COASTAL RESERVE INVESTIGATION

WAITOTARA COUNTY

PLANNING TEAM

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WELLINGTON LAND DISTRICT

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I N D E X

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

Waitotara County is the first county on the West Coast of the Wellington Land District to display physical features on its coast that relate it to South Taranaki geologic formations. That is large cliffs actively eroding, broken only by stream or river mouths. This physiographic pattern all but sets the reserve pattern and design for the County.

Waitotara County is itself eroding in size as Wanganui City continuously advances north into its territory, with another 387 ha of land currently being transferred. The presence of Wanganui City as a southern neighbour has an effect on the County not only physically through expansion but socially as it provides work for the rural population growth to the point where the County population is decreasing or at least static. This fact can be shown with a 1966 population of 2,939 dropping to 2,790 in 1974. The city at the same time provides pressure on coastal recreation facilities far in advance of the County population. The County Office is also located in Wanganui City.

In the north the County is bounded by the Waitotara River which not only provides the largest single break in the coast but a large supply of sand and silt to form the Nukumaru Beach,complex stretching 8 km south of the river and a series of large sand dunes shifting inland over the same distance. This area holds the greatest single recreation, wildlife and scientific value in the County and as such will be the subject of separate consideration as Zone 2 of this Coastal Investigation.

Waitotara County is rural in nature and concerned with the continued upgrading and maintenance of agricultural land within the County. However, the development of inland bush areas and coastal dune lands has shifted from farming or grazing to at least multi purpose use, including afforestation, wildlife habitats and rural residential development. This changing philosophy will affect all potential coastal reserve designations as well as the overall future of the Nukumaru Domain land which covers 40 or 50 per cent of the entire coast.

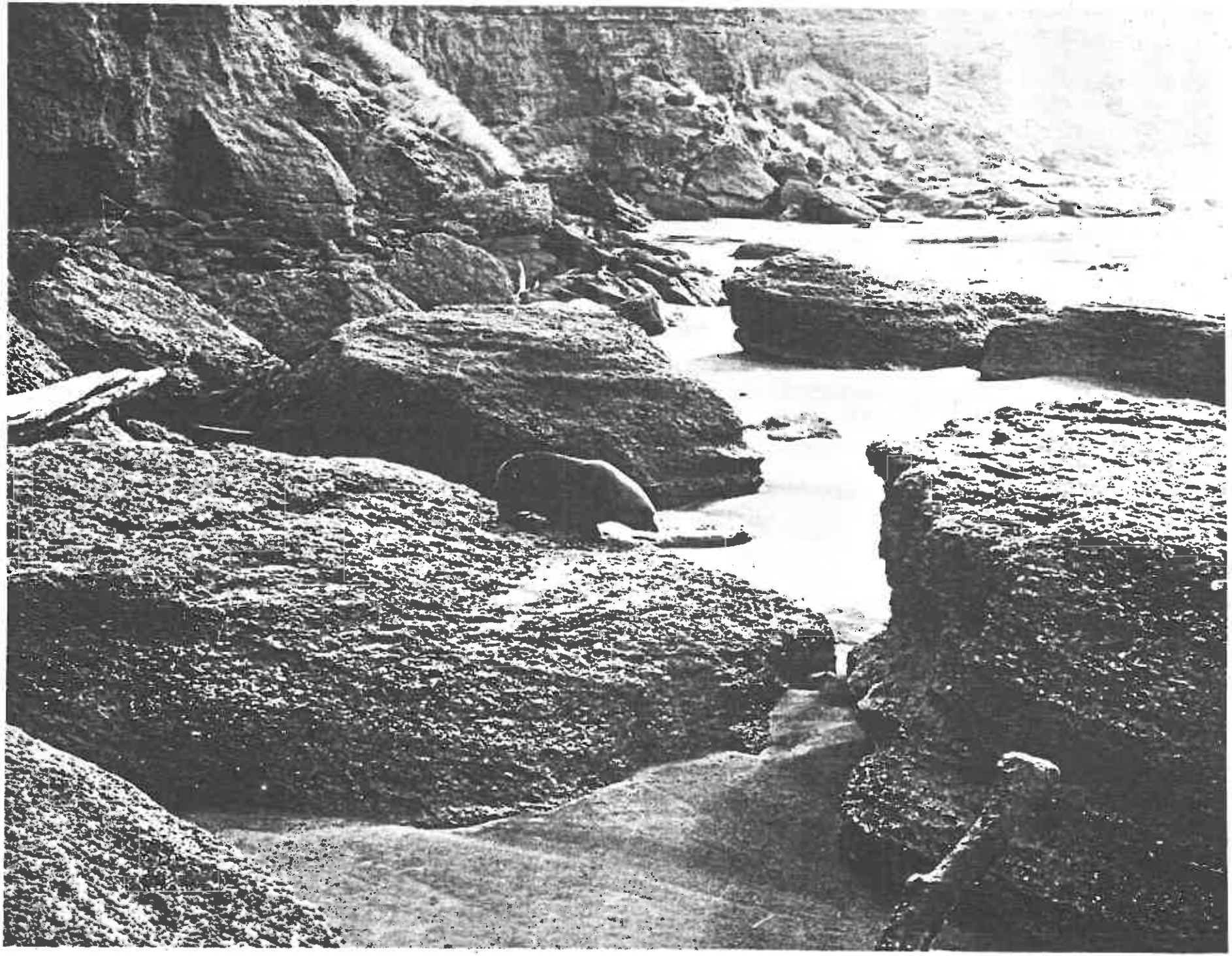
Zone 2 shows a mixture of private, Crown and Domain Lands which will be under extreme pressure: (i) for afforestation by the Wanganui - Rangitikei Catchment Board (ii) for lime mining to use in agriculture (iii) for scientific and wildlife reserve management (iv) for holiday home development and (v) for Domain Board objectives of raising funds by grazing to finance recreation objectives in their Reserve.

Zone 1 is a long stretch of coastal cliff topography largely in private ownership used for agriculture and presenting, except for a break at Mowhanau Beach, a continuous stretch of limited recreational potential. There are several areas where cliff erosion has caused the beach to build up above the high water mark and permanent vegetation to occur. However access to these areas is via a cliff 45 metres high making visitation difficult and expensive to develop.

Therefore the investigation must consider a mixture of physical setting and local objectives so as to present an acceptable and workable plan for the coast of Waitotara County. The report ultimately proposes a Regional Park stretching into Patea County and including all of Zone 2. This park if approved would set the County on a very good path for the future recreational management of the coast and provide a superior coastal location in which many groups of people could enjoy themselves.

The coastline of Waitotara County is 28 km long and can be divided into the following sections on the basis of topography and tenure:

7 km of undeveloped beaches
21 km of cliffs
16 km of publicly owned land
12 km of privately owned land

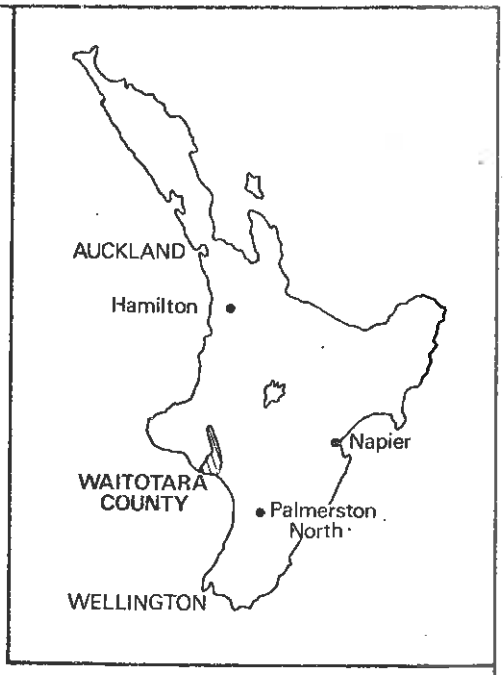


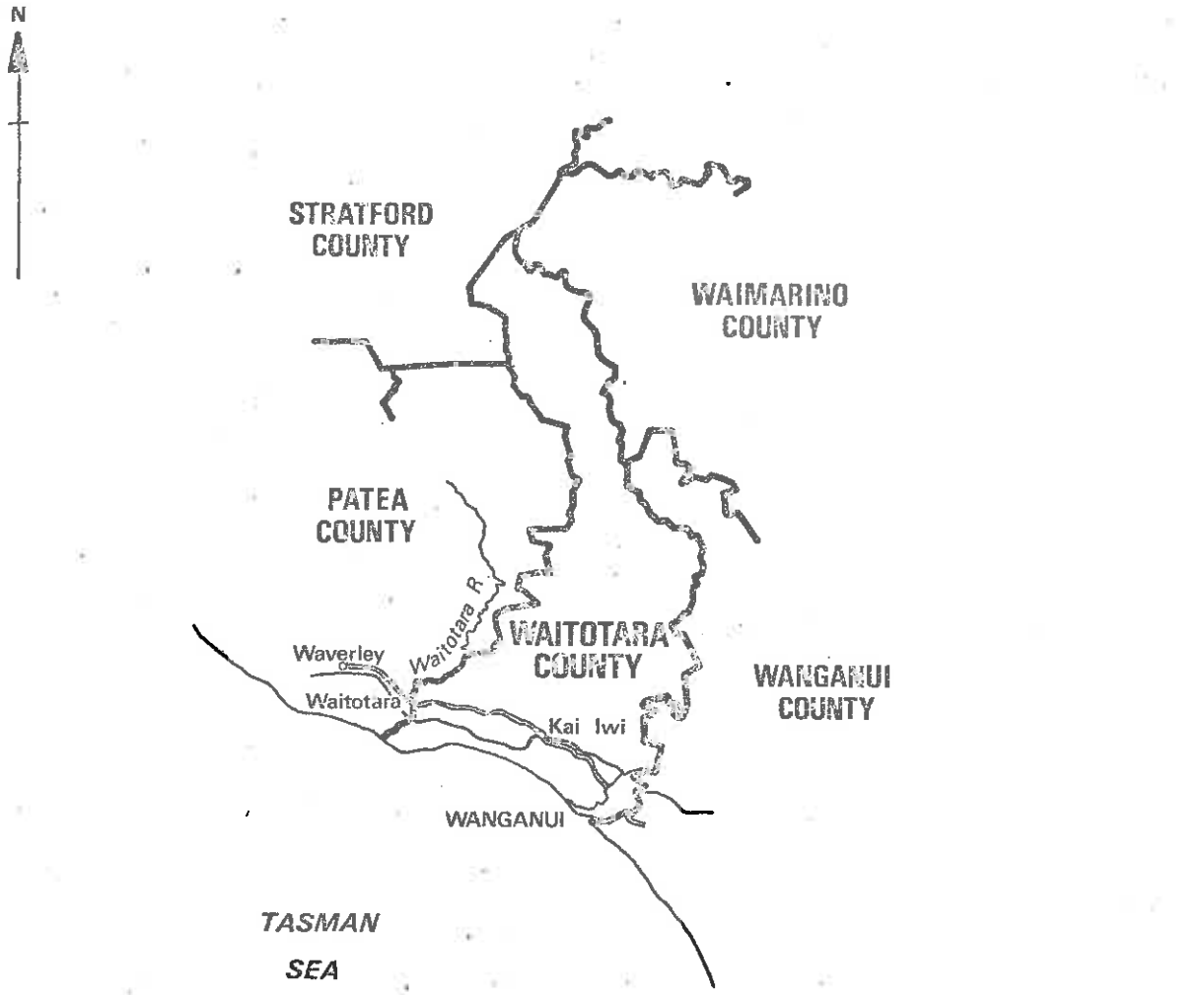
Map 1

COASTAL RESERVE SURVEY

WAITOTARA COUNTY

LOCALITY





REFERENCE

Roads

Railways

SCALE

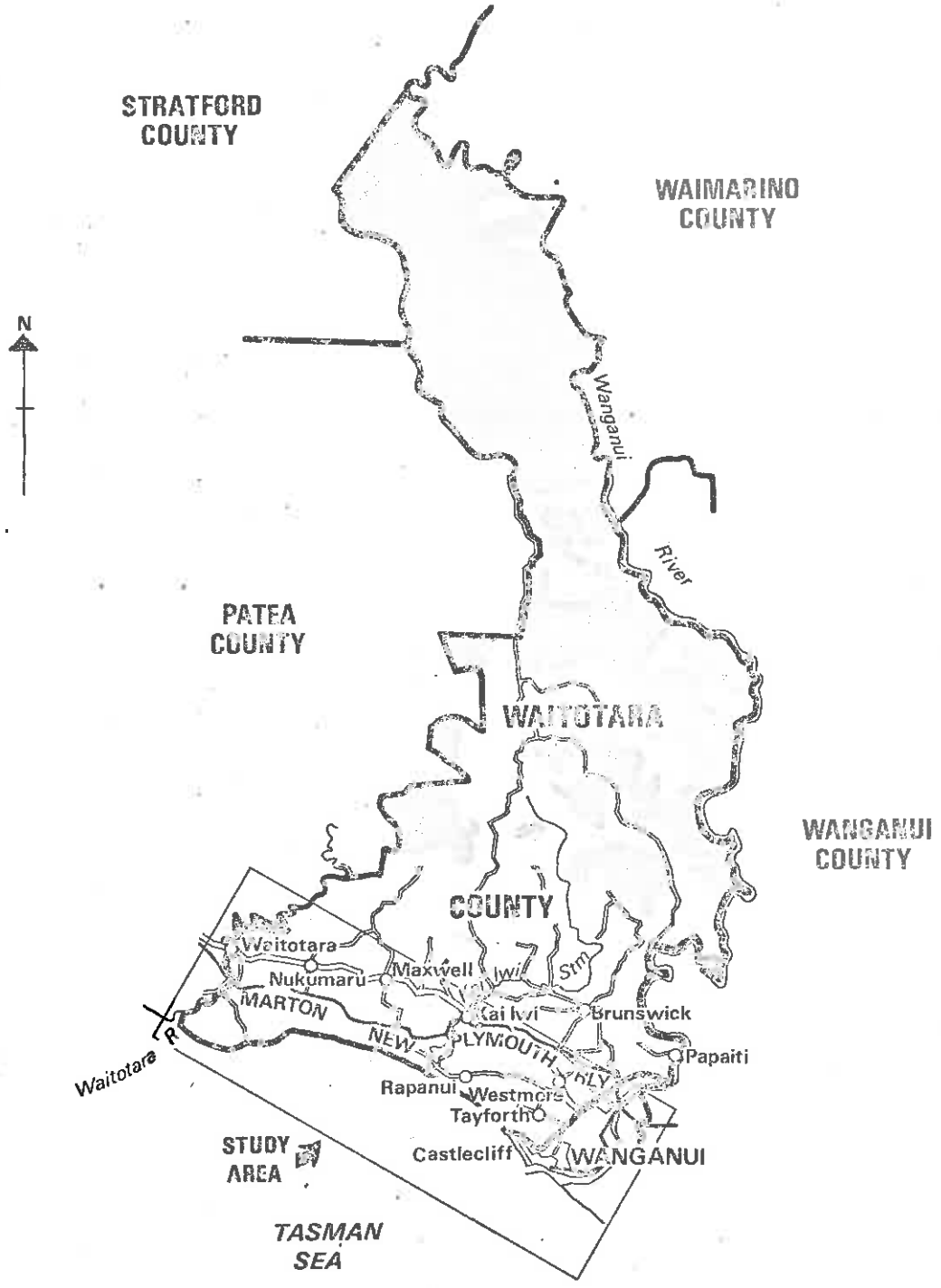
10 0 10 20 30 Kilometres

10 0 10 20 30 Miles

Map 2

COASTAL RESERVE SURVEY

WAITOTARA COUNTY



REFERENCE

Roads

Railways

Forest

SCALE

10 0 10 20 Kilometres

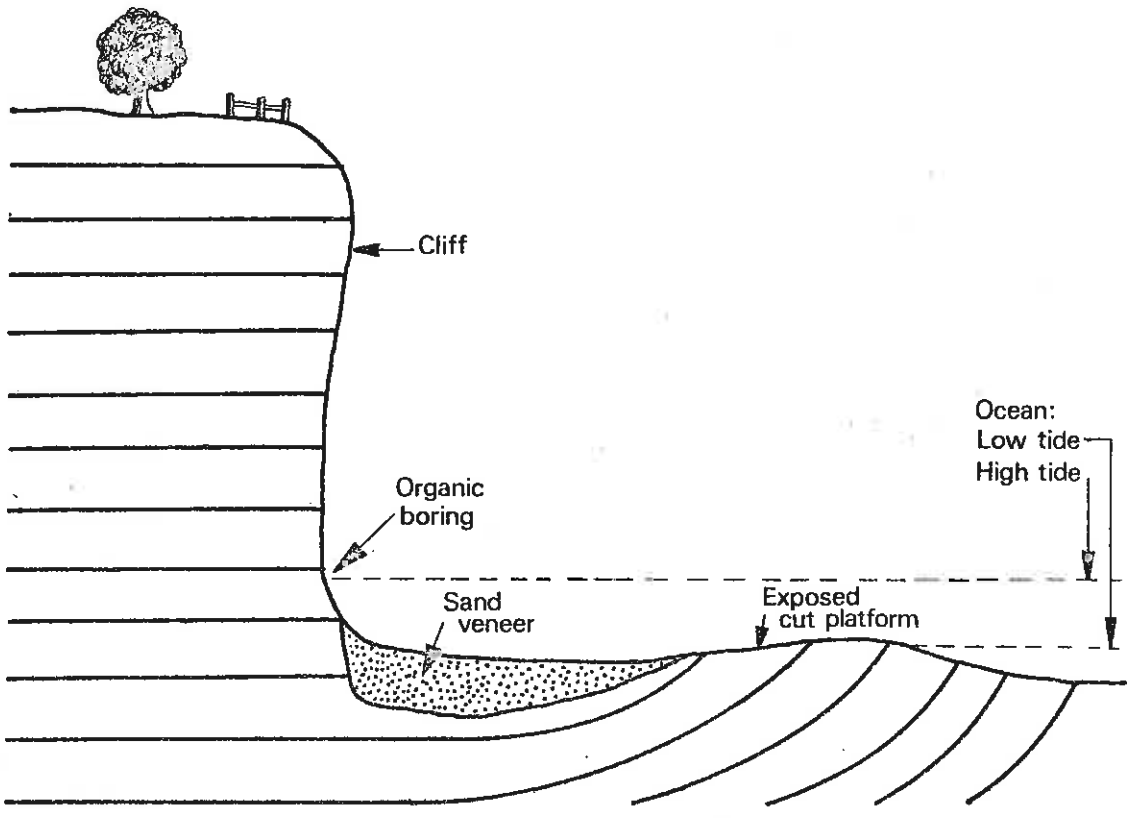
10 0 10 20 Miles

PART I - THE LAND

(a) Topography & Geology

The Geology of the Waitotara Coastline consists of marine, estuarine, fluviatile and Aeolian sediments of Pliocene, Pleistocene and Recent Age. These deposits have been disrupted by the Nukumaru Fault, one of the five major faults on the West Coast which comes ashore south of Nukumaru Beach. On stratiographic and palaeontologic grounds the sediments fall into three main series.

(i) The Wanganui Series includes thick, variable, geosynclinal deposits, chiefly marine, which can be subdividied easily. These deposits have been faulted and folded extensively. Numerous fossils in each layer have identified the rock as Pliocene age and mudstone, shelly conglomerate, siltstone and limestone make up the majority of the deposits. The Wanganui formations make up the bulk of the ocean cliffs and an ironsand beach extends up to the foot of the cliffs. Locally, an intertidal platform is cut in the Wanganui series and elsewhere the sand beach is a veneer over a cut platform except near the mouth of rivers where channels of greater depth are filled with recent sediment.



(ii) The Hawera Series which includes marine, terrestrial, fluviatile and aeolian sediments, is unconformably on those of the Wanganui series. These rocks are Pleistocene in age and composed of delta conglomerate, volcanic ash, beach and dune sand and beach pebbles. The glacial period was responsible for these deposits and their texture is basically the same as the underlying Wanganui series, that is, soft sedimer easily erodable. These formations present some of the best samples of fossil cockles, oysters, mussels and scallops in the world. The erosion of these formations especially by wind has caused some geologic formations of considerable scientific importance (Waitotara ventifacts[1]).

(iii) The Recent Series consists of beach, dune, swamp, fluviatile and volcanic ash deposits, of late geologic date, some of which were deposited when the land had attained virtually its present form. Other Recent sediments are still being formed.

These recent deposits are the most influential with respect to human occupation and scenery on the inland side of the coast. Chief amongst recent formations are the large sand dunes which have become mobile when their thin protective vegetation was removed late last century by burning and grazing. These large (30 metre) high dunes are advancing inland covering older dune country and pasture land, disrupting agriculture and damming small creeks to form lakes or swamps. Afforestation is the most effective and productive way of stopping dune advance (e.g. Santoft State Forest) and recently the Wanganui-Rangitikei Catchment Board has contracted to stabilize much of the active dune country in Waitotara County. The natural swamps and lakes provide excellent habitat for wildlife and will probably be managed as such in the future either privately or by public agencies. The Waitotara River will continue to supply sand to the dune country and stabilisation will occur in the foredunes as well as the inland dunes.

As the first row of ancient dunes left dry by faulting or folding and ocean level drop began to succumb to wind erosion and moved inland, they left the Rapanui Marine Rock Terrace composed of Basal conglomerate exposed to wind and iron sand abrasion. This situation removed the soft lignite (ashy silt), leaving hard augite andesite gravel of different types. These form the famed Waitotara Ventifacts which have been and continue to be unique scientific units, said to indicate dominant wind direction in the area and its change over long periods of time. However the stabilization of dunes in the area will effectively stop the process by which they were formed and collection hunters may in time deplete the best examples.

[1] Ventifacts: These are augite andesite rocks exposed or left from erosion of conglomerate layers and shaped by wind and iron sand abrasion. The shapes they take and their constituent minerals raise many geological questions such as their origin, the

direction of dominant winds over the area and coast in general.

Outside of the ventifacts, the area contains the national reference areas for the rocks of two fossiliferous intervals of geological time i.e. Waitotaran Stage at Wilkies Bluff and the Nukumaruan Stage along ocean cliff outcrops and in the lime quarry walls. It is considered most important that these rock types are not obscured particularly under large forest blocks. Also suggested is that when the quarries close a pit, that it be left to Geological Survey D.S.I.R. for further study. The Department of Lands and Survey was approached by a Scientist of the Geological Society of New Zealand and by the Nature Conservation Council to protect these features and currently scientific reserves are being studied. This report will at a later stage propose a coastal scientific reserve to cover these important features.

The Topography of the Waitotara County Coast breaks down into two basic types:

(i) sandy beach with outcrops of low cliff for 7 km.

(ii) cliffs from 30 to 50 metres high for 20 km.

The northern 7 km. of coast from the Waitotara River to the first large bay along the coast is primarily sand with a few hundred metres of low cliffs of the Hawera series. Because of this sandy beach nature backed by dunes, development pressure could be great over the entire area. The Crown, realizing the situation, vested in the Nukumaru Domain Board Lots 93, 94 and 95 in 1961 and Lots 98 and 99 in 1969 covering the entire area with the exception of some Crown land in Lot 100 (see Map 1). These lots were in addition to the original Domain Lands in Lot 63, 66, 67 71 and 71A. These recreation reserves ranged from a couple hundred metres to several miles inland and the development of beach baches restricted to a very small area at the end of Waimui Rd. These beach bacheswere established on Crown land under various leases to take care of former squatters, However, several other squatters have built huts along the coast on Domain Land on Section 71A and a quarrying company has extensively torn up large areas of Domain land in search of lime. Even though the lime is low quality because of impurities (sand) it is the only source of agricultural lime between Woodville and the King Country and is thus an important factor in the agricultural economy of the Wanganui-South Taranaki districts. On these grounds it appears the continued quarrying on Crown and Domain land should continue (if properly licensed). Two basic rules should apply to these operations.

(i) the pits when abandoned should be levelled and vegetation re-established to prevent wind and water erosion and to restore the landscape continuity.

(ii) the quarries if filled with fresh water should be landscaped to either recreational facilities (i.e. swimming with shelter trees) or wildlife habitat (food plants)

NOTE: One abandoned pit could be reserved for scientific purposes.

The huts which remain along Nukumaru Beach are generally unsightly and appear to belong to boat clubs of some kind, and while these remain they will remain a threat to the reserve area. It is recommended that negotiations with their owners be continued with a view to regulating their use or eventually phasing them out in the long term.

The cliff area of Coast stretching approximately 20 kilometres north from the Wanganui City boundary is broken in only 4 places by streams. At the mouth of Kai Iwi and Mowhanau Streams a sizeable settlement has evolved and the beaches between the breaks in the cliff provide safe swimming even at high tide. The other two gaps in the cliffs are on private and maori land respectively with the Ototoka Stream beach on the private land having a reserve designation over part of the area. Apart from these areas where streams have eroded the soft rock away, at no point can the ocean beach be reached except by climbing down a very steep and oftem undermined cliff. This topographical feature severly limits public access to the ocean and makes walking along the cliffs dangerous.Also because the tide flows right up to the base of the cliffs there is a hazard of slips on the foreshore.

In a few locations below the cliffs, large slips have fallen to form permanently vegetated areas often containing abundant artesian springs. These areas create a very pleasant setting for a day at the beach and the presence of ample fresh water would promote tree growth and swimming. The main problem is that no access either physical or legal, exists to these areas and both would be difficult or expensive to develop.

(b) Climate, Soils and Agriculture

The climate of Waitotara County is congenial towards outdoor coastal recreation with an average rainfall of about 900 mm per annum and a summer dry season. This pattern is broken only in that September is the driest month of all. The amount of rainfall permonth really does not vary enough to justify claims of major summer shortfalls. But the fact that the summer annual mean temperature ($18^{o}c$) is 3 times the winter mean ($6^{o}c$) and sunshine hours in summer are more than double winter,would

acoount for an evaporation rate much higher thus presenting an overall negative water balance in summer compared with a sizeable plus in winter. These facts add up to drought by negative evapotranspiration rates, not lack of moisture. It should be noted that summer rains would tend to be downpours of short length that quickly disappear causing the illusion of less overall rainfall in summer. Humidity drops substantially in summer to make coastal trips somewhat more enjoyable, this is caused by increased sunshine, a drop in rainfall and a temperature rise. This summer mixture of high temperatures and low humidity and precipitation creates a good outdoor recreational environment.

The wind blows primarily from the N.W. and West and is strongest in late Spring and early Summer. Though the highest incidence of storms and building damage occurs from winter southerlies, only 3.7 per cent of the time in each year is calm. Thus the coast is windy and with little or no shelter makes pleasure power boating dangerous and days on the beach annoying because of moving sand.

The soils of the Waitotara coastal lands are largely of the central yellow-brown sands classification of the D.S.I.R. soils bureau. They consist of complexes of dunes, sand plains and peat swamps with a very wide range of drainage conditions. The young sand dunes show little or no profile development and except where the water table is high, they are dry and unstable. Older dunes further inland are leached but this is offset by improved physical condition due to an increase in organic matter and accumulation of fine particles of dust that increase the moisture holding capacity and in turn increase resistance to erosion. With regular dressings of phosphate and potash these older dunes with high water tables will maintain high quality pastures for dairying and fat-lamb farming. On the more excessively drained yellow brown sand soils, exotic forestry is preferable to pastoral farming and in fact this has been the decision of Waitotara County over its Domain lands and private farmers over their dune country. It is important to note at this point that if the topsoils are breached severe wind erosion follows.

This current situation of young dunes moving inland to cover valuable stable old dune country was the result of over grazing and burning late last century. This process may continue to spread as the lime mining companies are removing topsoils to get at lime deposits and then leaving these pits and soil piles to drift over vegetation killing it and creating areas subject to wind erosion. It is important that these pits and piles of overburden be restabilized for several reasons:-

(i) to prevent dune advance over good pasture land

(ii) to return the landscape to its natural state and cover the scars.

(iii) to maintain wildlife shelter and food supply.

The Agriculture of any area is the direct result of a combination of its climate and soil. We have already established that Waitotara Coastal lands have a climatic situation and soil development conducive to good fertility and high returns. This is especially true of the southern area of the County called the Westmere Dune Complex which lies between Rapaunui Road and Mosstown and from the ocean cliffs to Highway No.3. These dunes are all stabilized and highly productive land except near the coast where stream erosion, overgrazing and topsoil removal by vehicles has occurred. Westmere Lake and Lake Virginia were formed as dunes blocked streams and created excellent wildlife habitats within this dune complex.

The northern half of the county has three areas of very active unstabilized dunes that continue to destroy good farmland. They are (i) the Okehu and Kai Iwi dune complex north of Okehu Stream and Kai Iwi Stream respectively. They are very near the Coastal Road and fed by small open areas near the ocean (ii) the Nukumaru dune complex which is very large and stretches from the Wainui Road to the Ototoka Stream. These are good examples of young active dunes destroying highly productive old dunes. This area has recently been scheduled by the Wanganui-Rangitikei Catchment Board for afforestation. Private Farmers were reluctant to approve of the forest use until recent economic trends made funds difficult to obtain to reclaim the advancing dune land. The reason being that the long term return for timber was completely outside private farmers economic plans. However, with the Catchment Board stepping in, the farmers get protection of their current holdings at little cost and may receive a return for the maintenance of the forest. (iii) the third area of active dunes is between the Waitotara River and Wainui Rd., and would be a prime source of sand for all the Nukumaru dunes. Because the ownership of the land in the area is Crown, Domain Board and private there may be some conflict in objectives. The Crown land is leased either for grazing or mining of lime and lies adjacent to a small bach settlement. It would appear that if a part of the Crown land becomes coastal reserve and the lime quarries continue operating that further bach development might well be acceptable on the Crown land behind the reserve. The remaining land could be used to trade with the neighbouring land owner in order to obtain the ventifact scientific sites.

It appears possible that if these lands are stabilized the mechanics that produced the ventifacts will cease but this loss must be weighed against the loss of productive inland farms due to dune advance plus wood production loss. The small settlement at Wainui Road should not be restricted to its present size, especially since the road to the beach is being upgraded and the Nukumaru Domain contains a large area either side of this settlement. It should be noted also that these marginal dune lands, even near the coast, are an integral part of many farms and their acquisition without reciprocal lease-back arrangements could upset their farming economies.

NOTE: All Crown and Domain lands are currently and historically leased for grazing.

(c) Vegetation and Forestry

The vegetation of the coastal area is typical of all the dune or cliff country of the west coast of the Wellington Land District. It contains marram grass, lupin, box thorn, marsh rushes, cabbage trees and various exotic and native wild flowers. This vegetation serves as a dune stabilizer wildlife habitat and food source but gives little shade relief which is essential to human leisure. The presence of ample artesian springs would encourage tree growth and support wildlife as well as cater for human recreation needs, such as picnicking, rest areas or swimming areas.

Forestry will obviously become of ever increasing importance in Waitotara County as a dune stabilization mechanism, an agricultural investment, wildlife habitat and recreation setting. It appears that pine will be the initial tree to be planted to stop the advancing Nukumaru dune complex and consequently may not present the best recreational setting. In addition, it is an extreme fire risk. Broadleaf trees such as willow, poplar, pohutakawa and eucalyptus clustered around artesian waters would enhance any area into which they could be successfully introduced. An example of such shade trees are around lakes Kaitoke and Wiritoa in Wanganui County.

An area of native Pingao plant near the Waitotara River mouth is of special Maori Cultural importance and will become a proposed cultural Reserve managed by several authorities. This reserve is another additive to the proposition of a regional reserve designation over all Zone 2.

(d) Wildlife

The northern area of the county is rich in bird life, insects and common exotic animal species. Large numbers of native land birds, water fowl (black swan) and sea birds inhabit the dune lands and swamps and many are protected species. The planting of forest if properly managed should not

destroy this environ just as grazing does not now. An effort would have to be made to protect wetlands and resting grounds in particular. The planting of food species around water holes and lakes will help to encourage more birdlife to the area and in addition game birds such as grouse and pheasant could be released in the drier lands. The attached report Appendix 1 from Wildlife Division Internal Affairs sets out these options with some specific sites to be considered. The advent of forests may cause the introduction of various types of deer to the population of hares and rabbits that already abound. Since the hunting season for all animals and waterfowl falls in winter when human visitation is low and fire hazard somewhat reduced because of increased rainfall this option would be desirable. Fire protection and prevention would need to be provided in any afforestation scheme especially when high visitation occurs at Nukumaru Beach and Domain. The N.Z. Forest Service would be the logical consultant on forest design for safety, planting and management as they have recently opened several State Forests to the public (i.e. Waitarere in Horowhenua County and Santoft in Rangitikei County).

In summary, Waitotara County will have to seek ways of safe guarding existing wildlife habitats between sand dunes while stabilizing these same dunes. For example, the fringe of the water filled lime pits which have a high recreational value will have to be planted in a pattern to enhance features such as shade, aesthetics, wildlife forage while promoting maximum fire prevention.

(e) Historical

The Maori population of the county was, before European Settlement, quite considerable especially along the Waitotara River. This river served as a route to the interior and several large terraced pas including food pits and middens at strategic points in the upper reaches. Along the coast are strange round pits of varying width and depth from which the Maori removed sand to mix with the soil for the kumera crop. Appendix 2 records some basic ideas that the Historic Places Trust has along this coast.

In the 1840's the Europeans under Wakefield purchased land as far north as Kai Iwi and began trading in pigs, pork, potatoes, whale-oil and bone. This gave way to cultivation of wheat, barley and oats along with the raising of livestock for supply to the South Island gold rush. During the Taranaki wars in the 1860's the area was almost abandoned by settlers and a large Army camp was established on Wilkies Bluff above the Waitotara River. On the other side of the river there is a large Maori Pa. After 1872 when the Maori Wars finished the area developed along its present lines of sheep and dairy farming. Wanganui City absorbs much of the

County's products and is the service centre for the area. As the city stagnated so did production in the county and only recently has an improvement occurred.

(f) Transport and Access

The natural highways of the County are the coast which is negotiable in most places and the main river valleys and spurs many of which run at right angles to the coast. Generally the roads follow such natural routes but the coast-route, used in the days of horse transport, has now been abandoned for a highway traversing the coastal plateau several kilometres inland. The railway also runs on the plateau or its fringe, parallel to the highway but closer to the ocean. All beach areas of the County with the exception of the mouth of Okehu Stream and those below the cliffs north of Ototoka Stream, have legal road access which is continually being upgraded.

The nearest aerodrome is at Wanganui on the south side of the Wanganui River near the ocean. It is close enough to the County to effectively cater for air traffic needs.

g) Ownership and Erosion

With approximately 50 per cent of the county's coast in public ownership Waitotara is well endowed with public access along and behind the coast. In fact at one time another 20 per cent of the coast was serviced with a road reserve of 20 metres width from mean high water mark but due to erosion this is now covered by the tide. This is the problem facing planners in establishing reserves along this actively eroding coast.

An analysis of the state of the Coast line north of the Wanganui River by J.S.Burgess reveals the following patterns:

In the area of Nukumaru which is the northern extremity of Zone 1 described in Section (a) of this report the cliffs are cut in the more resistant Nukumaru Limestone which erodes very slowly. South from Nukumaru to Ototoka Stream, the cliffs are protected from the sea by a debris slope composed of slumped cliffs and drifting sand. On these debris accumulations, vegetation has become established giving the impression that the whole area is permanent but obviously erosion by the sea has occurred at some time in the last few centuries.

Further south the coastline is broken by the deeply entrenched Okehu Stream. The mouth of this stream moves in position on the beach and at times of high wave activity may run almost parallel with the cliff line some distance before reaching the sea. This tendency, despite the small size of the stream has resulted in the removal of debris protecting the cliffs and consequently localised erosion of the unconsolidated cliff is occurring.

South of the Okehu Stream there is a further debris slope in front of the cliff. The cliff is still being eroded at the mouth of Ototoka Stream but the coast between Ototoka and Okehu Streams is generally stable. People living in the area claim that the remnants of an old fence 50-60 years old is still approximately the same distance from the cliff edge now as it was when originally erected.

From the Kai-Iwi Stream to a little south of the Omapu Stream, there is active erosion of the sea cliffs. The following table taken from a thesis by J S Burgess illustrates the intensity of erosion occurring near Mowhanau.

1876 - 1893	5.00 feet/annum	(1.52 m)
1893 - 1916	1.43 " "	(.44m)
1942 - 1953	2.23 " "	(.68m)
1953 - 1962	1.50 " "	(.47m)
1962 - 1969	2.22 " "	(.68 m)

The overall average per year was approximately 0.6 metres and this amounted to approximately 56 metres during the ninety three year period under the study.

The remainder of the coast is sporadically protected from further attack by accumulation of dry sand and driftwood but high tides, storm wave action and changing ocean levels could again cause erosion to increase substantially.

The fact that the coast is generally stable does not alter the difficulty found in achieving continuous walking access along the coast. A sudden change in conditions could eliminate a 20 metre strip rapidy but to try to calculate this change is currently very difficult. The only solution appears to be a 100 metre strip beginning at the cliff edge regardless of stable land below and coupled with this strip, an attempt to artificially create the process of stabilization in areas of current erosion. This latter point could serve to possibly create prime recreational land such as naturally has occurred below the cliff face. Any soil or rock debris along with timber waste from the afforestation of coastal land could serve as the source for stabilization of parts of the cliff. The creation of recreational areas below the cliffs and checking of erosion onto private pasture lands could be reasons given to win cooperation from owners. The land to be designated foreshore reserve would be generally amongst the least important agriculturally to the private owners and at the moment would require dune stabilization so that sand could not blow inland over better land.
The stable land below the cliffs in some areas is quite considerable and to have it as part of the reserve would require the defining of the cliff face as the M.H.W. mark or the establishment of a separate reserve designation on land below the cliffs that might disappear entirely with changing seas.

The current areas in either Domain Board or Crown Ownership have sufficient depth to last many decades even at rapid erosion rates but care should be taken to stabilize where possible eroding beach and cliffs so as to prevent losses in good pasture and forestry lands or even such areas as parking lots, roads, scientific objects or land for potential subdivision. Erosion prevention is a desirable aim because the land is a resource in itself and must be maintained where practical.

In 1975 the Nukumaru Domain Board Foreshore Control Order (N.Z. Gaz.p.2076) granted to that Board the control of the foreshore to mean high water for 21 years, subject to S.165 of the Harbours Act 1950. This in effect gave the Domain Board official responsibility for beach protection and cleanliness, and the control of access along the foreshore to the proposed reserve sites, in particular the areas of ventifacts and Pingao contained in Zone 2.

PART II - THE OCEAN

(a) The Marine Geology

The sea bed off Waitotara county is part of the Wanganui Geosyncline and dips gently out to sea reaching 50 metres at the 20 km mark. It is composed of the same erosion prone formations as the land and thus has been levelled to a very uniform profile by wave action, tidal movement, gravity and ocean current forces as well as chemical and organic break-up. There are no major banks or canyons near the coast though eventually the sea bed falls off into the Cook Strait trough and back up again to the South Island. Across this stretch of basin, surface material ranges from 90 per cent very fine sand to medium fine sand gradually becoming course sand in a zone 5 - 10 km wide from shore. Further offshore granular sands and shells dominate before entering the trough with its mud belt of less than 10 per cent sand.

All along the coast an ironsand beach laps the base of the cliff and veneers a cut platform. Waves commonly reach the base of these cliffs for several hours during high tide. Andesitic boulders derived from the overlying Rapanui Formation litter the shoreline. The cliff line if actively eroding is often deeply indented or crenulated with picturesque caverns, caves and gulches. It has been proven in several locations that these have been plucked out along zones of weakness such as fault on joint planes.

As mentioned before a section of the coast is very actively retreating while other areas have built up protective dunes and permanent vegetation. The protective areas were formed as blocks of these unresistant lithologies falling from the cliffs disintegrate quickly and the fine grades produced are readily removed by wave action. The boring activities of a variety of organisms hasten this process. In fact near Mowhanau Beach Settlement extensive bored horizons near high-tide level are often weakly prominent.

Off-shore a short way the eroded material is frequently deposited in mobile sand bars that are constantly changed by storm waves, tide and river sediments. The heavier iron sand ore titanomagnetite is deposited in blue-black coloured beaches or blown inland to feed active dunes. The deposits in the northern part of Waitotara County could be of commercial value and this would have to be reconciled with overall reserve policy.

(b) Water Properties and Classification:

The west of New Zealand is affected by two currents, the southern branch of

the East Australian current which affects the Westland current and the North Branch which runs more easterly and north of its counterpart and feeds the south moving West Auckland current. The overall effect of these currents splitting and converging is as yet uncertain but cards released at various ocean locations from Cape Farewell up to Cape Egmont turned toward the west coast of the North Island. They landed between Foxton Beach and Makara if released in the Maui area and Wanganui to Cape Terawhiti if released off the South Island near Cape Farewell. This indraught is historically called the D'Urville current and could bring any oil spill into the Waitotara County coastal areas.

It should be remembered that the cards moved on the surface and would have been affected by the dominant westerly winds and that cards released just several kilometres offshore were not recovered. As a matter of fact very few cards were recovered from any release and certainly not enough is known of the currents in the area to finalize any pattern.

More important to the Waitotara Coast than the large ocean currents, is the effect of river sediment and wooden debris on beach build up and cliff protection. A study of wood debris along the coastline would give age and probably source of origin which along with depth of burial may tell an important story of beach development and erosion just as the ancient totara stumps in the Waitotara river stand in testimony to a different river course and climate.

The tides along the coast would fall between 2 and 2.5 metres springs and 1 and 1.5 metres neaps with a north moving tidal stream flooding and a south going component ebbing. The flow rate of the tidal streams is very light, somewhere around 0.4 knots. Theoretical numerical model studies of New Zealand tidal dynamics are currently under way.

Average temperatures over the surface of the ocean along Waitotara County range from 19°C in summer to 13°C in winter. These temperatures decrease towards the south and make the water excellent for swimming over the summer months and usuable before many large beaches to the south by a few weeks. The water also contains high counts of nitrate and phosphate at the lower depths indicating a good environment for marine life. Further work on water content especially dissolved oxygen is needed to fully analyse the oceans potential for marine growth and life so as to protect its present status and manage its resources for recreation and commercial benefit.

The wave pattern along the coast is very regular averages 1.22 metres in height on shore and 3.4 metres a kilometre offshore. These heights can increase three-fold during storms. It has also been noted that based on 15 mos. of data collection, the December to March period contained below average wave heights and fewer storm waves. The waves break regularly and parallel to the coast making swimming safe for most people and strong rips though in evidence, are not excessive.

The water along the Waitotara Coast can be summarized as being excellent for recreation interaction, with small tides of low volume, good water temperature in summer, high marine life potential, smooth sandy bottom, regular wave pattern (good for surfing), and below average wave heights in summer.

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 alteration in the natural state of the sea water along this coast. This coast and water has a high natural quality. There will be some areas where the sea water and bed should be incorporated into any coastal reserve so as to preserve a cross section of the land and ocean environment. In other areas management related between the land and ocean will be required in recognition that any coastal reserve study should not ignore the fact of the strong inter-action between land and ocean which in fact creates the coastline. Any system to deal with this complex question must weigh up factors such as marine life endangered by human presence, quality of coast for recreation (i.e. sand quality wave height etc.) suitability for development and maintenance of a wilderness setting, climate and many other areas too numerous to list. It is essential that this work be undertaken with a view to reserves in the near future.

(c) Marine Life

The ocean waters off Waitotara County are amongst the richest in sealife in New Zealand. The basic food supply for fisheries and shellfish, the zooplankton biomass, is 1335 mgm^3 in the South Taranaki bight which compares favourably with an average of 300 mg/m^3 in all other New Zealand shelf areas and only 204 mg/m^3 in the North Taranaki bight

The Pelagic (open ocean surface)fisheries is as yet largely under exploited in this area but catches of trevally, kokawai, barracouta, mackerels, sardines and pilchards are taken currently in large numbers by foreign trawlers. These same fish are taken by New Zealand fishermen sailing from Wanganui and New Plymouth in excess of 9 times the Wellington catch. In 1970-71 a concerted effort was made on tuna fishing in several places and New Plymouth was established as a tuna fishing port. Since then commercial quantities of tuna have been taken and a continued development is foreseen. Since the tuna fisheries have been found to thrive in summer waters averaging 19°C to 22°C Waitotara County is about the southern limit of this zone. Similarly it has been noted that along with the tuna other animals thrive notably, dolphins, baitfish, squid and sea birds making the Waitotara Coast rich in marine life.

In all 31 species of whales pass through the North Cook Strait area on their migrations probably largely due to the abundance of plankton and squid.

The demersal (bottom feeding) fish represent a large part of the New Zealand catch and one of the major fields has its northern limits near Waitotara County. The snapper, terekihi, blue cod and gurnard are found in overlapping zones to within the breaker areas of the Coast. This picture presents a high level of potential recreational surf and line fishing for the coast as well as its current commercial value. Records show that winter is the best demersal fishing season in this area. North of Waitotara County in mid-Patea County there is a noticeable break or absence of these fishing beds. The reason for this lies in the absence of food species such as corals, bryozoons, sponges, crustocea, mullusca and polychaetous which exist in great abundance on a rock rubble-strewn platford 25 to 30 cm above the surrounding sea bed, ranging from a few hundred metres to 6 kilometres wide and stretching along the coast from Manawatu County to the Patea River. Large numbers of sharks are to be found in conjunction with the fishing bed and represent the largest (by weight) catch on the coast.

The lower reaches of the Waitotara River are popular areas for whitebaiting.

Surprisingly, the coast is not heavily populated by shellfish which fossils would indicate was true of the past. Only small green mussels inhabit the cut rock platform exposed at low tide. This platform supports a heavy cover of marine organisms which are an intricate part of the marine eco-system. These would draw the demersal fish near enough to shore for

land recreational fishermen to take good catches.

The sandy area between the rock platform and the cliffs contains few marine species as it is often shifting and pounded by waves at high tide though beetles and land crabs come out at low tide. The cliff face itself shows signs of organic borings but it erodes so rapidly that these do not have time to develop significant strata.

A local farmer claimed introduced paua, tuatua, toheroa and crayfish have flourised but no evidence was found to support this statement by any scientific study. The rough nature of the ocean would prohibit the introduction of shellfish farming or commercial crayfishing.

(d) Recreational Use and Character

The recreational potential of the ocean runs the full gamut of active participation such as swimming, surfing and fishing to more passive qualities of hiking and quiet reflection. The area around Nukumaru Beach in Geologic and Topographic Zone 2, would supply many of the active pastimes with ample scope and space while Zone 1 along the cliffs would lend itself to the scenic walks and more soul searching characteristics.

Sports such as power boating, sailing and skin diving would be limited by the oceans rough open character though the Waitotara River Estuary would be an outlet for some small boat cruising. Fishing from off-shore would be limited by the same rough nature of the ocean and lack of suitable landing sites. At present no offshore tours of the coast exist. A combination of the breakers with large shifting sand dunes and high bliffs presents one of the best scenic attractions on the West Coast of the Wellington Land District and should promote itself in the future as just such an area. The activities and possibilities of the coast will be more fully dealt with in the Introduction to Part III on Reserve Proposals.

PART III - RESERVE PROPOSALS

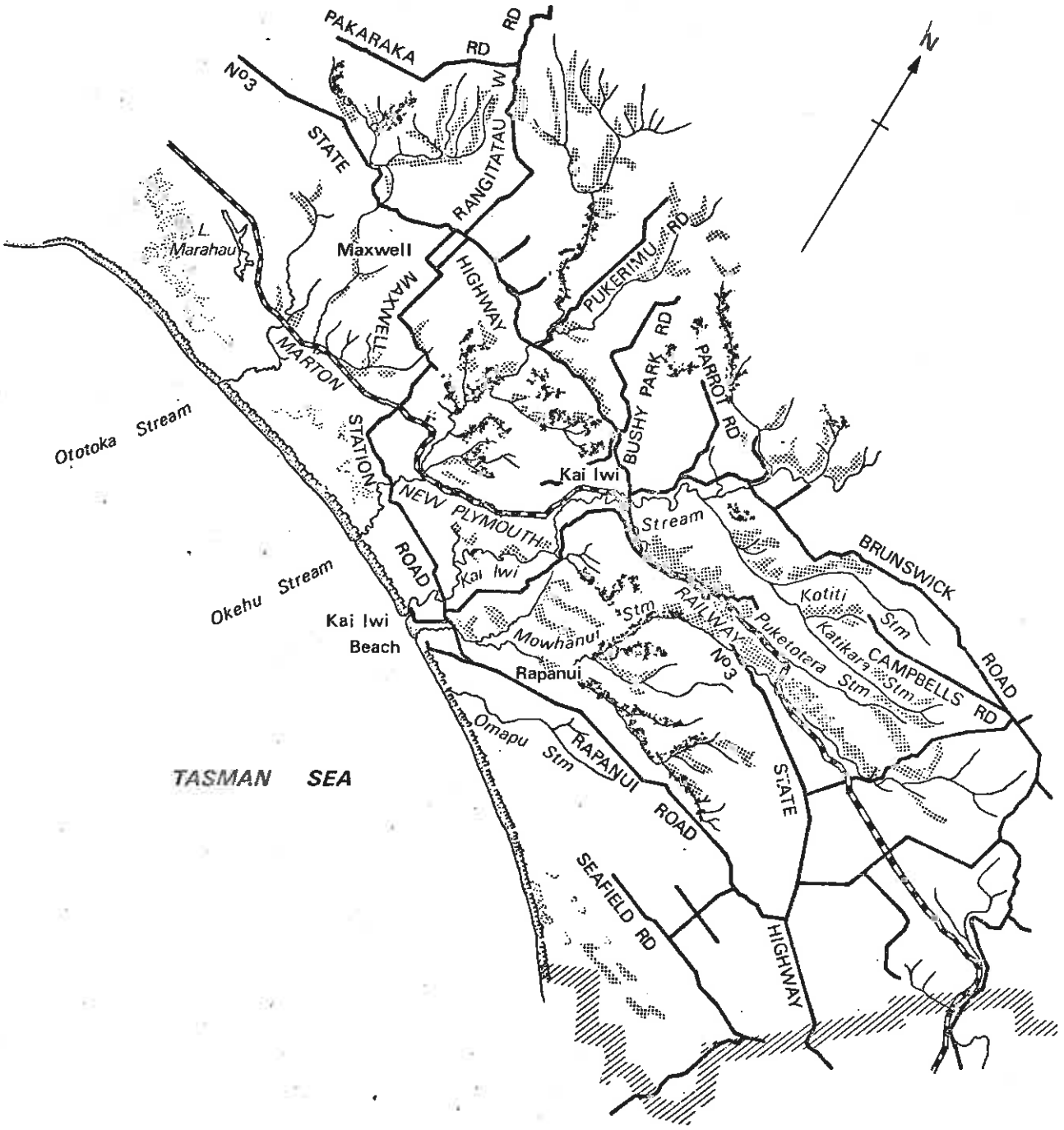
The identification of the qualities and values of the coastal fringe in terms of natural landscape character and potential for public usage for recreation in the preceding sections provides the basis for a number of proposed lines of action. In this County the proposals cover, in principle the future provision of public access and usage in conjunction with conservation and preservation of the coastal environment. The Waitotara County coastline lends itself to division into two zones by virtue of its topography, physiography and ownership. For 20 km from Castlecliff to just north Ototoka Stream the coastline is characterised by precipitous cliffs averaging 30 to 50 metres in height and broken only in four places by streams. The main appeal of this section of coastline is scenic and provision of access ways for cliff top hikes are proposed although erosion will continue to be a problem. Existing reserves are established at Mowhanau and Ototoka Stream mouth. North of this section is a stretch of 7 km of iron sand beach backed by 10 metre cliffs in places. with the coastal land entirely in Crown ownership or under control of the Nukumaru Domain Board. In this area there are a number of features of historical, geological and scientific importance which have national significance and this along with the complex nature of the physical environment and the management required have led to the proposal of a regional park which extends across the Waitotara River into Patea County. This proposed park will obviously have a regional significance and its establishment will be given a high priority.

This investigation and classification of the coastal environment is an important phase of the Department's function in 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 central Government in the Town and Country Planning Act Amendment 1973 which declared the"preservation of the natural character of the coastal environment....." to be a "matter of national importance."

Map 3

COASTAL RESERVE SURVEY

WAITOTARA COUNTY



ZONE 1

REFERENCE

Roads

Bush

Sand

Rocks

Railway

SCALE

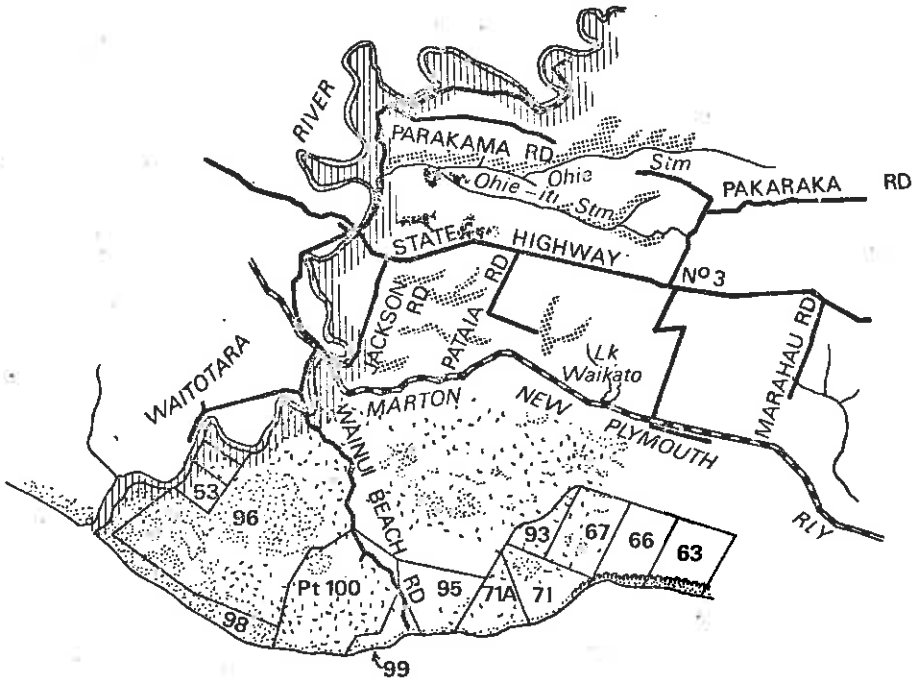
2 0 2 4 Kilometres

2 0 2 4 Miles

Map 4

COASTAL RESERVE SURVEY

WAITOTARA COUNTY



TASMAN SEA

ZONE 2

REFERENCE

Roads	
Railway	
Sand	
Bush	
Scattered Scrub	
Rocks	
Section Numbers	98, etc.

SCALE

2 0 2 4 Kilometres

2 0 2 4 Miles

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APPENDIX 1

Please Quote

WILDLIFE SERVICE
DEPARTMENT OF INTERNAL AFFAIRS

Private Bag, Wellington, N.Z. Telephone [illegible]738 699 Telegrams and Cables 'Internal'

11 December 1975

Department of Lands and Survey,
P.O. Box 5014,
WELLINGTON.

(Attention: G.A. Turner - Planning Officer)

COASTAL SURVEY WAITOTARA COUNTY

On the 9th and 10th of September 1975 officers of the Department of Lands and Survey and Wildlife Service jointly made a coastal survey in the Waitotara County within areas between the Waitotara River mouth south to Kai Iwi beach.

The following is a summary of the report submitted by the inspecting Wildlife Service Game Management Officer Mr D.R. Sutherland:

Coastal Survey Waitotara County

The purpose of Wildlife Service involvement in the survey being to identify areas with wildlife values.

A. From the end of Wainui Beach Road west to Waitotara River mouth bounded by Waitotara River and Wainui Beach Road.

A Recreation reserve controlled by the Nukumanu Domain Board within this area exists adjacent to the Waitotara River and sea coast.

Of all areas within the Survey this area has the most diverse patterns of habitat.

Wetland: Numerous small lagoons exist here and although most evaporate during dry summer periods, a number retain water for twelve months of the year. The average size of these lagoons is approximately 0.8 ha, many providing suitable habitat for waterbirds including breeding swan and duck, and facility for hunting recreation during the game season

Mr Turner.

Upland Habitat: These dunelands support a cover of lupin, marram grass and other typical duneland vegetation. Scattered populations of pheasant and quail exist. Management of the cover would considerably enhance and promote the value of the area as upland game habitat.

The presence of cattle appear to be significantly reducing the vegetal cover and aggravating sand dune movement.

B. End of Wainui Beach Road to trig M 1½ miles east. All lying within the Nukumanu Domain Recreation Reserve.

This area is similar in topography to that of area A. It has in past years supported good populations of upland game, which now, however, appear to be low. This decline in wildlife use is attributable to loss of habitat as the land is easily developed for the grazing of sheep and cattle.

C. Trig point M east to Kai Iwi beach.

The western end of this section lies within the Nukumanu Domain Board Recreation Reserve.

These dunelands, again of similar character to areas A and B are bounded on the coast by cliffs which drop steeply towards the sea. Because of the windswept nature of the area and the paucity of suitable cover, wildlife values are limited.

D. Kai Iwi beach and river mouth.

This area was visited briefly. Steep cliffs along the coast make access about the area difficult. The area has little value for wildlife.

Conclusion

The present wildlife values of the coastal area surveyed within the Waitotara County is, overall, limited. The best habitat exists within area "A" described, providing an environment for wetland birds and small scattered populations of upland game. However, much of the surveyed area has potential for wildlife habitat development, this being dependent on grazing being controlled, sand dune stabilisation and management of vegetation. Any form of land use incorporating these activities would in all probability increase wildlife use.

The coastal reserves controlled by the Nukumanu Domain Board provide an opportunity to utilize these lands for recreational use. Such development could include provision to enhance wildlife and upland game values and would be a desirable feature of reserve management. The Wildlife Service would be prepared to assist and advise in these matters.

M. E. Crombie

(M.E. Crombie)
for Secretary for Internal Affairs

APPENDIX 2

NEW ZEALAND HISTORIC PLACES TRUST

P.O. Box 12255 WELLINGTON
TELEPHONE 43 391
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 existin 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 plan. 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.

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 thercomplexes 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 Pates, 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) The work mainly of 1 interested person
N137-23) living in Hawera
N143- 1
N148- 1
N152- 2
N175/156-77 The work of the Wellington Archaeological Society, but mostly south of Waikanae.

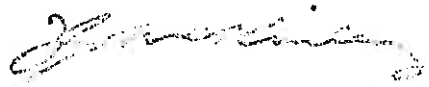
You will appreciate that such a low level of recording and unevenness of coverage, makes it impossible for me to give you any meaningful, specific information. There is not really any point in trying to give you a map of site distribution as it would have no real meaning.

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 Offenses 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.