Pukepuke Lagoon within Manawatu County has become a research centre for Wildlife Division of Internal Affairs.

The river flats are generally low lying but slope up gently to well defined levees bordering the rivers. The levees tend to impound drainage from the low lying parts and produce a high water table. Near the river mouth, areas that are inundated by brackish water during very high tides are saline. These same saline areas are very important for bird life and marine life - (shellfish & fish).

Further inland river terraces are 10 to 17 metres above the present river courses. Their surfaces are flattish, with occasional depressions representing old river courses.

(b) Climate, Soils & Agriculture

The climate of the Manawatu Coast can be described as generally moderate with few extremes. The rainfall is 914 mm average per year with a slight late summer low though not significant enough to effect agricultural water supply. Very few droughts of any duration have been recorded over the past 40 years. Most of the rain in this district is brought by westerly winds, and the rainfall pattern is largely controlled by the position of higher country to the east which causes precipitation of the moisture carried by these winds. Rainfall is lowest in the Himatangi-Foxton area where westerlies have little obstruction to their passage. To the south and north of this area the adjoining higher country of the Tararua Ranges and the Rangitikei hills cause slight rainfall increases on their slopes though overall the variation is recreationally and biologically insignificant.

The air temperatures are similar to the rainfall patterns with no great daily temperature range. February has a mean monthly average of 17.6°C and July an average of 8.3°C though summer daytime maximums stay in the high 20's. Overall this moderate pattern of temperature and rainfall leads to related moderate readings in relative humidity, days with frost, sunshine hours and incidence of severe hail, or thunder storms.

There is only one area of climate that is extreme during the prime recreational summer period and that is the wind. Almost a quarter of the 5 month summer period has winds of 34 knots or more. The dominant winds are from the west and north-west which causes generally large surf and active movement of foredune sand both of which are detrimental to recreational activities, especially with lack of shelter near the beach. The winter period on the other hand has many periods of calms though the most damaging gales

occur from strong southerlies in winter.

Overall the general climate of the coast is suitable for outdoor summer recreation with warm daytime temperature, moderate night temperature, low humidity, high sunshine hours and few special phenomena e.g. hailstorms, rain storms. The only detrimental quality being strong summer winds causing rough seas unsuitable for boating and children's swimming.

The soils of Manawatu County fall entirely within the D.S.I.R. Soils Bureau classification central yellow-brown sands. Soils of this type on the younger sand drifts bordering the coast show little or no profile development and except on sand plains where the water table is high, are droughty and unstable. Further inland the soil formed on older sand drifts are more weathered and slightly to moderately leached, but for growing plants leaching losses are more than offset by improved physical condition due to increases in organic matter and accumulations of fine particles of dust that increase the moisture holding capacity and resistance to erosion. The more weathered soils and those with high water tables are capable of maintaining high quality pastures for dairying and fat-lambing farming. Regular dressings of phosphate and potash are required, and the wetter soils need drainage. On the more excessively drained yellow-brown sand soils (dune tops) afforestation is preferable to pastoral farming.

Two sub-groups of central yellow-brown sand, Foxton soils and Pukepuke soils dominate the coastal zone. Foxton soils in the north are formed on slightly consolidated dunes and can maintain fair pastures of cocksfoot, ryegrass and subterranean clover. They are highly susceptible to erosion if cover is breached. The Pukepuke soils dominate the southern half of the county and develop on the sand plains, the best pastoral lands in the district. With shallow drainage and regular topdressing these soils hold excellent ryegrass and white clover pasture.

The agriculture of the County is deeply affected by the soil pattern described above and the climate. The Foxton soils of the County are forested to prevent erosion but only on the dune crest. All marginal areas on dune slopes and between dunes have received some measure of pastoral development which signifies Manawatu County's overall historical ties with maximum use of land for farming. Only very near the coast where pure sand dunes actively move and no soil profile exists has farming in the County conceded defeat and turned over a block of land to the Forestry Department for pine plantation. This was to protect already developed land at first but timber production has more recently become a viable economic proposition.

The Pukepuke soils of the south on the other hand have been extensively utilised for pasture and forestry has gained no foothold on lands south of Himatangi

Beach. These sand plains carry better soils and are less susceptible to erosion. This being the case the lands south of Himatangi Beach are far too productive to be used for reserves or forestry. Thus since the dune lands in the north are less productive and will be forested, they will make an excellent regional park setting as trees are needed for shade and wind shelter. However the hard won pasture inland of the Forest Block, currently largely under Lands and Survey control as a farm settlement should remain and be (strictly) maintained, as severe erosion could begin if use was changed to allow mass public access. Thus agricultural farming should remain part of the reserve management to maintain a check on erosion, to set a pleasant scene for visitors and perhaps supply financial backing to various projects i.e. toilets, boat ramps etc. The Regional Park concept will be more fully dealt with in Proposal 3 of the report on Tangimoana.

Fat-lamb farming is the main use of lands nearest the coast while dairying and market gardening dominate inland. This pattern of use has led to large properties along the coast and small ones inland. Since few people could privately afford to develop marginal dune lands, the Crown or County took control. This occurred mainly in the north of the County on the poorer soils. In the south the better soils required less development and consequently private individuals currently own the entire stretch of coast between Foxton Beach and Himatangi. This being the case the acquisition of areas for reserve in the north would be easier and less expensive. One problem in the northern area that may result in the change to Forestry will be the possibility that the trees when mature will prevent the winds from carrying dust and nutrients to the pasture land behind; the very factors that make them farmable and indeed which formed them in the first place.

(c) Forestry, Forest Parks and Vegetation

It is already established that the Forest Service has control of a large section of Coastal land north of Himatangi. The first job they perform is the shaping of the foredunes to protect the trees behind. Once the dunes have reached a high enough level to push the wind above small trees and cut back salt spray, stabilising vegetation is added. These traditionally include marram grass and spinnifex on the seaward side and top, with tree lupin, macrocarpa, and other assorted shrubs on the leeward slope and a few metres inland. Thus the sand that does blow inland is caught by the shrub wall. The pine forest is then planted behind the dunes with the first several hundred metres of trees sacrificed as a further barrier to salt burn.

It is possible that certain shade trees and shrubs could be planted in the

lee of the dunes and the first 200 metres before productive forest. Natives such as the pohutukawa and ngaio and exotics like eucalyptus and poplar would add colour and shade while providing similar protection to pines. Some species may also provide a habitat or food source to allow for the return of certain species of native coastal birds.

If this programme was promoted along the length of the County, coastal walks and day trips at the beach would be enhanced considerably. This general ideal should be used at the domains near Foxton Beach and Himatangi as well as the proposed Tangimoana Regional Park.

Unfortunately the programme for afforestation would involve the destruction of the relatively natural features currently intact along parts of the coastal zone. Contrary to popular belief there is a large number of native plants associated with unstable dune country. Though they are of no commercial value the fact that they exist points to a panorama of scenery that is a pre-European phenomenon. Various groups such as the N.Z. Ecological Society with support from Massey University have researched this situation and feel an area should be set aside for maintenance of this unique ecosystem. In generally agreeing this report suggests such an area could be established provided minimal effects on established pasture, wildlife areas and forest production was planned for. This is another issue that could well fall within a regional park because it requires a wide range of management options and a high technical input to be achieved. Proposal 3 delves into this suggestion and its options. Appendix 1 gives a list of plants in the dune country and some illustrations of those considered most significant.

(d) History of Coastal Lands

The Maori history in the area is little recorded, though the Historic Places Trust in Appendix 2 describes the general setting and possible features to look for. Archaeological sites with Moa bone deposits are known in dune areas of the County along with more numerous recent shell middens and small fire places. It has been suggested that a Maori Pa was present on the shores of the formerly much larger Lake Pukepuke and there was certainly a Pa and an eel fishery at nearby Lake Kaikokopu, although no trace of these formerly important habitation sites are known on the present surface. It is quite likely that they were buried below the Waitarere age sand dunes. The area currently receives some small usage by Maoris for the harvesting of Pingao.

The Manawatu County Council was constituted in 1876, following the abolition of the provinces. The County initially embraced the present counties of Horowhenua, Kairanga, Oroua, Kiwitea, Pohangina and Manawatu. The original County headquarters were in Foxton but moved in 1883 to Sanson. In 1883 Oroua County was severed and in 1884 Horowhenua County was formed.

The human effects on the physical setting have been very marked in Manawatu County. The following statement is extracted from a summary of a paper presented at the 21st Annual Conference of the N.Z. Ecological Society, 25 August 1972. "...a period of relative stability until about 1850 allowed the development of communities of swamp plants in former open water areas, but sufficient water remained to support large numbers of ducks. The presence of a Maori eel fishery at Kaikokapu and a Pa at Pukepuke suggests that food was abundant in the area. Between 1850 and 1900, bullocks grazing the spinifex foredune set the Waitarere dune phase in motion. Many of the former swamps and lakes were buried by drifting sand..... Superimposed upon these changes are those due to the invasion of the area by exotic plants and animals since European times."

Palmerston North City is 40 km by road from the coast and is the service and distribution centre, as well as chief market for the County's products. It is a large source of recreational pressure on the Manawatu County coast though to what degree and on what level is yet to be ascertained. The proposed park is however strategically located to provide facilities for a large and growing population which will continue to seek coastal recreation.

(e) Wildlife along the coast is confined to common exotic land mammals such as opossums, hedgehogs and rabbits. The development of exotic forests should enhance the area if game birds are released.

The main wildlife areas of the County are the Manawatu and Rangitikei river mouths which contain the habitat and breeding grounds for large numbers of native birds. A list of the birds is contained in Appendices 4 and 5 respectively. The birds exist in conjunction with plant and marine life systems contained only in the river estuaries which if changed in even the smallest degree can result in the elimination of an entire species. The birds also range far to sea to feed on fish schools and their relationship is detailed in Section (c) of Part II the Ocean. In the same realm as the sea birds are the eels and whitebait which travel inland to the lakes then back to sea, and any change in their spawning grounds could quickly result in their depletion.

(f) Conflict of Interest

All coastal zones have conflicts of interest to one degree or another but Manawatu has reached a stage where its geographical situation has brought these to the forefront. In the interest of clarification it is thought a list of the key conflicts would shed some light on the situation. The following are not in order of importance nor are they complete:-

1. The stabilisation of dune country to protect pasture land all along

the coast is beginning, with the New Zealand Forest Service acquiring large coastal areas. The question arises immediately as to how far inland exotic pines should be planted based on economic use of the land. Manawatu County is agriculturally orientated and has until recently pushed closer and closer to the foredunes with its land development schemes. The Department of Lands and Survey with its large Tangimoana Farm Settlement block near the coast has historically been set on the same course.

2. Some areas still unstabilised contain native plant life closely related to a natural setting which if left open would allow for scientific study of dune development, native plant ecosystems and sandy soil evolution. This situation is incompatible with developed pasture inland, forestry schemes, wildlife areas on inland lakes (Pukepuke Lagoon), and traditional recreation reserve proposals.
3. Proposals for reserves of any kind are often at odds with forestry farm development, wildlife values, private owners and beach settlement extensions and design, e.g. bikes in dunes can start erosion that affects forests, pasture, other recreation options, native wildlife and plants, and features such as roads and streams. This is particularly true of the proposed Regional Park at Tangimoana which will contain, if approved, elements of all the above.
4. The ownership of the coastal land is currently in many agencies and individuals which, though not necessarily in conflict on all issues, have overlapping values and jurisdictions, e.g. the proposed Regional Park has Crown Farm Development Ownership, Crown Beach Settlement land, Manawatu County dune lands, Wanganui-Rangitikei Catchment Board jurisdiction on the Rangitikei estuary islands, Rangitikei County jurisdiction across the Rangitikei River, Forest Service land and a Wildlife Division of Internal Affairs Department, Scientific Research Area (Pukepuke Lagoon.)

Part 2: THE OCEAN

(a) The Marine Geology and Topography

The shoreline of Manawatu County is the ocean washed zone of a Mesozoic geosyncline that has been uplifted and tilted. The coastal study area between State Highway No.1. and the shoreline is still rising with the subsequent progradation of the beach. The beach advance seaward is very slow having several stages of retreat during storms or exceptional high tides. The materials for this advance are largely brought down from the interior by the Manawatu and Rangitikei rivers. The sediments of the beach itself are clean, well sorted medium to fine grain sands. Only near the mouth of rivers and larger streams are concentrations of pebbles and other coarse detritus to be found.

The bathymetry of the seabed itself is very regular as ocean dynamics have levelled all marine banks and filled even the smallest valleys. The seabed gently slopes into the Cook Strait Trough and is only 50 metres deep around the 12 km mark. The northern coastal area off Manawatu County is one of only two places on the West Coast of the North Island below Cape Egmont to have the sea floor away from the immediate beach composed primarily of mud. The southern part of the County adjoins an area of seabed composed of medium to fine sand though this eventually gives way to the mud belt of the north.

Fault lines are largely uncharted but there is little doubt that the seabed off Manawatu County receives regular shallow-focus earthquakes. The significance of the activities is especially important if underwater pipelines for gas, oil, ironsand etc are planned.

The absence of rock outcrops in the ocean allows an unrelenting attack upon the beach of large waves causing a constant shift in sand banks. This shift in the beach zone is directly related to the storms of summer which because of the mechanics of the process leaves a marked drop-off into the surf. The swimming in this kind of surf is dangerous for children. The calms of winter and autumn replace this steep drop off with a gentle slope. Large protective sand bars run parallel to the beach and are constantly shifting which makes boating dangerous inshore.

(b) Ocean Classification, Character and Quality

The presence of Manawatu's long, wide beach has moved some to call this coast monotonous. The fact remains however that it is and will continue to be a popular ocean beach. This pattern is reflected in the 3 beach settlements and large day trip numbers of the summer.

The waves along the coast approach at right angles regardless of wind direction as the shallow uniform bottom straightens them out. The surf

averages approximately 1.2 metres in height near the shore and approximately 3.4 metres offshore making surfing popular but sailing and power boating limited. These same waves churn fine silt up from the bottom or maintain silt introduced from rivers in suspension, giving a zone 2.5 km. wide a murky appearance. This "dirty" appearance takes away from the quality of the coast for swimming, diving and directly inhibits inshore marine life by limiting biotic growth.

The overall current pattern for Cook Strait is complex and as yet not fully understood. There is a pronounced indraught especially from the South Taranaki Bight onto the Manawatu shore responsible for the wood debris lining the high water mark. This effect may also be the result of a tidal stream (up to 5 knots) running through the Cook Strait narrows facilitating the transfer of floating material from northern or southern Cook Strait without the need for any residual flow. However, this tidal stream measured off the Rangitikei river is only 0.7 knots and runs generally parallel to the coast probably accounting for the general absence of large quantities of wood debris along the Manawatu Coast excepting river mouths. The tides in the area range from approximately 2.5 m in spring to 1.4 m neaps which is low because of the open nature of the coast. These low tides mean that passage along the beach can be obtained at any time as the water level seldom covers the entire beach. The water temperature averages are from 18°C in the summer to 12.5°C in the winter though in-shore these would be higher in the shallow water. Salinity is lower in these waters than further north though the difference is minimal.

The ocean adjacent to the County is not subject to intensive use. Under the Water and Soil Conservation Act 1967 sea water may be classified and the procedure is controlled by the Water Resources Council. Provision is made for a water classification which is suitable for various public uses which have a range of water quality standard associated with them. Any water classification which may be applied to part or all of this portion of the coast needs to be related to the existing natural quality after balancing relevant considerations of existing discharges and existing and planned future land and water uses. Water classification is particularly useful in controlling pollution but is not necessarily needed where there has been no alterations in the natural state of the sea water along this coast. This coast and water has a high natural quality.

(c) Marine Life

The nitrate, phosphate and dissolved oxygen in the southern Cook Strait water column is four times the national average. This finding parallels another study by Cassie and Cassie in 1960 which, while looking at the winter

phytoplankton blooms that often discolour the water in winter, concluded that a very high rate of primary production of organic matter prevailed on the southern west coast of the North Island. Subsequently, it was found that zooplankton biomass in the South Taranaki Bight and Cook Strait is more than four times (1335 mg/m^3) the national average (300 mg/m^3) and six times the North Taranaki Bight readings (204 mg/m^3). The richness, quality and quantities are internationally significant.

The Pelagic Fisheries (open ocean) are largely under-exploited in New Zealand being only 20 per cent of the national catch as against 60 per cent total world catch. Pelagic fish have been divided into three groups by Cunningham, 1972

- (i) Clupeiform or 'Sardine' type - Pilchards, anchovies, sprats and sardines.
- (ii) Other school fish -kahawai, trevalli, barracouta and mackerels
- (iii) The Tunas

All the above types of fish are abundant throughout the coast from 10 m to 200 metres in depth except the tunas which run farther north. It is probable that this resource in the area will be developed commercially by purse seine fishing methods. Overseas fishing boats take large catches currently and there are plans for an increase in their activity throughout the area:

The Demersal Fisheries (bottom feeding) using the more traditional bottom trawl and long line fishing methods is well established along the coast. The high nutrient content once again leads to large plankton supplies and abundant vegetative and biotic growth. Manawatu County is the southern limit of a series of low (36 cm high) boulder strewn reefs that make some of the best grounds for demersal fishing in New Zealand. Nearest shore range the trevally followed seawards by the snapper, the gurnard, and finally the terakihi. All these fish are taken in large numbers by trawlers from Wanganui and Wellington.

Dolphins, sharks, squid and whales frequent the southern Cook Strait because the supply of fish and plankton is high. Squid and sharks are caught commercially and further exploitation can be expected.

Seabirds along the Manawatu Coast are largely confined to the Manawatu and Rangitikei river estuaries. These estuaries are used as feeding grounds and resting stops during migrations. Very few records have ever been kept of actual bird numbers but two lists of the annual records of bird sightings in the Rangitikei and Manawatu River Estuaries from 1959 to 1963 are contained in Appendices 3 & 4. During these four years both numbers and types of birds in the estuaries fell dramatically. It is not known if the pattern has continued but would prove interesting especially in light of proposals for the Rangitikei area to be a regional park based partly on wildlife values.

The river estuaries are large and produce much of the environment essential for eco-system maintenance along the coast; that is the nutrient and plankton content. The size of bird breeding colonies is indicative of the availability of plankton which in turn depends on the extent of water enrichment. It has been established that the pelagic and demersal fisheries are directly dependent on the same system. Thus it is no surprise to find Pilchard schools associated with white-fronted tern, red billed gulls, shags and gannets within 16 km of the shore - plus Cook's petrel, fluttering and flesh-footed shearwaters. Kahawai and mackerels are associated with fluttering and flesh-footed shearwaters, red-billed gulls and cape pigeons while tuna attract Bullers shearwater, Cook's petrel, mollyhawks and sooty shearwaters.

Other marine life such as crayfish, paua, scallops, mussels, toheroas, tuatuas, pipis, etc., are not abundant because of the lack of stable ground upon which to cling near the shore and the silt disturbed in the water cuts down sunlight input. However, further to sea and along the rocky reefs mentioned before several types of shellfish and sea-eggs thrive. The spats from the shell-fish are nourished in estuaries along the county shoreline to be distributed throughout Cook Strait in areas more protected from the surf such as Golden Bay, Tasman Bay and the lee of Kapiti Island. These have developed as shellfish beds of commercial value.

Thus even though the Manawatu Coast offers little in the line of commercial or recreational shellfish collection the estuaries produce the beginning for shellfish beds in other parts of Cook Strait and contain commercial and recreational marine life such as whitebait and eels.

The ideas touched on in this section lead to the inescapable conclusion that the estuaries of any major streams in reserves must be managed thoughtfully, preferably for ecological reasons but also as producers of commercial products as well. The proposed Tangimoana Regional Park (Proposal 3) is designed to co-ordinate management and to establish public control over the development of activities in the Rangitikei estuary. The Manawatu estuary should be planned similarly and to facilitate this reserves proposals covering both banks are laid down in Part III of this report. These ideas are in line with all other major stream and river mouths within the Wellington Land District covered by the Coastal Reserve Investigations. However, the investigation of wildlife systems, including an inventory within the estuaries and how they are affected by upstream activity is paramount to any management plan of these reserve designations. This report recommends a zone of coastal seabed be planned along with the reserves when the area of significance is researched.

(d) Recreation

Recreation is placed under the ocean section because it is the ocean above all that draws people to the coast whether their sport is totally land based or not. It is also the ocean which built the physical setting on which people recreate and dominates all activities by its various moods. The following are some of the major recreational pastimes on this coast;

- (i) Surf fishing would be fair particularly in winter with the major fishing banks offshore providing a good habitat for many species. Also whitebaiting and floundering.
- (ii) Swimming can be safe and enjoyable throughout the entire coastline except at river mouths, during and immediately after gales. The sandy bottom and shallow inshore bars make fine body surfing and small children if watched can play near the waters edge or in the shallows. The water temperatures in summer are moderate but comfortable.
- (iii) Surf boarding would be widespread and popular when larger waves roll in from Cook Strait after a gale.
- (iv) The sunshine hours are long in summer, temperatures warm, and rainfall low which combined with the overall physical setting make the Manawatu County Coastline a prime holiday home location. This fact is born out with the development of three coastal communities in the County. The rapid growth of Palmerston North and Wellington City region should put increasing pressure on these settlements.
- (v) Boating for pleasure, either power or sail, would be limited by surf conditions (caused by the constant wind and shallow shifting bottom) and consequently water skiing also. However the Manawatu and Rangitikei river estuaries provide some outlet for power boating, rowing and sailing.
- (vi) Passive recreation such as walking along the beach and behind the dunes is very easy and interesting, with wildlife, insects, and plant life to observe in natural surroundings.
- (vii) Camping and picnicking would be good in several areas behind the dunes sheltered from the wind. This is especially true where streams break the dunes or along the major river mouths.

The presence of trees is essential for these types of recreation as shade and wind protection are important.

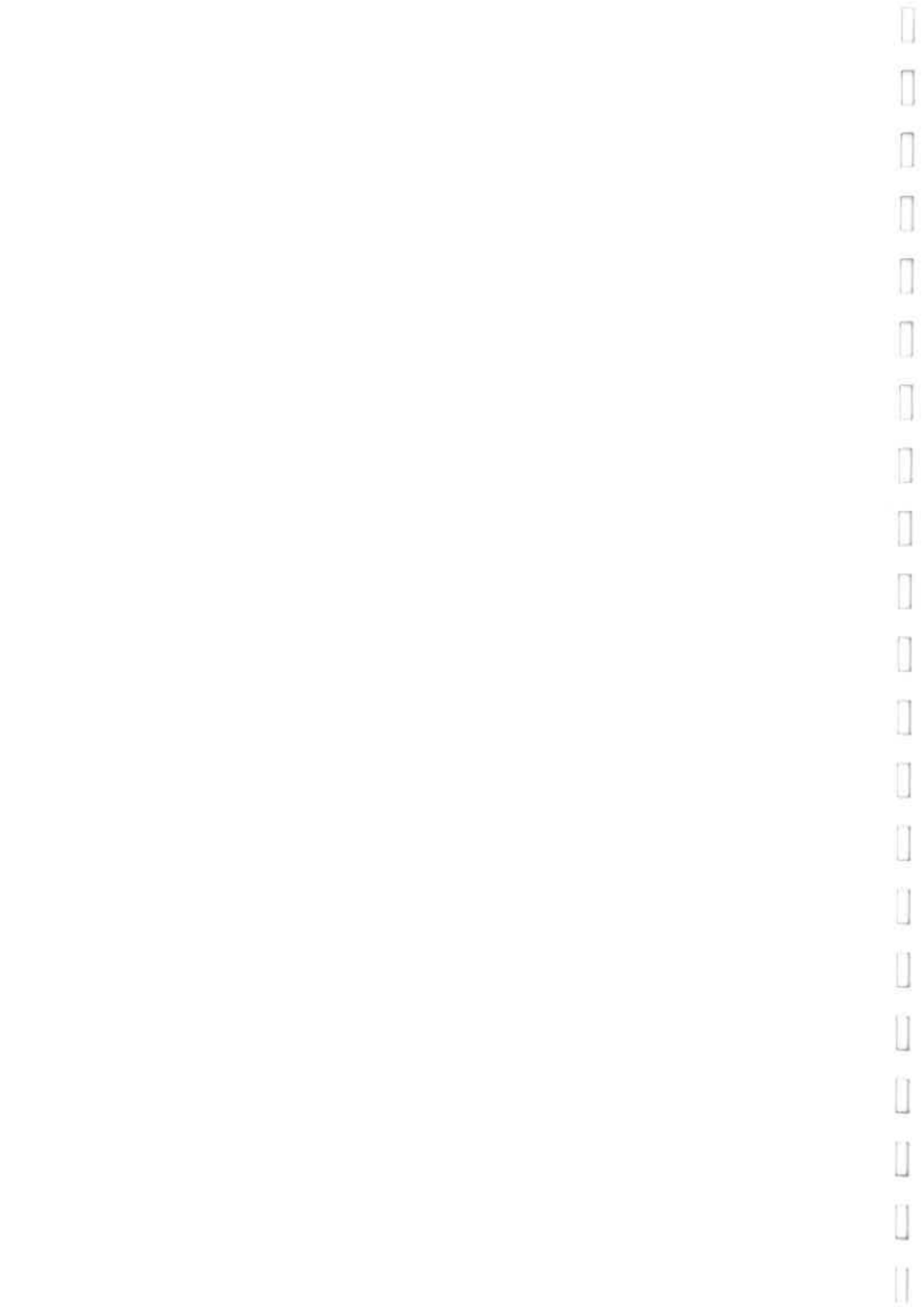
- (viii) Horses, dune buggies and motor bikes, with reasonable control, could be ridden along the beach with no trouble or damage. It is mandatory that they be prohibited on the foredunes as the erosion caused has often been extensive, i.e. County land near Tangimoana.
- (ix) Shooting in the estuaries and small lakes behind the dune country is restricted seasonally and in the case of Pukepuke Lagoon promoted on a management and scientific level. The afforestation of some areas would enhance hunting opportunities considerably. Most hunting (deer and game birds) occurs in winter which would limit climatically the vast majority of visitors and hence not conflict unduly with other activities.

Part 3: RESERVE PROPOSALS

The Identification of the qualities and values of the coastal fringe in terms of natural landscape character and potential for public usage for recreation in the preceding sections provides the basis for a number of proposals. In this County the proposals cover in principle the future provision of public access and usage in conjunction with conservation and preservation of the coastal environment.

The range of recreational activities outlined in Part II, Section (d) would require a definite pattern of reserves to satisfy demand. The present beach subdivisions will satisfy expected housing demand for 20 years and the County Council sees no need to establish future residential lots. Public access along the length would allow for many of the activities listed and a proposal for an esplanade reserve is made. The question of a regional park in the north of the County centred on Tangimoana is studied in detail in Proposal 3 of this report. The beach settlements of Himatangi and Foxton have recreation domains already established on the coast to cater for non-residents and these need not be mentioned except in general terms. The County Council agrees with the Regional Park and esplanade reserve concepts and has designated areas as block recreation reserves near all beach settlements in its District Scheme. Thus the Council is well aware of coastal reserve responsibilities and has taken a lead in this field. The Manawatu County District Planning Scheme became operative on 1 September 1975.

This investigation and classification of the coastal environment is an important phase of the Department's function of establishing and administering a national recreation and open space policy. It also facilitates the conservation of a highly valued national resource which was recognised by the Central Government in the Town and Country Planning Act 1973 which declared "the preservation of the natural character of the coastal environment..... to be a matter of national importance".



PROPOSAL 1

Aerial Photos: 3715 - 1/2

Aerial Mosaics: N.148 - 8

Aim: To set aside an area of land as Recreation Reserve.

Land & Area: Part Lot 1 D.P.17622
Part Section 6 Block I Moutere Survey District
Part Section 7 Block I Moutere Survey District
Part Section 3 Block II Moutere Survey District
Area is approximately 73 hectares.

Location: The land along the Manawatu River estuary and 1.5 km of ocean frontage running north to join up with an existing Recreation Reserve. The inland boundary is the Foxton Beach Township development.

Status: Foxton Harbour Board land now vested in the Manawatu County Council.

Vegetation: Marram grass, spinnifex and assorted dune plants

Access: Access to the area can be from numerous streets within the Foxton Beach Settlement which is connected to State Highway No.1. by sealed public road.

Utilisation: The area is a natural focal point for activities related to the sea, river mouth and river such as power boating, rowing, fishing, swimming and sailing.

General: The area is one of bare sand hills and semi-stabilised sand dunes. The planting of shade trees and the general stabilisation of the area would allow for picnic and camp sites as well as some active sports. The river area of the reserves would have to be watched closely for pollution, changes in wildlife numbers, and marine life depletion because of the inherent importance to the ecology of the entire coast. The riverside reserve would link up with a reserve proposal on the south side of the river in Horowhenua County giving public agencies control over the entire mouth of the river while being able to adjust to channel changes.

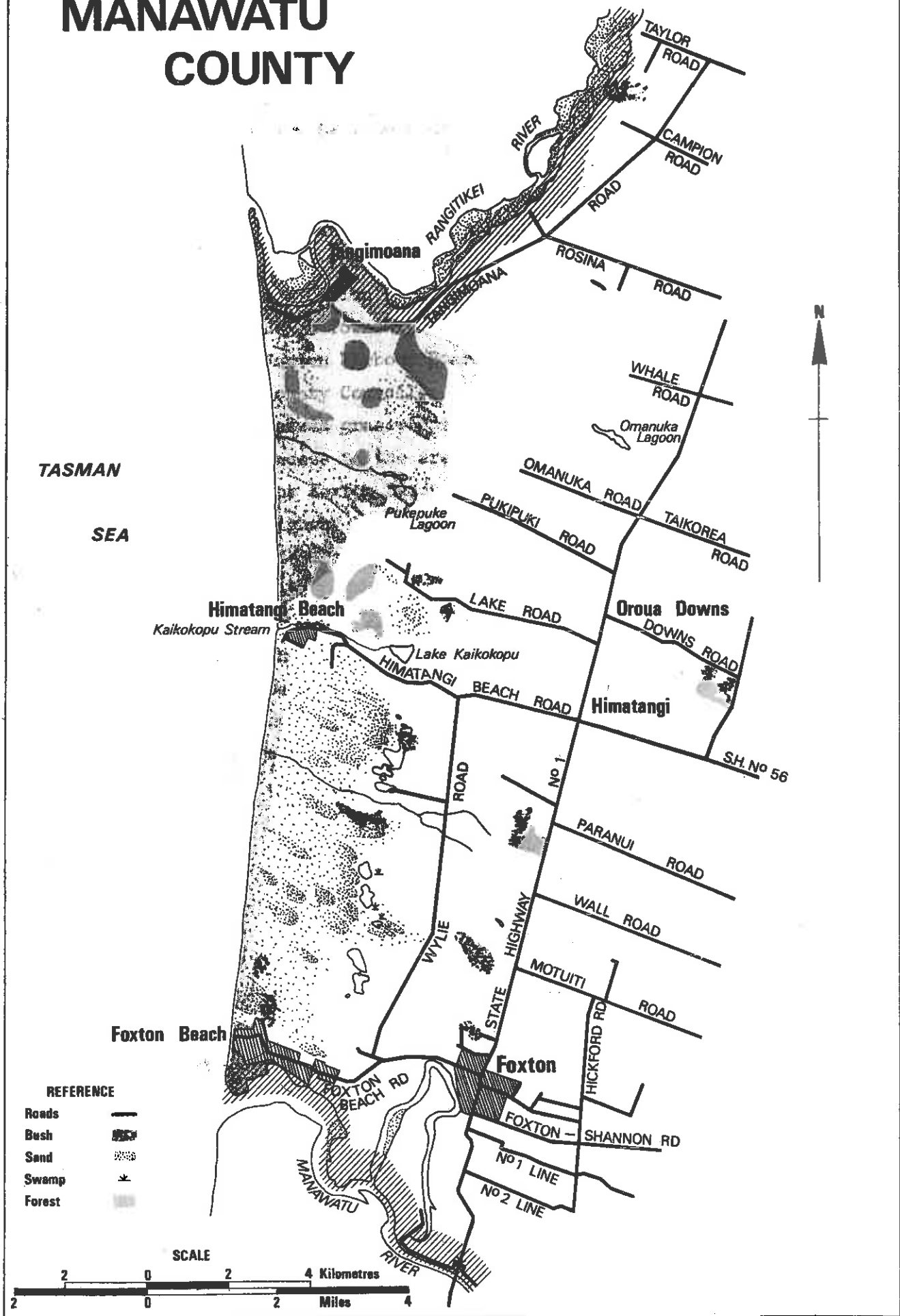
History: The Coastal Reserves Review Committee considered an interim report on 5 June 1975 which included this proposal and supported the County's designation over it. The operative district planning scheme shows this area designated foreshore reserve with the river mouth area as a reserve for the Protection of Wildlife and other parts along the river as plantation reserve and active play fields.

Significance: Regional
Priority: Medium
Action: No action required as the area has been designated
foreshore reserve on County District Scheme
(operative 1/9/75)

COASTAL RESERVE SURVEY

Map 3

MANAWATU COUNTY



TASMAN
SEA

REFERENCE

- Roads
- Bush
- Sand
- Swamp
- Forest

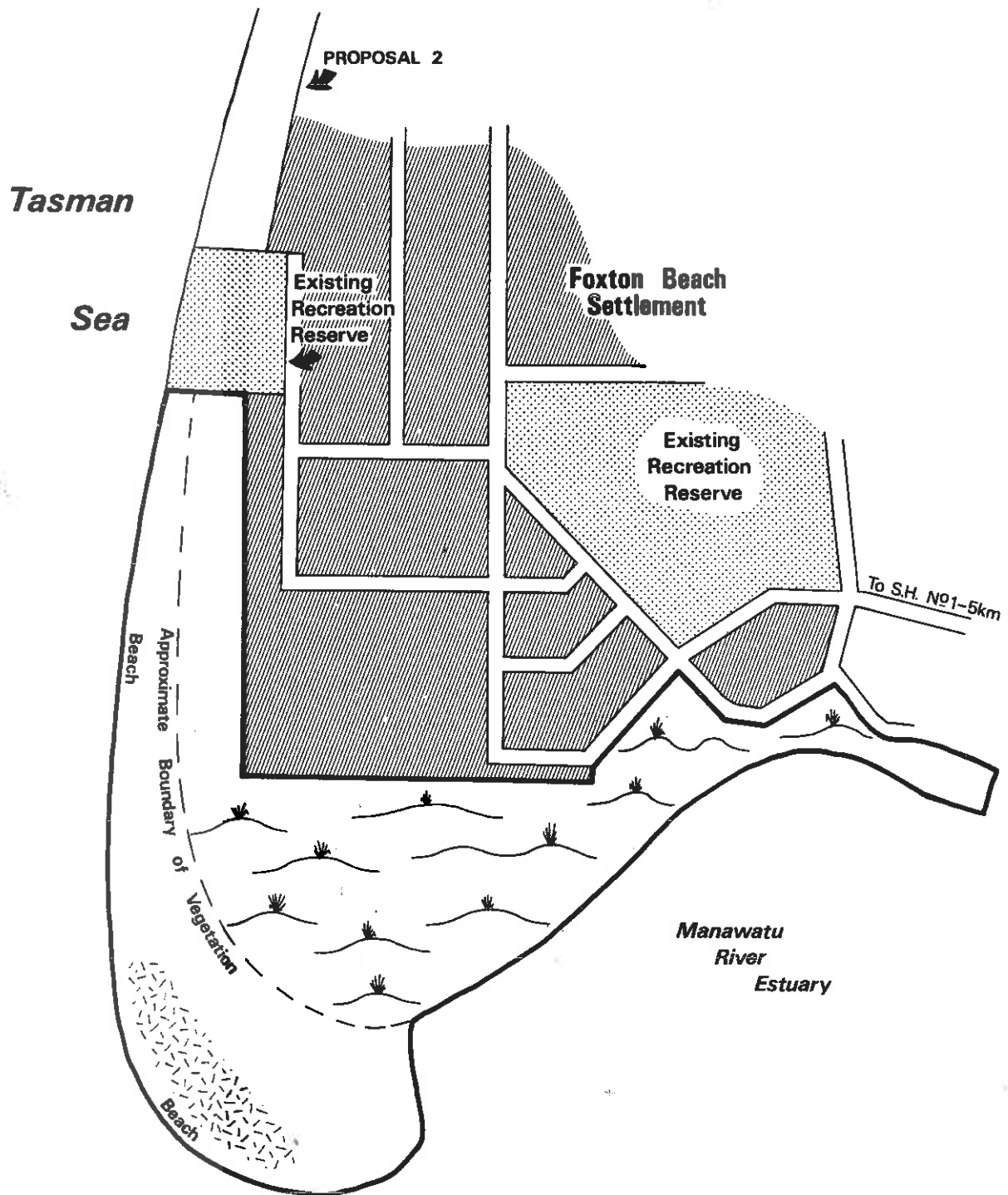
SCALE





Proposal 1

Sketch only.



Marram, Lupin and Spinifex	
Wood Debris	
Proposal Boundary	



PROPOSAL 2

Aerial Photos: 3414 - 1/2, 3413 - 1/2, 3412 - 1/2, 3411 - 1/2,
3410 - 1/2

Aerial Mosaics: N.148 - 2/5/8

Aim: To set aside a strip of coastal land for foreshore reserve
to provide for public access

Land & Area: Part of Lot 1 D.P.17622
Part Section 5 Block I Moutere Survey District
Part section 270 Town of Foxton
Part section 71B of Carnarvon
Part Lot 1 D.P.12976
Part Lot 1 D.P.12793
Part Section 645 Town of Carnarvon

These legal descriptions may be inaccurate because of
the uncertainty regarding accretion and erosion which
has occurred along the coast. The area is approximately
106 hectares based on 17.7 kms x 60 metres width.

Location: A strip of land along the entire length of Manawatu
Coast except the area of Proposal 1, and Proposal 3
(regional Park)

Status: Freehold, Public Road, N.Z.F.S., County

Vegetation: Largely marram, spinnifex, pingao, lupin and a number
of assorted native and exotic shrubs.

Access: The coast can be reached by three sealed roads :
Tangimoana Beach Road, Himatangi Beach Road, and Foxton
Beach Road.

Utilisation: Horse riding, bike and dune buggy driving, walking, surf
fishing, swimming and surfing.

General: The county-long strip would connect the proposed Reserves
at the Rangitikei and Manawatu river mouth areas and the
Domain at Himatangi Beach. Basically public access along
the coast is provided for. The area is not agriculturally
or forestry orientated and with sub-division already
established as being adequate the use would simply be
open space. Its official designation should affect
none of the owners and if the dunes are stabilised under
reserve management, this will protect productive land
inland including subdivisions. Motor bikes, dune buggies
and grazing cannot be tolerated in the sand hill zone or
even further inland as the land erodes very rapidly if
cover is removed.

History:

The Coastal Reserves Review Committee considered an interim report on 5 June 1975 which endorsed a 60 metre wide esplanade reserve which the County proposed in its District Scheme which became operative on 1 September 1975. The review committee supported this approach and the policy of providing for public access along the coast.

Significance:

Regional

Priority:

Medium

Action:

Endorse designation as proposed foreshore reserve on the District Scheme. Discuss with local authority the advisability of varying the inland boundary of the proposed reserve, according to terrain, to ensure adequate reserve is provided for dune protection.

Proposal 2

Sketch only.

Tasman
Sea

RANGITIKEI COUNTY

Tangimoana
Beach Sett.

Rangitikei River

TANGIMOANA BEACH ROAD

PROPOSAL 3

MANAWATU

Kaikokopu Stream

Himatangi Beach Sett.

Lake Kaikokopu

Beach

HIMATANGI BEACH ROAD

COUNTY

Beach

WYLIE ROAD - Metal

Foxton Beach Settlement

Proposal 1





FOXTON BEACH ROAD

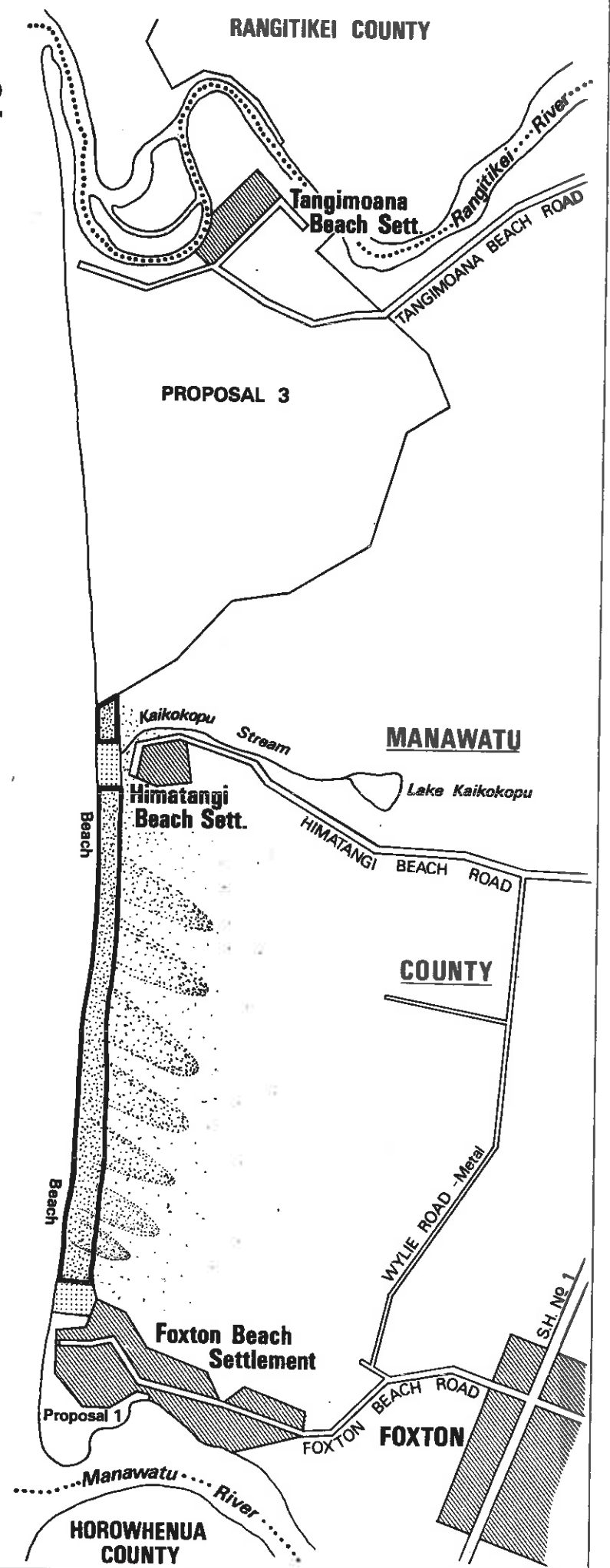
FOXTON

S.H. No 1

Manawatu River

HOROWHENUA COUNTY

Existing Recreation Reserve	
Unstable Sand Country	
Proposal Boundary	
County Boundary	





PROPOSAL 3

Aerial Photos: 4148 - 1/2/3/4, 4149 - 1/2/3/4, 4160 - 1/2/3
Aerial Mosaics: 143 - 8, 148 - 2

Aim: To set aside an area of land as a regional park complex.

Significance: Regional

Priority: High

Action: Approve regional park concept in principle.

Promote concept by:

- a) Endorsing existing designations on the District Scheme.
- b) Convening discussions with all interested agencies to assess support and to consider alternative methods of achieving a coordinated form of management. Options include reservation of all land and the establishment of a Board of Control as suggested in the report, and retention of areas basically in accordance with present status (except for reservation of Crown land). Control of a loose-knit ad hoc type could be established through a group of agency representatives in terms of a mutually acceptable management plan.

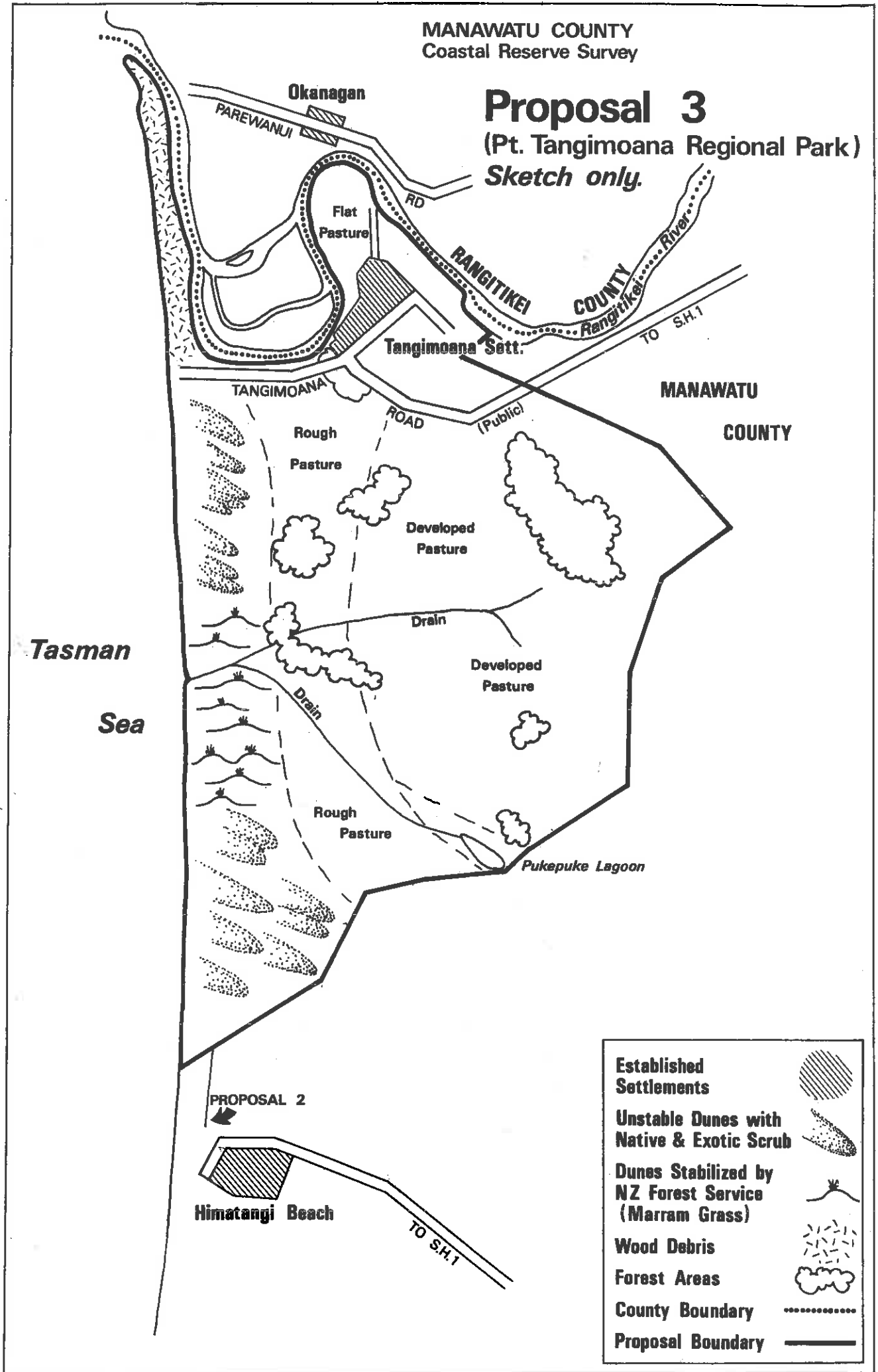
NOTE:

See separate study - Proposed Regional Park Tangimoana following.



Proposal 3

(Pt. Tangimoana Regional Park)
Sketch only.



Established Settlements	
Unstable Dunes with Native & Exotic Scrub	
Dunes Stabilized by NZ Forest Service (Marram Grass)	
Wood Debris	
Forest Areas	
County Boundary	
Proposal Boundary	



**Proposed
Regional
Park
TANGIMOANA**

Department of Lands and Survey,
Wellington. January 1976.



Manawatu County Coastal Reserve Investigation

**PROPOSED
REGIONAL PARK**

Tangimoana

Department of Lands and Survey
WELLINGTON January 1976

Incorporating: Proposal 3, Manawatu County Coastal Reserve Investigation
and Proposal 5, Rangitikei County Coastal Reserve Investigation.



Index

<u>Introduction</u>	25
1. The demand for a Regional Park	26
2. Land tenure and area	26
3. Present development	29
4. Ecological considerations	31
5. Recreational considerations	32
6. Management considerations	34
7. Recommendations	36
8. Conclusion	36

	Following Page
Photograph: Oblique aerial view of the proposed park.	25
Maps: 1. Proposed Regional Park - Locality and Access	25
2. Proposed Regional Park - Topography	25
3. Proposed Regional Park - Existing Land Tenure	28



Introduction

The progressive investigation of the New Zealand coastline by the Department of Lands and Survey is based on a policy of establishing a hierarchy of reserves for both potential recreational use and preservation of scientific, historic, scenic and wildlife values, as well as preservation of the character of the coastline as a matter of national importance. Such a hierarchy includes reserves not only of various type but also of scale and this policy as well as the regional approach to the coastal investigation has led to the examination of the concept of a large regional coastal park centred on Tangimoana at the mouth of the Rangitikei River. The ocean together with the estuary of this river form the focus of the proposed park which also contains numerous additional features which traditionally draw people to the coast for recreation.

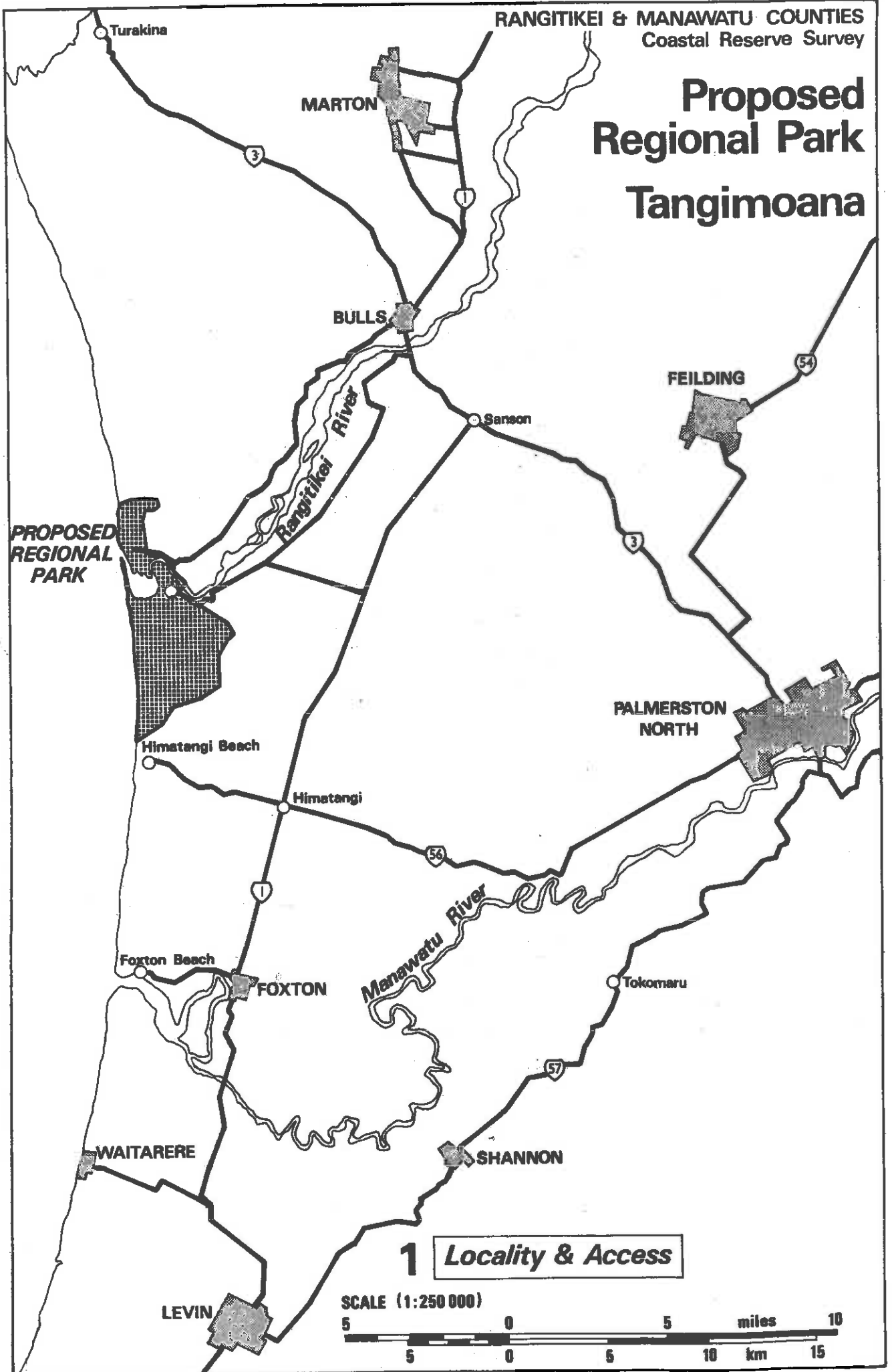
The basic requirement for a regional park is sufficient area to allow for multi-purpose recreation on a large scale without either conflict between various uses or prejudice of the conservation of those attractive values. A significant factor in favour of this proposal is that the relatively compact area is owned by public agencies which can be expected to continue their present land use or management with only minor concessions necessary to establish recreational use under co-operative management.

The location of the proposed park only 40 km from Palmerston North is strategic, as this city is the centre of a large population catchment which will continue to seek coastal recreation. The proposal also confirms the (theoretically sound) assumptions of a number of people in the region that this area is ripe for development of a regional park for public recreation, and Departmental records show a continuing public interest in the area. (Refer to Map 1 for locality and access).

The proposed regional park discussed here incorporates proposal 3 of the Manawatu County Coastal Reserve Investigation and Proposal 5 of the similar Rangitikei County Investigation. The general data on topography, climate, vegetation, agriculture, forestry, wildlife, the ocean and marine life in the body of those reports, which is relevant to this proposal, has been used in the analysis but not repeated here.

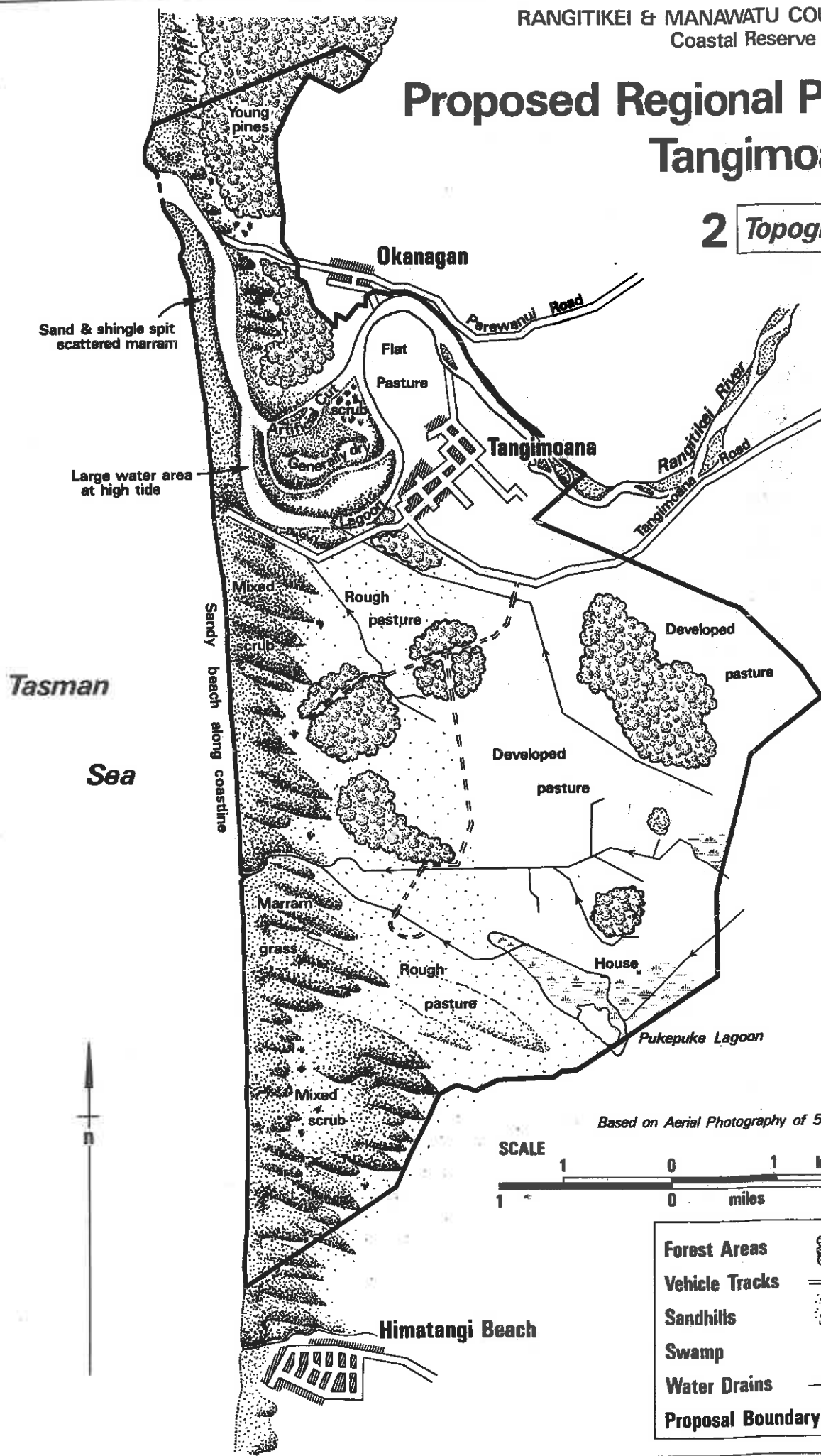


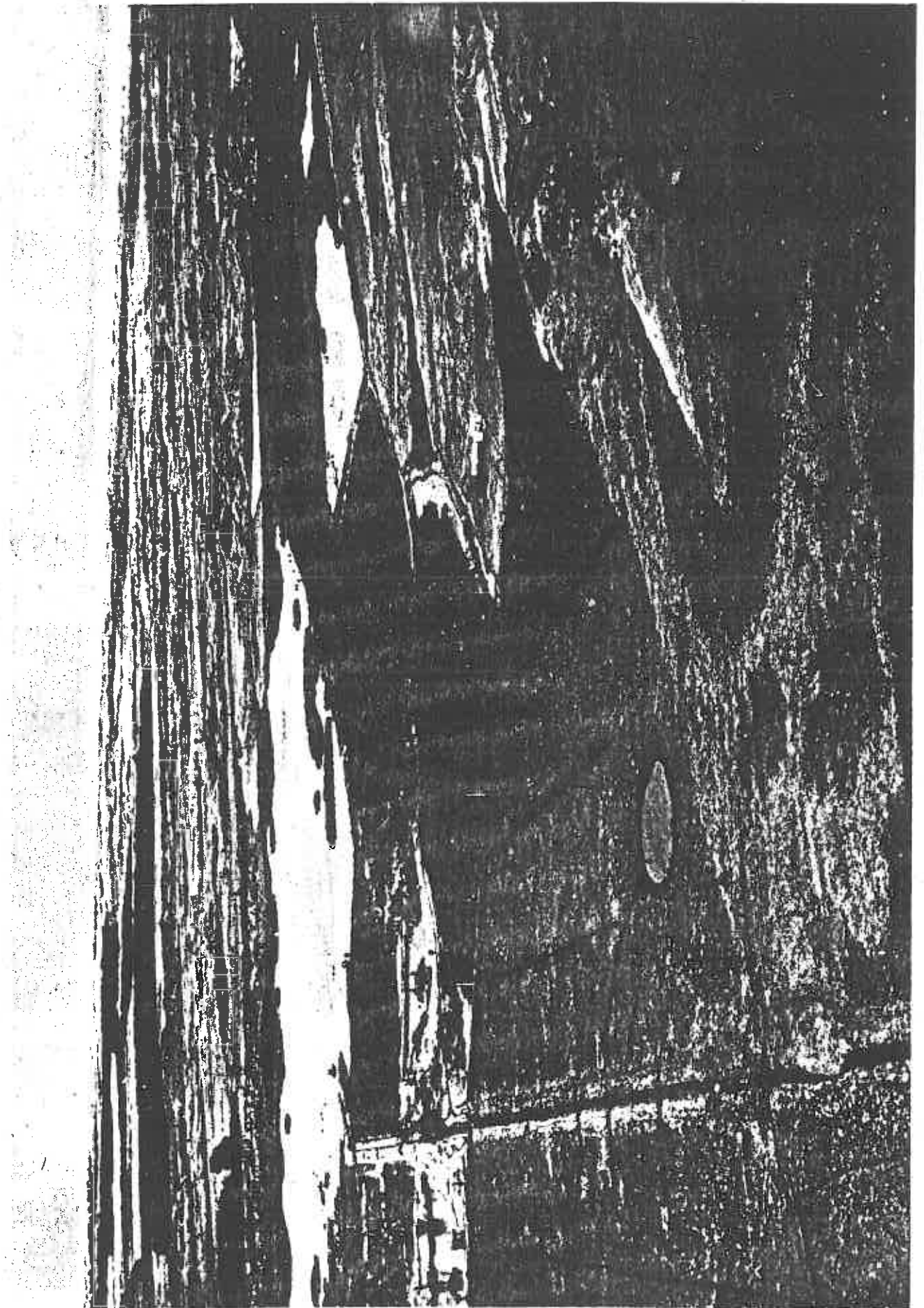
Proposed Regional Park Tangimoana



Proposed Regional Park Tangimoana

2 Topography





1. The Demand for a Regional Park

It has become apparent from public demand that there is a need for large regional recreation areas, usually associated with major urban developments, to perform a function that is not filled by either national parks or local reserves. There has in the past been a tendency for reserve areas close to cities to emphasise the high density forms of recreation but in the future there will be an increasing need to provide facilities that will permit dispersal of recreational activities within an easy driving distance of population centres.

With the expansion of population in the Manawatu area, particularly in Palmerston North, and with the increased mobility of the population due to greater car ownership, better cars, and better roads there has been a greater demand on coastal facilities in this area. Recent rises in petrol prices may actually increase this demand as more people find it desirable to recreate near home. However, the inter-regional travel predicted when a good road was completed between the Wairarapa-Southern Hawkes Bay areas and the Manawatu may not materialise for the same reason. The stretch of coastline most accessible to these sections of the population lies between the Manawatu and Turakino Rivers.. Within this area the Rangitikei River mouth and adjacent land offers the greatest potential for provision of coastal recreational facilities of a regional nature.

Palmerston North City has actively promoted the Tangimoana site which is only 39 km by good sealed roads from the city and therefore readily accessible to its residents. Moanaroa Township in Rangitikei County on the north side of the river is 51 km from Palmerston North, also by good sealed roads. The proposal is also centrally located within the Manawatu Region and a broad expression of interest in the concept has been noted among the neighbouring territorial local authorities and communities.

2. Land Tenure and Area

Any regional park complex requires a large area of land in order to provide for the types of low intensity recreation generally attracted to it while maintaining a background of spaciousness. The regional park as proposed will have ample land for the widest possible multiple recreational use concomitant with the continuation of existing land management.

Initially the area was identified by local Government agencies because the land is in public ownership, as Crown land, County land or as land taken for soil conservation and river control purposes. This fact alone has made the idea feasible as the expense involved in buying such an area was far beyond any individual or collection of groups. However, it was at this point that the unity of tenure was exposed to show a complex intertwining of various Government agencies whose management functions are, for the most part, mutually compatible though set apart from one another to a large degree. These agencies include Lands and Survey farm development, Forest Service land, Wildlife Management areas and Wanganui-Rangitikei Catchment Board controlled estuarine areas. The other two areas of land involved are a renewable Crown lease, and an area owned by the Manawatu County. All of these owners are public institutions except one and do cooperate in various ways, such as pine forest stabilization of farm settlement areas. In their own spheres of expertise the Government Departments can be most useful to each other and cooperate in many issues. It is vital to the establishment of a regional park that the existing land management policies continue and present developments are not jeopardised, otherwise the attractive values for recreation will deteriorate accordingly. It is confidently expected that recreational use of the area can be established under a cooperative type of management with only minor concessions in land management policies necessary. This aspect is developed further in the management considerations section.

The following areas are proposed to be included in the regional park:-

1. Tangimoana Farm Settlement - 1533 ha
 2. Permanent State Forest - 607 ha
 3. Manawatu County - 160 ha
 4. Crown lease - 77 ha
 5. Crown land in Rangitikei County - 500 ha
 6. Wanganui-Rangitikei Catchment Board land - 150 ha
- Total Area .. 3027 ha

It can be readily seen that the contribution from the Lands and Survey Department to the proposal would be approximately 75% of the total and that Tangimoana Farm Settlement is alone 60% (approx). This is significant for several reasons:-

- (i) The farm settlement is physically located as to be both a buffer zone to private farming interests inland and is pivotal to all other

owners in that it borders all other lands except those north of the river.

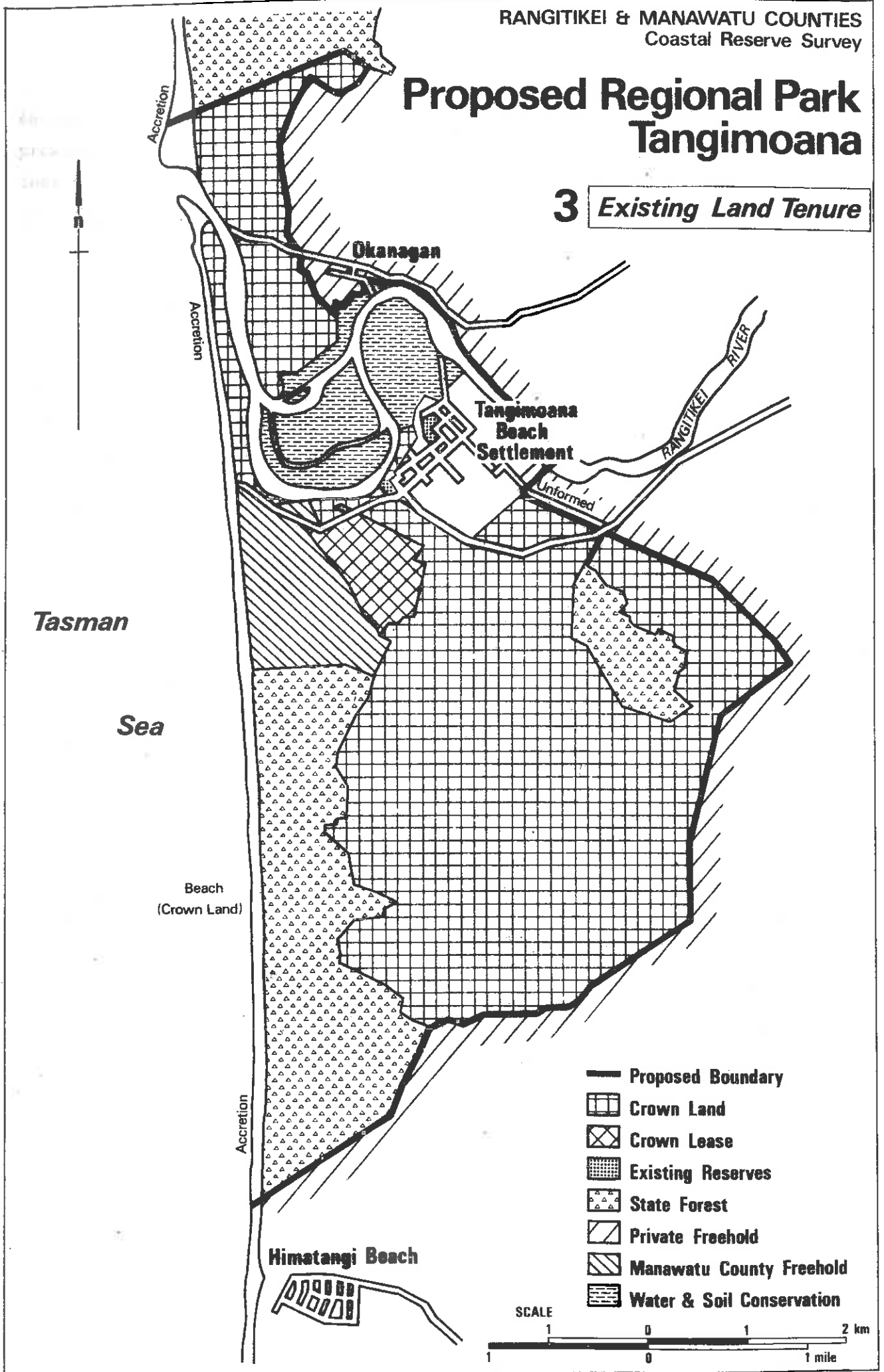
- (ii) The farm settlement is developed into pastures and woodlots which allows for easy movement and this in turn would allow for hiking horse riding, trail bike riding and nature studies to be carried on readily, although care must be taken in design of tracks. On other lands except the beach itself, erosion problems make several recreational pastimes difficult and undesirable within present land management policies.
- (iii) The other potential contributors to the proposed park look to the Crown for leadership in establishing coastal reserves and reserves in general, and have indicated a reluctance to support the park if the Crown is not involved itself. This is understandable because a number of the owners or other agencies have some connection or agreement with the Crown for use of the Settlement which would be desirable to retain, and which are also generally advantageous to a proposed park. This includes wildlife and game management by Wildlife Division of Internal Affairs, Hydrological studies of the sand country by Water and Soil Division of M.W.D, New Zealand Army exercises and cooperation with New Zealand Forest Service in stabilising and planting agriculturally non productive land. It is conversely true that without a direct voice on the proposed controlling authority the Settlement may lose a measure of cooperation in time.
- (iv) If the Settlement is sub-divided into private holdings the problems of (i), (ii) and (iii) above are compounded, especially on issues such as sand blow-outs, forestry and wildlife.

Thus from a planning point of view it is most desirable that the farm settlement carry on its present function within the Park framework for the above reasons and because the land was hard won to pasture over a long time from unstable dunes. The last point coincides with the Manawatu County's general and historical policy of maximizing the agricultural assets of the County.



Proposed Regional Park Tangimoana

3 Existing Land Tenure





3. Present Development

As described in paragraph 2 each owner has embarked on various land use programmes. It will be clearer to itemize each owner's programme and then compare these with Map 3 which shows tenure.

- (i) Farm Settlement - development of the farm land is practically completed and NZFS have a planting programme underway to stabilise marginal farm land areas and sandy ridges to ultimately establish a pine forest. The farm is efficiently and profitably run by the land development section of the Department of Lands and Survey. The land is susceptible to drought and as such is constantly watched by farm managers for over-grazing. Several feed crops are grown to be used as pastures dry out. It contains haybarns, equipment and wool sheds along with a Manager's house. The total value including stock is approximately \$500,000.
- (ii) Crown lease - the lessee grazes the land primarily in winter and has embarked on some development of the land. In summer the land generally dries out to the extent that, if grazed too heavily, severe sand blowouts occur. Some areas of wind erosion can be observed but generally the land is managed well, although it is of a very difficult nature as it lies adjacent to the active dunes in the Manawatu County land. The lease is renewable and has a term of 33 years and contains special conditions because of the sensitive nature of the unstable sand country.
- (iii) Permanent State Forest Lands - this area consists of large active sand dunes including the foredunes down to M.H.W. mark and a block of land in the middle of the Farm Settlement. The active dunes are currently under a major programme of stabilisation by the planting of marram grass. The inland block of stabilised land is planted in well established pine forest. Eventually both these areas will be completely planted in pine forest as well as the most marginal pasture lands bordering the active dunes but still part of the Farm Settlement land. These last areas were planted in forest by Lands and Survey but subsequently destroyed by a storm.
- (iv) Wanganui-Rangitikei Catchment Board Land - the Board controls the estuary of the Rangitikei River which includes two flat low lying islands and portions of both river banks. The natural course of the river as it nears the sea follows large meanders. The last of these meanders has been by-passed by an artificial cut to prevent erosion of Tangimoana Farm Settlement and as a result some of the old meander course is dry with the remainder forming a lagoon. The land within

the old meander course varies from swampy wetland to dry land several feet above water level which is intersected by subsidiary water channels. From the seaward end of the artificial cut the river flows northward almost parallel to the coast, and is separated from it by a sand and shingle spit. This has created an area of calm inland water of considerable size, particularly at high tide. The river bank areas are reserves while the low lying islands are leased for grazing. A boating club has been granted permission to build a boat ramp on the river bank near the Okanagan cut. A most important feature of this area is that there is about 20 km of shoreline along the sea and river estuary.

- (v) Manawatu County Block - this area contains a parking lot with toilets and a county rubbish tip. The rest of the block is largely unstable sand dunes with evidence of high vehicle use by dune buggies and trail bikes. The wide sandy beach adjoining the block is extensively used by the public for sunbathing, surf fishing, surfing, swimming and walking, though at times the prevailing westerly winds detract from its otherwise attractive features.
- (vi) Internal Affairs Department - Wildlife Management area - this is the Pukepuke Lagoon and some adjacent land which is to be severed from the farm settlement and acquired by the Wildlife Division for research purposes. A great deal of work and money have been put into the area to expand the surface water, study the water fowl and eel habits and experiment with swamp plant management. Maintenance of the lake level has been a cooperative venture involving Hydrological Division of Ministry of Works, Lands and Survey Land Settlement staff as well as Wildlife Division. Similarly, protection of the wild fowl and eels outside the Lagoon has been by general agreement between the respective departments. See Appendix 3 for more detailed description of Wildlife Division role at Pukepuke.

The regional park proposal and suggested management envisages that the present land uses will alter very little for a number of years and in fact will improve steadily in their present forms. The farm unit will continue to improve and maintain its pastures though the more marginal pasture will be afforested. This will not affect the carrying capacity of the farm and will increase value in the timber produced. The Manawatu County block will require stabilization to prevent infringement on the Crown lease and disruption of Forest Service plantations to the south. The rubbish tip should be removed from its present site as it is a

blight on the landscape, particularly as it lies so near the public beach. It is expected therefore that controlling bodies will carry on developing their fields of interest although allowing for a recreational function to overlay the entire area. This may be done by, for example, planting of shade trees for stabilization of sand ridges instead of pines to provide campers, picnic parties, hunters and hikers with shelter and a diversified landscape. At present no part of the proposed park is developed for intensive recreation.

4. Ecological Considerations -

As described in the preceding coastal study in Part 1 the climate, topography and agricultural orientation of the County has created a good setting for coastal recreation. There are four large eco-systems involved with the proposed regional park, the littoral region of outer coast (beach) an estuarine system, the dune country and the pasture land.

The littoral eco-system as described in Part 2, Sections (b), (c) has a limited diversity of species because of the mixture of rough seas, shifting sand and clouded near shore waters. The biota associated with an offshore reef is relatively more diverse manifesting itself as large fishing banks used recreationally and commercially. Further investigation is needed to define an area of ocean as part of the reserve, but as stated in the Preface a subtidal area should definitely be considered.

Because most of our large estuaries are close to population centres much estuarine habitat has been lost to dredging, reclamation, conversion to oxidation ponds and by pollution. The Rangitikei River estuary is an example of a substantially unmodified estuary. Large numbers of birds use it as a feeding and breeding ground and it is undoubtedly an important nursery and spawning area for fish. The river and its estuary is the focal point of the park and the biological value of this area is probably comparable with that of Pukepuke Lagoon which is in a special category.

The eco-system of the dune country is perhaps the hardest to identify and at the same time the most threatened with extinction. The dune country contains some native species that exist on unstable sand country. This type of country is gradually disappearing which means both the plants and landscape are becoming rarer and consequently, plant species, insects, bird life and wild life are all threatened. The main problem here lies in the fact that though this landscape has existed for a century or so, little if any of the true pre-European setting remains, the few native plants being perhaps the last evidence. Within the dune country of the proposed park, exotic plants and forestry stabilization programmes have severely limited the areas of any ecological value remaining and all will be gone by 1981 when the New Zealand Forest planting programme will be completed. Thus when the New Zealand Ecological Society, which has made a case for preservation of a representative dune ecology suggested an area within the proposed park it is fair to say the proposed preservation of some of this dune country would have a limited value. The coastal land to the south of Himatangi Beach has been shown to contain better examples of beaches that the Society seek to preserve and study, particularly the area between Himatangi Beach Road and the stream draining Koputara Lakes. No proposal in the region has been advanced to date and in view of the complexity of the issue and its scientific nature no action can be taken until boundaries and values have been established by interested parties. The Department of Lands and Survey would provide assistance within its policy of assessing the reservation of scientific areas, and the coastal reserve investigation. In the meantime, the lack of a proposal should not delay the establishment of a regional park, although this aspect could be studied further if the proposed park comes to fruition.

The secondary pastoral land of the farm settlement has become the eco-system inland of the dunes and its study is valuable to the regional park and agricultural industry. This being the case a connection with the park with nearby Universities could evolve rapidly especially with Pukepuke Lagoon already under concentrated study.

5. Recreational Considerations

A regional park by definition is required to cater for a large population within a large area with the potential to provide for recreational activities as the need for such facilities grows with the population. The regional park located at Tangimoana meets these criteria more than adequately.

The large area proposed has the potential to provide for a variety of space consuming active and passive recreational activities such as dune buggies, trail bikes, pony trails and golf with a minimum of conflict. Other possible activities include fishing, swimming, surfing picnicking camping, walking, canoeing, boating, birdwatching, and flounder netting. It would also be possible to provide facilities for more organised sports such as tennis and football if this proves desirable.

The location of the park is central to a large population and has well developed access on both sides of the river (from Bulls and State Highway 1) providing access to all parts of the estuary and the coast. These areas provide the main focus for the park and will attract a higher intensity of use than other areas. The existing use pattern in the estuary includes boating, whitebaiting, floundering, duck shooting and bird watching. Many of these activities are only for a seasonal period.

The block of the land south of the river shown on Map 3 as Manawatu County land is the focal point for ocean and dune country recreation. Large numbers of dune buggies and trail bikes travel around the dunes and along the beach. Swimming, sunbathing, surf fishing, hiking and surfing are all common uses of this area and recognising this emphasis the County has built a toilet unit and parking lot at the end of the road. Residents of Tangimoana which is only 2 km inland along the river use this site as its beach thus adding a constant use factor.

The rest of the land making up the bulk of the proposed reserve is currently confined to predominantly traditional recreational functions. The Lands and Survey Farm Settlement allows some game bird shooting and the Wildlife Service some seasonal water fowl shooting on Pukepuke Lagoon. The Crown lease area and forest blocks are more or less closed to the public for recreation at the present time. This situation will improve should all four areas be included in the regional park. The Crown leasehold area could be stabilised and developed for a golf course should the need be established. Palmerston North City is promoting this idea. The nearness of the river to this area would help in the provision of water fundamental to developing fairways, greens and tree growth. The Forest Service land would serve as an educational study area for students of forestry as well as improved hunting shelter. The farm settlement would allow for nature studies

through its association with the Pukepuke wildlife area and educational opportunities in general farming practice, secondary dune country pasture development, drought farm management and noxious animal control. It could also cater for such active recreation pastimes as hiking, horse riding, shooting, camping, birdwatching and trail bike riding.

North of the river mouth the other sealed access (Parewanui Road) terminates at a parking area and toilet facilities provided nearby. This area is being actively eroded by the river which flows almost parallel to the coast at this point. The Crown settlement of Moanaroa has been closed down and most people have moved 2 km inland to Okanagan (Scotts Ferry). The same recreational uses occur along the river in this area as on the south side of the estuary although less bird life congregates here as the major wetlands are centred around the old meanders on the south side of the river. There is walking access to the ocean beach north of the parking area but swimming in the river itself would be dangerous. New Zealand Forest Service has a stand of mature pine trees on Crown land between the road and the river which, with development, would provide camping and picnicking sites for the people who recreate along the river. This is the only area of shelter at present established near the river and as such is valuable. Shooting and deer hunting are carried on in the immature forest area north of the road.

By taking in both the north and south banks of the river many boundary problems arising from erosion and accretion become academic and since the eco-system of the estuary has to be managed as a unit both sides of the river should therefore be under the control of the Park Board to ensure effective management and problem identification. A future pedestrian bridge across the river would add significantly to the variety of recreation available.

It is probable that the total area will not be needed for recreational purposes in the immediate future and most of the area of the Park will be sparsely used. It is expected therefore that existing farming and forestry uses will continue for some time and accommodate an additional recreation function as demand for facilities gradually builds up.

6. Management Considerations

Although the whole area is publicly owned at present it is subject to very fragmented control and falls within both Manawatu and Rangitikei Counties. However, as indicated previously there is a significant degree of co-operation between owners. The Department of Lands and Survey have co-operated with New Zealand Forest Service in stabilising and planting

the marginal farm land and sand dune areas and established an integrated primary production pattern over the major portion of the proposed park area. Also the Wildlife Division of the Internal Affairs Department is presently managing the Pukepuke Lagoon area of the farm settlement and is soon to be given official control over it. Pukepuke Lagoon is a special area in which much money and effort, management and scientific study of wildlife has been spent, and because of the research function it supports it is very important even on a national basis. Research at the Lagoon is directed at waterfowl and their habitat as well as one of only a few significant eel fisheries unexploited commercially in New Zealand. Cooperation with the farm settlement is important because the water level is believed (with some difference of opinion) to affect the drought prone lands nearby. Fortunately both agencies agree that the level should be maintained as high as possible. The drain from the Lagoon runs out to the sea through the farm settlement and forestry land and points to the necessity for cooperation to protect movement of eels and also maintain water levels. Wildlife personnel could also help manage areas such as the large gull rookery on Forestry land and wildlife in the river estuary. Current access for educational trips to the Lagoon is over private land but if put into the park regular legal access over the farm settlement could be arranged. It could be expected therefore that the personnel of each agency could be very helpful to each other at the technical level in designing the park and coordinating the various interests.

It could be considered ideal that the whole area should acquire a uniform reserves status and be placed under the control of a suitable special authority, but in practice this may be difficult because of the specialised interests which exist. In particular, the land held for water and soil conservation purposes may need to retain its present status. However, the park concept would not be invalidated by such a failure to invest the whole area with formal reserve status provided that the controlling authorities are prepared to commit the land for recreational use or ecological protection within the limitations imposed by their specialised interests and to participate in a unified management system. Certain other bodies have strong interests in the proposal and should participate in its management. These would include the Palmerston North City Council and it would appear logical that that Council become involved and an owner in the proposal by purchase of the Crown lease, the present term of which expires in 1986.

A list of interested bodies would then include:-

1. Department of Lands and Survey
2. Wildlife Division, Internal Affairs
3. Wanganui-Rangitikei Catchment Board
4. New Zealand Forest Service
5. Manawatu County Council
6. Rangitikei County Council
7. Palmerston North City Council

7. Recommendations

Following approval of the concept it is recommended that a meeting of interested parties be convened by the Commissioner of Crown Lands Department of Lands and Survey, Wellington to consider alternative methods of achieving coordinated management. This should lead to a comprehensive landscape, planning and scientific study to form the basis of a management and development plan, and this should be prepared before any significant development takes place.

To establish the park area it is recommended that:-

1. All Crown land within the proposed boundary (Map 2) be set aside for reserve. That the Forest Service should be approached with the view to giving their land the status of recreation areas under the Forests Act.
2. The Manawatu County Council commit the land under its control to inclusion in the proposed park.
3. Investigation be made into the means by which land at present held for soil conservation and rivers control be included in the park.
4. The lessees interest of Section 789 be acquired at its expiry in 1986 and that it be set aside for reserve.
5. Controlling authority be established with representatives from bodies with interests in the proposed park.

Conclusion:

This area provides an opportunity to create a facility of high recreational and ecological value. It is of regional significance and its importance will increase. Because most of the land is in public ownership the proposal can be implemented with a minimum of direct cost and administrative problems and the opportunity should be taken now to ensure that the areas recreational potential is fully utilised.

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APPENDIX 1

NATIVE SPECIES OF MANAWATU DUNE COUNTRY

NOTE: the list is not complete

Marram Grass

Graphalium luteo-album (forming zones around hollows)

Carex pumila (colonising seaward end flats)

Juncus ssp.

Senecio lautus

Leotocarpus Simplex

Selliera radicans (round leaved form)

Scirous

Lobelia anceps

Coprosma acerosa

Cassinia leptophylla

Pingao

In addition the following species (excluding pasture grasses) were recorded

Spinnifex

Senecia elegans

Trifolium spp

Medicags spp

Ammophyila arerapia

Leontoon hispious

Lagurus ovatus

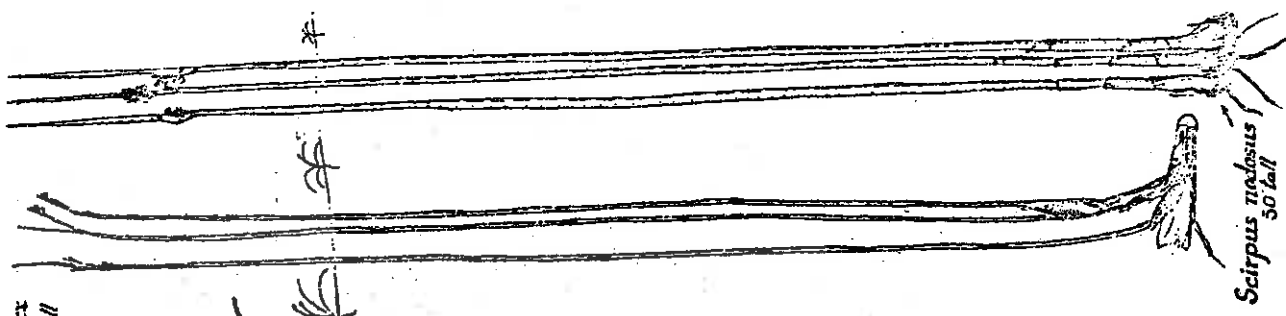
* Limosella lineata

* Ranunculus acaulis

* Eleochoous neo-jelandica

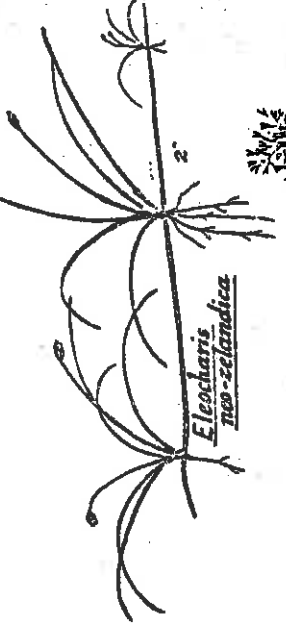
*rare plants

Lepidocarpus simplex
30" tall



Scirpus trichostus
30" tall

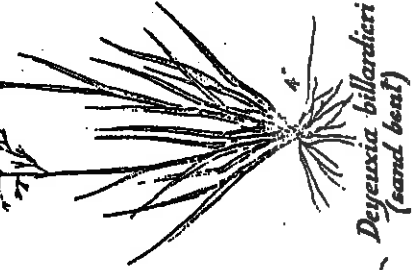
Figures refer to length of leaf in inches



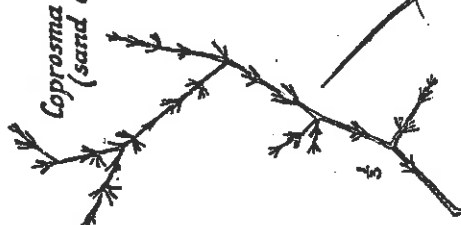
Eleocharis neo-zelandica



Coprosmma acerosa
(sand coprosma)

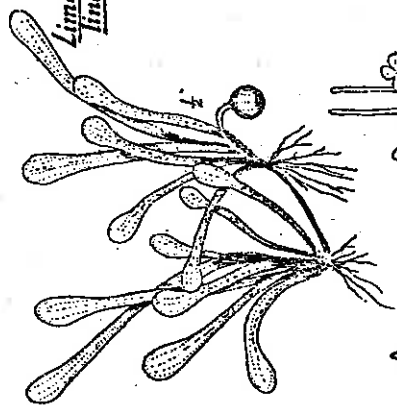


Deyeuxia billardieri
(sand bent)



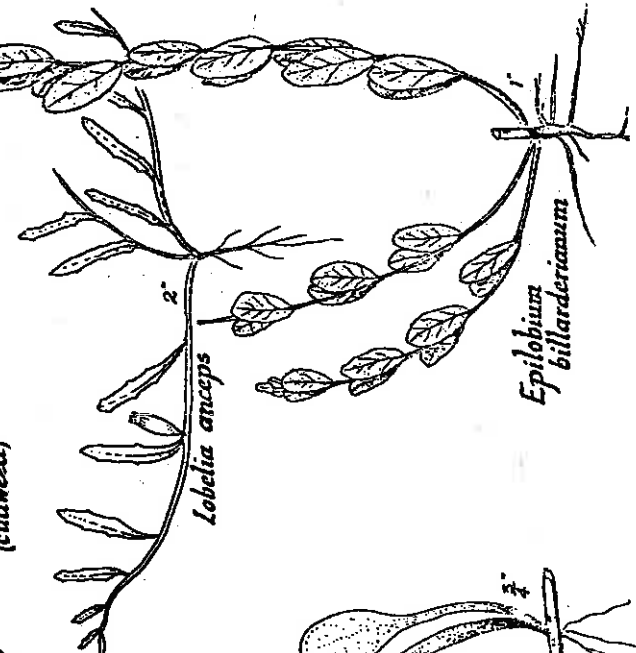
Carex punila

Limosella lineata



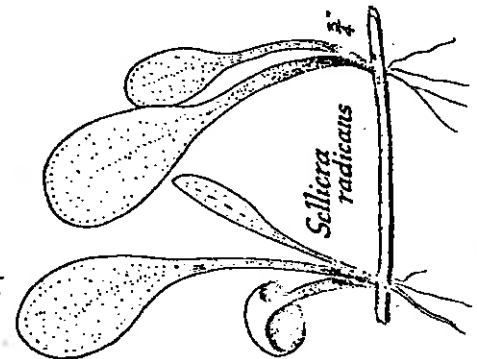
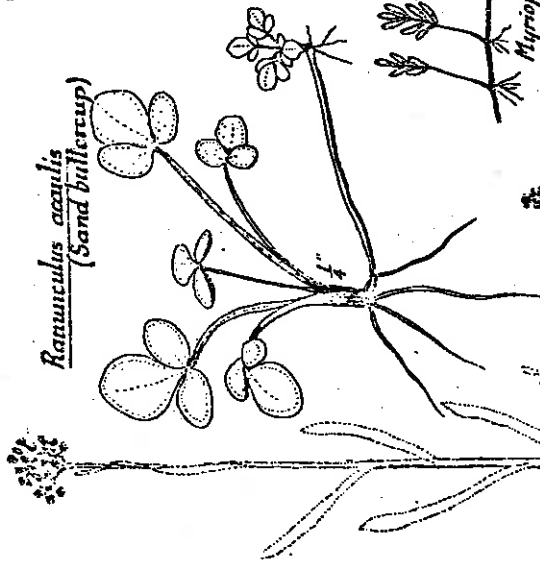
Myriophyllum volschii

Gnaphalium luteo-album
(cutweed)



Epilobium billardierum

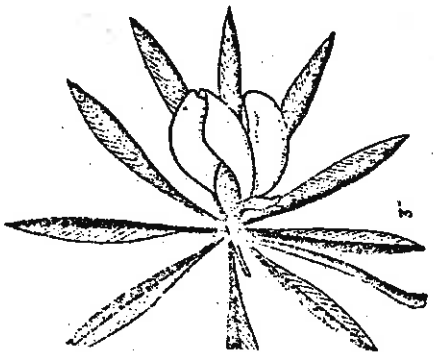
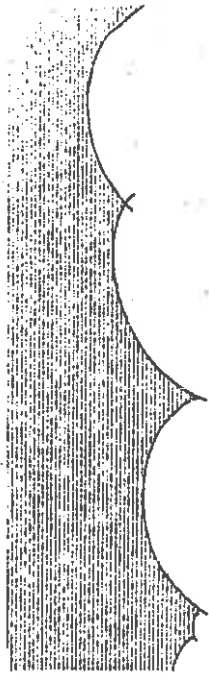
Ranunculus acris
(Sand buttercup)



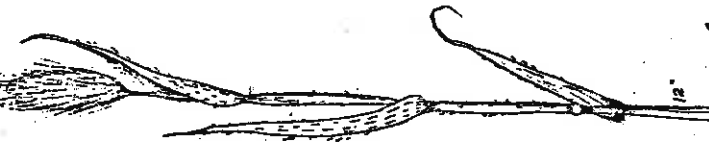
Sclitica radicans

Appendix I

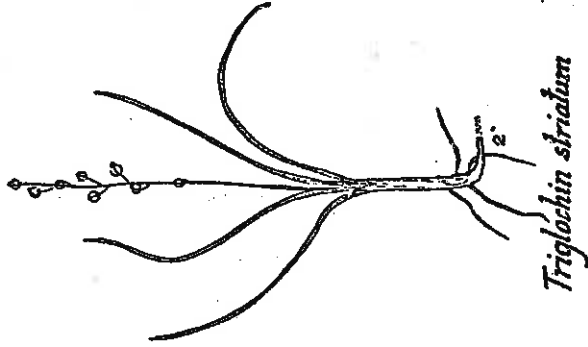
Scirpus cernuus



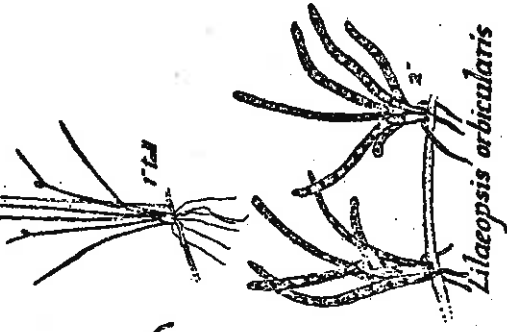
Lupinus arboreus
(tree lupin)



Lagurus ovatus
(hare's tail)



Triglochin striatum



Liacopsis orbicularis



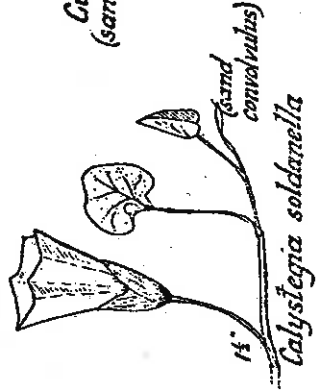
Pimelea arenaria
(sand pimelea)

Prepared by

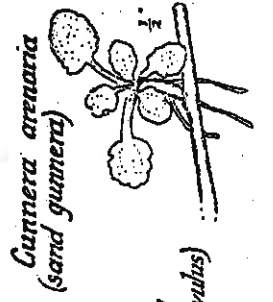
A. E. Esler Nov. 1968



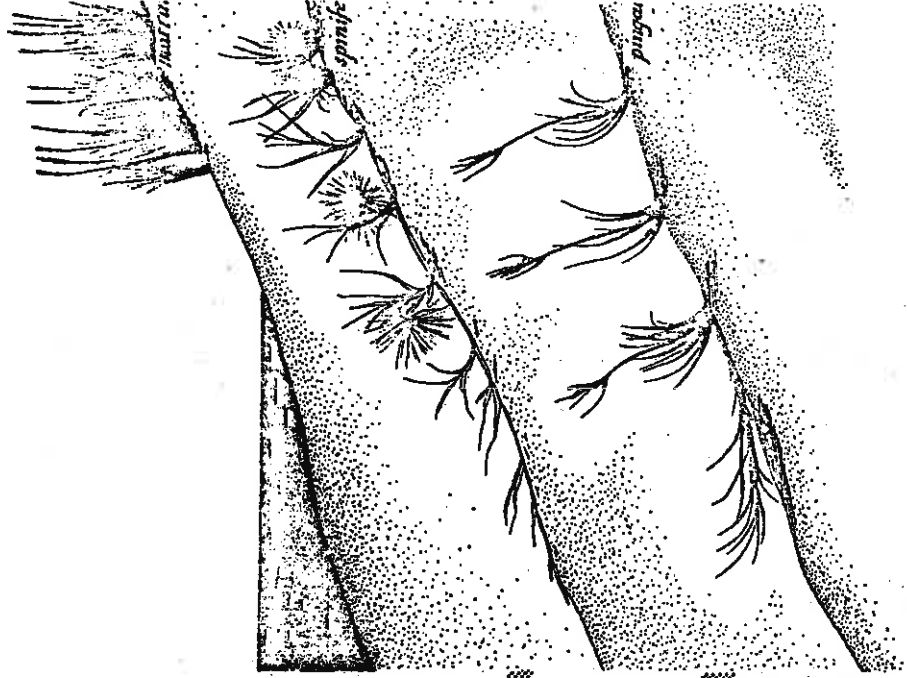
Cassinia leptophylla



Calystegia soldanella



Cunera arenaria
(sand gunnera)



SAND PLANTS

NEW ZEALAND HISTORIC PLACES TRUST

P.O. Box 12855 WELLINGTON

TELEPHONE 724-341

PLEASE REFER TO
HP 8/3/6

6 November 1975.

District Commissioner of Lands
Wellington Office,
Department of Lands and Survey,
State Insurance Building,
Lambton Quay,
WELLINGTON.

Dear Sir,

ARCHAEOLOGICAL SITES, HOROWHENUA-PATEA COUNTIES.
Attention Mr Carlin.

I have checked our available records (which is the Archaeological Association Site Record file) and discussed this matter with Mr Daniels, Trust Director, and find that I am really unable to give you any precise details of archaeological sites located in the coastal zone of the Counties from Horowhenua through to Patea. But obviously this does not mean that no sites exist in the area. Rather our lack of data is due to the fact that the areas have been inadequately recorded. So I am reduced to providing only some general comments which you may find useful for your plan.

1. The area with which you are concerned consists in the main of alluvial deposits of various marine and riverine origins, which are generally of low relief, and to a large degree, somewhat unstable. A number of major rivers and many smaller watercourses disgorge from the hinterland to cross this coastal plain. Throughout the region, numerous lakes and swampy areas of various sizes have been formed.
2. The area as a whole would have provided a rich resource area for prehistoric occupants. There would have been the fish of the sea, rivers and lakes, the birds of the bush and lakes, the fertile, easily cultivated land, the edible plants and berries, and the trees and plants which were available for industrial uses. Hence it is only to be expected that many sites of this former occupation will exist, in many forms, throughout the area.

However, due to the unstable nature of the coastal areas, and the vast changes of topography, drainage and vegetation brought about by European clearance and farming of the land, it is now very difficult to locate and identify these prehistoric sites. And many sites have been destroyed, either directly or indirectly by the farming operations. More recent developments such as afforestation and iron sand extraction have compounded the difficulties. But I would stress that a great number of sites of many types still exist throughout this area.

5 Pipitea Street, Wellington 1, New Zealand

4. The main general localities where sites might be expected to be found are:-
- (a) at river mouths on the coast, or along the flanks of river valleys where they cut into the older sediments;
 - (b) along the line of the first terraces and slopes inland of the unstable and less fertile sand dune areas;
 - (c) around the more permanent lakes and swampy areas.
5. The main types of sites which may be expected to be found are:
- (a) Pa Sites: These will be found at river mouths, around and within lakes and swamps, on defendable coastal or riverine headlands, and even on relatively flat areas where extensive defensive ditching would have to be employed. These sites would be recognized by their major earthworks, and sometimes by their complexes of pits.
 - (b) Pit Complexes: These may have existed throughout the area, but they are today most easily recognized where they occur on the more stable land which has been cleared for farming. Of course, most are partly filled in and disguised by ploughing. They may occur singly or associated with pa sites, but more often they occur in isolated complexes. Many are not recognized as Maori pits by the present landowners.
 - (c) Quarry or Borrow Pits: From which material has been taken for addition to cultivated soils.
 - (d) Field patterns: These have been largely ploughed out, but there are areas, e.g. near Patea, where the prehistoric field patterns may still be recognized.
 - (e) Small Settlement Sites: These will be found at river mouths, around lakes or associated with pa and pit complexes. They are perhaps easiest recognised by their shell rubbish dumps, or middens, but they are important sites for they contain a great deal of information about the prehistoric exploitation of the area. These sites are difficult to recognize, and the level of destruction through farming has been high.
 - (f) Isolated midden heaps, particularly close to the coast where access to the beach is easy.

6. Having stressed the great number of sites which do exist throughout the area, I would now note the number of sites which have been recorded:

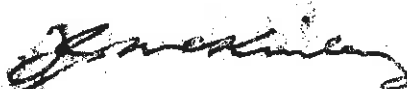
NZMS 1 N136-16)
 N137-23) The work mainly of 1 interested person
 living in Hawera.
 N143- 1
 N148- 1
 N152- 2
 N175/156-77 The work of the Wellington Arch-
 aeological Society, but mostly
 south of Waikanae.

You will appreciate that such a low level of recording and unevenness of coverage, makes it impossible for me to give you any meaningful, specific information. There is not really any point in trying to give you a map of site distribution as it would have no real meaning.

7. I think that you should note in your plan the two recent Acts of Parliament which will affect activity in your planning area. The first is the Historic Places Amendment Act which from 1 April 1976 will make it necessary for any person or organization carrying out work which will adversely affect an archaeological site to obtain a permit for such work from the Trust. The Trust may refuse any application or may attach special conditions to permits which are granted. The second is the Antiquities Act 1975 which from 1 April 1976 controls the trading in and export of a wide range of antiquities, and also provides that a newly discovered Maori artefact will become the property of the Crown (not the landowner or the finder) and all such finds must be reported to the Secretary for Internal Affairs. You might also note that discoveries of human remains are covered by the Burials and Cremations Act and the Police Offences Act.
8. To conclude, I would think that for your planning purposes, you will be restricted to statements of general site type and probability of occurrence. Should you require more detailed information on specific areas, special surveys would have to be carried out. It may be possible for the Trust to arrange to have these done. However, the Trust is now obliged to establish a New Zealand Register of archaeological sites and although this will take several years, we are establishing priority areas, which include coastal zones under threat, so perhaps we will be able to arrange for general surveys in your area before very long.

I am sorry that I am unable to provide you with the precise details which you require, but I hope that which I have been able to provide will be of some assistance.

Yours faithfully,



(J.R. McKinlay)
Archaeologist.



WILDLIFE SERVICE
DEPARTMENT OF INTERNAL AFFAIRS

WIL 31/4/13

Private Bag, Wellington, N.Z.

Telephone 738 699

Telegrams and Cables 'Internal'

29 January 1976

Mr W. Carlin,
Planning Officer,
Department of Lands and Survey,
P.O. Box 5014,
WELLINGTON.

REGIONAL PARK PROPOSAL - TANGIMOANA

As stated to you in your discussion of 26 January with Messrs T. Caithness and G.P. Adams, this Department insists that the reservation of land at Pukepuke Lagoon as a wildlife management reserve vested for control and management in the Minister of Internal Affairs, and as previously agreed upon by the Department of Lands and Survey must proceed, whether or not a regional park is formed.

In the event that the regional park proposal does proceed, reservation and vesting of the Pukepuke Lagoon area in the manner described above is important for these reasons;

1. Protection and management of wildlife resources in New Zealand has not been as successful as it might have been for the reason that few wildlife habitats have been under the direct control of those with the responsibilities for, and knowledge in, wildlife conservation viz the Wildlife Service. Control in the hands of groups without the necessary knowledge, can and frequently has led to;

- (a) policies being adopted which while preservation oriented, do nothing for wildlife with the consequence that habitat degrades to the detriment of wildlife.
- (b) policies and practices which have led to exploitation and abuse of the habitat.

2. Even if the Wildlife Service were represented on any controlling body, its viewpoint can readily be overridden, for expediency sake, if it does not have a landowning role. Without this role the Wildlife Service would be in a disadvantaged position, not only on issues involving Pukepuke Lagoon but on other wildlife

matters also.

3. The Lagoon is the principal waterfowl research centre for N.Z. We have a fulltime resident officer with appropriate accommodation and support facilities. Four wildlife scientists and two technicians are currently engaged on long-term studies relating to waterfowl production, feeding regimens, natural predation patterns and harvest rates by hunters. In addition to our own staff, three university staff members are engaged on separate studies relating to parts of the ecosystem as they effect waterfowl. These studies are being carried out under our sponsorship and direction in areas where our own staff have not sufficient expertise to properly conduct the research. One of these workers Dr P.J.H. Castle, Senior Lecturer, Zoology Dept, Victoria University of Wellington is a world expert on eels. Pukepuke Lagoon, outside of the National Parks and Lake Pounui is the only protected area for eels. We have long suspected that large eels could be significant predators of young ducklings and Dr Castles work is directed towards establishing whether or not this hypothesis is true. Eels are very slow growing animals taking between 15 and 25 years to attain sexual maturity so, his study is necessarily long-term. We have been under considerable pressure from commercial ventures to allow eel fishing within the Lagoon. This we of course are totally opposed to. To continue protecting the "Fishery" for many years at least is fundamental to our knowledge and attitude towards eels in both Pukepuke and other important wetlands throughout the country.

All research programmes are directed toward obtaining maximum production of waterfowl and the results obtained here are used and related on a national scale.

Since 1968, through edge and vegetation management we have increased the Lagoon's hunting potential for waterfowl hunters from 28 participants to 43 by 1974.

The Lagoon now has representative basin status in that it is the only sand-country body of water being studied by the M.O.W. Hydrology Division. Both Departments have vital interests here. The behaviour of water-surface and ground, in sand country has long been somewhat mystifying and is fundamental if drainage practises in such areas are to be nationalised. This study initiated, our scientists, enabling us to understand the importance of water levels and humidity as it effects ground nesting bird production.

The overall importance of the Lagoon for management and research purposes cannot be over-emphasised. To date nearly \$500,000 of expenditure has been generated by our efforts. At the same time isolation, lack of unscheduled disturbance is vital to our continuing studies. For these reasons, direct control of the research area and access is imperative to our work.

Hundreds of groups of interested parties have been conducted through the reserve, but these of course are pre-arranged to avoid

disturbance to any research programme.

4. Pukepuke Lagoon is a much sought after place for game bird hunting. Control of the lagoon by other than the Wildlife Service would place hunting in jeopardy. There are ample precedents which illustrate how game bird hunting is excluded from public parks, reserves, domains etc., yet there are about 60,000 people who hunt game birds each year, and this figure is increasing by 2.7% per year. This increasing number of hunters faces a diminishing number of places to hunt. The Wildlife Service have statutory obligations to provide for hunting.

Comment

The Wildlife Service would be happy to become a member of the Park's controlling body as it recognises the influences exerted on Pukepuke Lagoon by nearby lands and vice versa.

The means by which the Park would be constituted requires clarification. I would be opposed to the inclusion of Pukepuke Lagoon if in gazettal, the purposes and vesting in my Minister were changed.

The proposed wildlife area includes a small area of duneland. Unstable dunes would be a serious threat to the lagoon so management of these will be directed to ensuring stability. In addition a certain amount of highland is an important adjunct to a wetland, in providing nesting cover for water birds.


(G.P. Adams)

for Director, Wildlife Service

APPENDIX 4

TABLE 4-20 ANNUAL RECORDS OF BIRD SIGHTINGS IN
THE RANGITIKEI ESTUARY

	<u>1959-60</u>	<u>1960-61</u>	<u>1961-62</u>	<u>1962-63</u>
Prion	2 dead	1	1	-
Buller's shearwater	1 dead	-	-	-
Sooty shearwater	8 dead	thousands migrating nth 14/5/61	12	-
Garnet	2-6	-	1-3	-
Black shag	46	17	24	-
Little shag	several	9-10	9	-
White faced heron	11-18	3-12 (some juv.)	3-4	-
Grey duck and mallard	200DM	50D 70M	30M120D	-
Shoveller	1-2	2-3	-	-
Harrier	-	-	1	-
Bush hawk	1	-	-	-
Pukeko	1	-	1	-
SI pied oystercatcher	1-4	-	4-7	3-4
NI variable oystercatcher	6-8	25	27	4
Pacific golden plover	8-13	10-14	11	8-16
Banded dotterel	80-102	140	130	-
Wrybill	12-24	27	22	27
Asiatic whombril	1	1-2	1	1
Bar-tailed godwit	3-75	16-65	45	145
Turnstone	1-2	1	8	-
Knot	20	30	8	11-17
Sharp-tailed sandpiper	1-4	1-2	2	-
Red-necked stint	7-11	10	2-6	6
Pied stilt	50	55	85	-
Black-backed gull	small colony	-	100	2 pairs
Red billed gull	1	-	1-4	-
Black billed gull	29	40	100	-
Black-fronted tern	1 juv.	-	1	-
Caspian tern	28	35	16	-
White-fronted tern	small flocks	400+	650+	-
NZ crested penguin	1	1 dead	-	-
Light mantled sooty albatross	-	1 dead	-	-
Blue reef heron	-	1	-	-
Artic skua	-	1	1	-
Fair tern	-	1	-	-
D=grey duck; m=mallard				(anpn 1960,61,62,63)



APPENDIX 5

Table 4-19. Annual records of bird sightings in the Manawatu Estuary

	1959-60	1960-61	1961-62	1962-63
Black shag	60	20	—	25
Little shag	1-3	3+	—	1-2
White heron	1-3	1-2	—	2-3
White-faced heron	5	8	—	—
Bittern	1	—	—	1
Royal spoonbill	23+	26	31	42
Black swan	few	4	—	1
Grey duck/mallard	100-200	200+	133	150 grey 150 mallard
SI pied oystercatcher	30+	36	55	65
NI (variable) oystercatcher	12	6	10-13	18
Pacific golden plover	24	33	23	28
Banded dotterel	200+	210	200	200
Wrybill	29	11	14	13
Whimbrel	1	1	—	—
Bar-tailed godwit	280	280	260	300
Hudsonian godwit	1	1	1	—
Knot	15	60+	22	24
Sharp-tailed sandpiper	7	1-3	3-5	1-2
Pied stilt	160	140	155	204
Black-billed gull	75	155	160	35
Red-billed gull	125	—	—	10
Black-fronted tern	3	—	2	3
Caspian tern	22+	24	25	35
White-fronted tern	60	130	250	1 500
Kingfisher	12	2-3	—	—

(Anon 1960, 61, 62, 63)

August 1973

	Square 44A 25th	39B 16th	43B 25th	41A 16th
Wandering albatross	—	1	—	2A 1 imm
Black-browed albatross	—	—	—	16A 1 imm
Buller's albatross	—	—	—	1
Shy albatross	1	—	3	13
Giant petrel	5	10	5	19
Cape pigeon	—	25+	4	50
Prion sp.	—	—	150+	5
Gannet	—	—	9	1
Black-backed gull	1A 1 imm	1 imm	—	4A 3 imm
Fluttering shearwater	—	—	50+	—
White-fronted tern	—	—	50+	—

September 1973

	Square 45A 25th	45 25th	43B 6th	43C
Wandering albatross	4A 3 imm	4A 4 imm	—	—
Black-browed albatross	—	1	—	1
Shy albatross	—	4	2	4
Giant petrel	—	2	6	—
Cape pigeon	60+	50+	—	10
Buller's shearwater	—	11	—	—
White-faced storm petrel	—	15+ prob.	—	10
Giant skua	—	1	—	—
Cape petrel	—	—	10	—
Fluttering shearwater	—	—	50+	11
Prions	—	—	100+	200+
Gannet	—	—	3	8
Black-backed gull	—	—	5A 3 imm	—



October 1973

	Square	45 6th	44A 17th	43B 17th	43B 21st	43C 5th
Wandering albatross		2 imm	4 imm	2A 5 imm	—	—
Shy albatross		—	—	3	7	11
Black-browed albatross		3A 1 imm	—	1A 1 imm	—	—
Giant petrel		2	6	6	—	—
Cape pigeon		2	100+	80+	3	—
Grey-faced petrel		1	—	5	2	—
Buller's shearwater		—	1	5	3	20+
Silver-grey fulmar		—	—	1	—	—
Great skua		—	—	2	—	—
Gannet		—	—	—	2	200+
Sooty shearwater		—	—	—	—	120+
Fluttering shearwater		—	—	—	—	20+
White-fronted tern		—	—	—	—	620+

Terns, gannets, shearwaters in large mixed flocks about shoals of fish and porpoises.

November 1972-3

	Square	44A 3rd	1973 45 11th	45 25th	43B 10th	1972 45a 1st
Wandering albatross		2 imm	1	1	—	2
Shy albatross		1	1	2	5	—
Black-browed albatross		—	1	—	—	—
Buller's shearwater		1 200+	5	50+	100+	30+
Flesh-footed shearwater		2	20	—	—	—
Sooty shearwater		—	1	—	20+	—
Fluttering shearwater		—	rafts 20-100	—	—	—
White-faced storm petrel		—	—	30+	2	—
Cape pigeon		12	—	—	—	—
Gannet		12	—	5	5	7
White-fronted terns		—	—	2	—	—
Great skua		—	—	1	—	—
Giant petrel		7	—	—	—	4
Red-billed gull		—	—	—	—	30+

December 1972

	Square	45 6th	45 9th	45 25th	45A 25th	44 20th	42 21st
Wandering albatross		1	1A 3 imm	1	1A 3 imm	3	4
Shy albatross		—	1	—	—	—	—
Black-browed albatross		—	1A 1 imm	—	—	1	—
Buller's shearwater		5	600	—	8	—	1
Fluttering shearwater		—	20+	5	—	—	—
Sooty shearwater		—	—	—	—	1	—
Flesh-footed shearwater		—	950	—	5	—	—
Giant petrel		1	3	1	—	1	—
Gannet		—	—	1	31	—	—
Grey-faced petrel		—	—	—	11	2	—
Cape pigeon		1	—	—	—	—	—
White-faced storm petrel		—	—	—	10	—	—

A = adult; imm = immature