BAY OF PLENTY
REGIONAL
COUNCIL

SIGNIFICANT INDIGENOUS VEGETATION OF THE BAY OF PLENTY COASTAL ZONE

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Prepared for the Bay of Plenty Regional Council

by

Wildland Consultants Ltd

FOREWORD

A new era of resource management began in New Zealand on 1 October 1991 with the commencement of the Resource Management Act. This statute directs that the use of natural and physical resources must be undertaken in accordance with the principles of sustainable management. These principles are defined in Part II of the Act, and collectively they embody its philosophical basis and define the axioms which underscore all other provisions therein.

Within Part II of the Act there are listed several matters of national importance which all persons exercising functions, duties and powers under the Act must recognise and provide for (s.6). One of these matters is the preservation of the natural character of the coastal environment (s.6 [a]). Another is the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna (s.6 [c]).

These two matters of national importance are inextricably linked, as it is obvious that an essential component of the natural character of the coastal environment is its flora and fauna. In turn these two components themselves are linked, as in many instances it is the vegetation which provides the habitat for indigenous fauna.

The purpose of this report is to itemise the results of a study commissioned by the Bay of Plenty Regional Council in order to meet its obligations under s.6 (c) and thereby, in part, s.6 (a) of the Act. Presented herein are the specific examples of indigenous vegetation which are held to be significant within the Bay of Plenty coastal zone.

This is not to infer that all other sites not listed have no significance. To the contrary every indigenous remnant has value, especially along this coastline of ours which has experienced misuse for so long. Each of the identified sites represents the best example (and in many cases virtually the last example) of each vegetation type present within the coastal zone. In aggregate they embody the distinctive indigenous vegetation of this area, and are fundamental to both the unmatched splendour and uniqueness of its natural character.

The loss of any site identified in this report represents the impoverishment of both our own and our childrens' natural heritage. The challenge facing us all is to have the will to ensure that this does not happen.

We commend this report to you and ask that you play your part in this all important task; the protection of biological diversity.

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Project Scientific Advisor

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1 INTRODUCTION

This report was prepared under contract for the Bay of Plenty Regional Council. It is an inventory and assessment of the terrestrial and wetland indigenous vegetation of the coastal zone[1] of the Bay of Plenty region (Figure 1).

This study was designed and carried out primarily as a desk exercise based on existing information (using published and unpublished information). Field checking of some sites was carried out and a first approximation map prepared showing the distribution of vegetation types in the study area.

The physical character classes of the study area were identified. Vegetation types and physical character classifications were combined to identify the ecological units in the coastal zone within each ecological district. The location of all known ecological units is listed and representative examples of each ecological unit identified (see Appendix 1). Sites of botanical conservation value were then identified. These sites are referred to as significant sites (or SS) within this report. Each SS has been ranked based on its relative values, (international, national, regional or district) and the justification for its selection is outlined. The ecological units comprising each site are listed, and each site is mapped.

An overview of the vegetation character of the Bay of Plenty coastal zone, and each ecological region and district is given prior to the presentation of the specific results for each ecological district.

The objectives of the study are provided in Section 2. The methodology and definitions used are outlined in Section 3.

Appendices contain lists of vegetation types, sites of local significance (all known sites of local significance were identified), a list of unpublished base maps and data collected during the course of this study, and glossaries of common plant names used in the text, symbols and abbreviations, and definitions.

The Bay of Plenty Regional Council has developed and maintains a database of sites of ecological significance within the region. Botanical information collected during this study was added to this database, and the sites of significance added to the database map-set which will be digitised as a component of the Council's Geographic Information System (GIS).

[1]Refer to section 3.1 and the glossary for a more detailed definition.

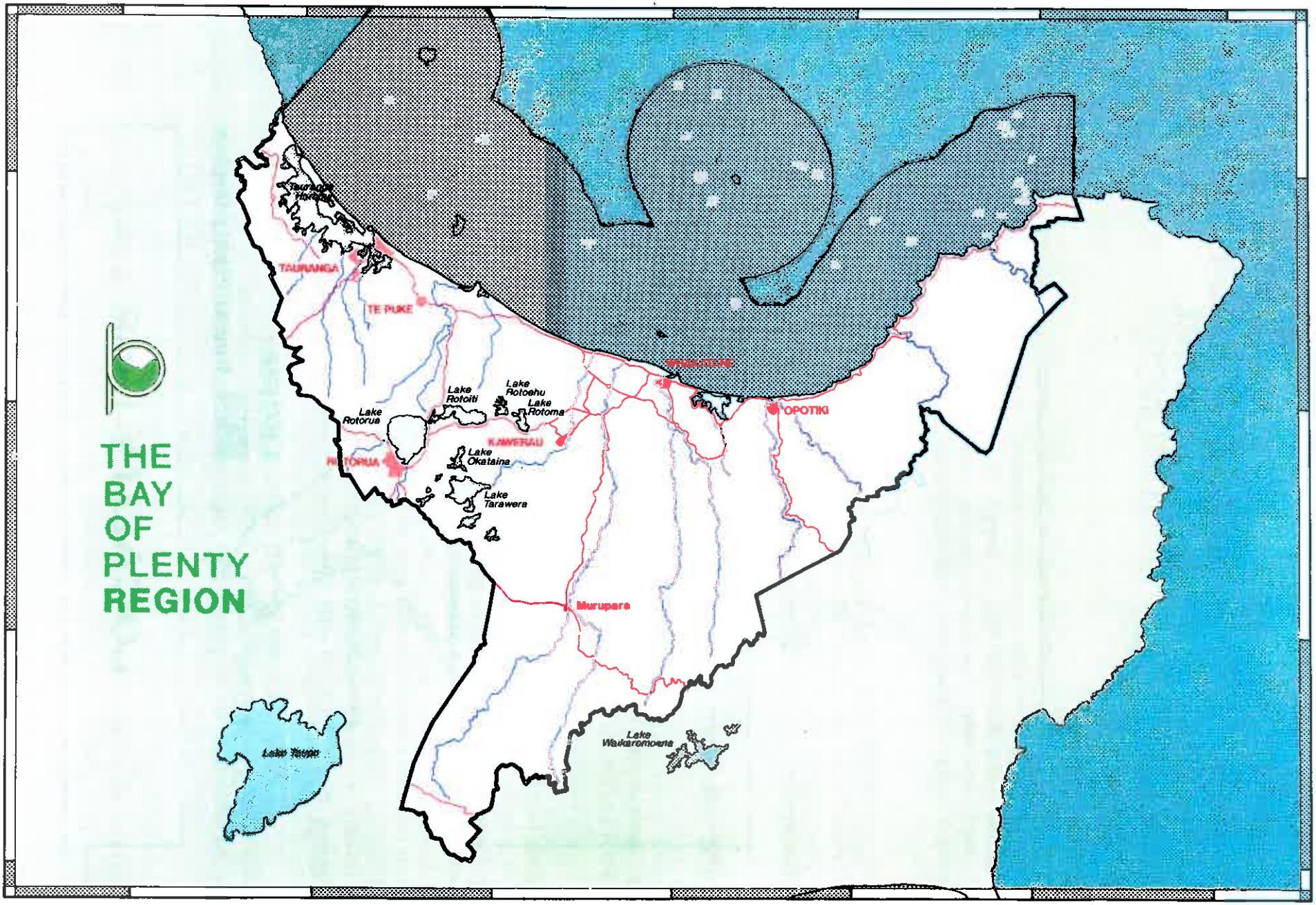


FIGURE 1

BAY OF PLENTY REGION

2 OBJECTIVES

The objectives of the study are outlined below:

1. To demarcate the coastal zone landward boundary for the Bay of Plenty in terms of vegetation.

2. To collate information on the botanical values of the coastal zone from existing literature sources and networking procedures.

3. To derive for each ecological district, a classification of vegetation types (within the coastal zone) from the information collated.

4. To identify the sites of significant indigenous vegetation within each ecological district.

5. To describe and justify the selection of each site identified as being of botanical significance to the Bay of Plenty coastal zone.

6. To provide a brief written description of the botanical values of the Bay of Plenty coastal zone.

3 METHODOLOGY

3.1 Coastal Zone Definition

The extent of the coastal zone, which is equivalent to the coastal bioclimatic zone, was determined based on the following accounts; Clarkson *et al.* (1986), Regnier *et al.* (1988), Shaw (1988) and Humphreys and Tyler (1990). The landward boundary of the coastal zone was delineated on NZMS 260 1:50,000 topographic maps. Indicator species or assemblages of species were used to define the coastal zone, which, as it transpired, generally extends from the coast to the inland limit of pohutukawa as a dominant canopy species. The coastal zone normally extends approximately 1km inland. There are exceptions to this general rule, such as islands, where the zone of coastal influence extends further inland (e.g. on Mayor Island pohutukawa-dominant forest occurs more than 1.5 km from the coast). Pohutukawa also occurs outside of the coastal zone around inland lakes in the Bay of Plenty, and along the hills inland of the Rangitaiki Plains (a former coastal margin). For the purposes of this study the coastal zone extended seaward to include intertidal vascular vegetation (i.e. mangroves and saltmarsh).

3.2 Existing Information

One of the first tasks was to assemble a bibliography of relevant published and unpublished information. All published and unpublished literature was searched for information relating to either discrete sites within the coastal zone or to larger (but still definable) areas. Local knowledge was also used as a source of information. The more specific the data obtained, the more use it was in constructing the initial overview.

Each discrete site for which information existed was allocated a number and then mapped using the NZMS 260 Series (scale 1:50,000). Information of a more general nature (i.e.; dealing with an area rather than a discrete site [such as Tauranga Harbour]) was also allocated a number.

For each ecological district (refer to section 3.3) the following information has been collated:

(i) distribution of vegetation types

(ii) distribution of threatened and local taxa (as per Cameron *et al.*, 1993);

(iii) distribution limits of taxa;

(iv) distribution of special or unusual vegetation types.

3.3 Ecological Districts and Regions

Ecological districts and regions were used as a framework for collating information and identifying representative examples of vegetation, and significant sites.

The study area encompasses all or parts of 11 ecological districts, which in turn comprise parts of 5 ecological regions. These are listed below, with boundaries illustrated in Figure 2.

TABLE 1

LIST OF ECOLOGICAL DISTRICTS AND REGIONS IN THE COASTAL ZONE OF THE BAY OF PLENTY REGION	
Coromandel ecological region	Waihi ecological district (part) Mayor ecological district
Northern Volcanic Plateau ecological region	White Island ecological district Motiti ecological district Tauranga ecological district Otanewainuku ecological district
Whakatane ecological district	Te Teko ecological district Taneatua ecological district Opotiki ecological district
Raukumara ecological region	Motu ecological district
East Cape ecological region (part of)	Pukeamaru ecological district (part)

3.4 Classification System

In addition to using ecological districts as a framework it was necessary to use a classification system in order to collate and assess the full range of vegetation types within the coastal zone. The components of this classification are as follows:

(1) Physical Character (e.g.: volcanic hard coast/dune sands);

(2) Vegetation Types (e.g. forest/treeland/sandfield);

Each of these components is briefly outlined below.

3.4.1 Physical Character

The physical character classification is driven by the nature and complexity of the terrain assemblages present. The classes defined are units of the land surface that have a distinctive character, reflecting the local importance of either a geological, geomorphic, climatic, soil related or hydrological feature or process. The factors considered in the determination of physical character include:

(a) Climate

Rainfall, temperature, salt inundation, wind.

(b) Soil

Stability, fertility, structure, water relations.

(c) Geology

Rock type, structure, lithology.

(d) Geomorphology

Landforms, geomorphic processes.

(e) Hydrology

Drainage net, stream characteristics.

The physical character classifications were provided by David Slaven (Bay of Plenty Regional Council) and Dr. Ian Nairn (Landcare Research New Zealand Ltd; 1992). All saline wetlands, freshwater wetlands, lagoons and lakes were identified on NZMS 260 1:50,000 maps using a combination of published information, personal knowledge, aerial photographs and field inspections. Maps showing these boundaries are held at the Bay of Plenty Regional Council offices, Whakatane. The final checklist of physical character classes is given in Table 2.

3.4.2 Vegetation Types

Vegetation type names are based upon a structural classification of vegetation developed by Atkinson (1985). A total of thirteen structural classes were identified in the coastal zone. Definitions for these structural classes are given in Appendix 5. Dominant canopy species are listed along with the structural class; for example: Pohutukawa (dominant canopy species) forest (structural class).

TABLE 2

LIST OF PHYSICAL CHARACTER CLASSES	
CLASSES	**CHARACTERISTICS**
Volcanic Hard Coast	Basalts-andesites-rhyolites-lavas
Volcanic Soft Coast	Ignimbrites-breccias
Alluvium Beaches	Alluvium-shingle-gravel-coast sand
Dune & Beach Sands	Unconsolidated and consolidated; may include peat

Exposed Rocky Coast & Hinterland	Exposed siltstone-sandstone-greywacke
Sedimentary Coastal Hinterland	Sheltered primary/redeposited ashes-tuffs-sandstones-siltstones
Lakes, Ponds & Freshwater Lagoons	
Freshwater Wetlands	
Saline Wetlands	

3.4.3 Ecological Units

After definition of the vegetation types in the coastal zone, the next step was to combine the vegetation types with physical character classes to form an ecological unit.

A check list was compiled comprising the full range of ecological units present within the coastal zone (i.e.: the combinations of bioclimatic zone, physical character and vegetation type). Some examples are; "coastal pohutukawa forest on volcanic hard coast", "coastal pohutukawa treeland on dune sands", or "coastal pohutukawa forest on sedimentary coastal hinterland".

3.5 Master List of Ecological Units

Existing information (see section 3.2) was used to list all known vegetation types and their location(s) in each physical character class for each ecological district (Appendix 1). Brief field inspections were carried out during May - June 1992 in the Tauranga, Otanewainuku, Te Teko, Taneatua and Opotiki ecological districts and information collected during these inspections was incorporated in these lists. Other relevant information was noted, including:

(i) The tenure and status of each site listed, where known (e.g., Scenic Reserve, Recreation Reserve, private land);

(ii) The source(s) of the above information.

The best representative examples of indigenous vegetation within the Bay of Plenty coastal zone were then selected from this list. These are called significant sites (or SS).

3.6 Significant Sites

3.6.1 Selection

The primary aim of this exercise was to identify sites containing the best examples of representative ecological units.

In making these assessments the ranking system of Shaw (In press) was used, having regard to the criteria proposed by Myers *et al.* (1987):

representatives - the primary criterion
diversity and pattern
rarity and special features
naturalness
long term viability
size and shape
buffering and surrounding landscape

Additional areas have been included in some "significant sites" to provide natural boundaries, adequate size and compact shape, following sound reserve design principles (O'Connor *et al.* 1990; Myers *et al.* 1987; Diamond 1975).

3.6.2 Evaluation

Each significant site was described and given a ranking based on its relative values.

The ranks used are international, national, regional and district.

International sites are those containing ecological processes, vegetation types, or taxa that have significance beyond New Zealand because of:

(a) features so special that they have an international profile.

(b) importance for international research (e.g. comparable with similar features in other countries).

The criteria for the remaining rankings are equivalent to the criteria defined in Shaw (In Press) for botanical conservation rankings (refer to Appendix 5) as follows:

national is equivalent to a botanical conservation ranking of exceptional, and infers the site is nationally significant;

regional is equivalent to a botanical conservation ranking of very high, and infers the site is significant within the ecological region;

district is equivalent to a botanical conservation ranking of high, and infers the site is significant within the ecological district;

Each site is mapped in this report (scale 1:50,000) and the justification for its selection outlined. The area of each site was calculated by Bay of Plenty Regional Council (draughting section).

Certain sites of **local** significance also stand out because they have interesting associated features. These sites are equivalent to a botanical conservation value of moderate (Shaw In Press). The justifications and maps for these sites of local significance are presented in Appendix 3. This assessment did not identify all sites of local significance.

The list of significant sites and their respective botanical conservation rankings are given in Table 3.

FIGURE 2

STRICTS AND REGIONS OF
ENTY (from McEwen 1987)

4 OVERVIEW OF THE BAY OF PLENTY COASTAL ZONE

Sand dunes line the Bay of Plenty coast from Waihi to Opape, broken only occasionally by river and harbour mouths, volcanic landforms (e.g., Bowentown and Maunganui) and rocky headlands (e.g. Oreti Point and Kohi Point). Harbours and estuaries are a feature of the region (e.g. Tauranga, Maketu, Waihi, Ohiwa). Wetlands were originally common on plains behind the sand dunes and around the harbour margins, with some of these having been formerly extensive (e.g. Rangitaiki swamp, Kawa swamp and Waihi swamp). However the majority of wetlands in the region have now been drained and developed for farming. Low coastal hills and headlands surround Tauranga Harbour and Ohiwa Harbour and adjoin the coast between Pukehina and Matata.

Between Opape and Raukokore there are steep rugged headlands interspersed by gravel beaches on long exposed reaches and finer sand and pebble beaches in the numerous small secluded bays. North-east of the Raukokore River is a series of narrow coastal terraces. The rugged cliffed coastline is broken only by a few small sandy beaches and the wide, flat-bottomed Whangaparaoa River valley.

There are three "island" ecological districts in the region, including in total four relatively large islands and several smaller islands and stacks. The islands are virtually all of volcanic origin and one, Whakaari (White Island), is an active volcano.

In the past the sand dunes would have been dominated by native sand binders including spinifex (*Spinifex sericeus*) and pingao (*Desmoschoenus spiralis*). Mangroves (*Avicennia marina* var. *resinifera*), searush (*Juncus maritimus* var. *australiensis*) and oioi (*Leptocarpus similis*) would have dominated estuarine saline wetlands, grading into marsh ribbonwood (*Plagianthus divaricatus*) and manuka (*Leptospermum scoparium*). Raupo (*Typha orientalis*), sedges, harakeke (*Phormium tenax*) and cabbage tree (*Cordyline australis*) would have dominated freshwater wetlands, with local swamp forest. The coastal hillslopes and headlands would have been forested; dominated by pohutukawa (*Metrosideros excelsa*) or mixed coastal forest including pohutukawa, puriri (*Vitex lucens*), karaka (*Corynocarpus laevigatus*), tawa (*Beilschmiedia tawa*), rewarewa (*Knightia excelsa*), kohekohe (*Dysoxylum spectabile*) and (locally) hard beech (*Nothofagus truncata*) and taraire (*Beilschmiedia tarairi*). Steep coastal cliffs would have supported an array of coastal shrubs and herbs including manuka, whararíki (*Phormium cookianum*), New Zealand ice plant (*Disphyma australe*), *Sarcocornia quinqueflora*, kanuka (*Kunzea ericoides* var. *ericoides*), mingimingi (*Leucopogon fasciculatus*), *Isolepis nodosa*, and local *Olearia pachyphylla* (near Opape) and *Melicytus novae-zelandiae* (on islands).

The vegetation of the Bay of Plenty coastal zone has had a long history of modification and disturbance, being extensively modified by Polynesians during pre-European times. Modification continued following the arrival of the European and much of the original vegetation cover has been substantially modified or removed. However, there are many remnant examples of the major vegetation associations (i.e. sand dune vegetation (e.g. Matakana Island); coastal forest on hillslopes and headlands (e.g. Matata Scenic Reserve and Ohope Scenic Reserve) and wetlands (Tauranga and Ohiwa harbours). The natural character of the coastal zone for each ecological district is described in more detail below.

TABLE 3 LIST OF SIGNIFICANT SITES

COROMANDEL ECOLOGICAL REGION (PART)	
Waihi Ecological District (Part)	
National Significance:	Orokawa (Scenic Reserve)
Mayor Island Ecological District	
National Significance:	Tuhua (Mayor Island Wildlife Refuge)

NORTHERN VOLCANIC PLATEAU ECOLOGICAL REGION	
Tauranga Ecological District	
National Significance:	Matakana Island 1. Athenree 1. Blue Gum Bay 1. Tirohanga Te Hopai Island Aongatete Estuary Hunters Creek Waimapu Estuary 1. Kaituna sand dunes
Regional Significance:	Bowentown sand dunes Katikati 1. Wainui Estuary 1. Waipapa Estuary 1. Wairoa Estuary 1. Motuotau Island Arawa
District Significance:	Athenree 2. Bowentown Heads Taupiro Estuary Matakana Island 2. Matakana Island 3. Katikati 2. Blue Gum Bay 2. Wainui Estuary 2. Apata Estuary Waipapa Estuary 2. Tahunamanu Island Motungaio Island Opureora

Table 3 Continued	
	Rangiwaea Island Mt Maunganui 1. Te Puna Estuary Wairoa Estuary 2. Wairoa Estuary 3. Matua Estuary Waikareao Estuary Waimapu Estuary 2. Papamoa sand dunes Kaituna River Maketu Spit Waihi Estuary Part Waewaetutuki Pukehina 1
Motiti Ecological District	
Regional Significance:	Karewa Island Motunau Taumaihi Island
District Significance:	Motuputa Island Motiti Motiti Islets
Otanewainuku Ecological District	
National Signficance:	Matata 1.
Regional Significance:	Herepuru 1.
District Significance:	Otamarakau Hauone Herepuru 2. Matata 4.
White Island Ecological District	
International Significance:	Whakaari
Regional Significance:	Moutoki and Rurima Moutohora
District Significance:	Volkner Rocks

Table 3 Continued

WHAKATANE ECOLOGICAL REGION	
Te Teko Ecological District	
National Significance:	Matata 2. Wahieroa dunes 1.
Regional Significance:	Thornton 1.
District Significance:	Matata 3. Wahieroa Dunes 2. Thornton 2. Whakatane Estuary (Part) Kohika
Taneatua Ecological District	
National Signficance:	Ohope Uretara Island Motuotu Island Pataua Island Hiwirau
Regional Significance:	Kohi Point Whitiwhiti
District Significance:	Islets near Ohakana Island Ohope Spit Tern Island Island near Tern Island Stipa Oscar Reeve Toritori
Opotiki Ecological District	
Regional Significance:	Bryan 1. Waiotahi Spit & Estuary
District Significance:	Bryan 2. Bryan 3. Waiotahi Beach Huntress Creek Tirohanga Waiaua Estuary Opape

Table 3 Continued

RAUKUMARA ECOLOGICAL REGION	
Motu Ecological District	
National Significance:	Opape Headland 1. Haurere Headland 1. Whanarua-Kereu Corridor Te Uritukituki
Regional Significance:	Part Houpoto Swamp Part Whitianga
District Significance:	Opape Headland 2. Haurere Headland 2. Part Torere Corridor Maraenui Motu Corridor Motu Kaimeanui Island Motu Papaku Island

EAST CAPE ECOLOGICAL REGION (PART)	
Pukeamaru Ecological District (Part)	
National Significance:	Part Tupuaeharuru
District Significance:	Part Whangaparaoa Part Tikirau Papatea

5 COROMANDEL ECOLOGICAL REGION

Coromandel ecological region comprises nine ecological districts including Great Barrier and Little Barrier islands in the north and all the Coromandel Range to the end of Te Hunga Ridge on the Kaimai Range. Of these, only Mayor ecological district and a small portion at the southern end of Waihi ecological district are within the study area. The remainder either do not reach the coast (Te Aroha ecological district) or are outside the Bay of Plenty Region.

The Coromandel ecological region is a peninsula bounded by sea, with the Hauraki Plains to the southwest and the lowlands of Tauranga Harbour to the southeast. *"The most strongly unifying features of the five mainland districts are the distinctive kauri [Agathis australis] element from near sea level to a little over 800m a.s.l.; the volcanic origins of most of the country rock and the steep Coromandel Range"* (Regnier 1987). The Coromandel lies within a zone characterised by high levels of regional endemism in the woody flora (McGlone 1985).

For a detailed description of the region and an assessment of conservation values see Humphreys and Tyler (1990).

5.1 PART WAIHI ECOLOGICAL DISTRICT

The Waihi ecological district comprises mainly hilly to steep country of moderate altitude reaching approximately 750m a.s.l. There is rolling to undulating country and alluvial plains in the south-east of the district. The coastal bioclimatic zone comprises largely a narrow band of hills bounded by steep ignimbrite cliffs on the seaward margin. Most of the larger eastward flowing rivers flow into the Otahu estuary.

The original vegetation cover has been extensively modified. Pohutukawa forest and coastal forest comprising pohutukawa, tawa, puriri, kohekohe, rewarewa, pigeonwood (*Hedycarya arborea*), mangeao (*Litsea calicaris*) and karaka would have dominated the coastal hillslopes before clearance. Kauri and podocarps [e.g. rimu (*Dacrydium cupressinum*) and miro (*Prumnopitys ferruginea*)] were probably once more common in the coastal forests, but are now very limited. In the inland parts of the coastal zone tawa, kohekohe and hinau (*Eleaocarpus dentata*) would have been more common with pohutukawa declining in abundance. However most coastal hills have been cleared of their former forest cover. Orokawa and Homunga Bay Scenic Reserves include the largest remaining remnants.

Most of the dunelands are heavily modified (e.g., mined for sand and developed for housing) and only remnant foredunes remain. Whilst some still support spinifex and pingao, marram (*Ammophila arenaria*) and harestail (*Lagarus ovatus*) are common.

Otahu Estuary includes good examples of the original vegetation including herbaceous plants on the mudflats and a fringe of mangroves with extensive areas of searush, oioi and scattered marsh ribbonwood and manuka. Drainage for farming and housing developments have reduced other estuarine wetlands to very small remnants.

On the alluvial plains of the Otahu River and Waiharakeke Stream contiguous with the estuarine wetlands there are large areas of manuka, with occasional cabbage trees and kanuka on higher ground. However the majority of freshwater wetlands have been developed for farming with only very small remnants of raupo and flax remaining along river channels (Regnier 1987; Humphreys and Tyler 1990).

Pimelea tomentosa (classed as vulnerable, Cameron *et al.* 1993) occurs in Orokawa Scenic Reserve.

Only a small portion of the southern end of the ecological district is in the Bay of Plenty Region.

5.1.1

SPECIAL VEGETATION TYPES AND THREATENED AND LOCAL PLANTS	
PART WAIHI ECOLOGICAL DISTRICT	
Vulnerable taxa:	
Pimelea tomentosa:	Present in Orokawa Scenic Reserve (Miller 1984).
Endemic to the Coromandel Ecological Region:	
Hebe pubescens var. *pubsescens*	Present in Orokawa Scenic Reserve (Miller 1984; Miller 1985).

5.1.2 SIGNIFICANT SITES: NATIONAL

OROKAWA (Scenic Reserve)

Area	Approx 373 ha
Altitude	0-253m
Grid reference	NZMS 260 U13 700200
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	Physical character
Pohutukawa forest	Volcanic hard coast
Pohutukawa-tawa-rewarewa-puriri-puriri-pigeonwood-mangeao-karaka-kohekohe forest	Volcanic hard coast
Five finger-rangiora-karamu/manuka-kanuka scrub	Volcanic hard coast
Pohutukawa treeland	Volcanic hard coast
Pohutukawa-karo-houpara treeland	Volcanic hard coast
Helichrysum glomeratum-karo-kohuhu-taupata shrubland	Volcanic hard coast
Manuka shrubland	Volcanic hard coast

(from Miller, 1984)

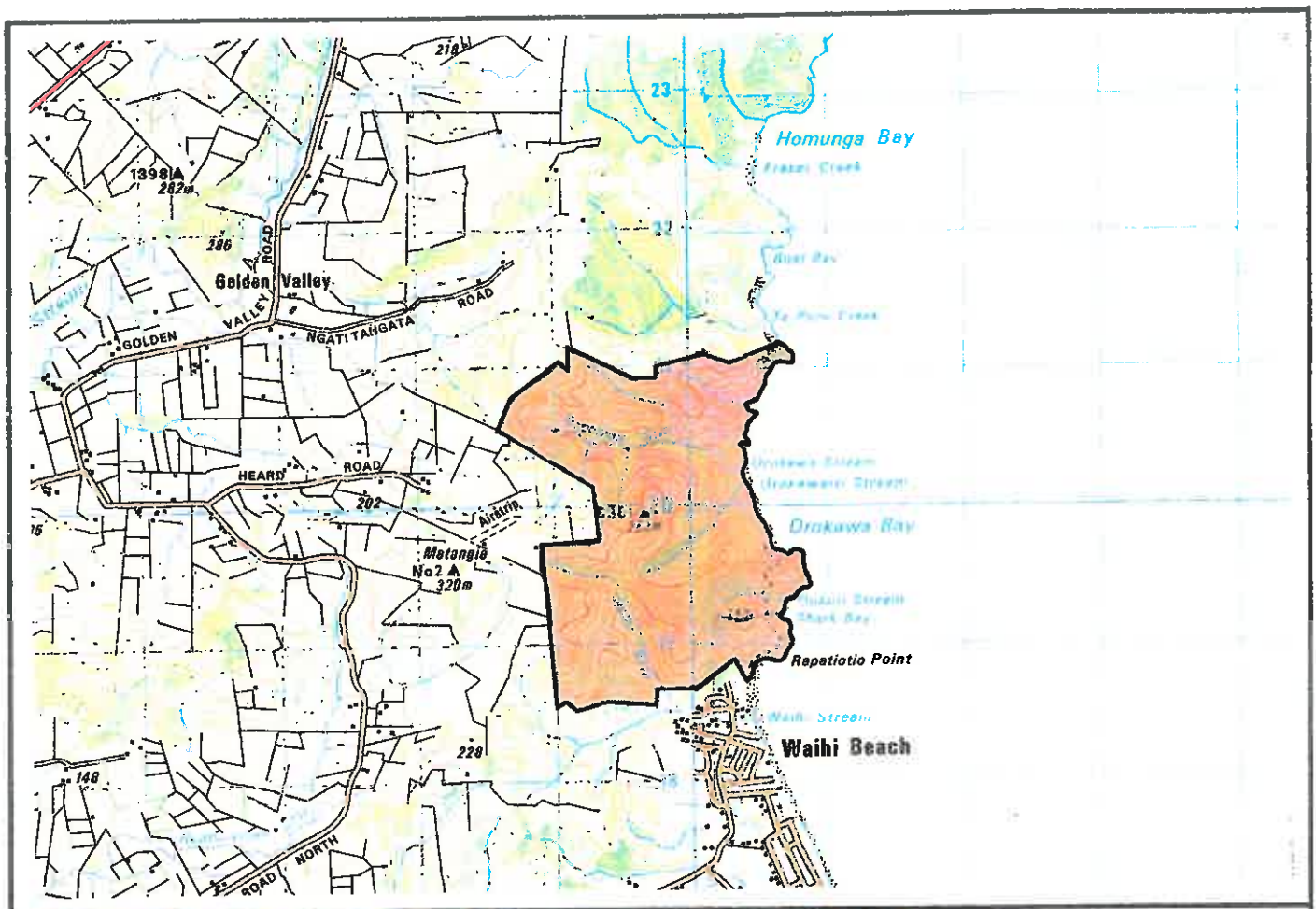
Vegetation map: Miller 1984

Justification

Much of the coastal zone of the Waihi Ecological District has been cleared and converted to pasture (Humphries and Tyler 1990). Orokawa Scenic Reserve is a representative, relatively good quality example of the coastal vegetation of Waihi Ecological District and contains the best example of the remaining coastal forest in the ecological district.

One threatened and local plant occurs in the reserve, *Pimelea tomentosa* (Miller 1984), classed as vulnerable (Cameron *et al.* 1993). *Hebe pubescens* var. *pubescens*, a plant endemic to the Coromandel Ecological Region, also occurs in the reserve (Miller 1984).

SS OROKAWA


Homunga Bay
Orokawa Bay
Repatiotio Point
Waihi Beach
Golden Valley
GOLDEN VALLEY ROAD
NGATI TAHGATA ROAD
HEARD ROAD
Airstrip
Metangio No2
320m
NORTH ROAD
23
202
228
148
286
282m

5.2 MAYOR ECOLOGICAL DISTRICT

Mayor Ecological District comprises Tuhua (Mayor Island). Tuhua is the emergent summit of an isolated rhyolite volcano lying near the edge of the continental shelf about 26km offshore in the western Bay of Plenty. The island is roughly circular, with a diameter of about 4km, and is surmounted by a large caldera (about 3km in diameter). There are two crater lakes. Tuhua was connected to the mainland during the last glacial.

All of the island is in the coastal zone. The vegetation was extensively modified by Polynesian occupation during pre-European times. Modification continued following the arrival of the European and much of the vegetation on Tuhua has developed following burning. No original forest remains, with most of the forest on the island's outer slopes being less than 180 years old. The present day vegetation, except where interrupted by cliffs and crater lakes, is generally forest composed primarily of three species: pohutukawa, rewarewa and kanuka. Kamahi (*Weinmannia racemosa*) is locally common. Covering the talus heaps on the inside of the caldera rim is a tall forest of enormous pohutukawa, puriri, kohekohe and local mangeao. Manuka is locally dominant on the crater floor. Grasses, New Zealand iceplant, flax and pohutukawa are common on sea cliffs. Common wetland species include *Baumea articulata, B. juncea,* raupo, giant spike sedge (*Eleocharis sphacelata*), *Carex secta, C. virgata,* manuka, sphagnum (*Sphagnum cristatum*), harakeke, *Baumea rubiginosa, B. huttonii,* and *B. tenax,* swamp kiokio (*Blechnum minus*). Willow (*Salix sp.*) is locally common.

An interesting feature of the flora is the relative absence of native conifers except for low numbers of small totara (*Podocarpus totara*) in the crater.

A number of threatened and local plant taxa have been recorded on Tuhua: *Euphorbia glauca* (classed as vulnerable, Cameron *et al.* 1993), *Cyclosorus interruptus* (rare), *Pimelea tomentosa* (vulnerable), *Rorippa divaricata* (vulnerable), *Hibiscus trionum* "NZ" (vulnerable), *Pisonia brunoniana* (rare), *Sicyos australis* (local), *Corybas cryptanthus* (local), *Marattia salicina* (rare), *Ranunculus macropus* (rare), *Lepidium oleraceum* (rare), and *Pterostylis nana* (endangered). The last seven species have not been recorded for a number of years. Tuhua is also the southern limit for coastal maire (*Nestegis apetala*).

(Source: Atkinson 1956, Bayley *et al.* 1955, Edmonds and Briggs, n.d.)

5.2.1

SPECIAL VEGETATION TYPES AND THREATENED AND LOCAL PLANTS	
MAYOR ISLAND ECOLOGICAL DISTRICT	
Endangered taxa:	
Pterostylis nana	Tuhua (Mayor Island); recorded in 1955 by Hynes and Knowlton, but not recorded since.
Vulnerable taxa:	
Hibiscus trionum "NZ"	Tuhua (Mayor Island); 1986 (NZFRI).
Euphorbia glauca	Tuhua (Mayor Island); small colony present in 1986 (S. M. Beadel pers. obs.).
Rorippa divaricata	Tuhua (Mayor Island); 1986 (NZFRI).
Pimelea tomentosa	Tuhua (Mayor Island); recorded in 1936 (Mason CHR 22204), but not since then.
Lepidium oleraceum	Tuhua (Mayor Island); recorded by Allan and Dalrymple in 1926 but has not been recorded since.
Rare taxa:	
Cyclosorus interruptus	Tuhua (Mayor Island); small colony observed in 1986 (S.M. Beadel pers. obs.).
Marattia salicina	Tuhua (Mayor Island); recorded by Allan and Dalrymple (1926) but it has not been recorded since.
Ranunculus macropus	Tuhua (Mayor Island); recorded by Sladden (1926) but has not been recorded since.
Pisonia brunoniana	Tuhua (Mayor Island); Given 1981 refers to reports of this species from Tuhua.

Local taxa:	
Corybas cryptanthus	Tuhua (Mayor Island); 1930 (Lucy Moore record. B Irwin pers. comm.)
Sicyos australis (maawhai, native cucumber)	Tuhua (Mayor Island); recorded by Sladden (1926) and also in 1950 (AK herbarim specimen) but has not been seen since. This taxon is not included in the current threatened and local plant list (Given 1990) but it will probably be included when the list is updated.
Distribution: Southern limit:	
Nestegis apetala	Tuhua (Mayor Island)
Vegetation:	Tuhua (Mayor Island); nationally significant site for pohutukawa forest.

5.2.2 SIGNIFICANT SITES: NATIONAL

TUHUA
[Mayor Island Wildlife Refuge (Maori owned)]

Area	1075 ha
Altitude	0-320m
Grid reference	NZMS 260 U13 987298
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	Physical character
Kanuka forest	Volcanic hard coast
Manuka forest	Volcanic hard coast
Pohutukawa forest	Volcanic hard coast
Pohutukawa/kanuka forest	Volcanic hard coast
Rewarewa forest	Volcanic hard coast
Rewarewa/kanuka forest	Volcanic hard coast
Pohutukawa treeland	Volcanic hard coast
Manuka/sphagnum shrubland	Volcanic hard coast
Crater cliff communities	Volcanic hard coast
Marine cliff communities	Volcanic hard coast
Baumea sedgeland	Freshwater wetland
Carex secta sedgeland	Freshwater wetland
Raupo reedland	Freshwater wetland
Eleocharis sphacelata reedland	Freshwater wetland

(Atkinson and Percy 1956; Bayley *et al.* 1956)

Vegetation map: Atkinson and Percy 1956

Justification

This site comprises the entire Mayor Ecological District (including Tuhua (Mayor Island) and adjacent small rock stacks). Tuhua is a nationally significant site for pohutukawa forest, free from the effects of possum. Introduced animals present on the island are pigs, cats, mice, kiore and Norway rat. No introduced animals are known from the small islands around Tuhua. Its flora (about 370 species) is the largest of any of the Bay of Plenty islands (Clarkson and Spring-Rice 1992), which reflects its relatively large size and diversity of habitats (including freshwater wetlands).

Several threatened and local plants have been recorded from Tuhua: *Pterostylis nana* (endangered), *Euphorbia glauca* (vulnerable), *Cyclosorus interruptus* (rare), *Lepidium oleraceum* (rare), *Ranunculus macropus* (rare), *Rorippa divaricata* (vulnerable), *Hibiscus trionum* "NZ" (vulnerable), *Pisonia brunoniana* (rare), *Sicyos australis* (local), *Corybas cryptanthus* (local), *Marattia salicina* (rare), and *Pimelea tomentosa* (vulnerable), (Beadel 1992). However, seven of these species have not been recorded in recent years. *Nestegis apetala* reaches its southern limit on Tuhua.

SS TUHUA (MAYOR ISLAND)

6 NORTHERN VOLCANIC PLATEAU ECOLOGICAL REGION

The Northern Volcanic Plateau Ecological Region comprises five ecological districts: Motiti, Tauranga, Otanewainuku, Rotorua Lakes and White Island. The region is characterised by its volcanic substrates and landforms. All of the ecological districts have coastal margins except the Rotorua Ecological District. Each ecological district has a different volcanic history and landform. For example, Otanewainuku is a dissected ignimbrite plateau whilst White Island Ecological District comprises two volcanic islands and several rockstacks, one of which (Whakaari or White Island) is an active volcano. Motiti Ecological District also comprises several islands and rock stacks.

6.1 TAURANGA ECOLOGICAL DISTRICT

Tauranga Harbour is the dominant feature of this ecological district's coastal bioclimatic zone. It is a one of the largest harbours in New Zealand covering a total area of 218 square kilometres. It is a tidal estuarine lagoon impounded by a barrier island (Matakana Island) and two barrier tombolos, Mount Maunganui at the southern entrance and Bowentown to the north. Low coastal hills occur around the inland margin of the harbour. The coastal strip comprises an extensive sand dune system, some of which has been developed for housing, pastoral farming and (on Matakana Island) forestry plantations. Extensive freshwater wetlands originally occurred behind the sand dunes, but most have been drained and there are only small remnant wetlands. There are two estuaries near Maketu, separated by Oreti Point.

The vegetation of Tauranga Ecological District has been substantially modified by humans since the fourteenth century (Stokes 1980). Around Tauranga Harbour there were extensive freshwater and saline wetlands, whilst in the eastern part of the district there were extensive swamps known as Kawa and Waihi. The Kawa and Waihi swamps have been extensively drained and developed for farming and only small remnants of the original vegetation remain.

The original wetlands in Tauranga Harbour would have included mangrove scrub and shrublands in the harbour and extending up stream channels, with local *Schoenoplectus pungens*. Behind the mangroves there would have been mosaics of oioi, searush and local *Baumea juncea*, grading into marsh ribbonwood sedgelands and shrublands and manuka scrub and shrublands with local *Coprosma propinqua* subsp. *propinqua*. The major difference between the present day vegetation and the original cover is the vegetation that occurs inland from the band of manuka scrub. Originally at many sites there would have been freshwater wetlands, dominated by raupo, sedges (including *Carex* spp., *Gahnia xanthocarpa, Baumea* spp.), harakeke, swamp millet (*Isachne globosa*) and cabbage trees. Undoubtedly in places there would have been swamp forest dominated by kahikatea (*Dacrycarpus dacrydioides*); possibly with local pukatea (*Laurelia novae-zelandiae*) and swamp maire (*Eugenia maire).* Kahikatea stumps have been found in the swamps at Maketu (Stokes 1980), Only a very small proportion of the freshwater wetlands remain today and there is little or no swamp forest present. Many of the remaining freshwater wetlands have been invaded by grey willow (*Salix cinerea*). Reduced water levels and modification of the original vegetation cover by clearance, grazing and burning has encouraged this invasion. (Source: Beadel 1992)

Two threatened ferns (*Cyclosorus interruptus*, rare; *Thelypteris confluens*, rare) and a native buttercup *Ranunculus macropus* (rare) are found in the wetlands on Matakana Island. *Cyclosorus* and *Thelypteris* also occur in a small remnant of the Kawa swamp near Maketu.

Sand dune vegetation would have been dominated by spinifex and pingao, and these are still common in many places on the dune system. Two threatened sand dune plants which still occur in the district would probably have been more common; *Austrofestuca littoralis,* (classed as rare) and *Pimelea arenaria* (classed as rare).

On Mount Maunganui, Bowentown Heads, Oreti Point, Moturiki Island, Motuotau Island and the hillslopes and headlands bordering Tauranga Harbour there would have been pohutukawa forest and tall coastal forest (canopy dominants including pohutukawa, puriri, karaka, rewarewa and kohekohe). However only small areas of pohutukawa forest and treeland now remain. Minor areas of coastal shrubland dominated by taupata and *Melicytus novae-zelandiae* occurs on Motuotau Island. *Melicytus novae-zelandiae* is also present on Moturiki Island and Matakana Island.

6.1.1

SPECIAL VEGETATION TYPES & THREATENED AND LOCAL PLANTS	
TAURANGA ECOLOGICAL DISTRICT	
Rare taxa:	
Austrofestuca littoralis	Two populations of *Austrofestuca littoralis* are known to occur in the district; (i) Sand dunes east of Papamoa (population of over 100 plants). (ii) Maketu Spit (4 plants) (S M Beadel pers. obs. 1992).
Ranunculus macropus	North-western end of Matakana Island (Beadel 1990b).
Thelypteris confluens	Two populations of *Thelepteris confluens* are known in the district; (i) North-western end of Matakana Island; (over one thousand plants, one of the best populations in New Zealand, Beadel 1989b & 1990b). (ii) Arawa wetland, Maketu (Beadel 1989c).
Cyclosorus interruptus	Two populations of *Cyclosorus interruptus* are known from this district; (i) North-western end of Matakana Island; (over one thousand palnts, one of the best populations in New Zealand, Beadel 1989b & 1990b). (ii) Arawa Wetland, Maketu (Beadel 1989c).
Pimelea arenaria	Matakana Island (largest population in the Tauranga Ecological District) (Beadel 1989a); Papamoa (about 20 plants, S M Beadel pers. obs. 1992); Waihi Beach (P de Lange pers. comm; one plant was observed in 1983).

Local taxa:	
Desmoschoenus spiralis (pingao)	Throughout the ecological district; common between Papamoa and Waihi, local east of Papamoa. The best populations are on Matakana Island, Bowentown Spit and Papamoa Beach (Beadel 1989a and S M Beadel pers. comm. 1992). The population on Matakana Island is one of the best in New Zealand.

6.1.2 SIGNIFICANT SITES: NATIONAL

MATAKANA ISLAND 1.
(wetlands at the north-western end and sand dunes)

Area	Approx 500 ha
Altitude	0m
Grid reference	NZMS 260 U13 745097
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	Physical character
Cyclosorus interruptus-Thelypteris confluens-Baumea juncea-Carex secta sedge-fernland	Freshwater wetland
Baumea articulata/oioi sedgeland	Freshwater wetland
Carex secta/Eleocharis acuta sedgeland	Freshwater wetland
Harakeke/*Baumea juncea* sedgeland	Freshwater wetland
Marsh ribbonwood/searush-oioi-*Baumea juncea* sedgeland	Freshwater wetland
Oioi/Muehlenbeckia complexa sedgeland	Freshwater wetland
Raupo/reed sweet grass reedgrassland	Freshwater wetland
Baumea articulata reedland	Freshwater wetland
Baumea articulata-Baumea juncea reedland	Freshwater wetland
Baumea articulata-raupo-*Schoenoplectus validus*-grey willow reedland	Freshwater wetland
Raupo reedland	Freshwater wetland
Raupo-*Schoenoplectus validus-Baumea articulata-(Carex secta)*-(grey willow)/*Eleocharis acuta-Polygonum salicifolia* reedland	Freshwater wetland
Schoenoplectus validus reedland	Freshwater wetland
Radiata pine/*Baumea juncea* forest	Dune and beach sands
Radiata pine/*Zoysia pauciflora* forest	Dune and beach sands
Isolepis nodosa/Muehlenbeckia complexa vineland	Dune and beach sands
Muehlenbeckia complexa vineland	Dune and beach sands
(Radiata pine)-(coast tea tree)/*Isolepis nodosa-Calystegia soldanella-Deyeuxia billardierii*-spinifex-pingao shrubland	Dune and beach sands
Coast tea tree shrubland and scrub	Dune and beach sands
Spinifex grassland	Dune and beach sands
Spinifex-*Calystegia soldanella*-pingao grassland	Dune and beach sands
Spinifex-*Carex pumila* grassland	Dune and beach sands
Spinifex sandfield	Dune and beach sands
Spinifex-pingao sandfield	Dune and beach sands

Spinifex-(pingao) sandfield Dune and beach sands

(Beadel 1989a & 1990b)

Vegetation map: Beadel 1989a & 1990b

Justification

This site contains high quality, representative examples of sand dune communities and wetland communities which are of national significance (Beadel 1989a & 1990b).

A natural spinifex-pingao community occurs along the majority of the frontal foredune of Matakana Island. This community is generally relatively intact, although marram is present locally in this zone (Beadel 1989a). This vegetation community is now rare in New Zealand (Kelly 1980). Behind the frontal foredune zone the vegetation is still predominantly indigenous with only scattered exotic grasses and herbs. Pingao (classed as local) is also common on these sites and over sixty plants of *Pimelea arenaria* (classed as rare) were recorded in 1989 (Beadel 1989a). Another species of botanical interest which occurs on the island is *Melicytus novae-zelandiae*. This species occurs on several other islands in Bay of Plenty but is rare on the mainland; one plant has been recorded from Papamoa Beach (S. M. Beadel pers. obs. 1992).

The wetlands at the northwestern end of Matakana Island contain one of the best populations of *Thelypteris confluens* (rare) and *Cyclosorus interruptus* (rare) in New Zealand. *Ranunculus macropus* (rare) also occurs in the wetlands (Beadel 1990b).

The understorey in the pine plantations is generally dominated by indigenous species.

Some examples are:

(i) Dense *Baumea juncea* and *Isolepis nodosa* with locally common oioi.

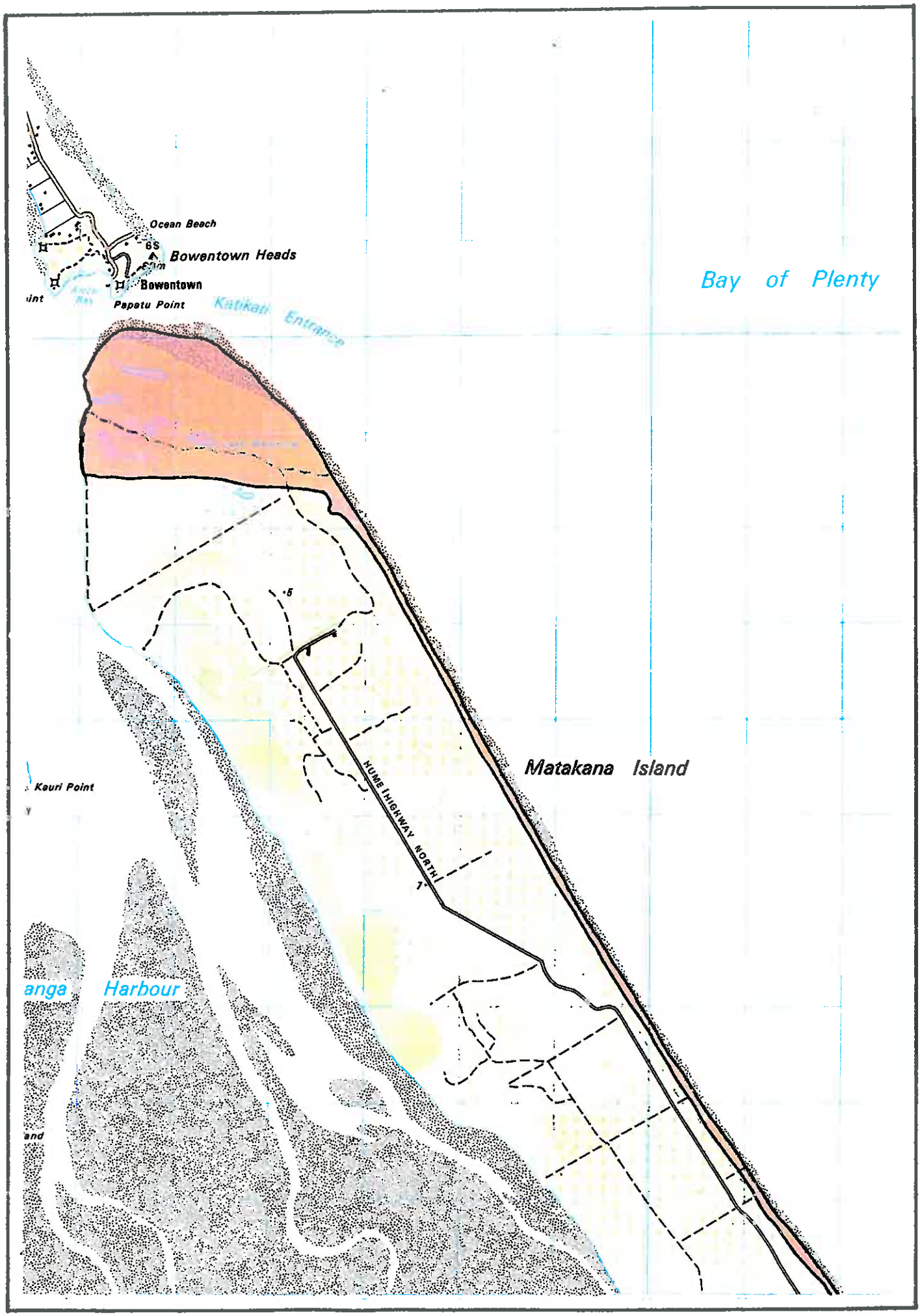
(ii) Zoysia pauciflora common amongst abundant pine needle litter with local *Lobelia anceps, Earina mucronata, Dendrobium cunninghamii* and *Thelymitra longifolia.*

(iii) At a few small sites there are no pines and sand is the dominant cover with scattered *Coprosma acerosa, Isolepis nodosa, Zoysia pauciflora* and *Pseudognaphalium* sp (*P. luteoalbum* agg., "Pseudognaphalium Coast"). (Beadel 1989a).

Two threatened and local species, *Desmoschoenus spiralis* (local) and *Pimelea arenaria* (indeterminate) have been recorded from beneath the pine plantations (Beadel 1990b).

The north-western end of Matakana Island was identified as a category one area in Beadel (1992a); defined in Appendix 5.

SS MATAKANA ISLAND 1



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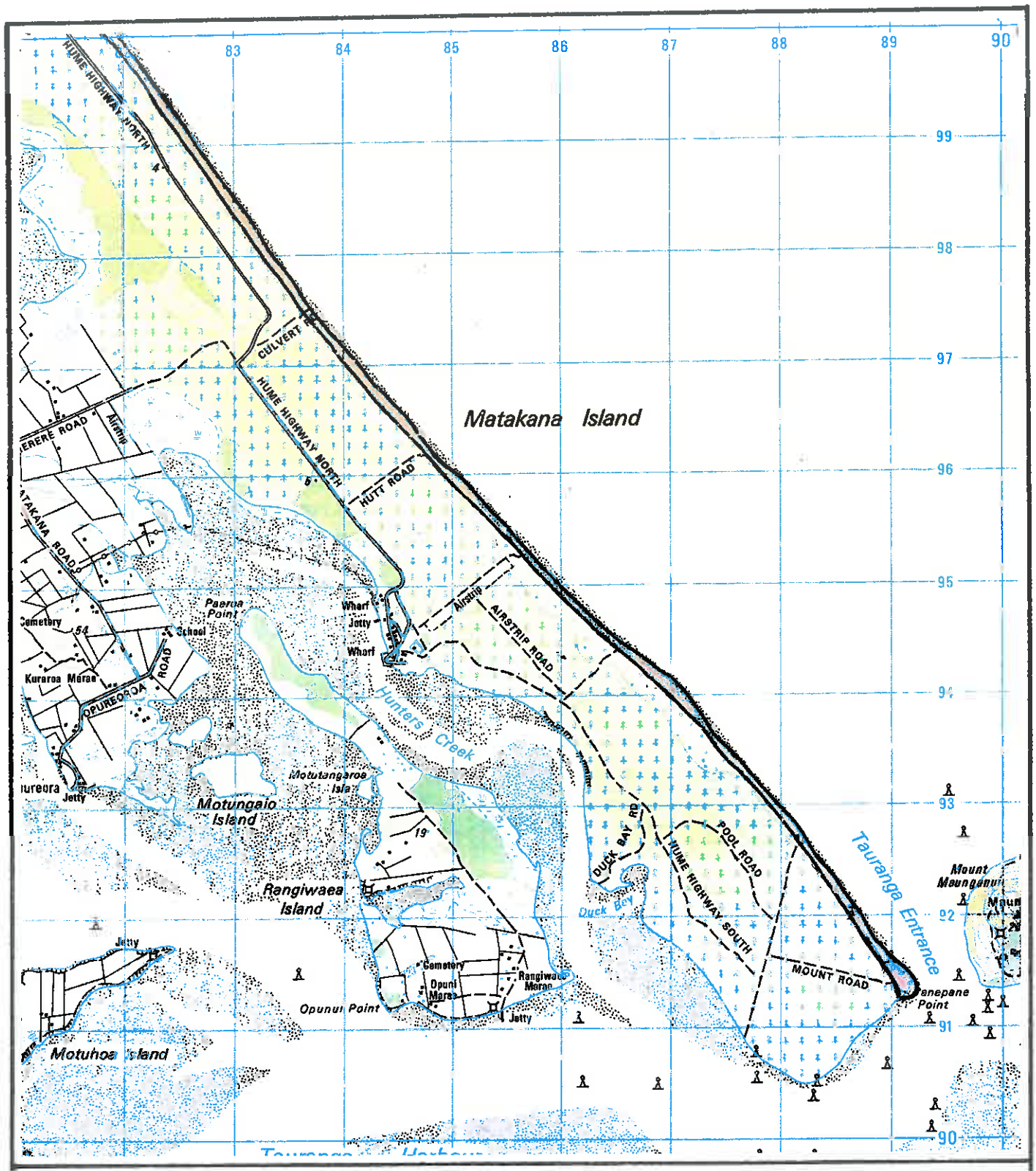


ATHENREE 1.

Area	Approx 60 ha
Altitude	0m
Grid reference	NZMS 260 U13 716144
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	Physical character
Mangrove scrub	Saline wetland
Mangrove shrubland	Saline wetland
Searush tussockland	Saline wetland
Flaxland	Freshwater wetland
Bolboschoenus fluviatilis sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
Raupo reedland	Freshwater wetland
Estuarine margin vegetation	Freshwater wetland

(Beadel 1992a)

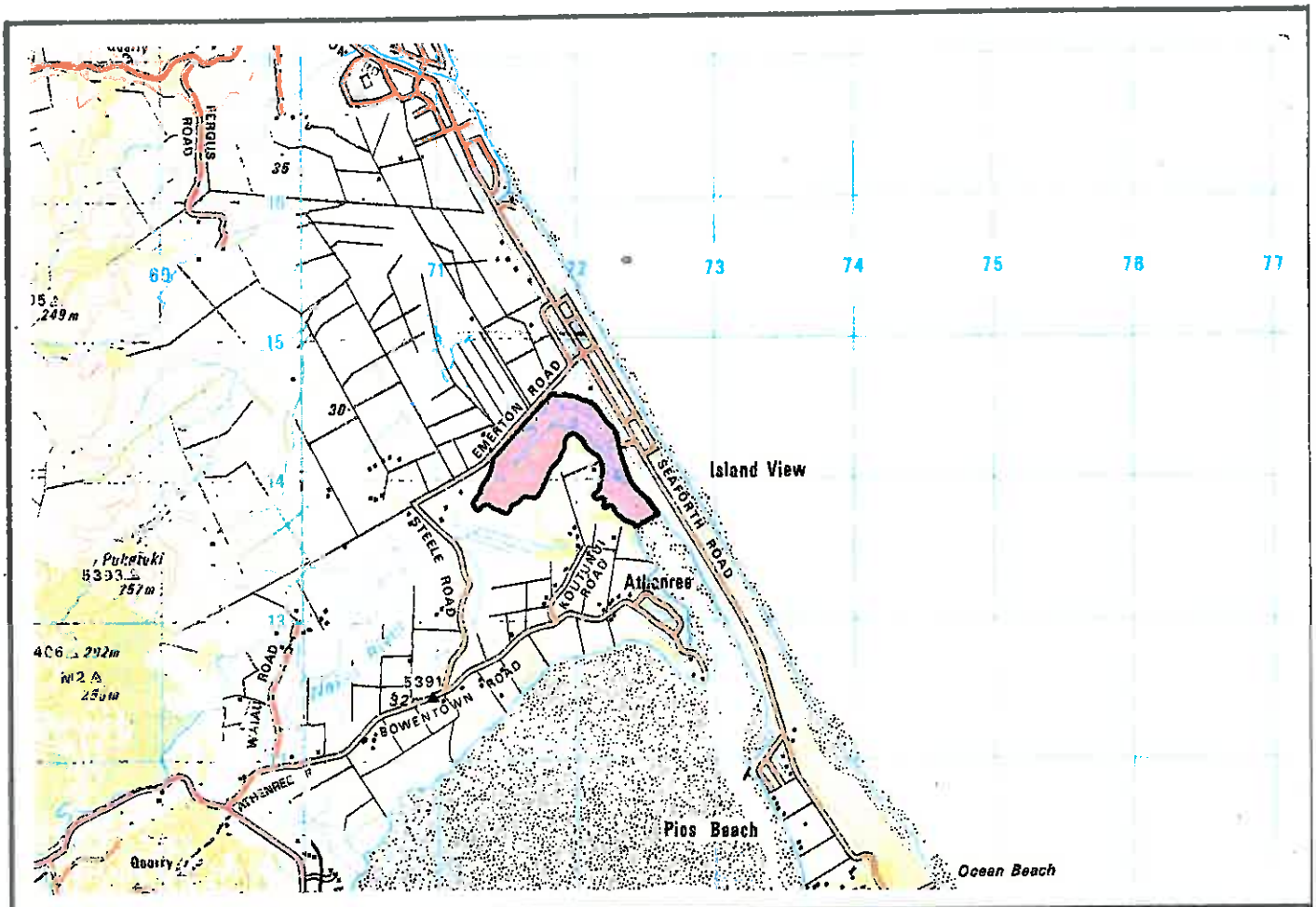
Vegetation map: Beadel 1992a

Justification

A large wetland, much of which is relatively unmodified, comprising a representative example of the estuarine vegetation of Tauranga Harbour (Beadel 1992a). It was identified as a Category One Area in Beadel (1992a) (defined in Appendix 5.4).

Much of this site is in the Athenree Wildlife Management Reserve.

SS ATHENREE 1



BLUE GUM BAY 1.

Area	Approx 21 ha
Altitude	0m
Grid reference	NZMS 260 U14 814987
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	Physical character
Grey willow forest	Freshwater wetland
Manuka forest	Saline wetland
Cabbage tree/*Baumea juncea-Coprosma tenuicaulis-Baumea articulata* treeland	Freshwater wetland
Manuka scrub	Freshwater and saline wetland
Mangrove shrubland	Saline wetland
Manuka-flax-toetoe shrubland	Freshwater and saline wetland
Manuka-mingimingi-*Olearia solandri* shrubland	Freshwater and saline wetland
Searush tussockland	Saline wetland
Flaxland	Freshwater and saline wetland
Baumea teretifolia-B. sp. *(B. huttonii?)/ Gleichenia dicarpa* fernland	Freshwater wetland
Baumea juncea-marsh ribbonwood-oioi sedgeland	Saline wetland
Baumea juncea-searush-oioi sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Schoenoplectus pungens sedgeland	Saline wetland
Estuary margin vegetation	Freshwater and saline wetland
Sandspit vegetation	Saline wetland

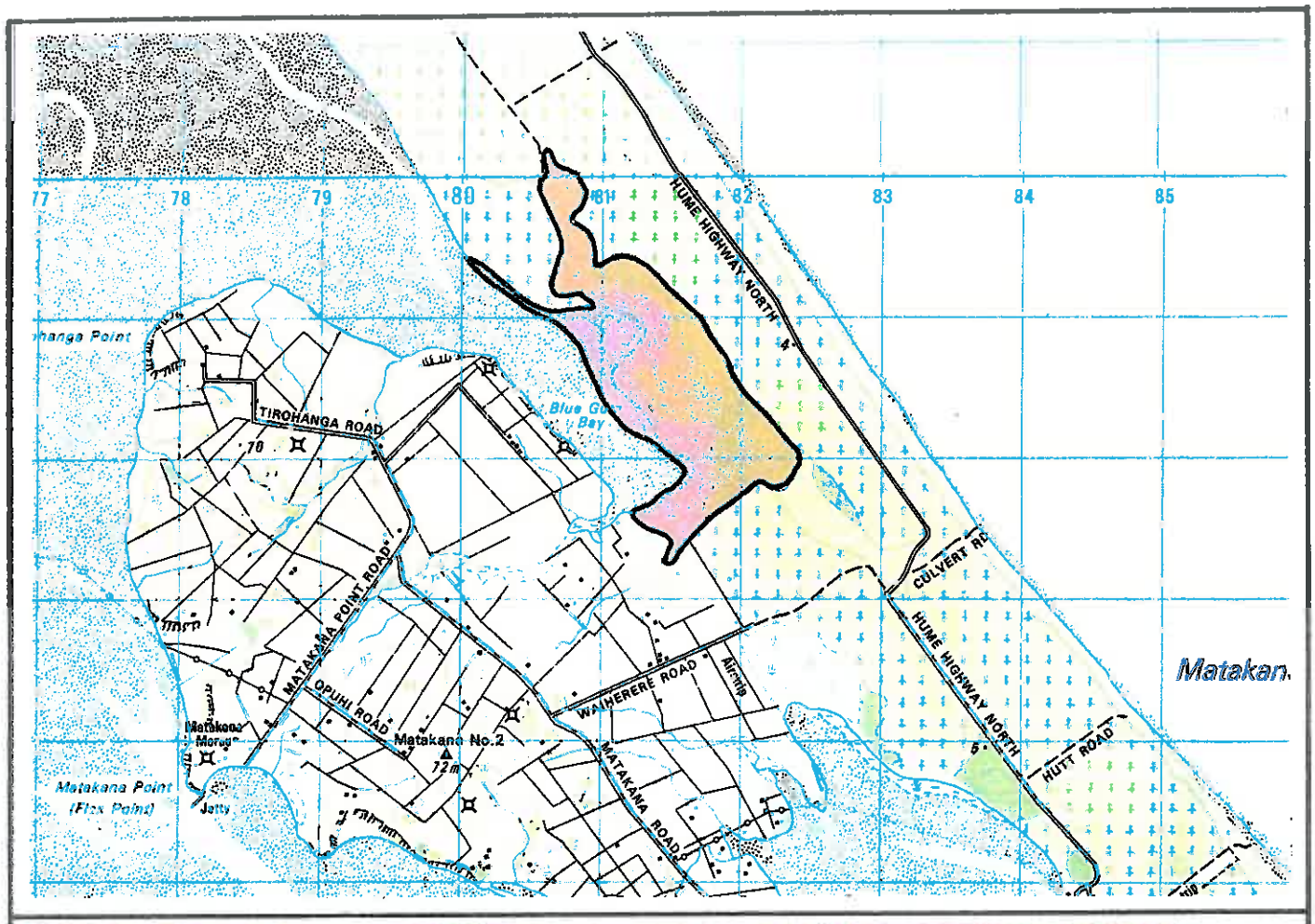
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

An extensive wetland, much of which is relatively unmodified, comprising a representative example of the estuarine and freshwater vegetation of Tauranga Harbour (Beadel 1992a). It was identified as a Category One Area in Beadel (1992a) (defined in Appendix 5.4).

SS BLUE GUM BAY 1



TIROHANGA

Area	Approx 182 ha
Altitude	0m
Grid reference	NZMS 260 U14 760983
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	Physical character
Mangrove scrub	Saline wetland
Mangrove shrubland	Saline wetland

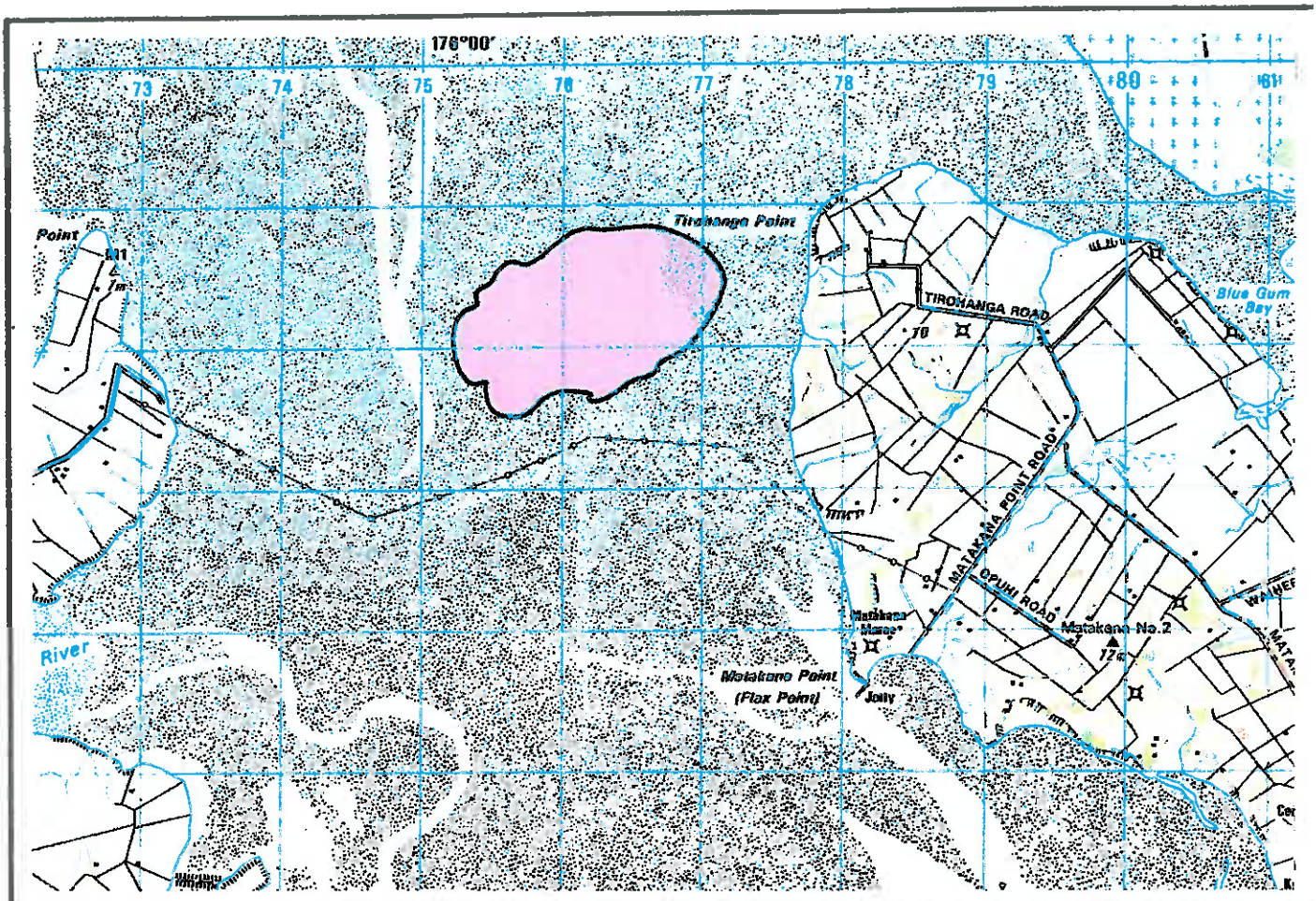
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

This site contains the largest example of mangrove scrub and shrublands in the harbour. It is a good quality, representative example of the estuarine vegetation of Tauranga Harbour (Beadel 1992a). It was identified as a Category One Area in Beadel (1992a) (defined in Appendix 5.4).

SS TIROHANGA



TE HOPAI ISLAND

Area	Approx 72 ha
Altitude	0m
Grid reference	NZMS 260 U14 745933
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	Physical character
Mangrove scrub	Saline wetland
Manuka scrub	Freshwater and saline wetland
Manuka-*Olearia solandri* scrub	Freshwater and saline wetland
Flax-*Olearia solandri*-marsh ribbonwood-oioi shrubland	Freshwater and saline wetland
Mangrove shrubland	Saline wetland
Mangrove-(*Sarcocornia quinqueflora*) shrubland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland *Sarcocornia quinqueflora* herbfield	Saline wetland
Ngaio/*Coprosma propinqua* subsp. *propinqua*-*Olearia solandri*-marsh ribbonwood shrubland	Freshwater and saline wetlands
Olearia solandri-*Coprosma propinqua* subsp. *propinqua*-toetoe/oioi-marsh ribbonwood shrubland	Freshwater and saline wetland
Coprosma propinqua subsp. *propinqua*-toetoe-marsh ribbonwood-*Olearia* solandri-manuka/oioi sedgeland	Freshwater and saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Olearia solandri/oioi sedgeland	Saline wetland
Sandspit vegetation	Saline wetland

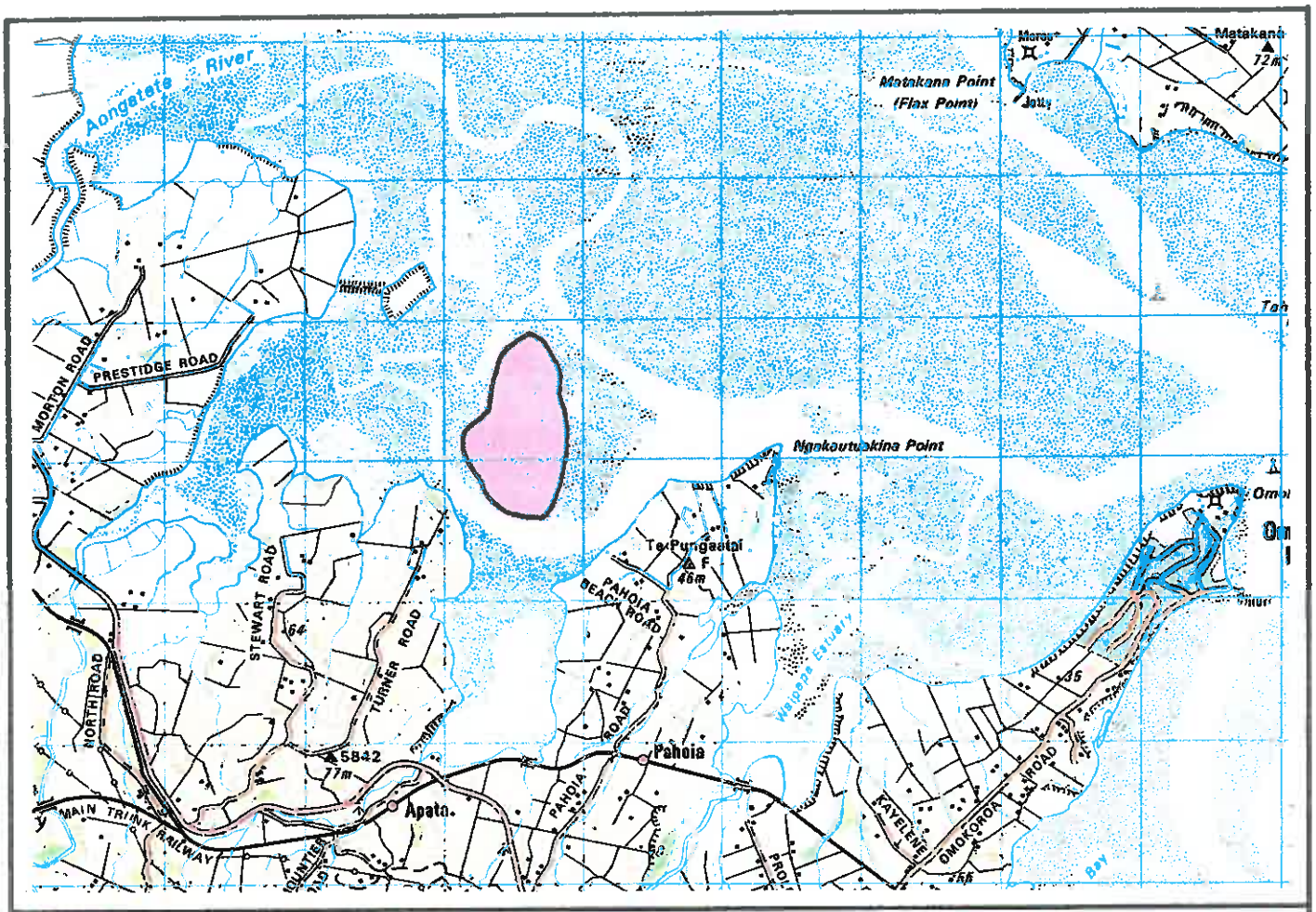
(Beadel 1992a)

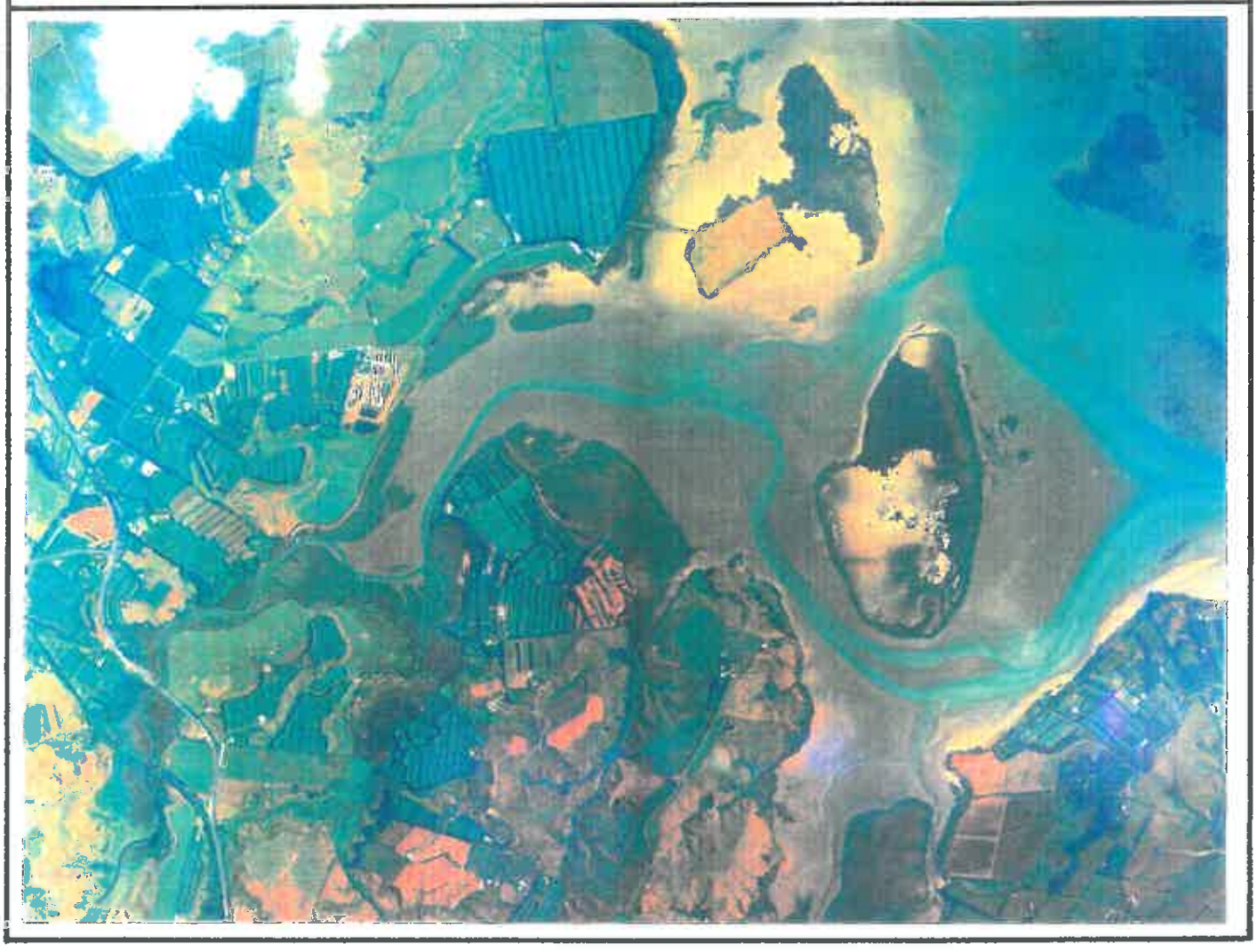
Vegetation map: Beadel 1992a

Justification

Te Hopai Island is probably the least modified substantial area of estuarine vegetation in Tauranga Harbour and contains a high quality, diverse, representative vegetation sequence. Several of the vegetation types occur nowhere else in the harbour (Beadel 1992a). It was identified as a Category One Area in Beadel (1992a); defined in Appendix 5.4.

SS TE HOPAI ISLAND





AONGATETE ESTUARY

Area	Approx 207 ha
Altitude	0m
Grid reference	NZMS 260 U14 715955
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	**Physical character**
Mangrove scrub	Saline wetland
Mangrove shrubland	Saline wetland
Searush tussockland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Oioi sedgeland	Saline wetland

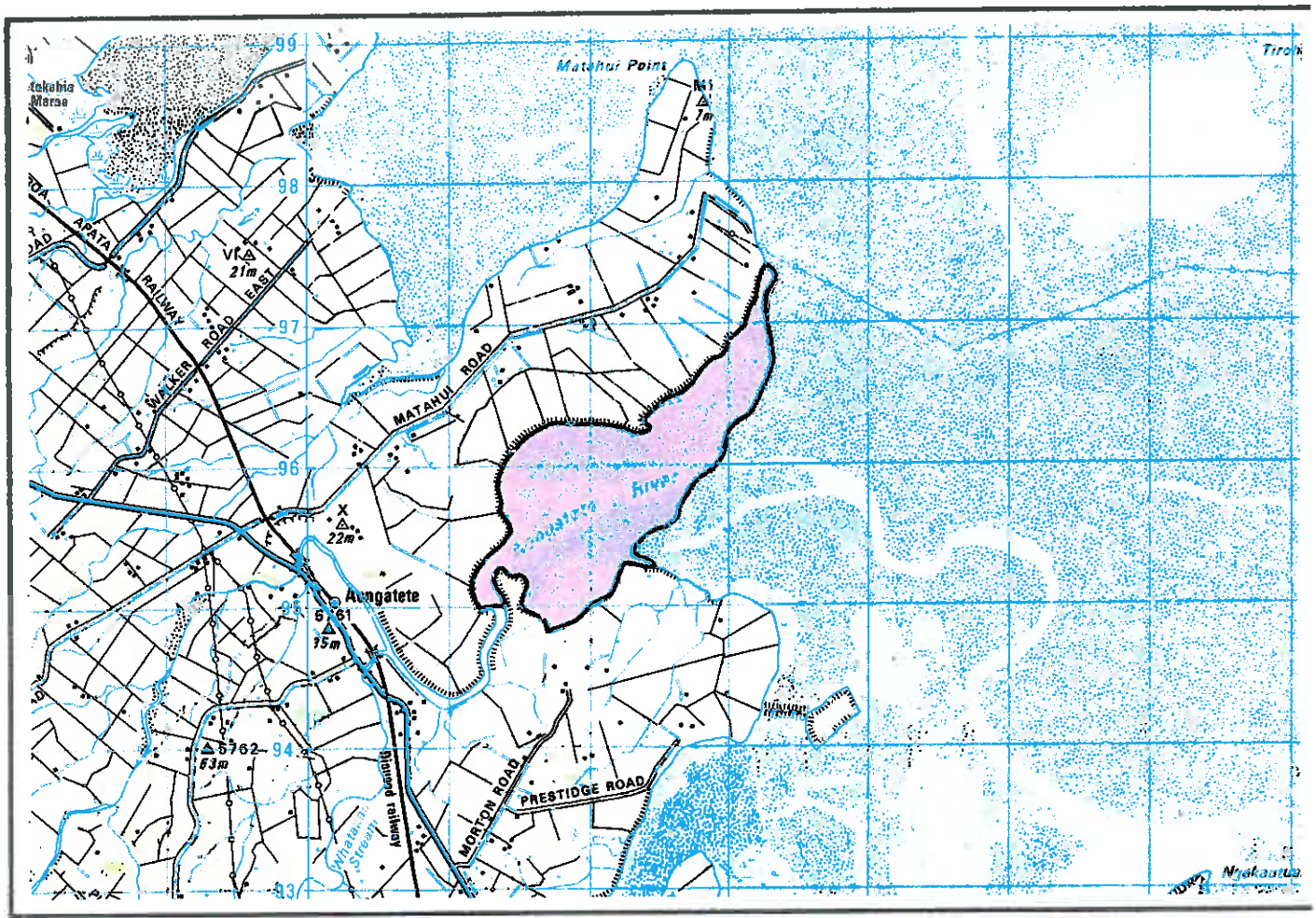
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

Aongatete Estuary contains large areas of representative mangrove stands which are diverse in stature and density. These stands are contiguous with saltmarsh of high quality characteristic of Tauranga Harbour (Beadel 1992a). It was identified as a Category One Area in Beadel (1992a); (defined in Appendix 5.4).

SS AONGATETE ESTUARY



HUNTERS CREEK

Area	Approx 61 ha
Altitude	0m
Grid reference	NZMS 260 U14 825963
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	Physical character
Grey willow forest	Freshwater wetland
Manuka scrub	Freshwater and saline wetland
Manuka shrubland	Freshwater and saline wetland
Searush tussockland	Saline wetland
Baumea teretifolia-B. sp. *(B. huttonii?)/ Gleichenia dicarpa* fernland	Freshwater wetland
Baumea juncea sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
Oioi-*Baumea juncea* sedgeland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Schoenoplectus pungens sedgeland	Saline wetland

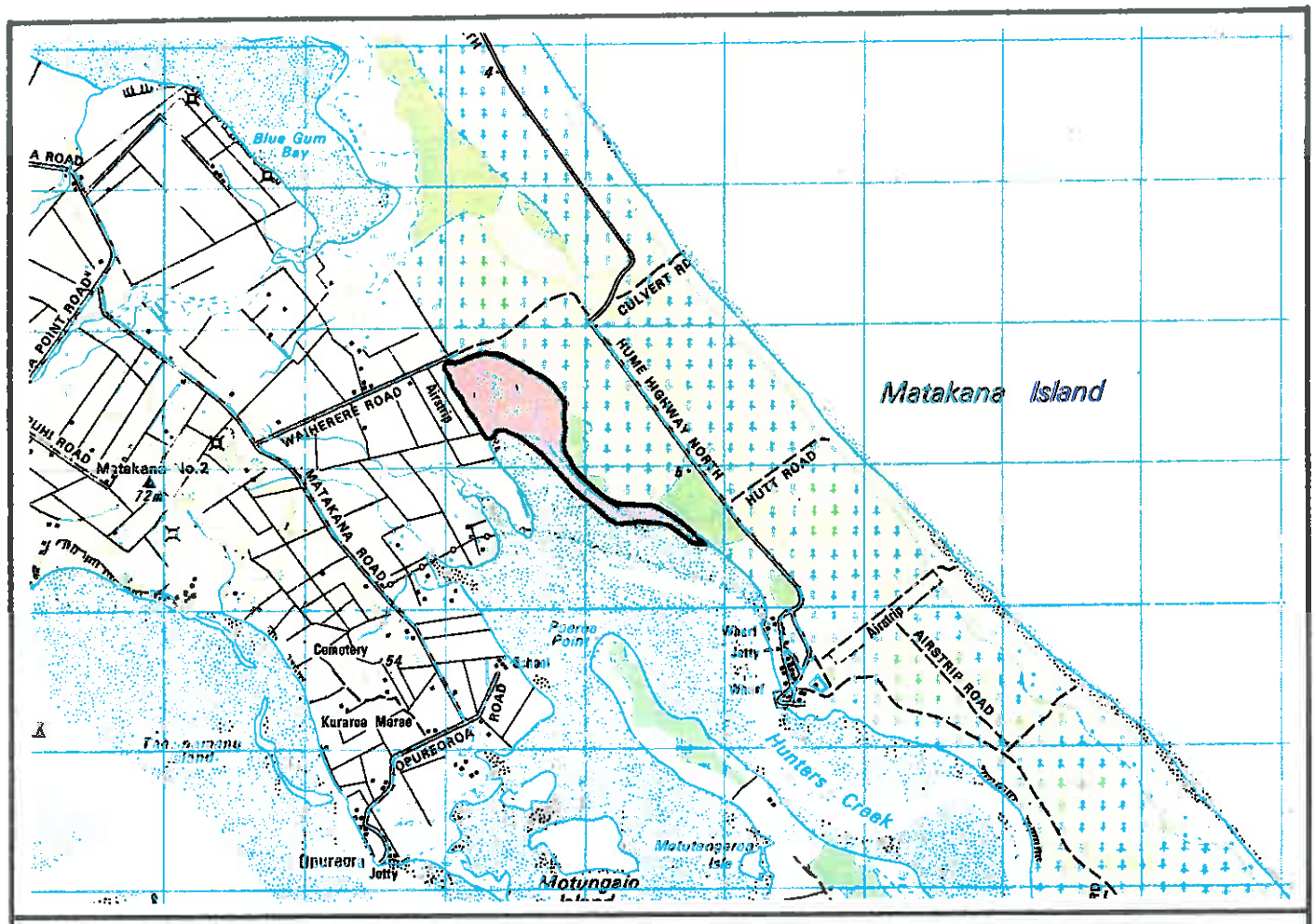
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

Hunters Creek contains a relatively intact, high quality representative example of a contiguous estuarine and freshwater wetland vegetation sequence. Relatively intact, large freshwater wetlands contiguous with high quality examples of estuarine wetlands are rare in Tauranga Harbour (Beadel 1992a). It was identified as a Category One Area in Beadel (1992a) (defined in Appendix 5.4).

SS HUNTERS CREEK



WAIMAPU ESTUARY 1.

Area	Approx 34 ha
Altitude	0m
Grid reference	NZMS 260 U14 877812
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	Physical character
Willow-manuka forest	Freshwater wetland
Manuka scrub	Freshwater and saline wetland
Coprosma propinqua subsp. *propinqua* shrubland	Freshwater and saline wetland
Searush tussockland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
Oioi-*Baumea articulata* sedgeland	Freshwater and saline wetland
Raupo reedland	Freshwater wetland
Arrow grass herbfield	Saline wetland

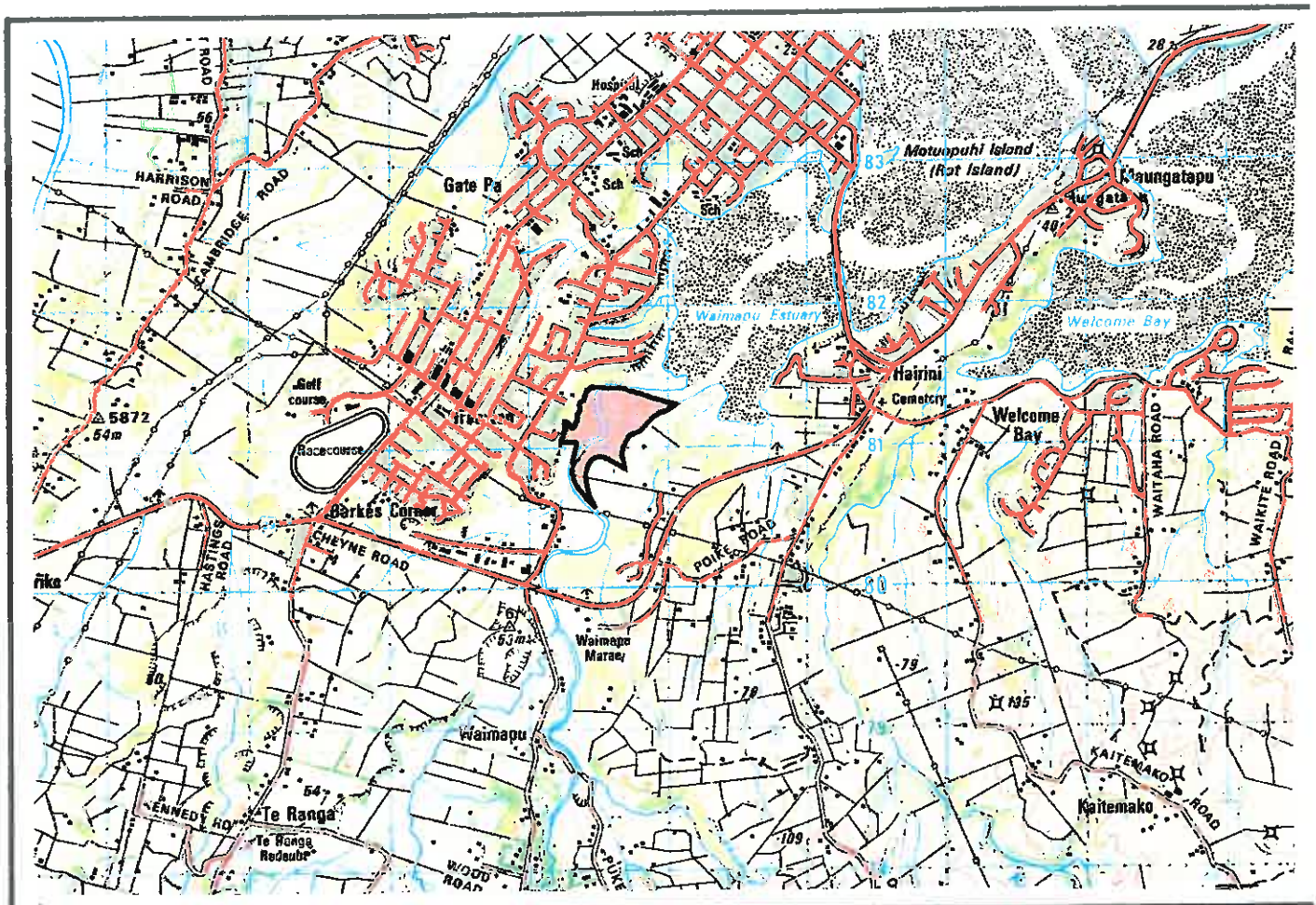
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

Waimapu Estuary contains a high quality, representative example of a freshwater wetland contiguous with saltmarsh. It contains the best example of *Coprosma propinqua* subsp. *propinqua* shrubland remaining in the Tauranga Harbour. This type would probably have been more common in the past, but the area in Waimapu Estuary is now the only example of any size remaining in the harbour (Beadel 1992a). It was identified as a Category One Area in Beadel (1992a) (defined in Appendix 5.4).

SS WAIMAPU ESTUARY 1



KAITUNA SAND DUNES

Area	Approx 51 ha
Altitude	0m
Grid reference	NZMS 260 U14 080798
Bioclimatic zone	Coastal
Ranking	National

Vegetation type	Physical character
Spinifex-(*Austrofestuca littoralis*)-(pingao) sandfield	Dune and beach sands
Muehlenbeckia complexa vineland	Dune and beach sands
Spinifex-(pingao) sandfield	Dune and beach sands
Carex pumila sandfield	Dune and beach sands

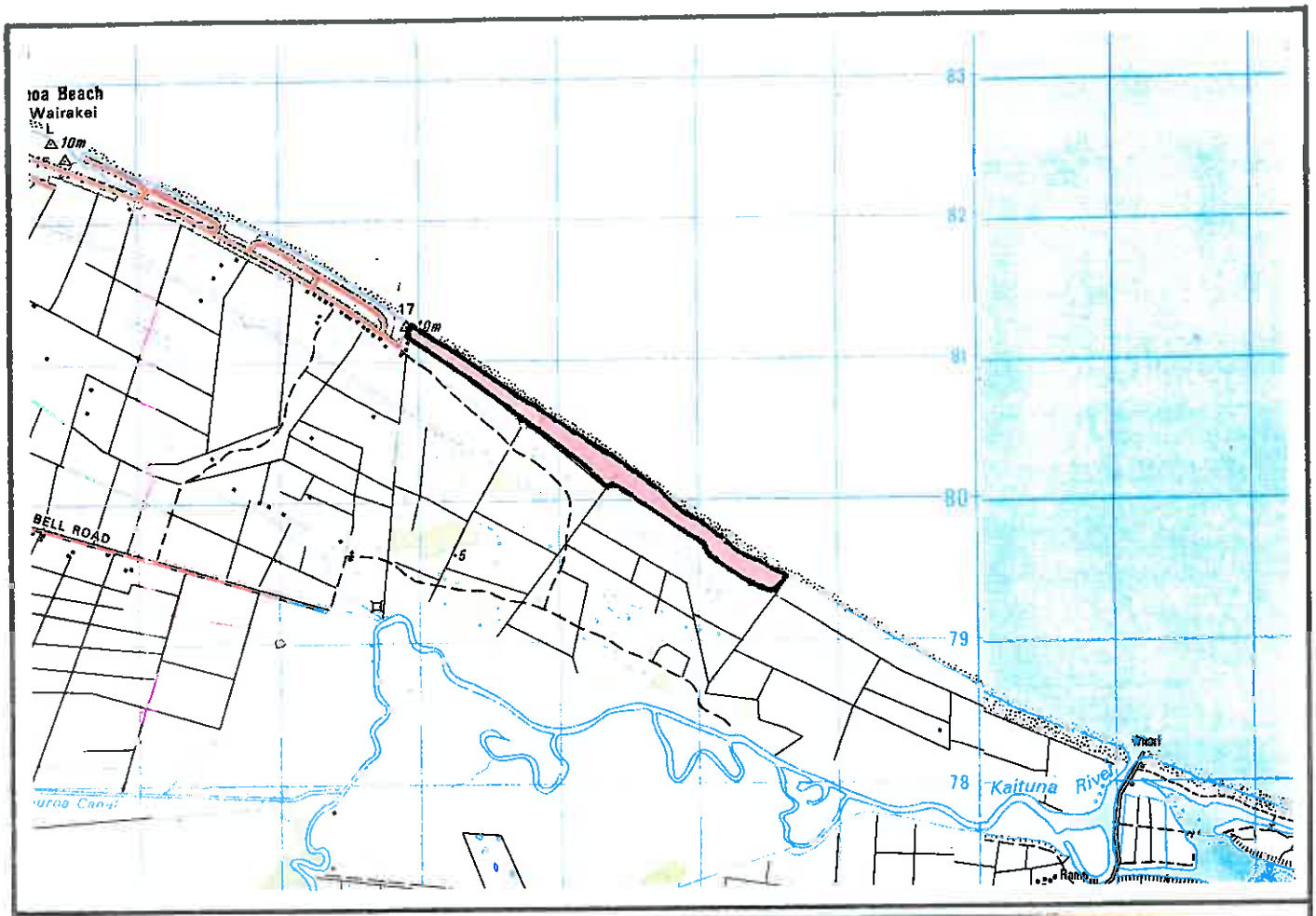
(S. M. Beadel pers. obs. 1992)

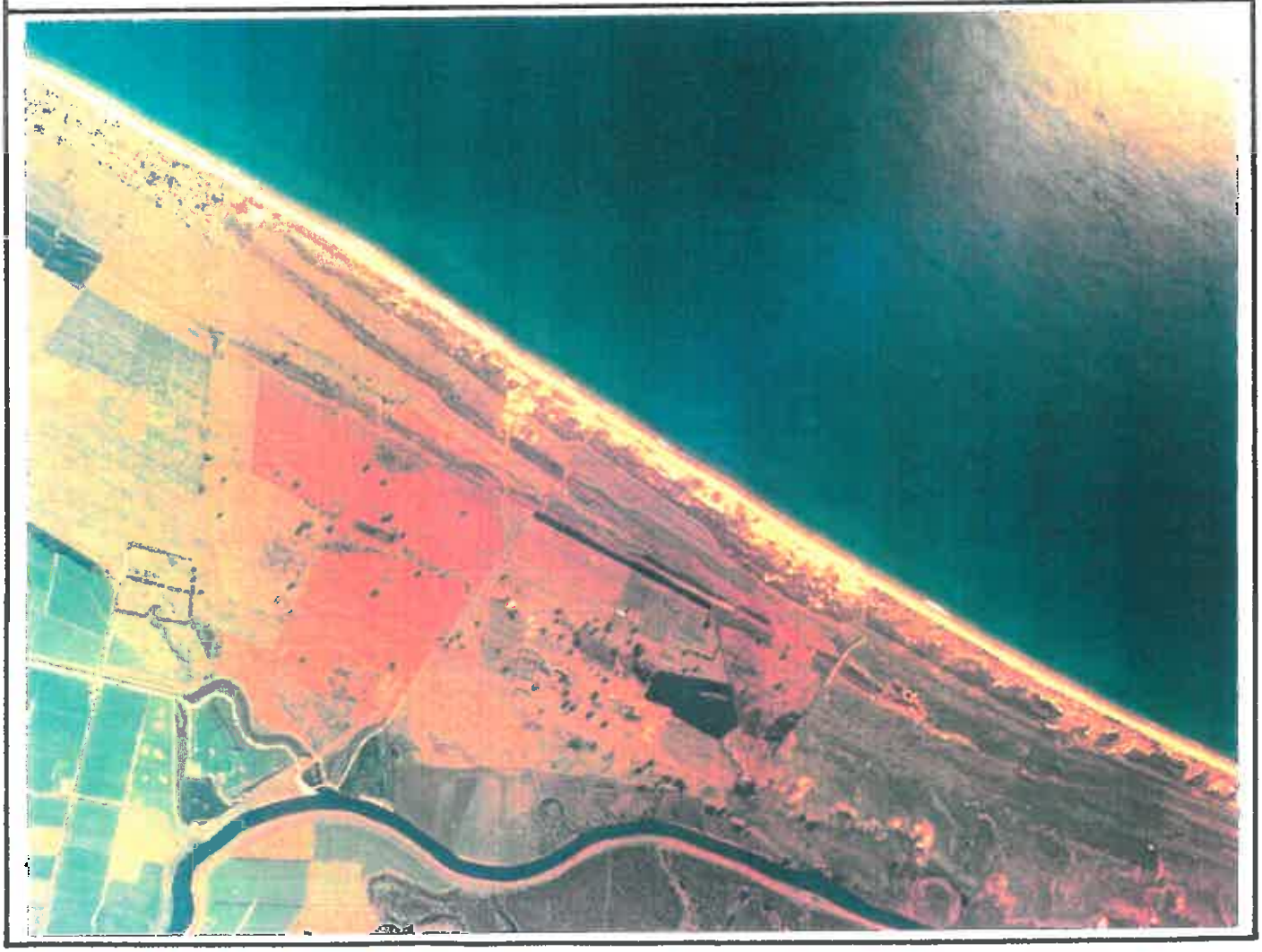
Justification

This site contains a relatively large population of *Austrofestuca littoralis*, a species classed as rare (Cameron *et al.* 1993). This species was once relatively widespread in sand dune communities in New Zealand; however, only 13 colonies are now known to occur in the North Island and several of these comprise only a few plants (Partridge 1992 and S. M. Beadel pers. obs. 1992). This is the best population of *Austrofestuca littoralis* in the Bay of Plenty and is a representative example of sand dune communities in the region.

Desmoschoenus spiralis (pingao), classed as local, also occurs at this site.

SS KAITUNA SAND DUNES





6.1.3 SIGNIFICANT SITES: REGIONAL

BOWENTOWN SAND DUNES (including recreation reserve)

Area	Approx 65 ha
Altitude	0m
Grid reference	NZMS 260 U13 740117
Bioclimatic zone	Coastal
Ranking	Regional

Vegetation type	**Physical character**
Isolepis nodosa/Muehlenbeckia complexa vineland and sedgeland	Dune and beach sands
Muehlenbeckia complexa vineland	Dune and beach sands
Spinifex grassland	
Spinifex-*Isolepis nodosa/Muehlenbeckia complexa-Calystegia soldanella-Deyeuxia billardierei* sedge-vine-grassland	Dune and beach sands
Houpara/*Isolepis nodosa/Muehlenbeckia complexa* vine-sedgeland	Dune and beach sands
Spinifex sandfield	Dune and beach sands
Spinifex-pingao sandfield	Dune and beach sands
Spinifex-(pingao) sandfield	Dune and beach sands

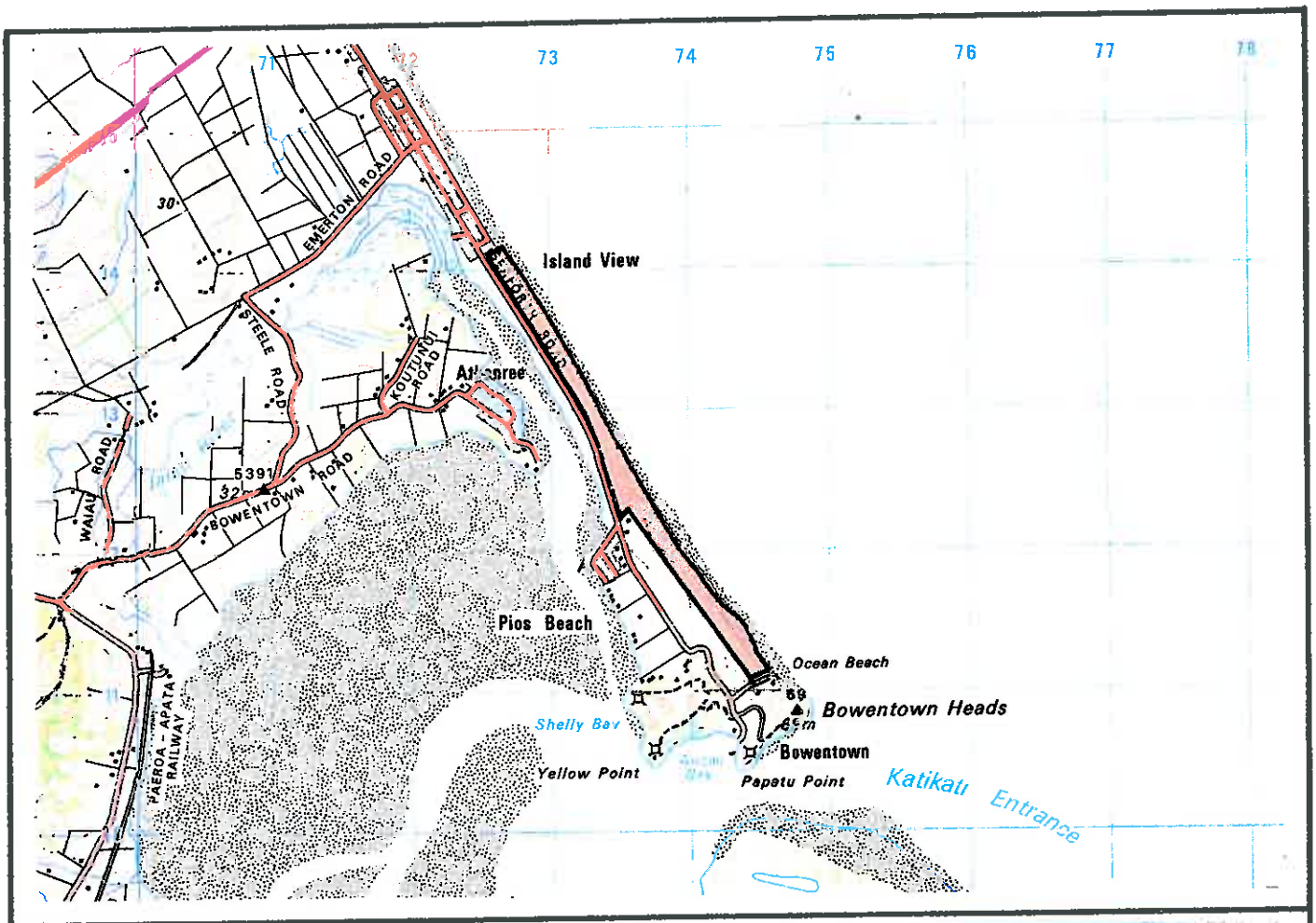
(S. M. Beadel pers. obs. 1992)

Justification

This site contains good quality representative sand dune vegetation communities characteristic of Tauranga ecological district. Their indigenous flora is relatively diverse. An interesting feature of these communities is the presence of seedling and sapling houpare amongst the *Muehlenbeckia complexa* and *Isolepis nodosa*. *Tetragonia trigyna* (New Zealand spinach) is also locally common amongst the *Muehlenbeckia complexa* and *Isolepis nodosa*.

One plant of *Pimelea arenaria* (rare) was recorded from this site in 1983 (P. J. de Lange pers. comm.) *Desmoschoenus spiralis* (pingao) is locally common at this site (classed as local; Cameron *et al.* 1993).

SS BOWENTOWN SAND DUNES



KATIKATI 1.

Area	Approx 43 ha
Altitude	0m
Grid reference	NZMS 260 T13 684027
Bioclimatic zone	Coastal
Ranking	Regional

Vegetation type	**Physical character**
Grey willow forest	Freshwater wetland
Mangrove scrub	Saline wetland
Manuka shrubland	Freshwater wetland
Mangrove shrubland	Saline wetland
Flaxland	Freshwater wetland
Searush tussockland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
Raupo reedland (minor area)	Freshwater wetland

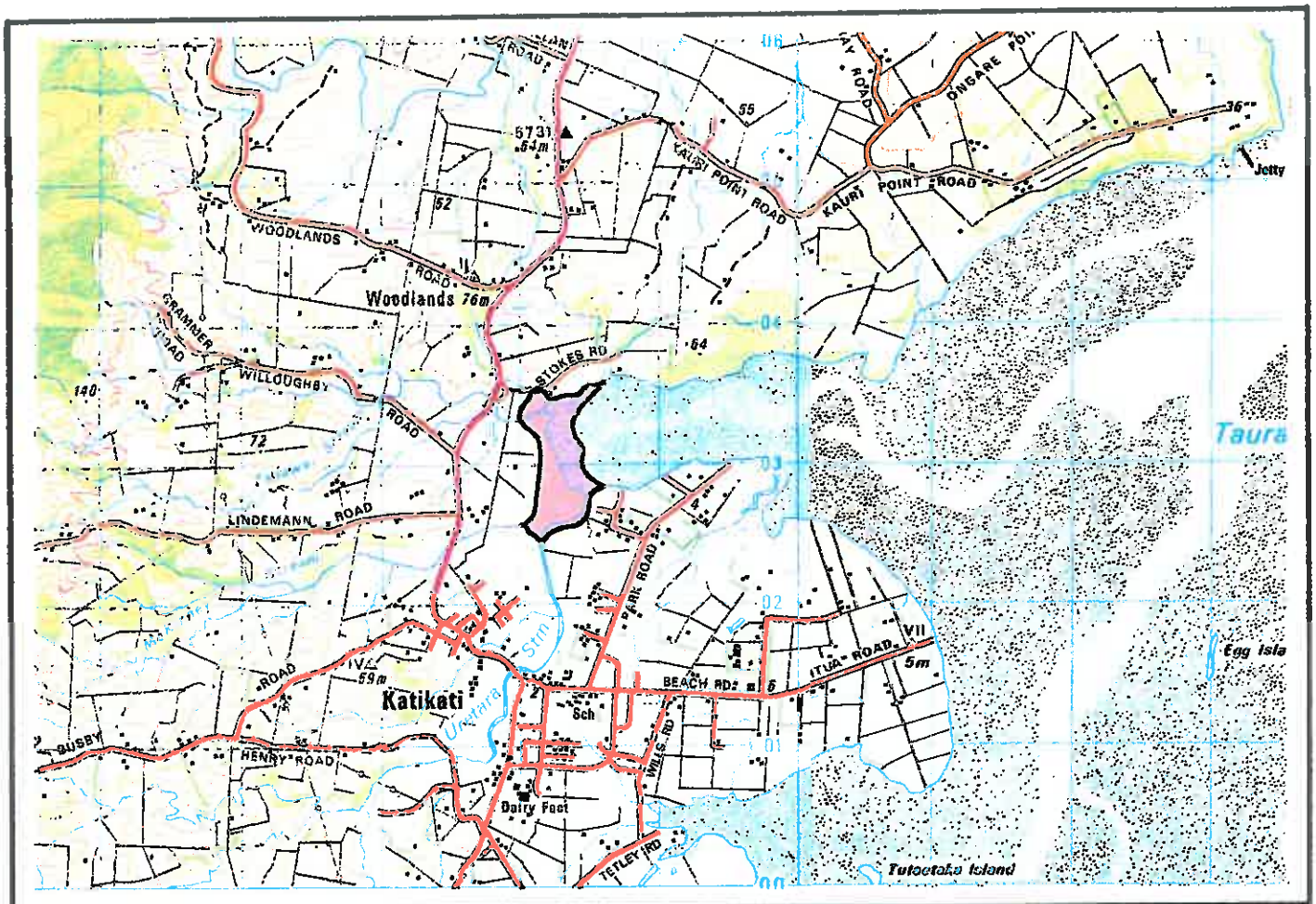
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

A relatively large, good quality, representative example of the wetland vegetation of Tauranga Harbour. It contains relatively extensive examples of three of the common vegetation types in the harbour: searush tussockland, oioi sedgeland and mangrove scrub/shrublands. It was identified as a Category One Area in Beadel (1992a) (defined in Appendix 5.4).

SS KATIKATI 1



WAINUI ESTUARY

Area	Approx 9 ha
Altitude	0m
Grid reference	NZMS 260 U14 714917
Bioclimatic zone	Coastal
Ranking	Regional

Vegetation type	Physical character
Grey willow forest	Freshwater wetland
Manuka shrubland	Freshwater wetland
Manuka-raupo-toetoe shrubland	Freshwater wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
Oioi-*Baumea articulata* sedgeland	Saline wetland
Searush tussockland	Saline wetland
Raupo reedland	Freshwater wetland

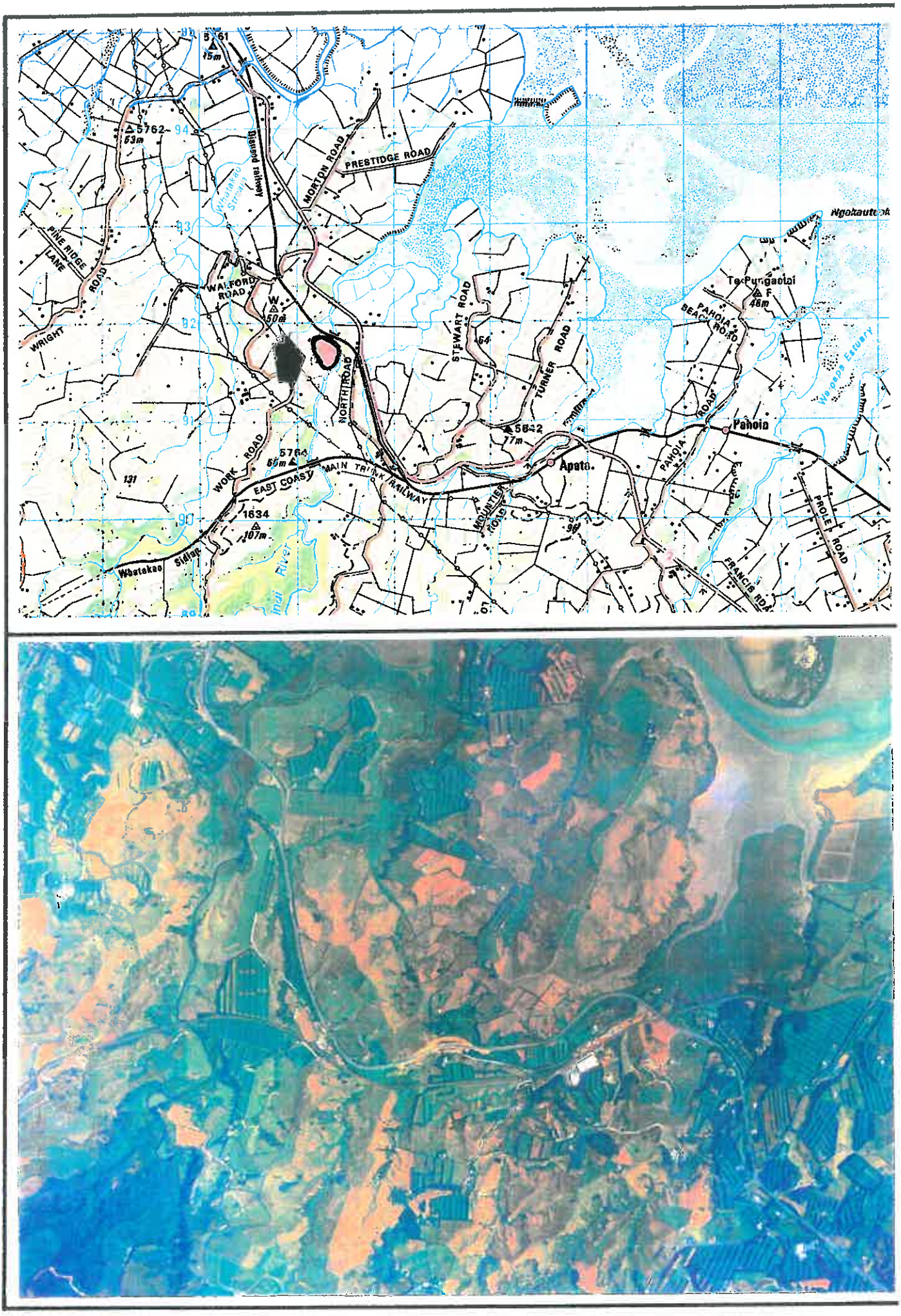
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

This site contains representative examples of oioi sedgeland inland from the main harbour adjacent to a tidal stream, and manuka-raupo-toetoe shrubland; these vegetation types are characteristic of Tauranga Harbour. It was identified as a Category One Area in Beadel (1992a); defined in Appendix 5.4.

SS WAINUI ESTUARY 1



WAIPAPA ESTUARY 1.

Area	Approx 21 ha
Altitude	0m
Grid reference	NZMS 260 U14 756933
Bioclimatic zone	Coastal
Ranking	Regional

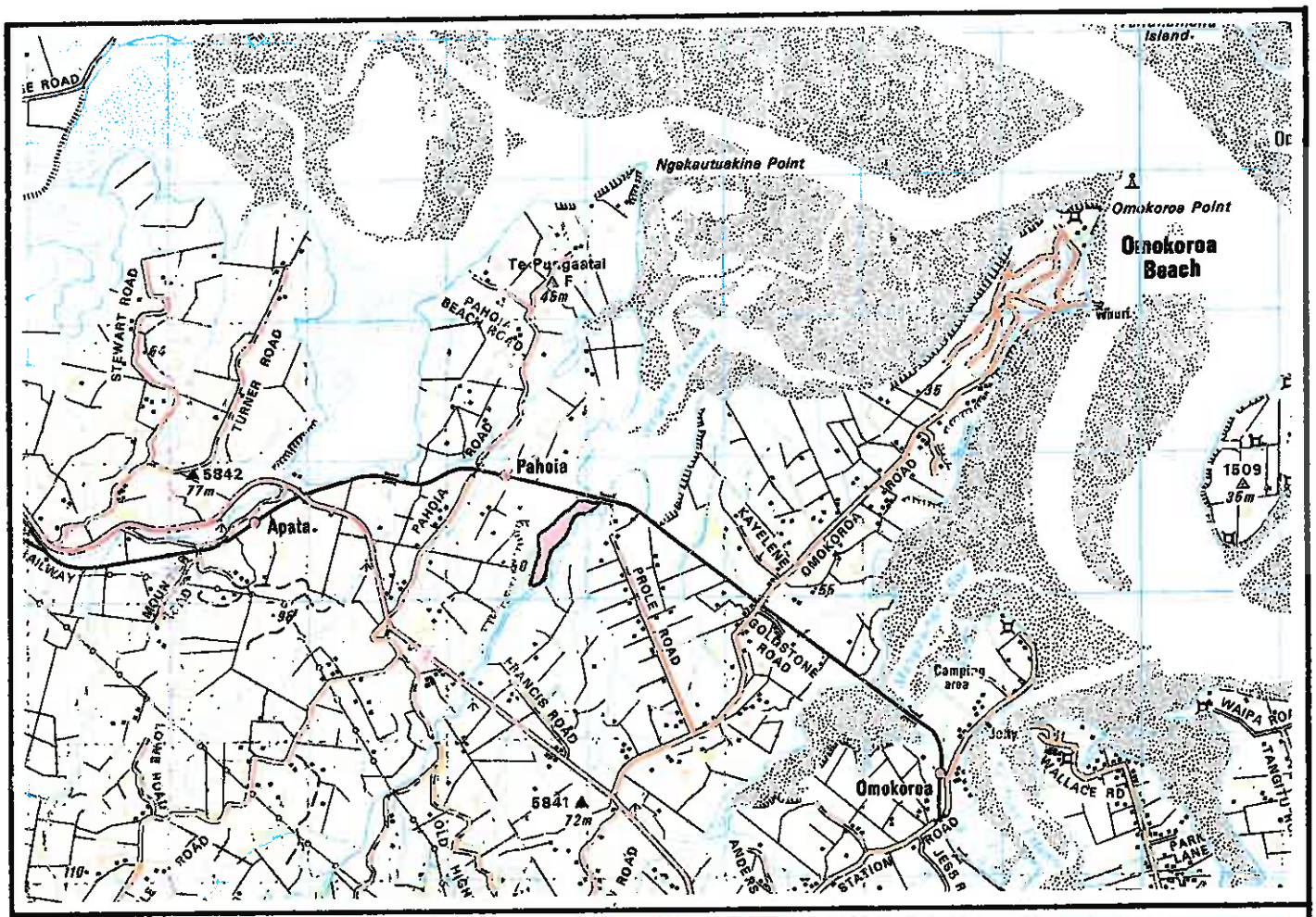
Vegetation type	**Physical area**
Grey willow forest	Freshwater wetland
Mangrove scrub	Saline wetland
Manuka scrub	Freshwater wetland
Mangrove shrublands	Saline wetland
Oioi sedgeland	Saline wetland
Olearia solandri-oioi sedgeland	Saline wetland
Raupo reedland	Freshwater wetland

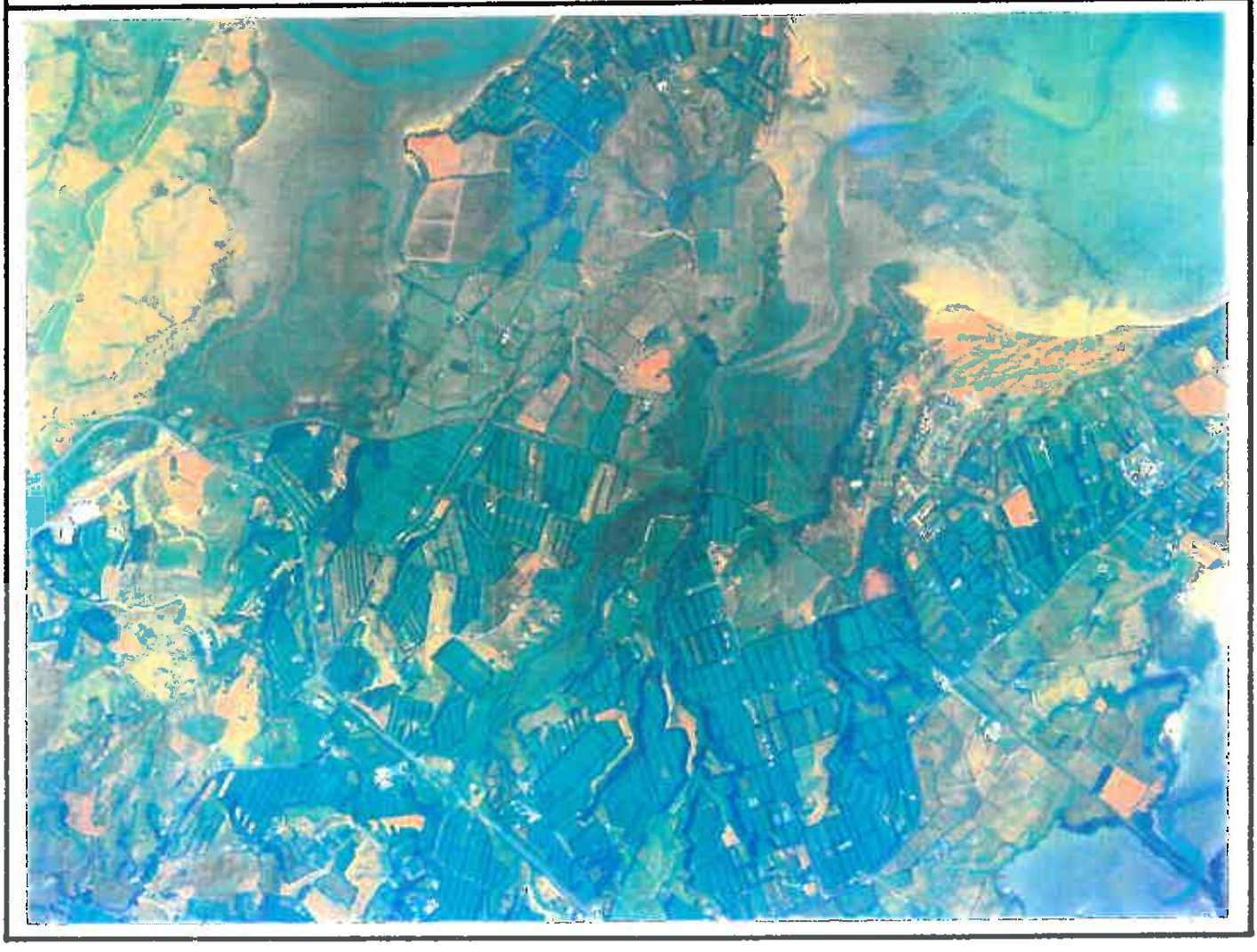
(Beadel 1992a)

Justification

This site contains a representative, relatively large area of high quality oioi sedgeland inland from the main harbour adjacent to a tidal stream. It was identified as a Category One Area in Beadel (1992a); (defined in Appendix 5.4).

SS WAIPAPA ESTUARY 1





WAIROA ESTUARY 1.

Area	Approx 7 ha
Altitude	0m
Grid reference	NZMS 260 U14 829854
Bioclimatic zone	Coastal
Ranking	Regional

Vegetation type	Physical area
Cabbage tree-mamaku-brush wattle forest	Sedimentary coastal hinterland
Coprosma propinqua subsp. *propinqua*/oioi shrubland	Freshwater wetland
Oioi-*Baumea articulata* sedgeland	Freshwater wetland
Raupo reedland	Freshwater wetland
Limosella lineata-Selliera radicans-Isolepis cernua-Samolus repens-bachelor's button herbfield	Freshwater wetland

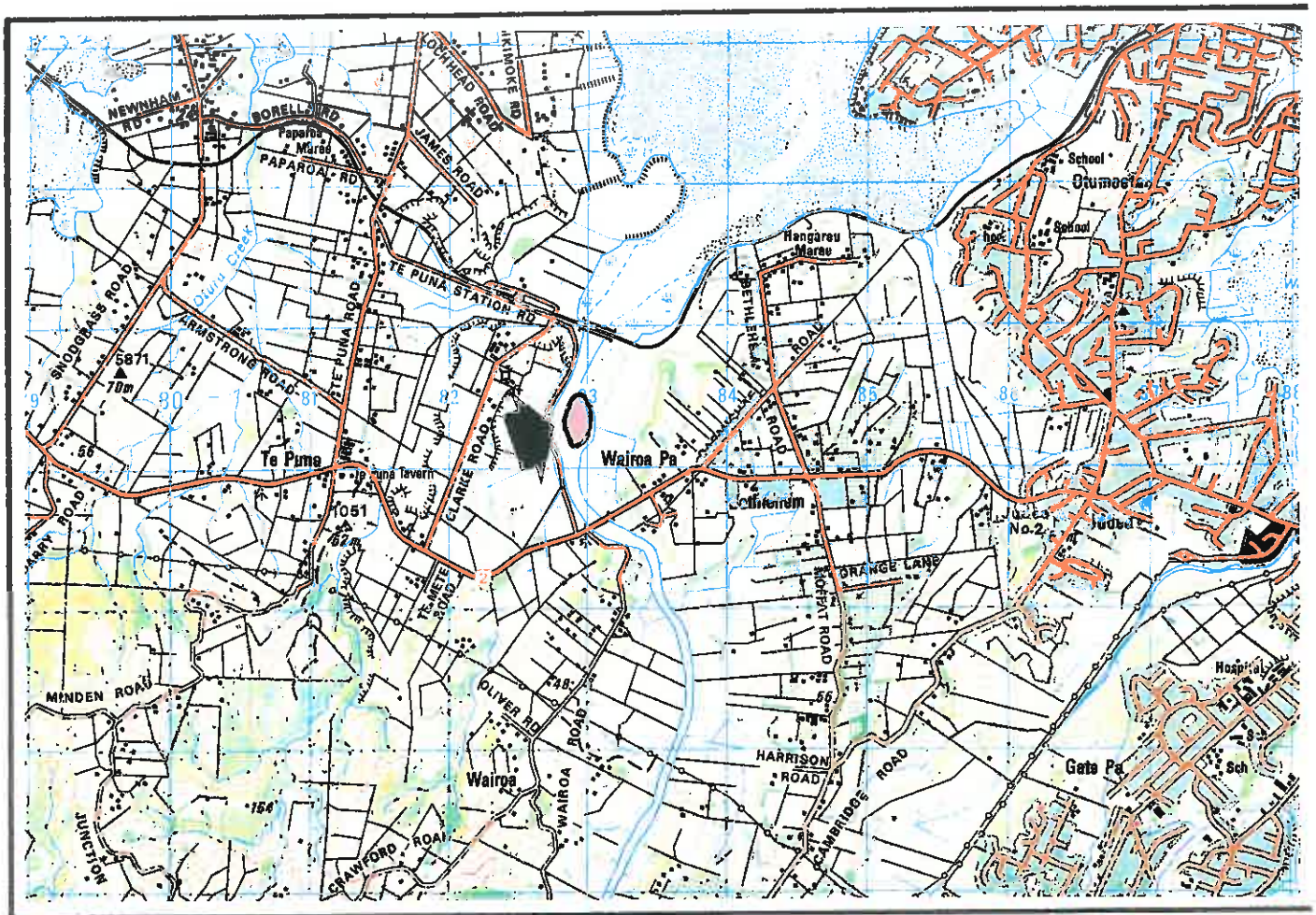
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

A small island in the Wairoa River which contains a good quality representative vegetation sequence, characteristic of Tauranga ecological district. This was the only site where *Limosella lineata* was recorded during the 1992 survey. It was identified as a Category One Area in Beadel (1992a); (defined in Appendix 5.4).

SS WAIROA ESTUARY 1



MOTUOTAU ISLAND (Scenic Reserve)

Area	2.5ha
Altitude	0-45m
Grid reference	NZMS 260 U14 922918
Bioclimatic zone	Coastal
Ranking	Regional

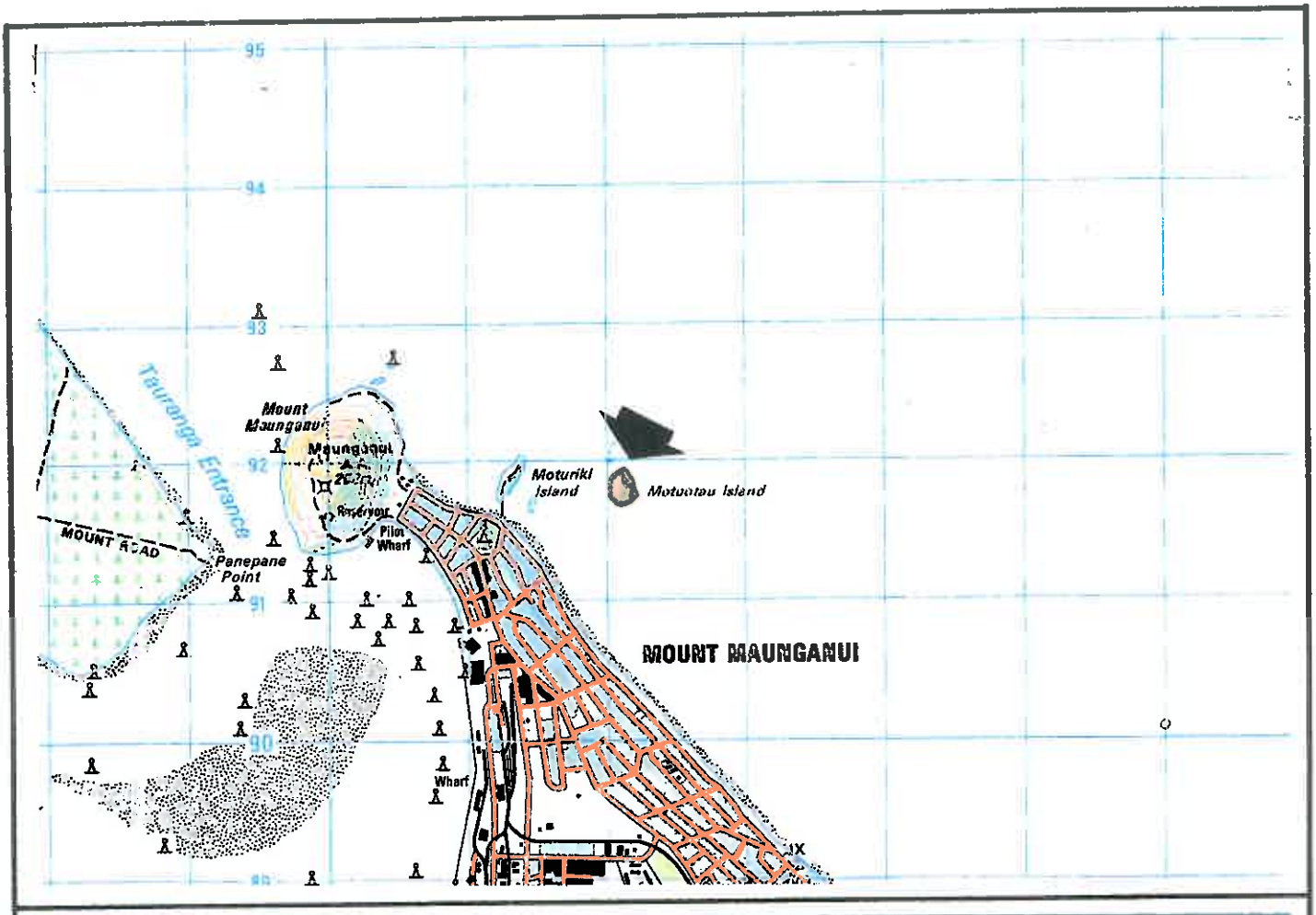
Vegetation type	Physical area
Pohutukawa forest	Volcanic hard coast
Bracken-blackberry shrub-fernland	Volcanic hard coast
Arthropodium cirratum-Sarcocornia quinqueflora-Poa anceps subsp. *anceps-Senecio lautus* var. *lautus*-New Zealand iceplant grass-herbfield	Volcanic hard coast

(Clarkson and Spring-Rice 1992)

Justification

Pohutukawa forest was formerly common in the Tauranaga Ecological District. It has been greatly reduced in extent and only small areas now remain (e.g. Mount Maunganui, Bowentown Heads and Tanners Point). Although very small, Motuotau Island is a representative example of coastal forest. It is also of considerable value as an example of pohutukawa forest free from the effects of possums or other browsing mammals (Clarkson and Spring-Rice 1992). Whilst no introduced animals occur on the island now, absence of geckos and skinks from the island indicates that they may have been present at some time in the past (P Jansen pers. comm.).

SS MOTUOTAU ISLAND



ARAWA

Area	Approx 12 ha
Altitude	0m
Grid reference	NZMS 260 V14 138758
Bioclimatic zone	Coastal
Ranking	Regional

Vegetation type	Physical character
Cabbage tree/grey willow forest	Freshwater wetland
Grey willow forest	Freshwater wetland
Grey willow-*Coprosma propinqua* subsp. *propinqua*-pampas-harakeke treeland	Freshwater wetland
Manuka-harakeke shrubland	Freshwater wetland
Baumea juncea-harakeke-*Coprosma propinqua* subsp. *propinqua* sedgeland	Freshwater wetland
Baumea articulata-raupo reedland	Freshwater wetland
Raupo reedland	Freshwater wetland
Bachelor's button herbfield⇌*Oioi Baumea juncea*-marsh ribbonwood-searush-pampas grass-tussock-sedgeland	Saline wetland
Bachelor's button-arrow grass-*Mimulus repens*-*Spergularia media-Isolepis cernua-Plantago coronopus* herbfield	Saline wetland
Duckweed herbfield	Freshwater wetland

(Beadel 1989c)

Vegetation map: Beadel 1989c

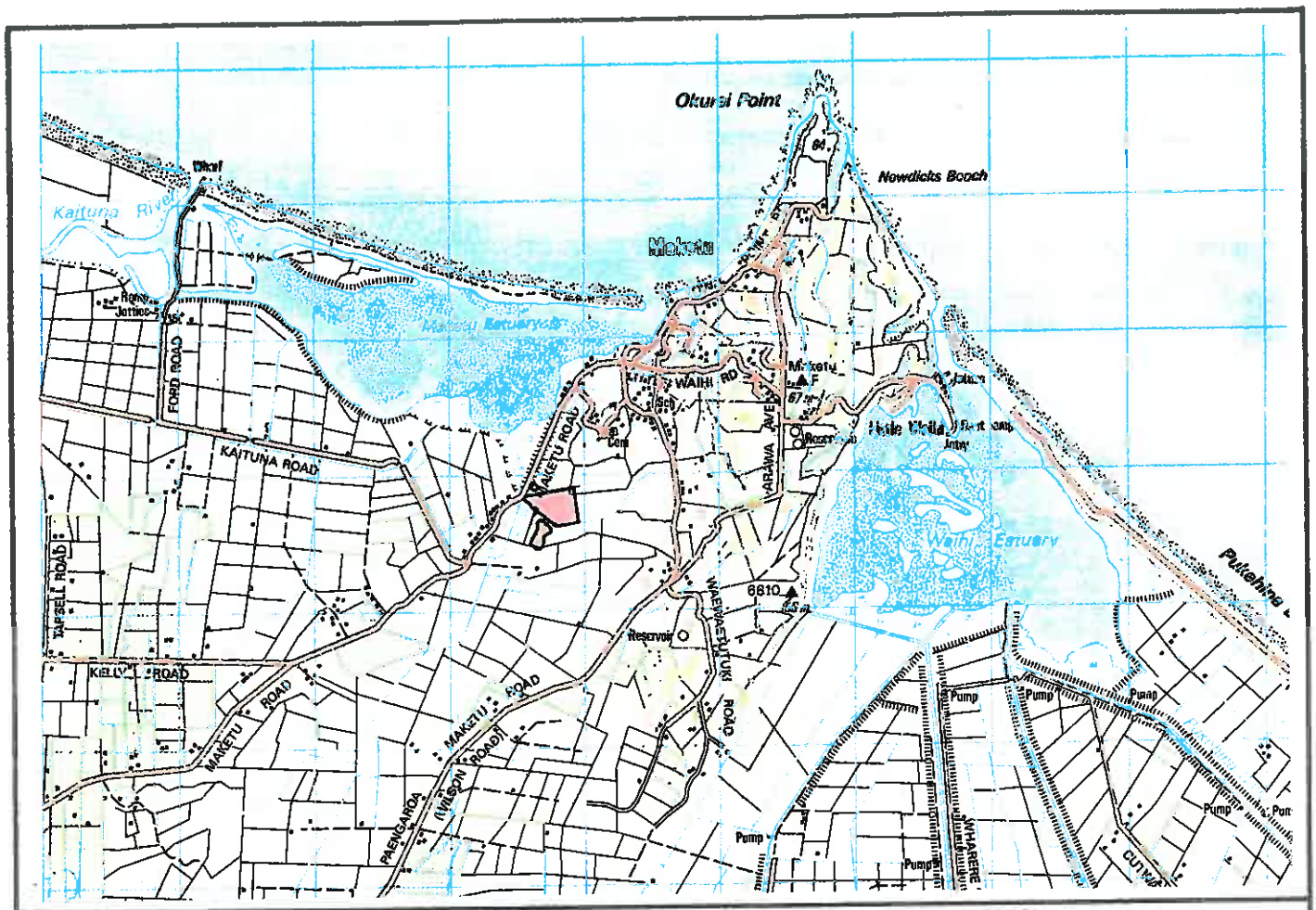
Justification

This site contains one of the few remaining examples of the wetland vegetation of the Kawa swamp which once covered hundreds of acres west of Maketu (Kirk 1873). Two threatened plants occur in the wetland: *Thelypteris confluens* (rare) and *Cyclosorus interruptus* (rare). The Arawa wetland is one of two known locations for these species in the Tauranga ecological disgrict (the other site being Matakana Island). *Thelypteris confluens* was once a prominent plant in the Kawa swamp (Kirk 1873).

Although relatively small this site is a good quality, representative example of the vegetation of the original Kawa swamp.

One regionally uncommon species occurs at this site being *Mimulus repens* (refer to the justification section for Waihi Estuary for a brief discussion of this species).

SS ARAWA


Okurei Point
Nowdicks Beach
Kaituna River
Maketu
Maketu Estuary
Waihi Estuary
Waihi
Pukehina
KAITUNA ROAD
FORD ROAD
TAYSELL ROAD
KELLY ROAD
MAKETU ROAD
WAIHI RD
ARAWA AVE
WAEWAETUTUKI ROAD
PAENGAROA ROAD
WILSON ROAD
WHARERE
Reservoir
Pump
6810

6.1.4 SIGNIFICANT SITES: DISTRICT

ATHENREE 2.

Area	Approx 32 ha
Altitude	0m
Grid reference	NZMS 260 U13 707134
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Grey willow forest	Freshwater wetland
Grey willow-manuka forest	Freshwater wetland
Manuka scrub	Freshwater wetland
Manuka shrubland	Freshwater wetland
Cabbage tree/*Baumea juncea-Coprosma tenuicaulis-Baumea articulata* treeland	Freshwater wetland
	Freshwater wetland

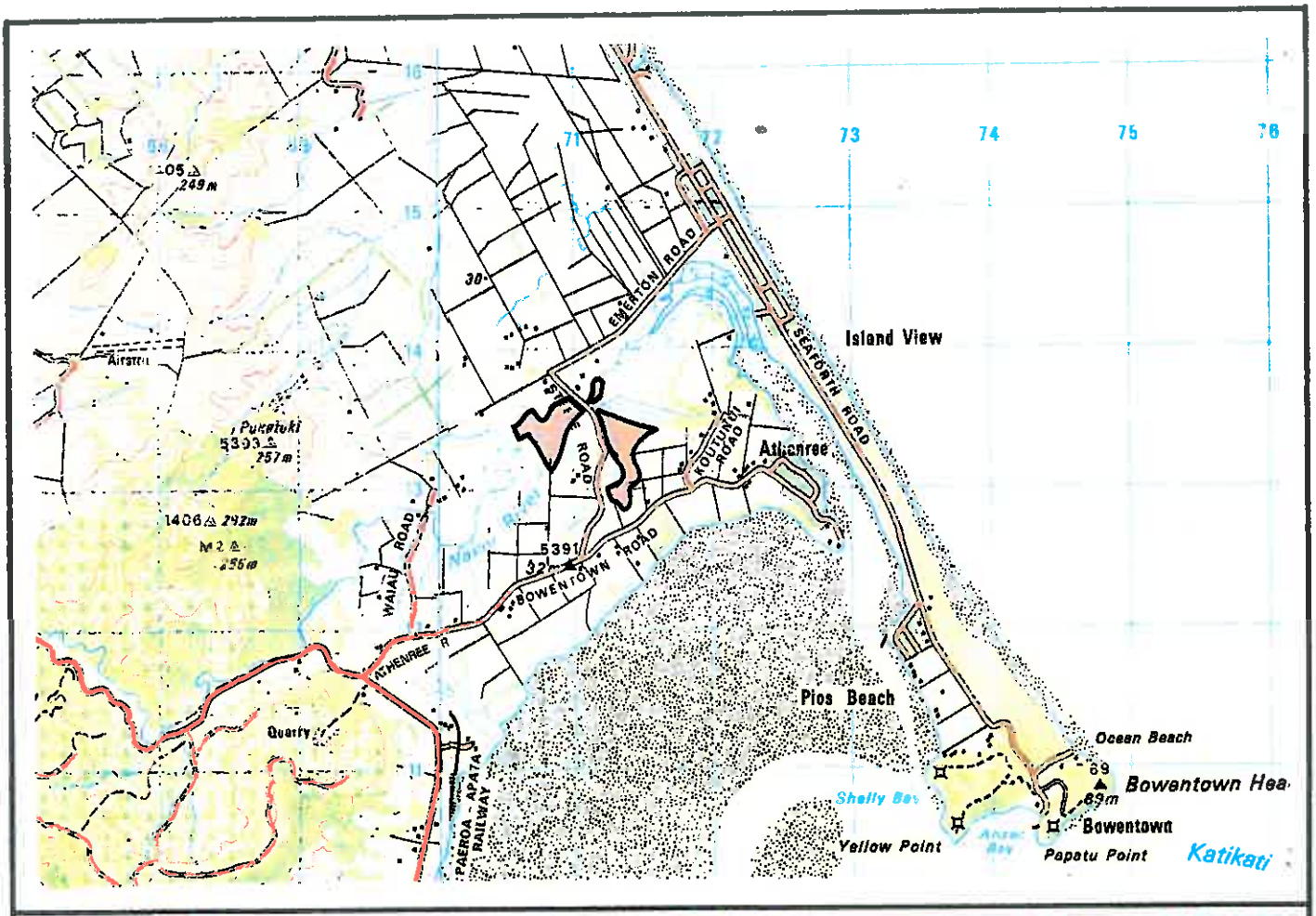
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

A relatively large example of these freshwater wetland vegetation types, characteristic of Tauranga ecological district. This site was identified as a category two area in Beadel 1992a (defined in Appendix 5.4). The adjacent estuarine wetlands in Athenree Estuary were identified as a Category One area in Beadel 1992a.

SS ATHENREE 2



BOWENTOWN HEADS

Area	Approx 34 ha
Altitude	0-89m
Grid reference	NZMS 260 U13 748109
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Pohutukawa forest	Volcanic hard coast
Five finger-houpara-mapou-brush wattle forest	Volcanic hard coast

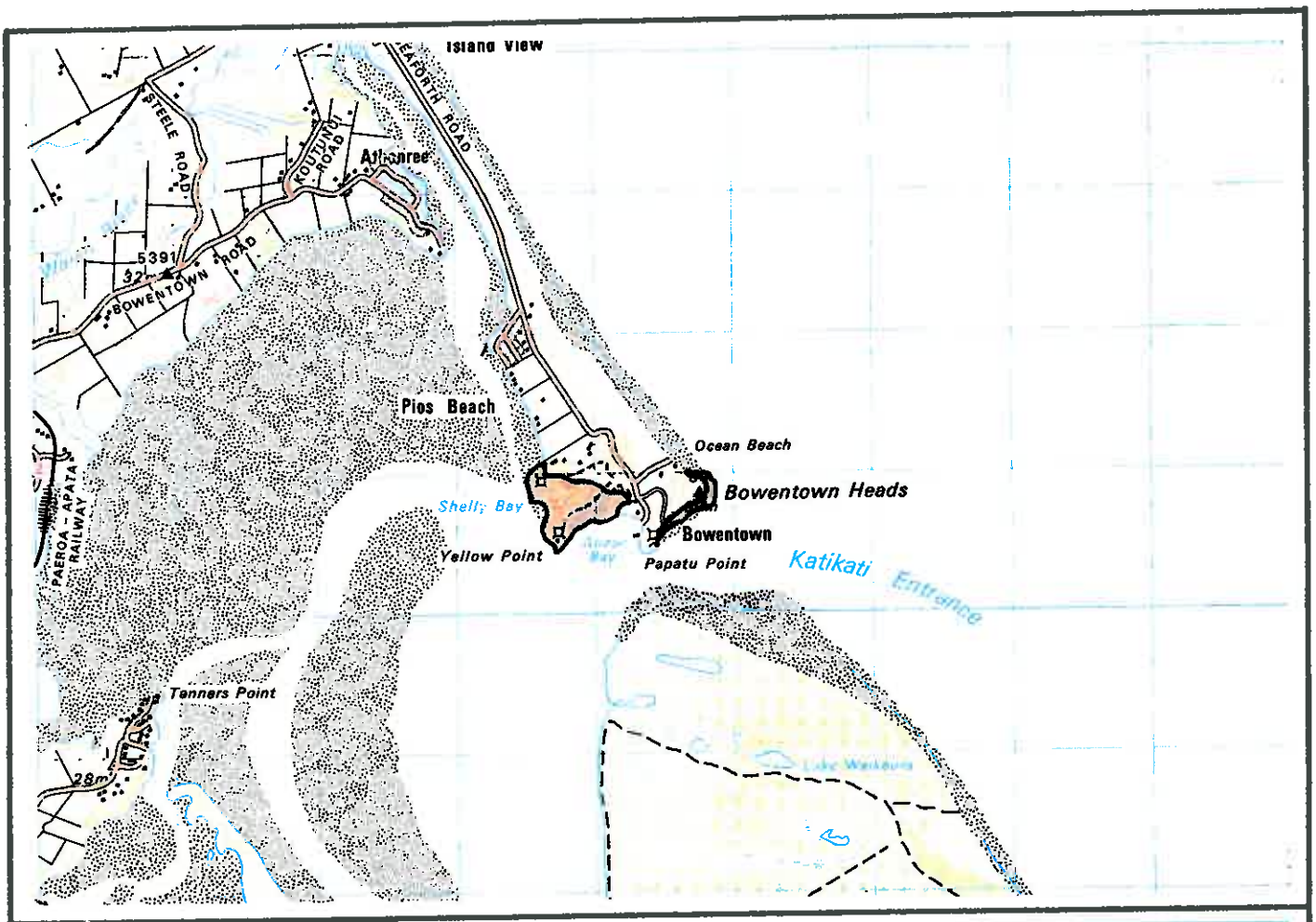
(S. M. Beadel pers. obs. 1992)

Justification

Pohutukawa forest was once common in the Tauranga Ecological District; however it has been greatly reduced in extent and only small areas now remain (e.g. Mount Maunganui, Bowentown Heads and Tanners Point). This is a good example of remnant pohutukawa forest and secondary mixed forest on volcanic hard coast.

New Zealand spinach (*Tetragonia tetragonioides*) occurs at this site. This species is uncommon in the Coromandel-Bay of Plenty-East Cape Region.

SS BOWENTOWN HEADS



TUAPIRO ESTUARY

Area	Approx 64 ha
Altitude	0m
Grid reference	NZMS 260 T13 697078
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Grey willow forest	Freshwater wetland
Pohutukawa forest	Sedimentary coastal hinterland
Mangrove scrub	Saline wetland
Manuka scrub	Freshwater wetland
Mangrove shrubland	Saline wetland
Flaxland	Freshwater wetland
Searush tussockland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Baumea juncea-searush-oioi-sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
Raupo reedland	Freshwater wetland
Sandspit vegetation	Dune and beach sands
Freshwater wetland vegetation	Freshwater wetland

(Beadel 1992a and pers. obs. 1989)

Vegetation map: Beadel 1992a

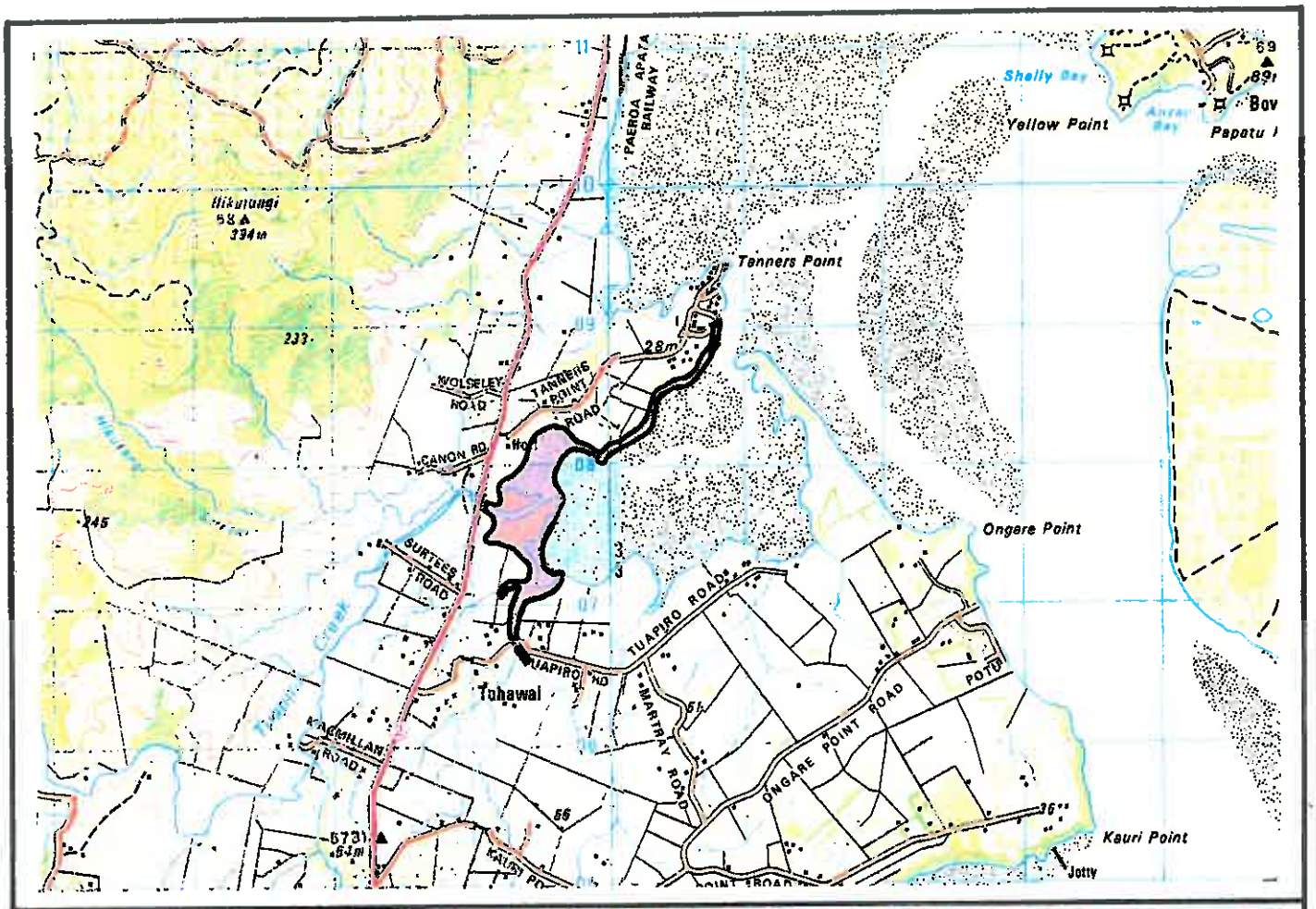
Justification

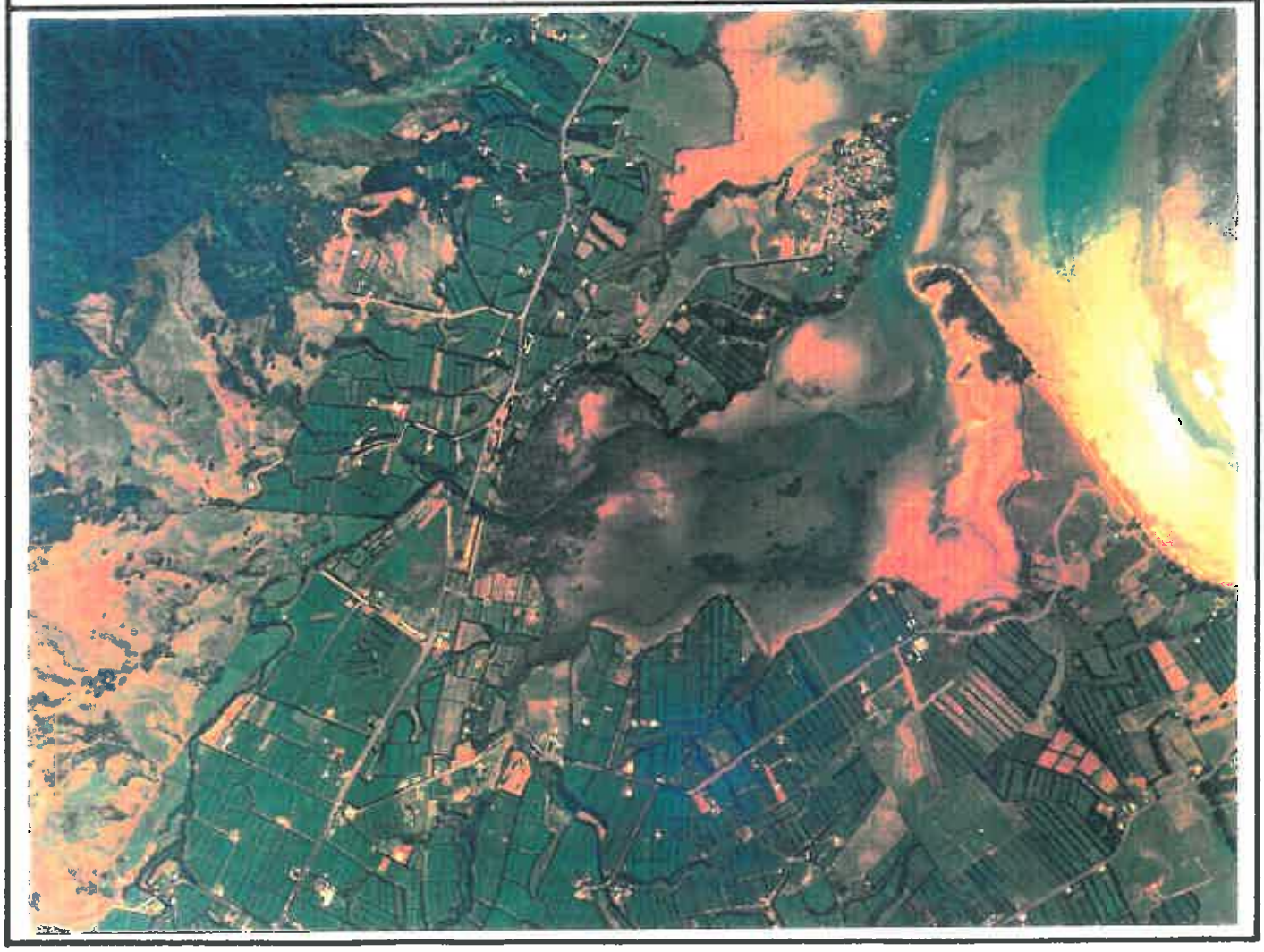
This is a large, relatively good quality, diverse example of the estuarine vegetation of Tauranga Harbour. In places the searush tussockland at this site varies from that present elsewhere in the harbour, being shorter in stature and less dense. There is a narrow fringe of freshwater wetland vegetation.

Pohutukawa forest was once common in Tauranga ecological district. It has been greatly reduced in extent and only small areas now remain (e.g. Mount Maunganui, Bowentown Heads, Tanners Point). This site includes a good example of pohutukawa forest, with a reasonably intact understorey (S. M. Beadel pers. obs. 1992).

Asplenium terrestre subsp. *maritinum* (NZFRI 18299) occurs in the pohutukawa forest. This species is only known from one other mainland site on the east coast of the North Island (although it occurs on Moutuhora Island (P. Brownsey pers. comm.)). Its distribution is centred on Cook Strait and it is known from two localities on the west coast of the North Island and down the east coast of the South Island to Banks Peninsula (Brownsey 1973).

SS TUAPIRO


Shelly Bay
Yellow Point
Papatu I
Tanners Point
Hikurangi
334m
233
245
28m
WOLSELEY ROAD
TANNERS POINT ROAD
CANON RD
SURTEES ROAD
Tuhawai
TUAPIRO ROAD
TUAPIRO RD
MARTRAY ROAD
ONGARE POINT ROAD
POTTI
MACMILLAN ROAD
Ongere Point
Kauri Point
Jotty
PAEROA APATA RAILWAY



MATAKANA ISLAND 2.
(estuarine wetlands north of Blue Gum Bay)

Area	Approx 48 ha
Altitude	0m
Grid reference	NZMS 260 U13 794007
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Cabbage tree-grey willow-manuka forest	Freshwater wetland
Mangrove scrub	Saline wetland
Manuka scrub	Freshwater wetland
Mangrove shrubland	Saline wetland
Flaxland	Saline wetland
Baumea juncea sedgeland	Saline wetland
Baumea juncea-marsh ribbonwood-oioi sedgeland	Saline wetland
Whahariki/*Baumea juncea*-oioi-marsh ribbonwood sedgeland	Saline wetland
Mangrove/*Schoenoplectus pungens* sedgeland	Saline wetland
Searush tussockland	Saline wetland
Oioi sedgeland	Saline wetland
Sandspit vegetation	Dune and beach sands

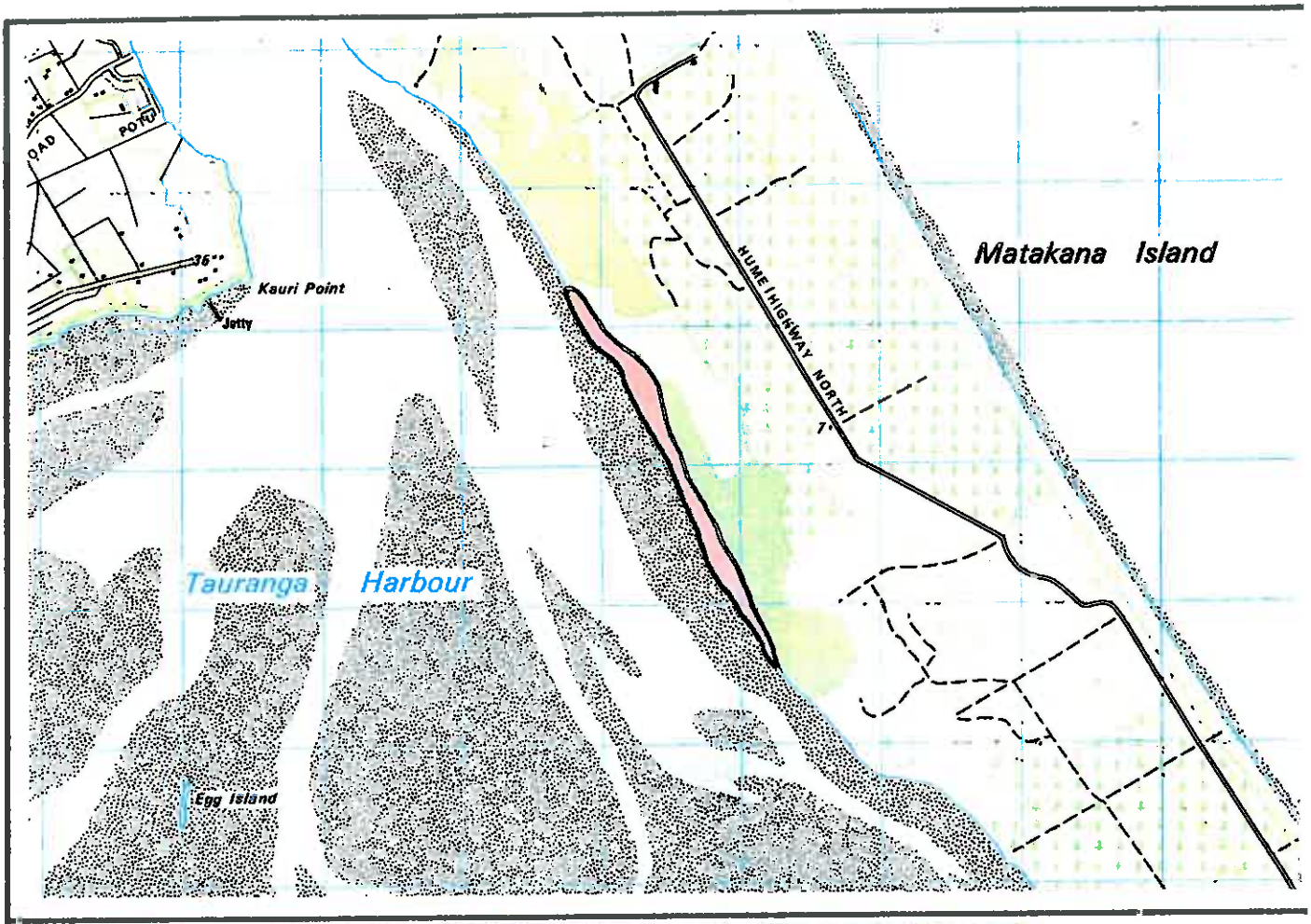
(Beadel 1992a)

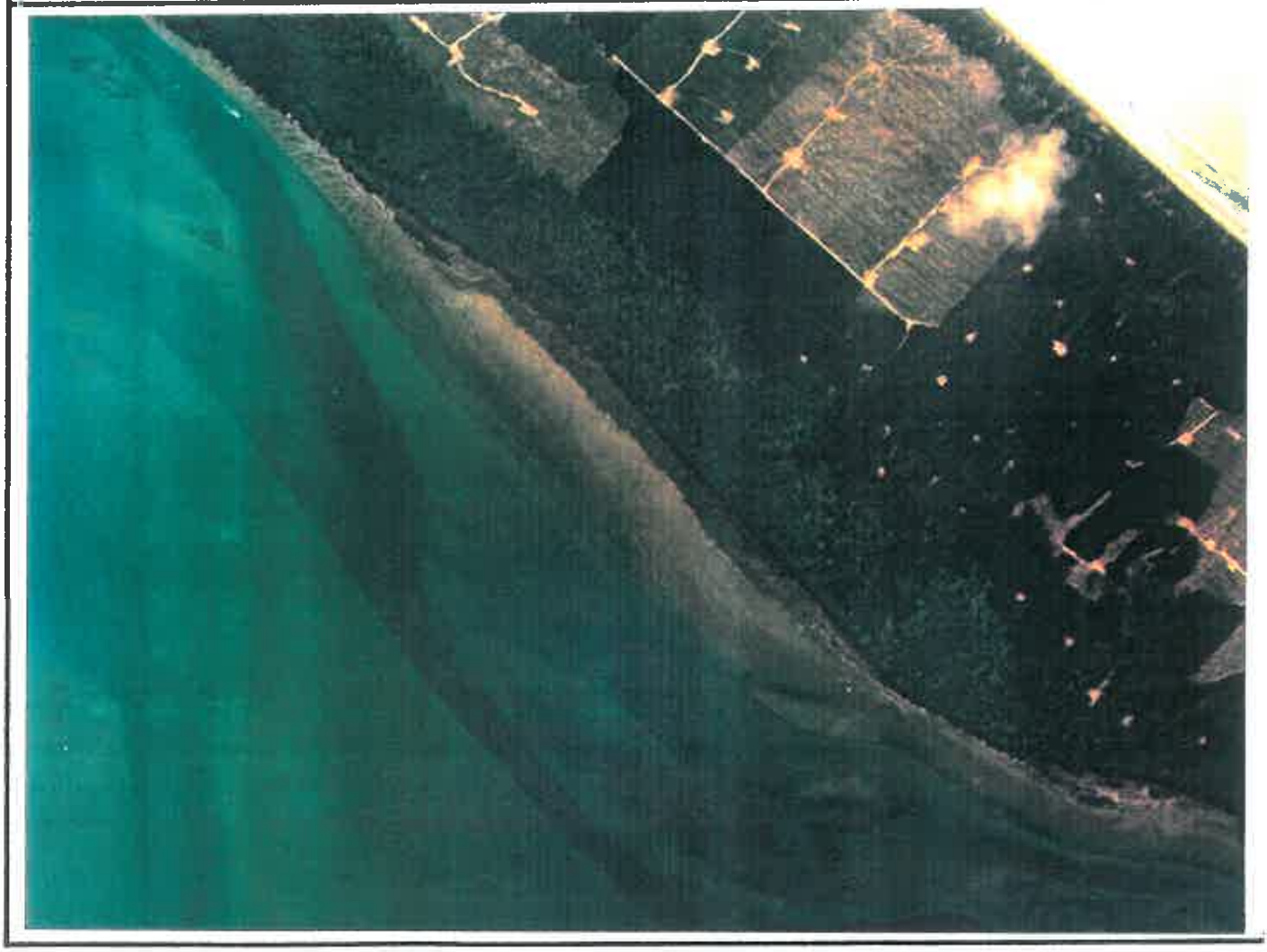
Vegetation map: Beadel 1992a

Justification

This is a relatively large, good quality representative example of these vegetation types, characteristic of Tauranga ecological district. This site was identified as a category two area (Beadel 1992a); defined in Appendix 5.4.

SS MATAKANA ISLAND 2





MATAKANA ISLAND 3.

Area	Approx 45 ha
Altitude	0m
Grid reference	NZMS 260 U13 740089
Bioclimatic zone	Coastal
Ranking	District

Vegetation type

Not described

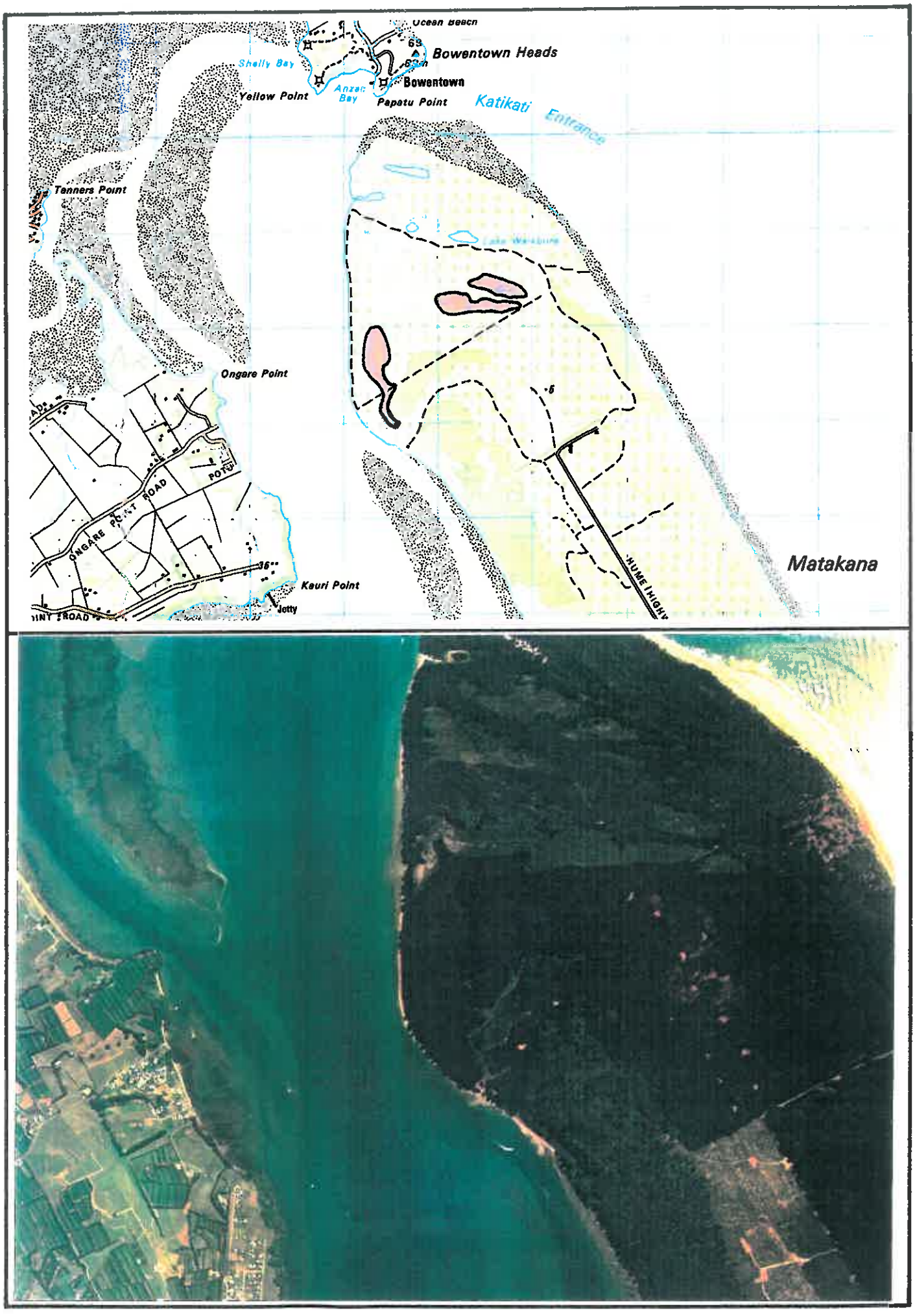
Physical character

Freshwater wetland vegetation

Justification

These wetlands are part of a larger wetland system (see SS Matakana Island 1; a site ranked as National which includes a category one area (Beadel 1992a). The wetlands in Matakana Island 3 are of significant conservation value, despite being more modified than those in Matakana Island 1. Freshwater wetlands have been greatly reduced in extent, particularly in lowland areas (c.f. Pike 1991).

SS MATAKANA ISLAND 3



KATIKATI 2

Area	Approx 37 ha
Altitude	0m
Grid reference	NZMS 260 T13 697025
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Manuka scrub (minor area)	Freshwater wetland
Searush tussockland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Whararikí/*Baumea juncea*-oioi-marsh ribbonwood sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
Sandspit vegetation	Dune and beach sands

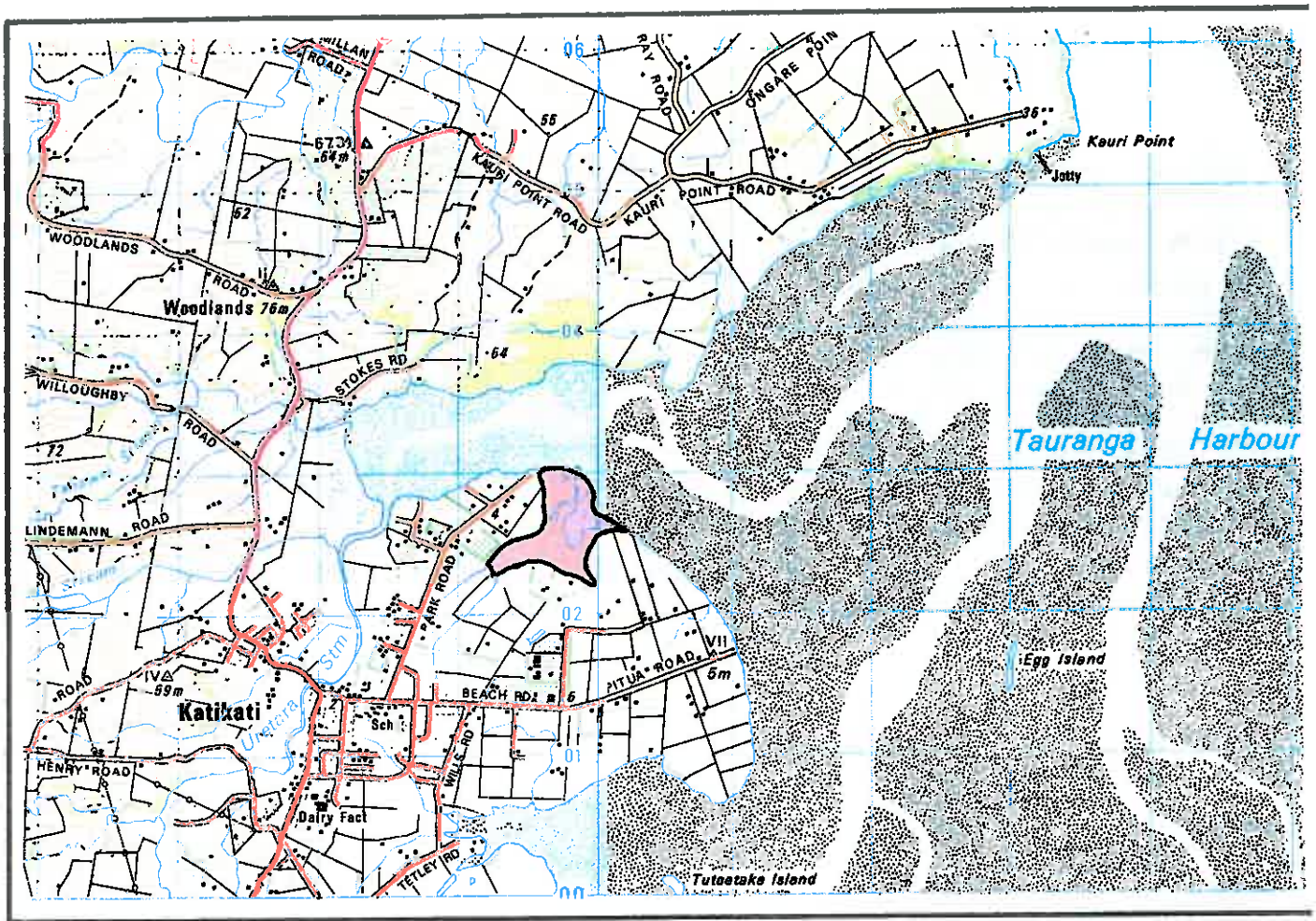
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

A relatively large area of mangrove scrub with small areas of saltmarsh. These vegetation types are characteristic of Tauranga ecological district. This site was identified as a Category Two Area in Beadel (1992a), (defined in Appendix 5.4).

SS KATIKATI 2



BLUE GUM BAY 2.

Area	Approx 15 ha
Altitude	0m
Grid reference	NZMS 260 U14 810975
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Cabbage tree-grey willow-manuka forest	Freshwater wetland
Grey willow forest	Freshwater wetland
Searush tussockland	Saline wetland
Oioi sedgeland	Saline wetland
Schoenoplectus pungens sedgeland	Saline wetland
Estuaruy margin vegetation	Freshwater wetland

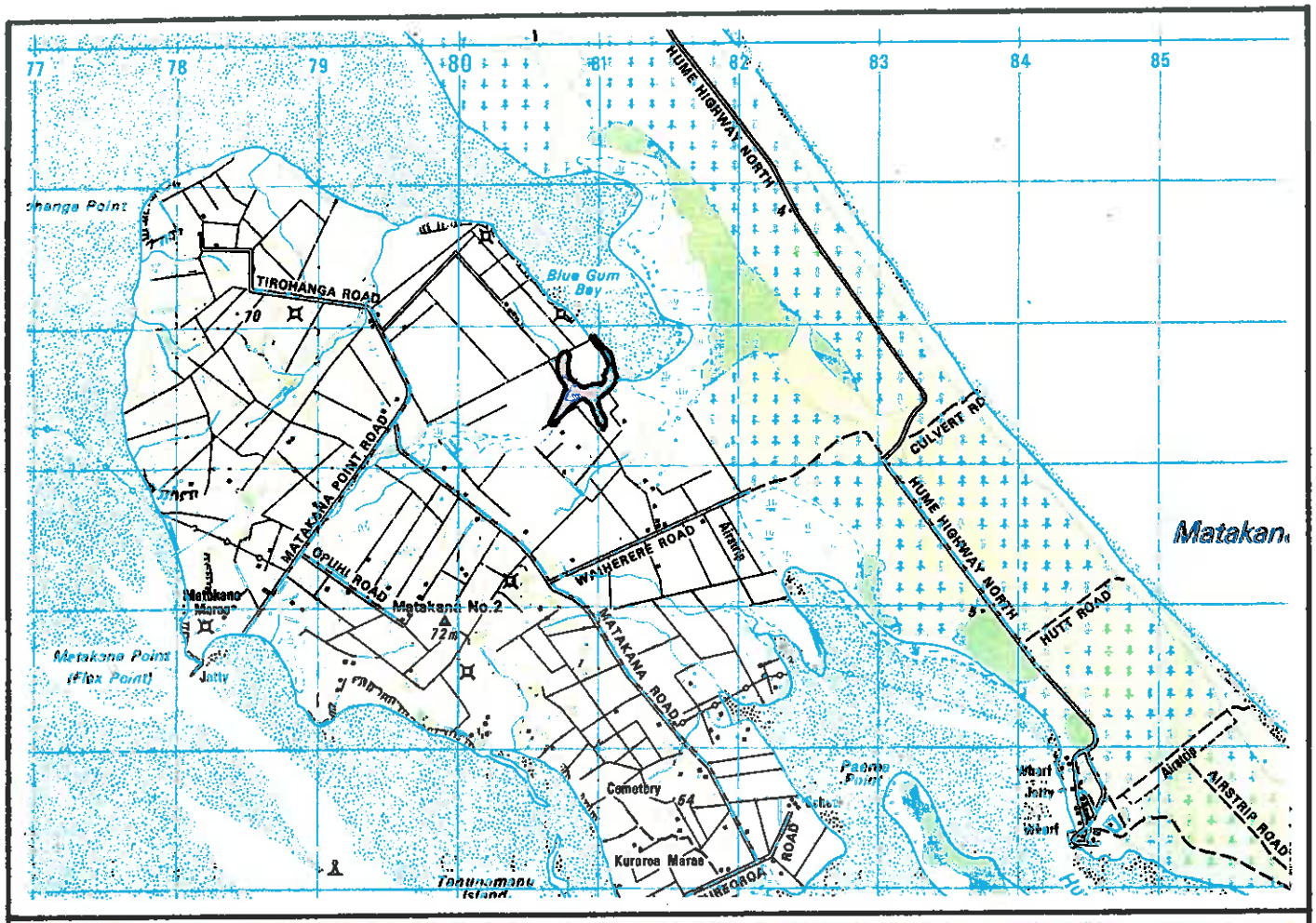
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

This area was identified as a category two area in Beadel (1992a) (defined in Appendix 5.4). It is contiguous with and complementary to the Blue Gum Bay category one area which is a large good quality, representative example of the wetland vegetation of Tauranga Harbour.

SS BLUE GUM BAY 2



WAINUI ESTUARY 2.

Area	121 ha
Altitude	0m
Grid reference	NZMS 260 U14 720927
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Mangrove scrub	Saline wetland
Mangrove shrubland	Saline wetland
Manuka shrubland	Freshwater wetland
Searush tussockland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Baumea juncea-marsh ribbonwood-oioi sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
Raupo reedland	Freshwater wetland

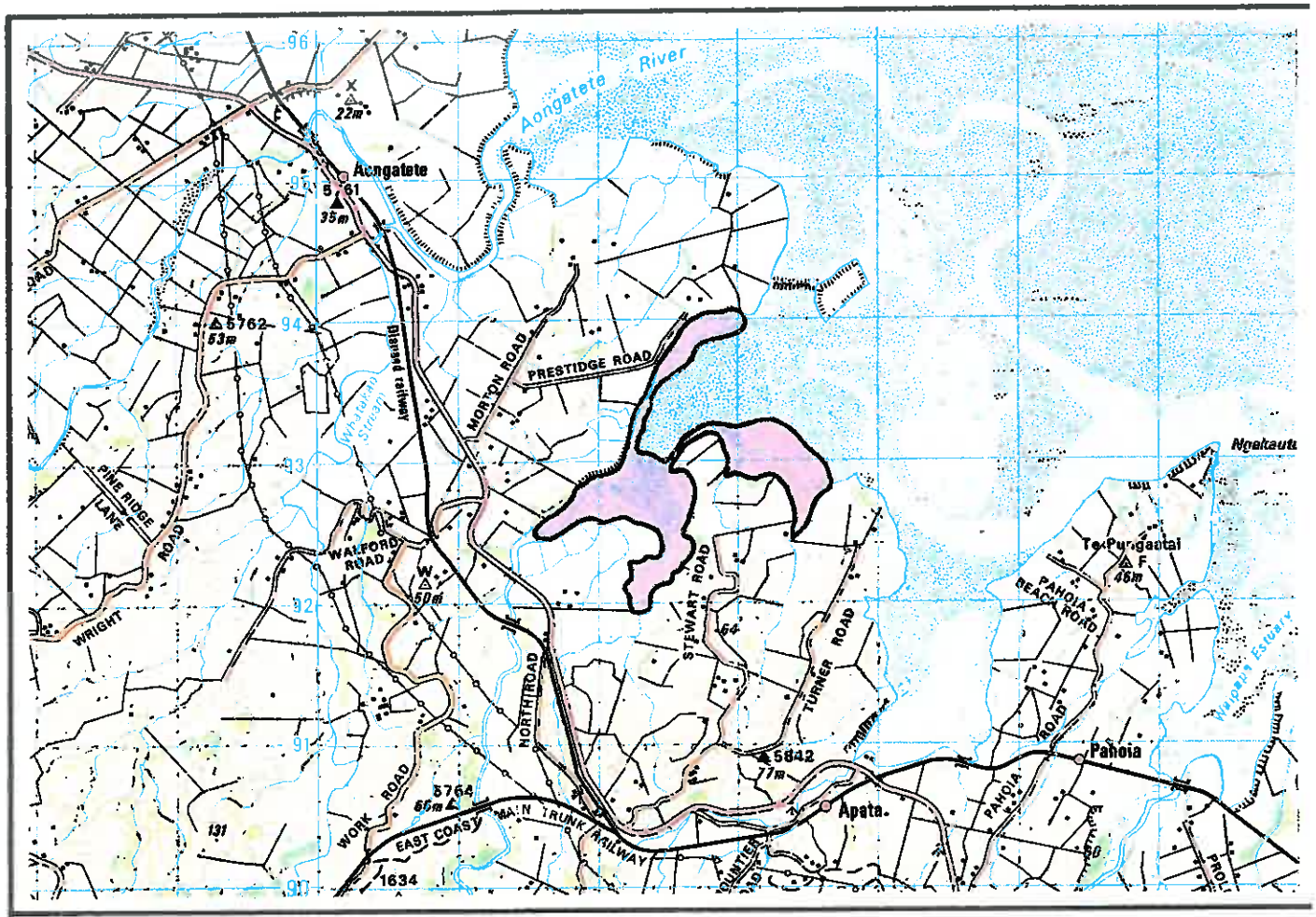
(Beadel 1992a)

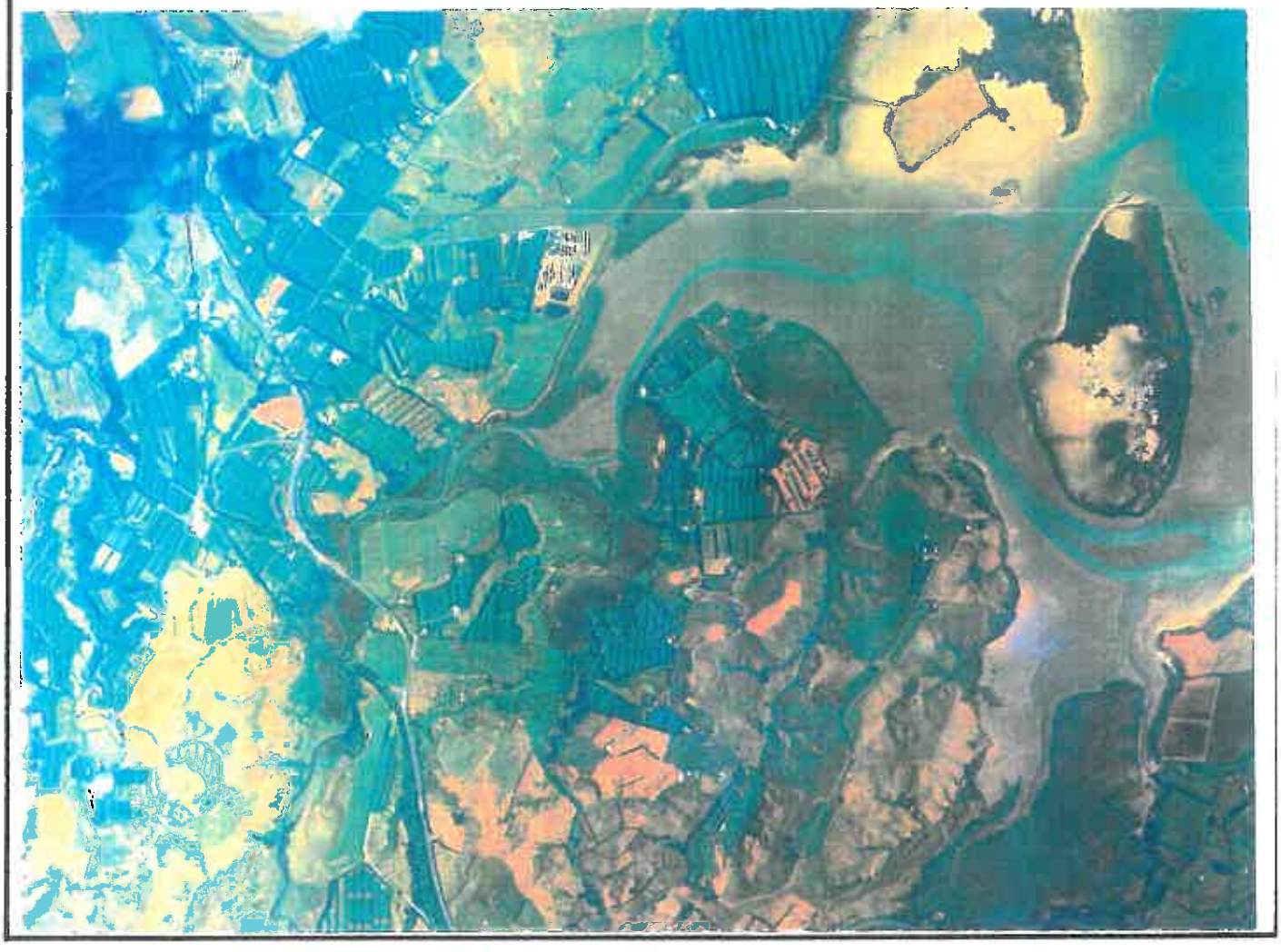
Vegetation map: Beadel 1992a

Justification

This area is a relatively large, good quality example of the above wetland vegetation types, which are characteristic of Tauranga Harbour. It was identified as a category two area in Beadel (1992a) and is contiguous with and complementary to SS Wainui Estuary 1 (identified as category one area in Beadel 1992).

SS WAINUI ESTUARY 2





APATA ESTUARY

Area	Approx 87 ha
Altitude	0m
Grid reference	NZMS 260 U14 745912
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Grey willow forest	Freshwater wetland
Mangrove scrub	Saline wetland
Mangrove shrubland	Saline wetland
Searush tussockland	Saline wetland
Oioi sedgeland	Saline wetland
Raupo reedland	Freshwater wetland

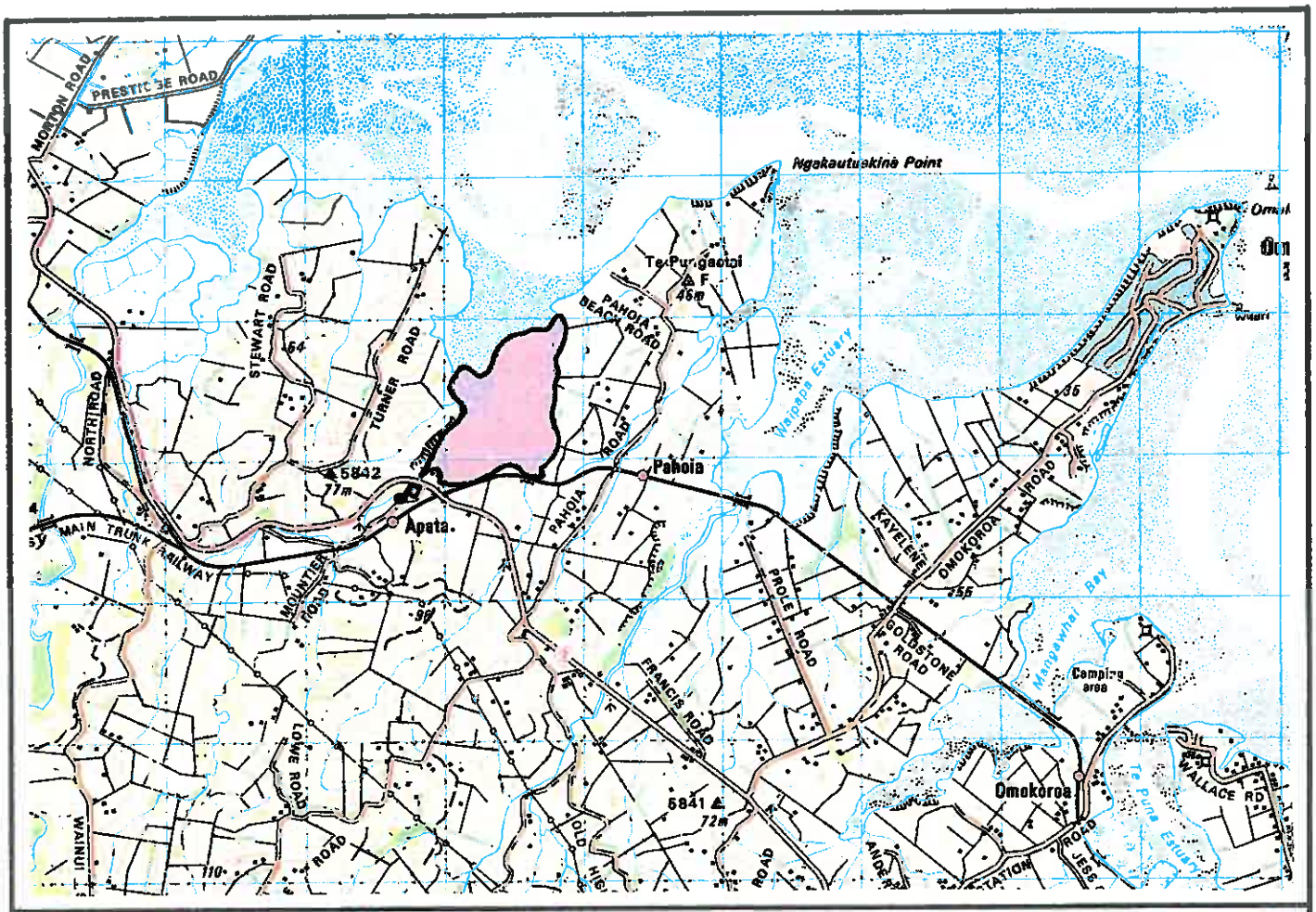
(Beadel 1992a)

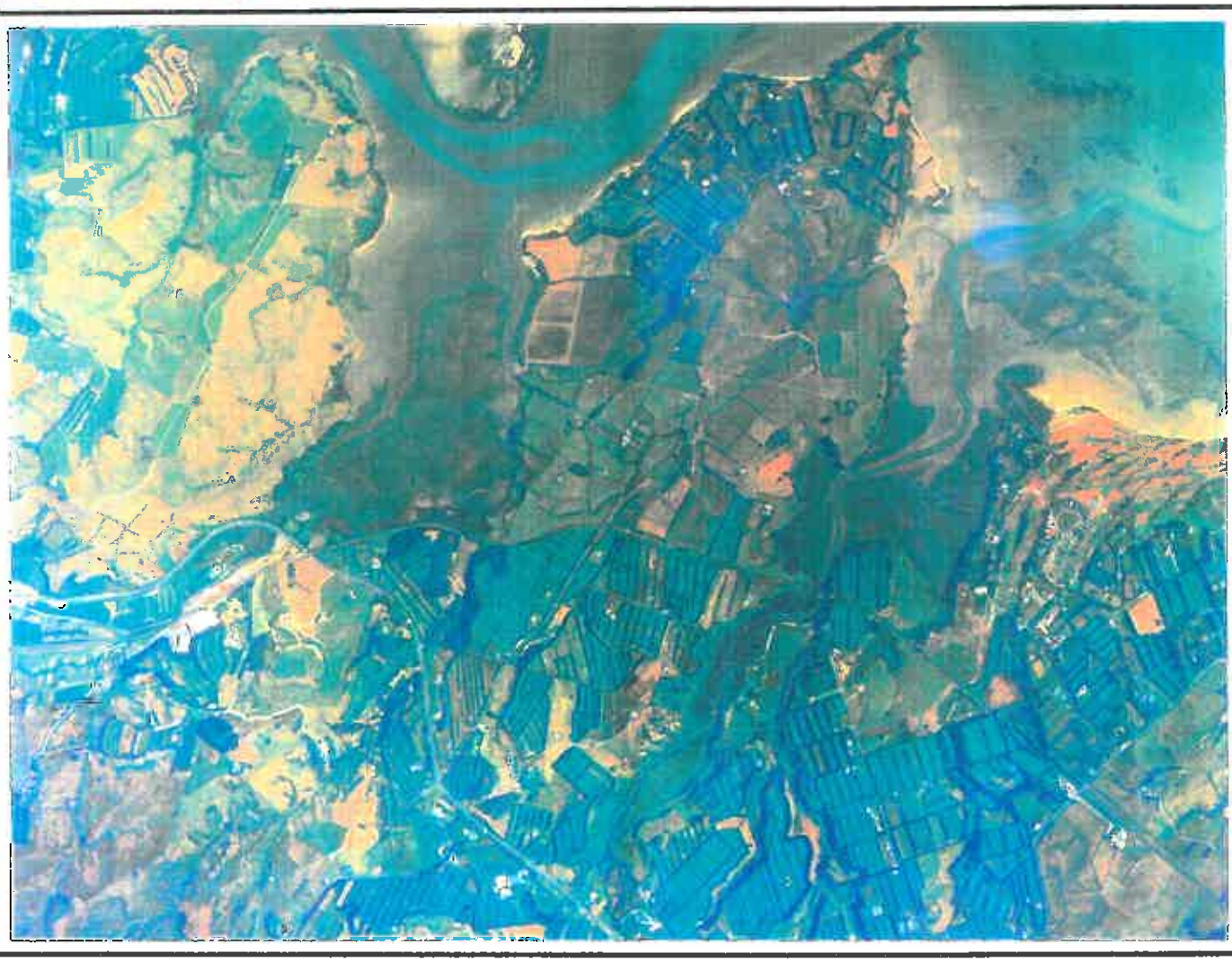
Vegetation map: Beadel 1992a

Justification

Apata Estuary contains a large, good quality stand of mangroves, with relatively narrow strips of saltmarsh along the margins. It was identified as a Category Two Area in Beadel (1992a); defined in Appendix 5.4.

SS APATA ESTUARY





WAIPAPA ESTUARY 2.

Area	Approx 56 ha
Altitude	0m
Grid reference	NZMS 260 U14 764910
Bioclimatic zone	Coastal
Ranking	District

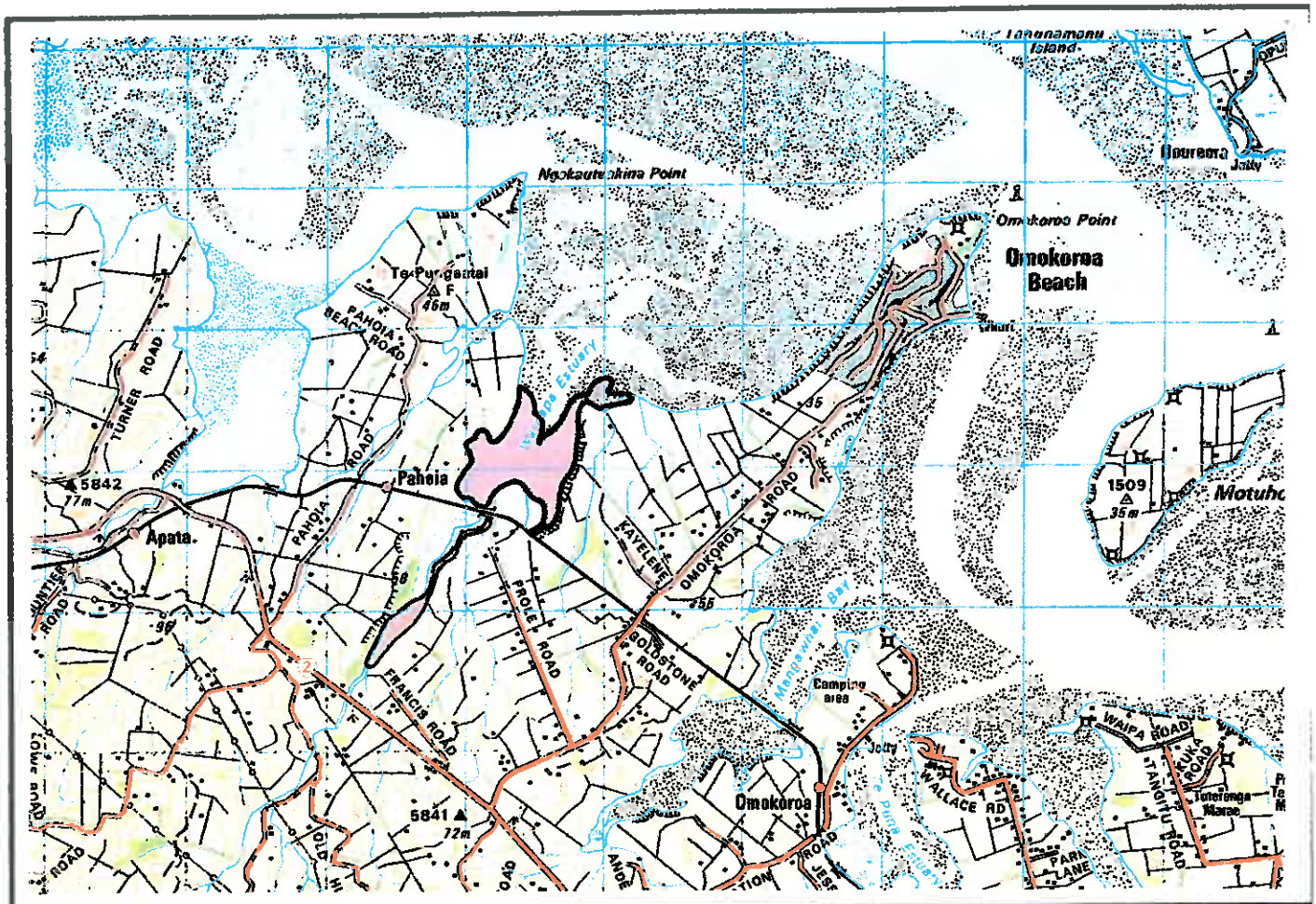
Vegetation type	Physical character
Grey willow forest (minor area)	Freshwater wetland
Mangrove scrub	Saline wetland
Manuka scrub	Freshwater wetland
Mangrove shrubland	Saline wetland
Manuka-whahariki-toetoe shrubland	Freshwater wetland
Searush tussockland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
Raupo reedland	Freshwater wetland
Sandspit vegetation	Dune and beach sands
Estuary margin vegetation	Saline wetland

(Beadel 1992a)

Justification

A relatively large, good quality example of mangrove stands and saltmarsh. Mangrove scrub and shrublands form the cover over much of this area. This was identified as a Category Two Area in Beadel (1992a) (defined in Appendix 5.4).

SS WAIPAPA ESTUARY 2



TAHUNAMANU ISLAND

Area	Approx 4 ha
Altitude	0m
Grid reference	NZMS 260 U14 811936
Bioclimatic zone	Coastal
Ranking	District

Vegetation type

Sarcocornia quinqueflora herbfield
Sandspit vegetation

(Beadel 1992a)

Vegetation map: Beadel 1992a

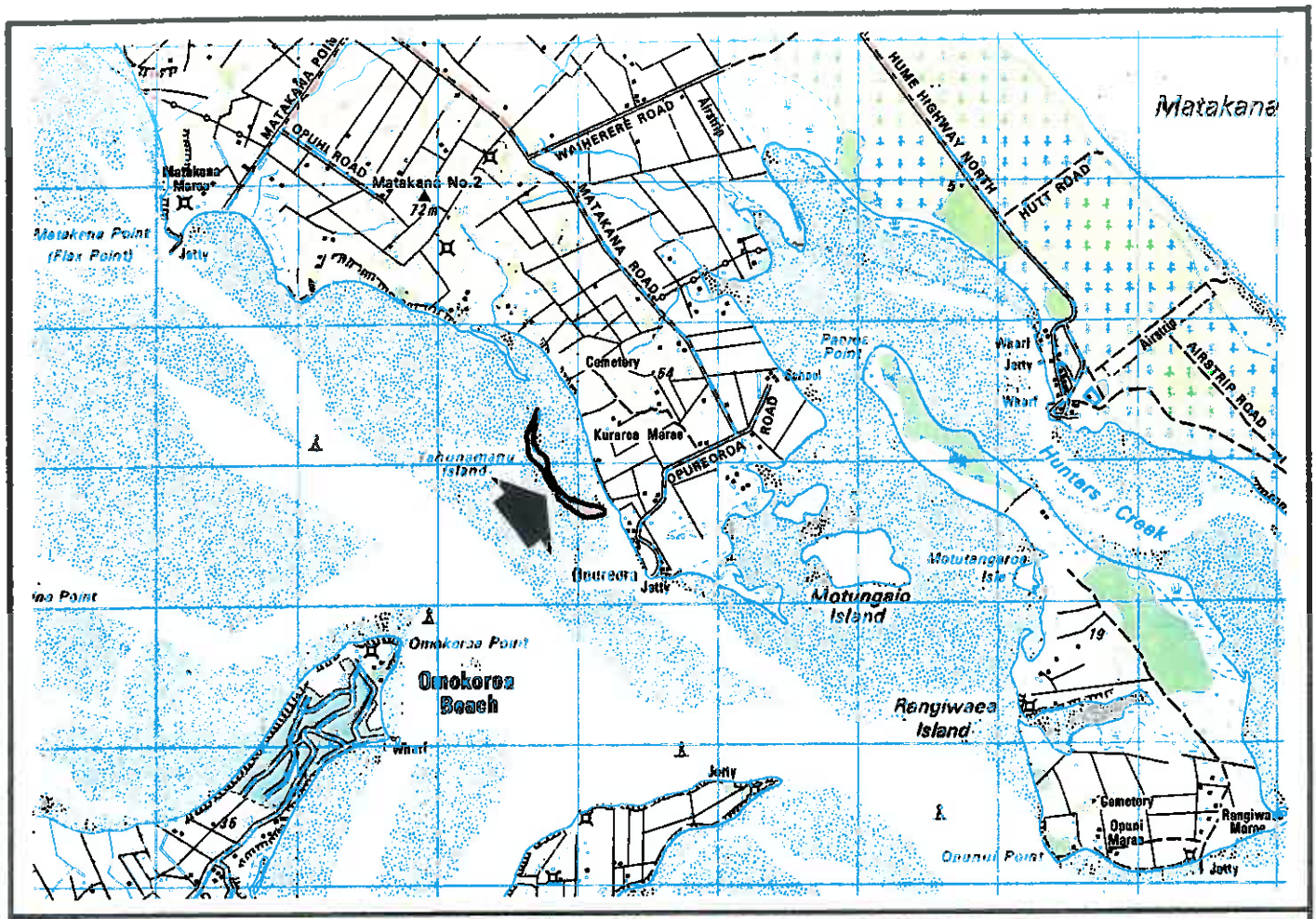
Physical area

Saline wetland
Dune and beach sands

Justification

Tahunamanu Island supports a representative example of the vegetation occurring on sandspits (some adventive species are present but these are now a characteristic of these sites throughout the harbour). Small examples of *Sarcocornia quinqueflora* herbfield occurs throughout the harbour; this is one of the larger better quality examples. It was identified as a Category One Area in Beadel (1992a); defined in Appendix 5.4.

SS TAHUNAMANU ISLAND



MOTUNGAIO ISLAND

Area	Approx 25 ha
Altitude	0m
Grid reference	NZMS 260 U14 830933
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical area
Manuka forest	Dune and beach sands
Manuka scrub	Freshwater wetland; Dune and beach sands
Searush tussockland	Saline wetland
Baumea juncea-marsh ribbonwood-oioi sedgeland	Saline wetland
Olearia solandri/oioi sedgeland	Saline wetland
Samolus repens herbfield	Saline wetland
Sandspit vegetation	Dune and beach sands

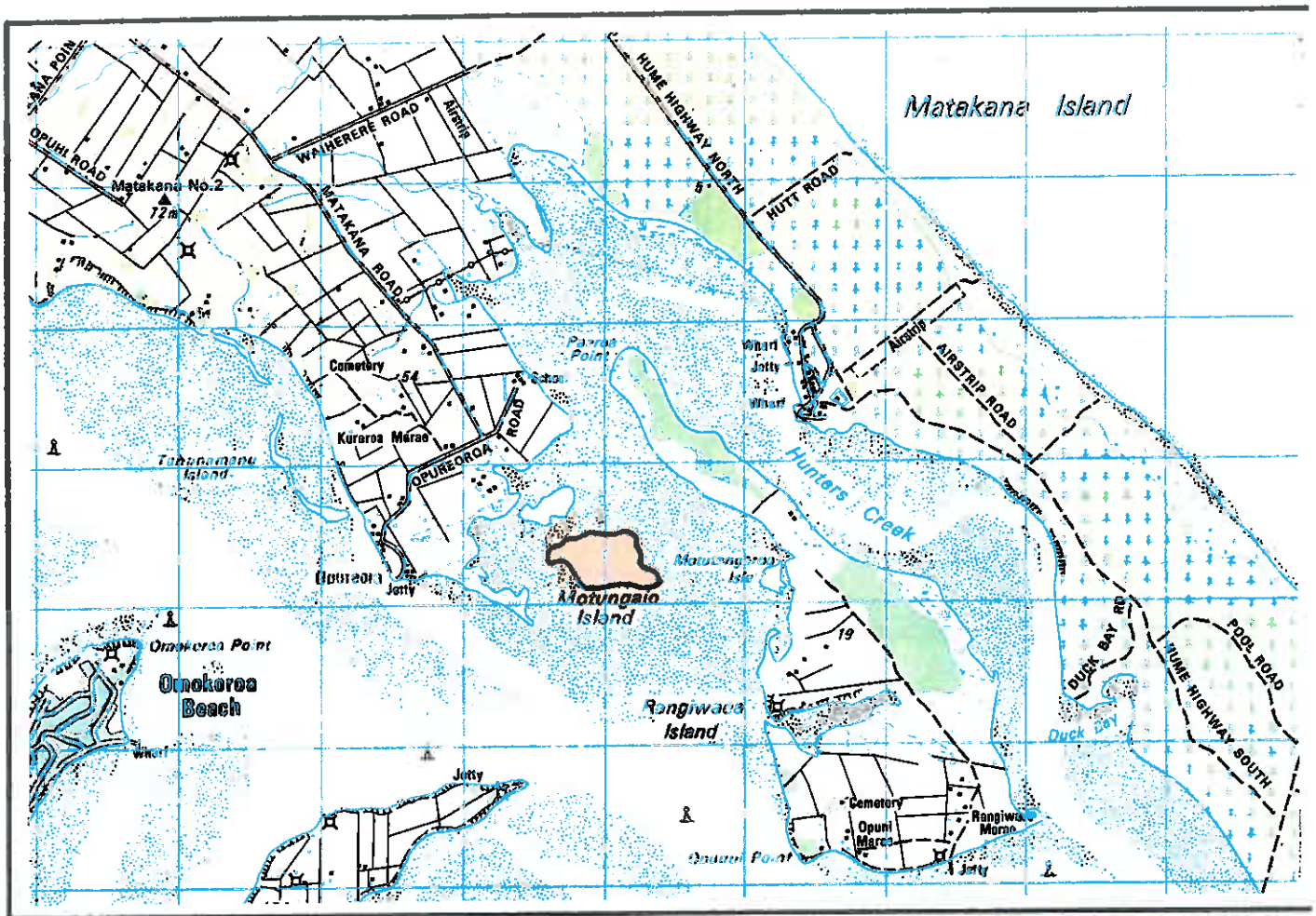
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

This site was identified as a Category Two Area in Beadel (1992a) (defined in Appendix 5.4). It is a good example of a vegetation sequence grading from saltmarsh to manuka scrub and forest. This site is near Opureora Category One Area (see SS Opureora) and is complementary to the Opureora site.

SS MOTUNGAIO ISLAND



OPUREORA

Area	Approx 14 ha
Altitude	0m
Grid reference	NZMS 260 U14 824930
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Manuka scrub	Freshwater wetland
Manuka shrublands	Freshwater wetland
Searush tussockland	Saline wetland
Stipa stipoides-oioi-*Baumea juncea*-searush tussockland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Sandspit habitat	Dune and beach sands

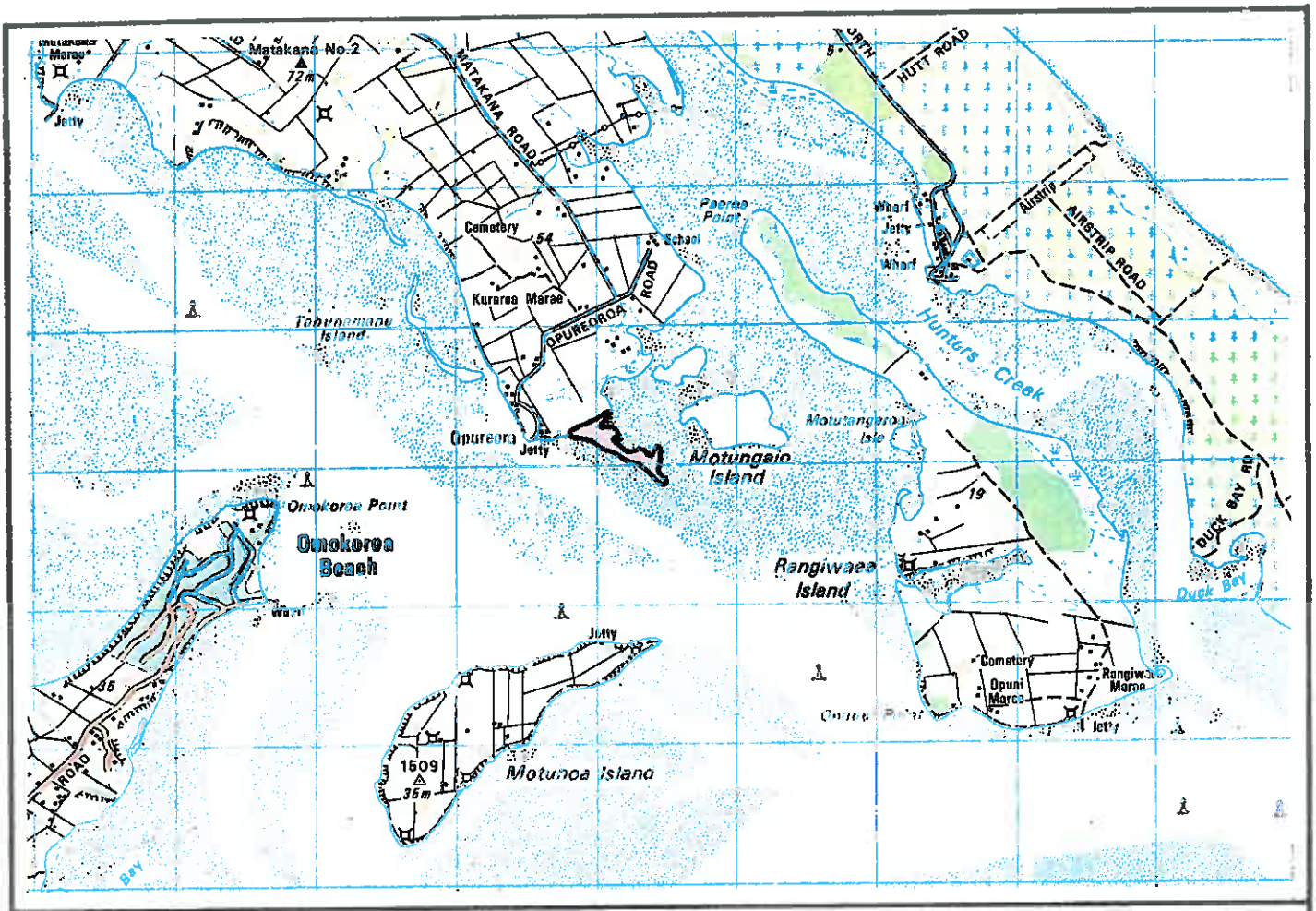
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

This is the only site in Tauranga Harbour where a *Stipa stipoides*-oioi-*Baumea juncea*-searush tussockland association was recorded during the 1992 survey (Beadel 1992a). It also contains a relatively good quality example of sandspit habitat. It was identified as a Category One Area in Beadel (1992a); defined in Appendix 5.4. This site is near SS Motungaio Island (identified as a Category Two Area in Beadel 1992a) and is complementary to SS Motungaio Island.

SS OPUREORA


Matakana No.2
72m
Jetty
MATAKANA ROAD
Cemetery
54
School
Kararea Marae
OPUREORA ROAD
Tohunganui Island
Opureora
Jetty
Motungaio Island
Paerata Point
Wharf
Jetty
Wharf
HUTT ROAD
Airstrip
AIRSTRIP ROAD
Hunters Creek
Motungaio Isle
19
DUCK BAY RD
Duck Bay
Onokorea Point
Onokorea Beach
Wharf
Rangiwaea Island
Cemetery
Opuni Marae
Rangiwaea Marae
Jetty
Jetty
35
ROAD
1509
35m
Motunoa Island
Bay

RANGIWAEA ISLAND

Area	Approx 34 ha
Altitude	0m
Grid reference	NZMS 260 U14 828924
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	**Physical character**
Manuka scrub	Freshwater wetland; Dune and beach sands
Searush tussockland	Saline wetland
Oioi sedgeland	Saline wetland
Sandspit vegetation	Dune and beach sands

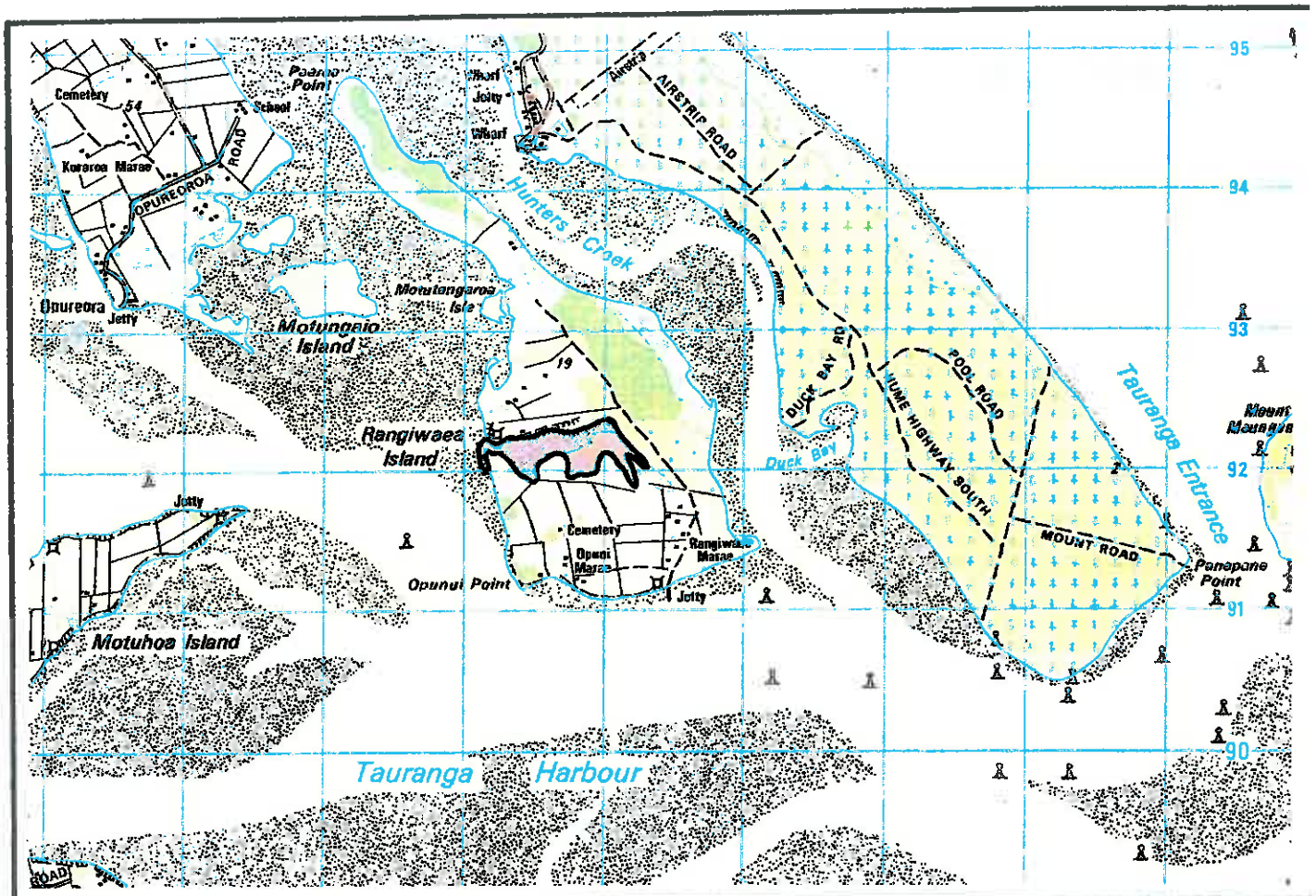
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

A good example of manuka scrub on sand, contiguous with saltmarsh. These vegetation types are characteristic of Tauranga ecological district. Pingao (*Desmoschoenus spiralis*) is present on the sandspit at this site (classed as local). This site was identified as a Category Two Area in Beadel (1992a) (defined in Appendix 5.4).

SS RANGIWAEA ISLAND



MOUNT MAUNGANUI 1.

Area	Approx 11 ha
Altitude	0-252m
Grid reference	NZMS 260 U14 898921
Bioclimatic zone	Coastal
Ranking	District

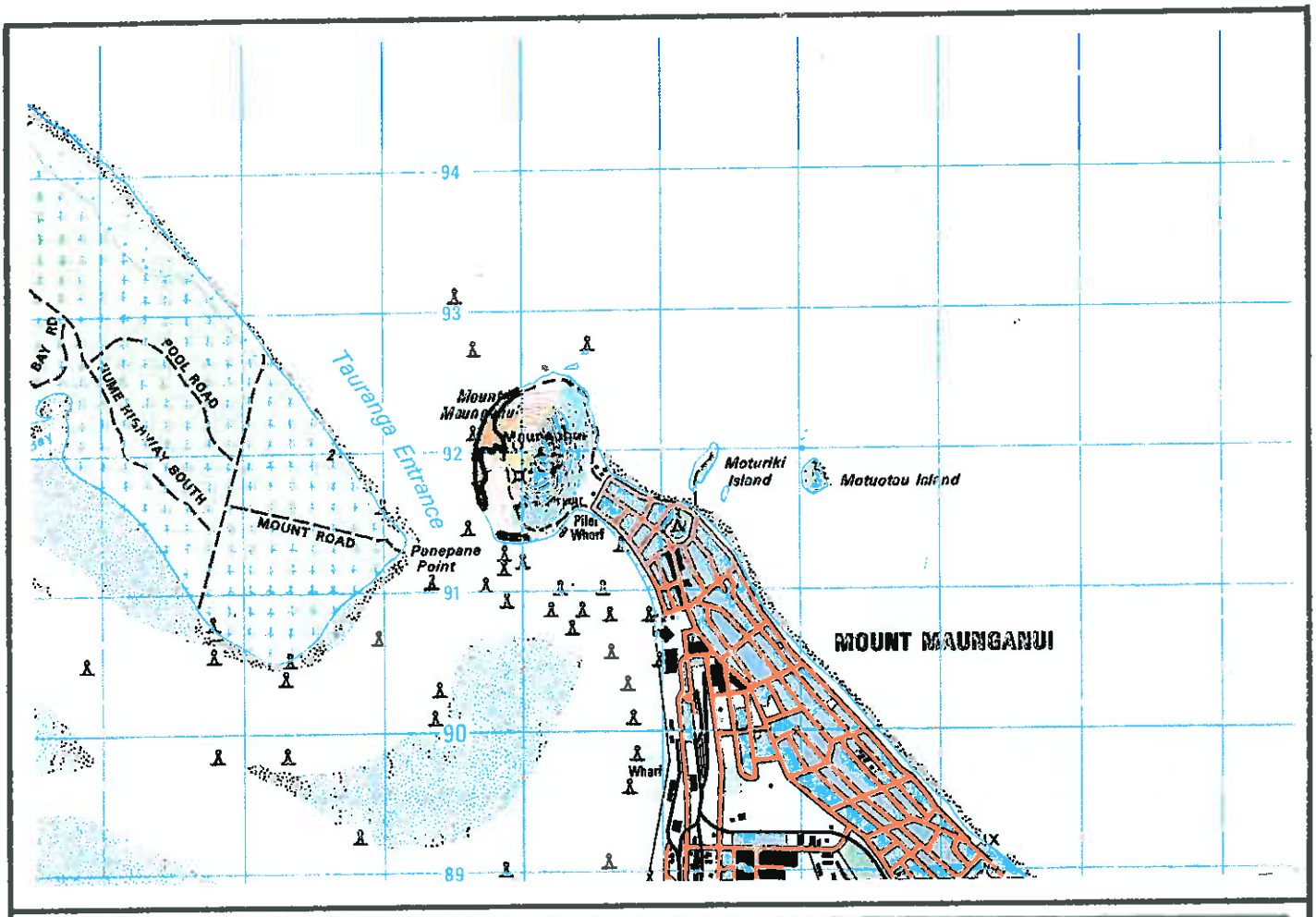
Vegetation type	Physical character
Pohutukawa forest	Volcanic hard coast

Justification

Pohutukawa forest was once common in the Tauranga Ecological District; However it has been greatly reduced in extent and only small areas now remain (e.g. Mount Maunganui, Bowentown Heads and Tanners Point). This is a good example of remnant pohutukawa forest on volcanic hard coast.

The remainder of the indigenous vegetation on Mount Maunganui has been ranked as local (refer to Appendix 4.1.2).

SS Mt MAUNGANUI 1



TE PUNA ESTUARY

Area	Approx 4 ha
Altitude	1m
Grid reference	NZMS 260 U14 777863
Bioclimatic zone	Coastal
Ranking	District

Vegetation type

Manuka forest

(Beadel 1992a)

Vegetation map: Beadel 1992a

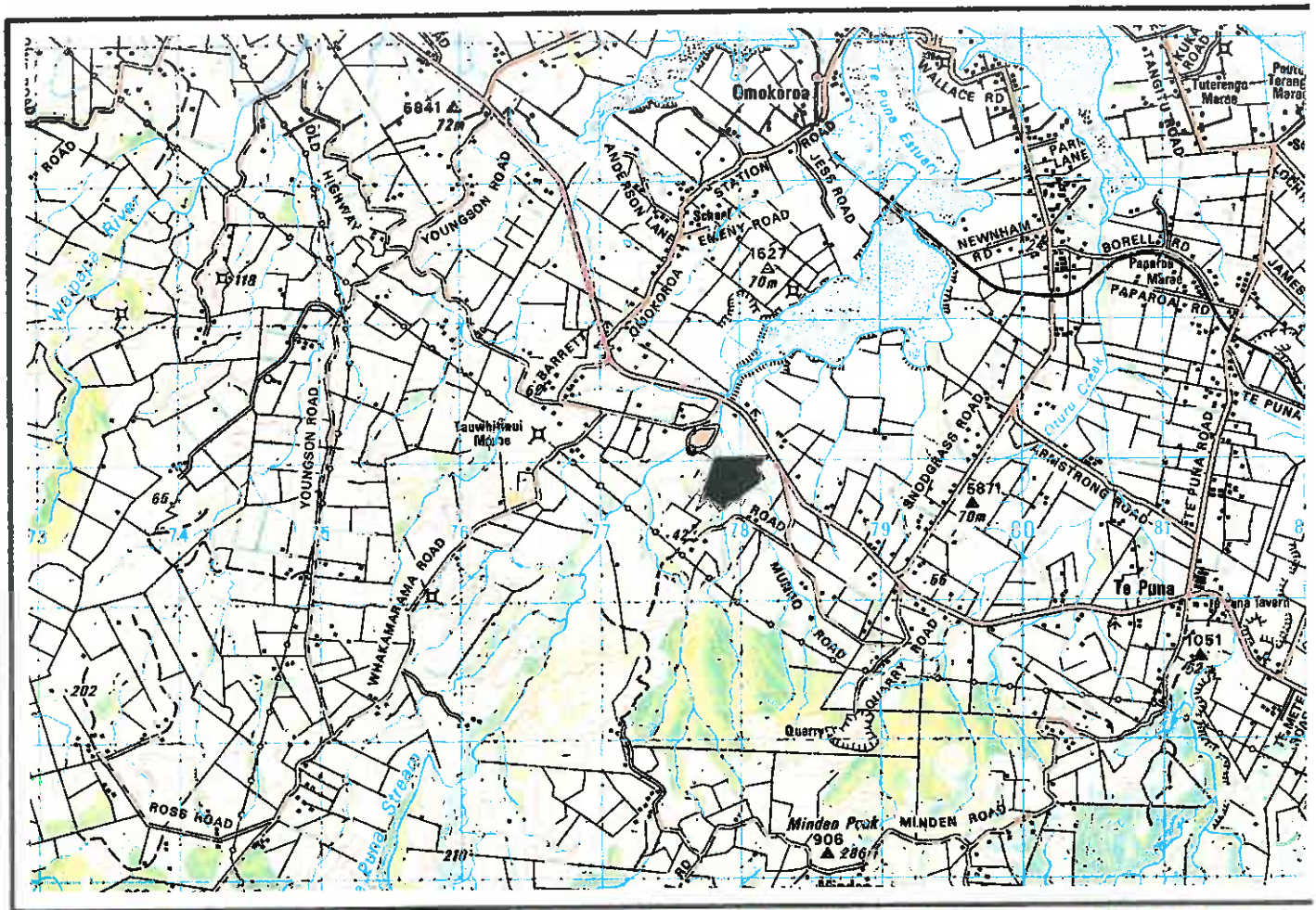
Physical character

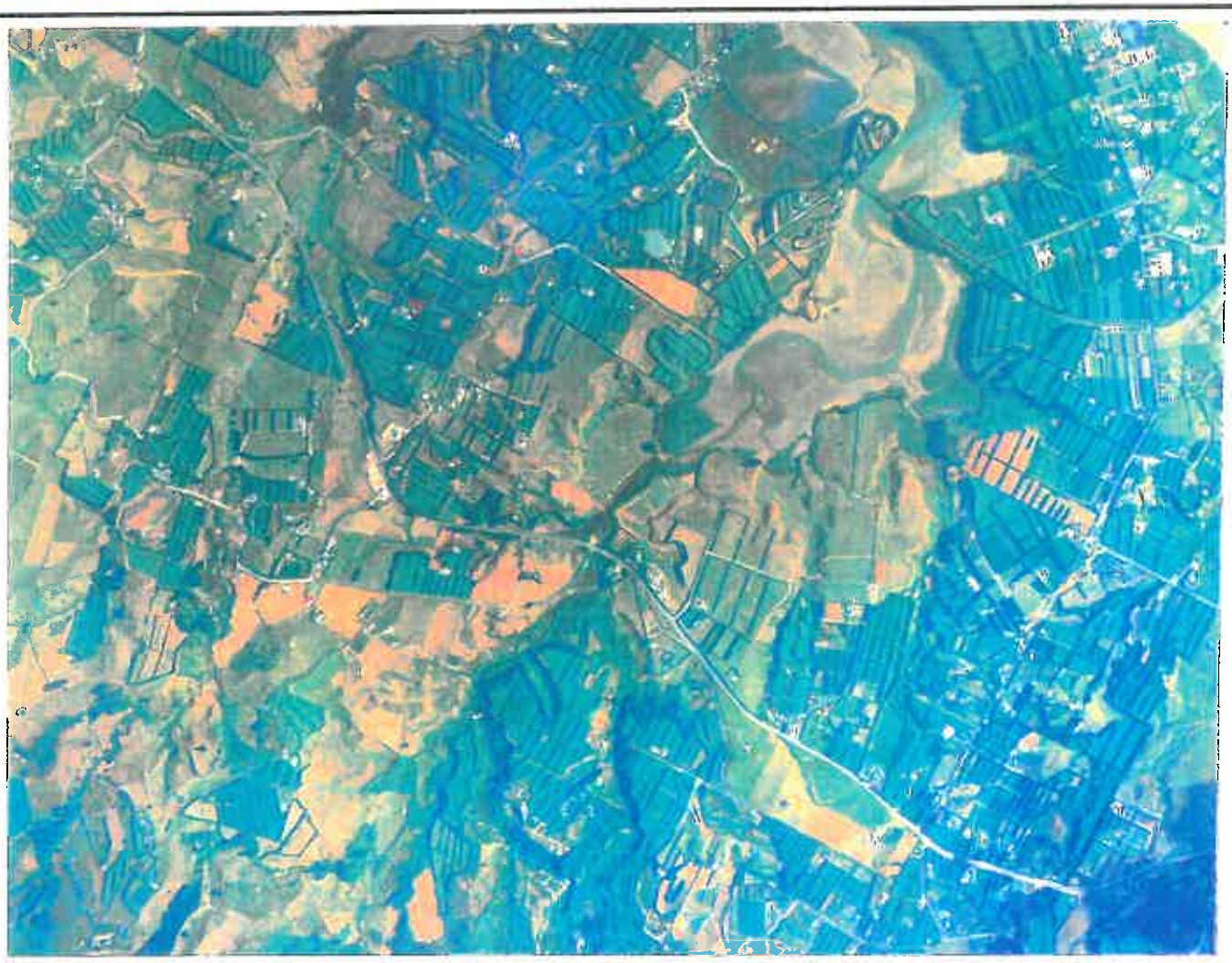
Freshwater wetland

Justification

Manuka forest would once have been relatively common adjacent to the tidal streams of Tauranga Harbour, but has been greatly reduced in extent. This site comprises a good quality example of this type. It was identified as a Category Two Area in Beadel (1992a) (defined in Appendix 5.4).

SS TE PUNA ESTUARY





WAIROA ESTUARY 2.

Area	Approx 35 ha
Altitude	0m
Grid reference	NZMS 260 U14 835862
Bioclimatic zone	Coastal
Ranking	District

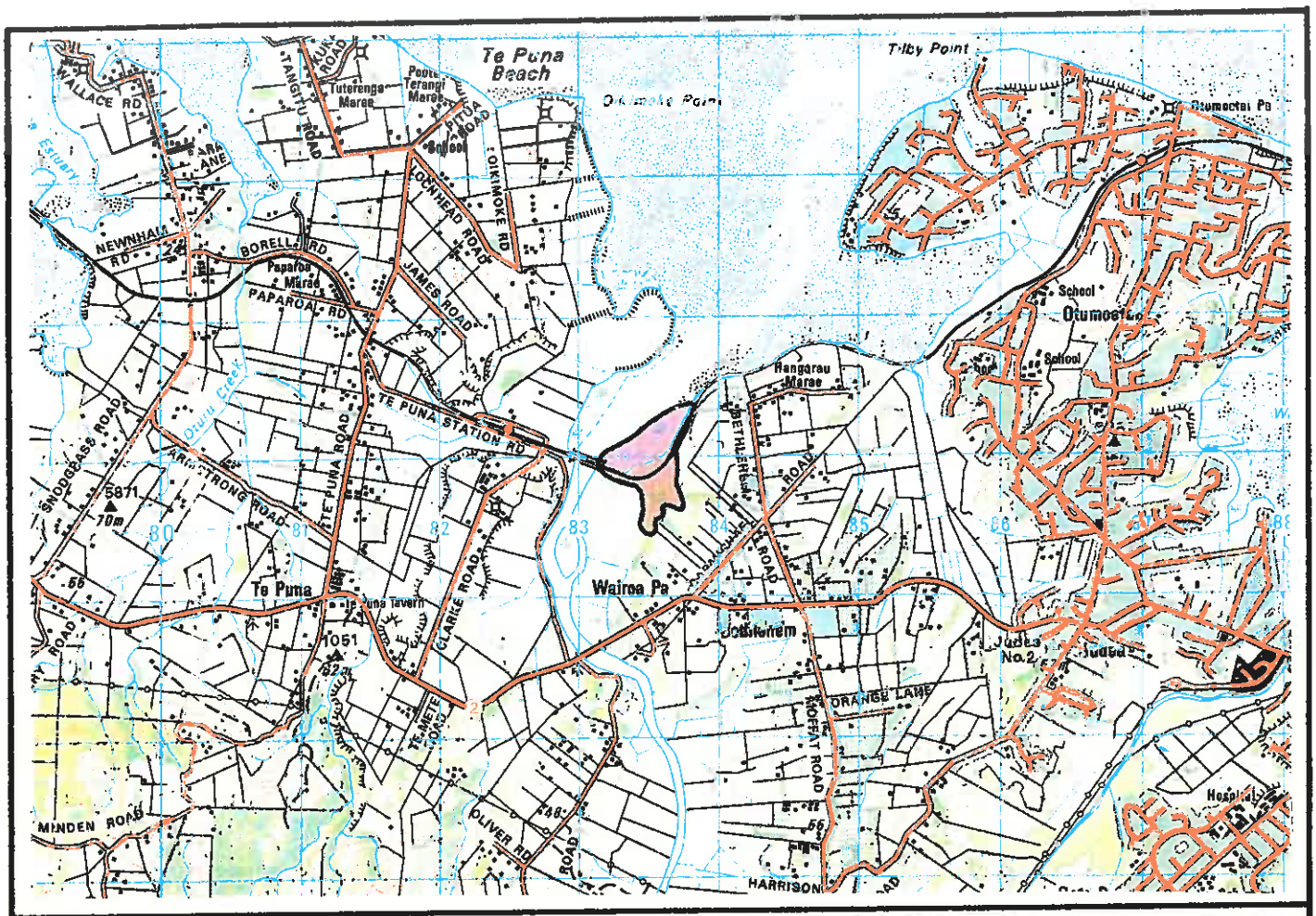
Vegetation type	Physical character
Grey willow forest	Freshwater wetland
Mangrove scrub	Freshwater wetland
Manuka scrub	Freshwater wetland
Mangrove shrubland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Freshwater wetland
Oioi sedgeland	Saline wetland
Oioi-*Baumea juncea* sedgeland	Saline wetland

(Beadel 1992a)

Justification

A relatively large and diverse example of estuarine vegetation with associated freshwater wetland vegetation. It was identified as a Category Two Area in Beadel (1992a) (defined in Appendix 5.4).

SS WAIROA ESTUARY 2



WAIROA ESTUARY 3.

Area	Approx 14 ha
Altitude	0m
Grid reference	NZMS 260 U14 829852
Bioclimatic zone	Coastal
Ranking	District

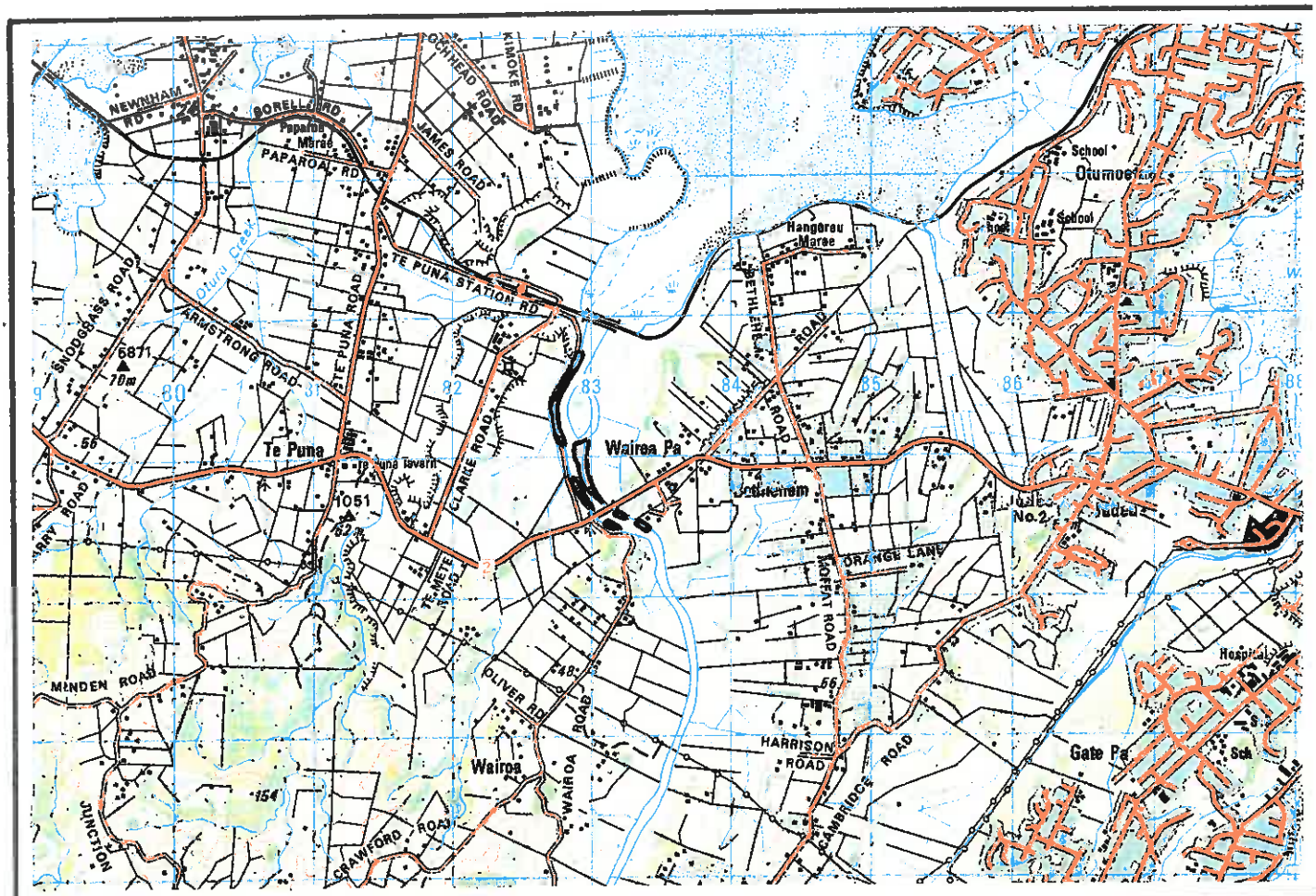
Vegetation type	Physical character
Raupo reedland	Freshwater wetland
Schoenoplectus validus reedland	Freshwater wetland
Baumea articulata reedland	Freshwater wetland
Raupo-*Schoenoplectus validus-Baumea articulata* reedland	Freshwater wetland

(Beadel 1992a)

Justification

A representative example of freshwater wetland vegetation adjacent to a river channel. It was identified as a Category Two Area (Beadel 1992a; defined in Appendix 5.4.), and is contiguous with and complementary to SS Wairoa 1 (a Category One Area in Beadel 1992).

SS WAIROA ESTUARY 3



MATUA ESTUARY

Area	Approx 35 ha
Altitude	0m
Grid reference	NZMS 260 U14 860875
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Mangrove scrub	Saline wetland
Mangrove shrubland	Saline wetland
Manuka shrubland	Freshwater wetland
Searush tussockland	Saline wetland
Oioi sedgeland	Saline wetland
Raupo reedland	Freshwater wetland
Estuary margin vegetation	Saline wetland and freshwater wetland

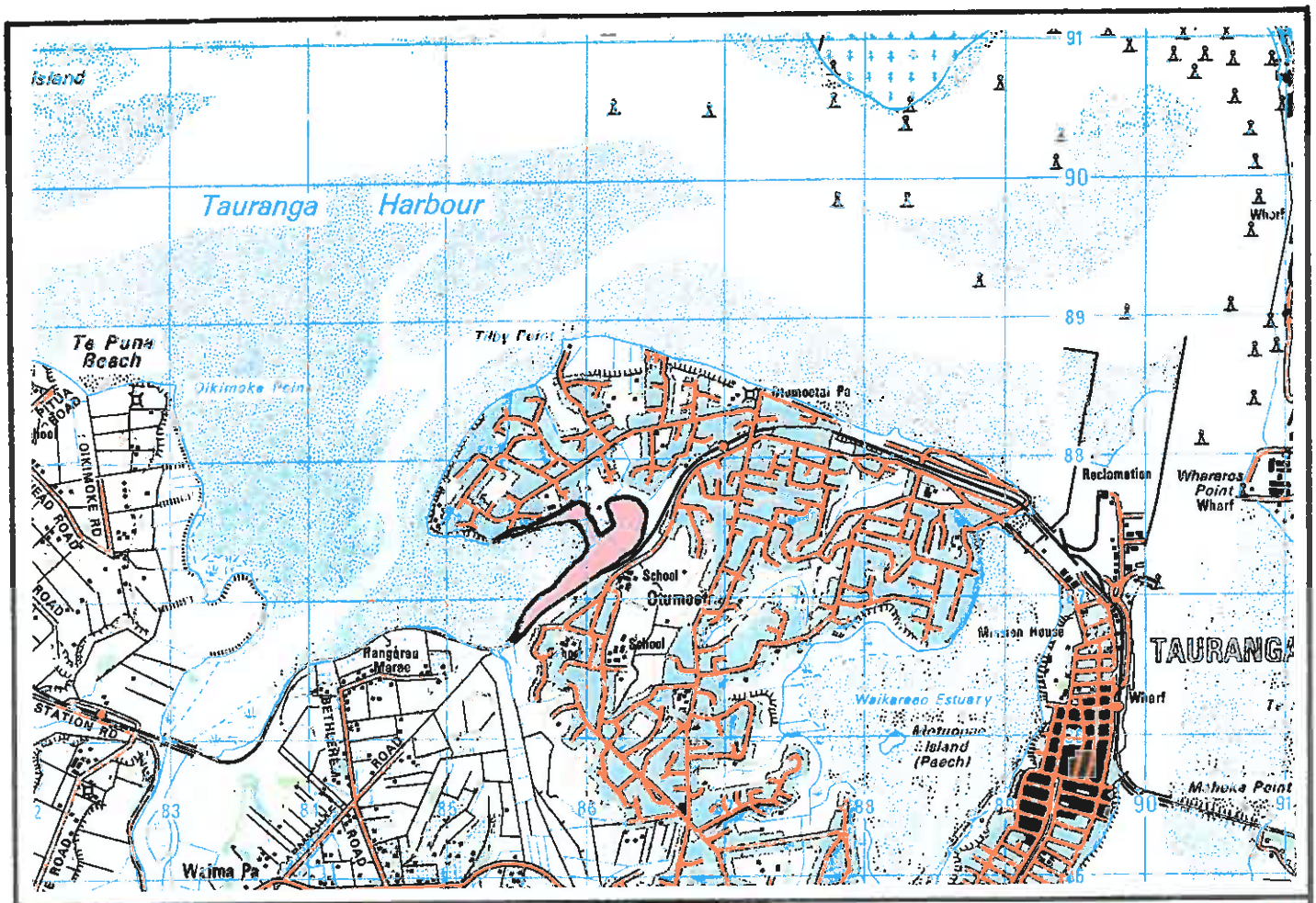
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

The Matua site is a good example of saltmarsh which has been heavily modified in the past (i.e. extensive drains, grazing and fencing). It is recovering well and will probably continue to improve in quality. It was identified as a Category Two Area in Beadel (1992a) (defined in Appendix 5.4).

SS MATUA


Island
Tauranga Harbour
Te Puna Beach
Oikimoke Point
Tuby Point
Otumoetai Pa
Reclamation
Whareroa Point Wharf
School
Otumoetai
Mission House
TAURANGA
Wharf
Rangarau Marae
Waikareao Estuary
Motuopae Island (Peach)
Matuka Point
Waima Pa
OIKIMOKE RD
STATION RD
BETHLEHEM ROAD
83
86
88
90
91

WAIKAREAO ESTUARY

Area	Approx 48 ha
Altitude	0m
Grid reference	NZMS 260 U14 880867
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical area
Grey willow forest	Freshwater wetland
Mangrove scrub	Saline wetland
Mangrove shrubland	Saline wetland
Manuka shrubland	Freshwater wetland
Searush tussockland	Saline wetland
Oioi-marsh ribbonwood shrub-sedgeland	Saline wetland
Oioi sedgeland	Saline wetland
(Cabbage tree)-(manuka)/raupo reedland	Freshwater wetland
Raupo reedland	Freshwater wetland

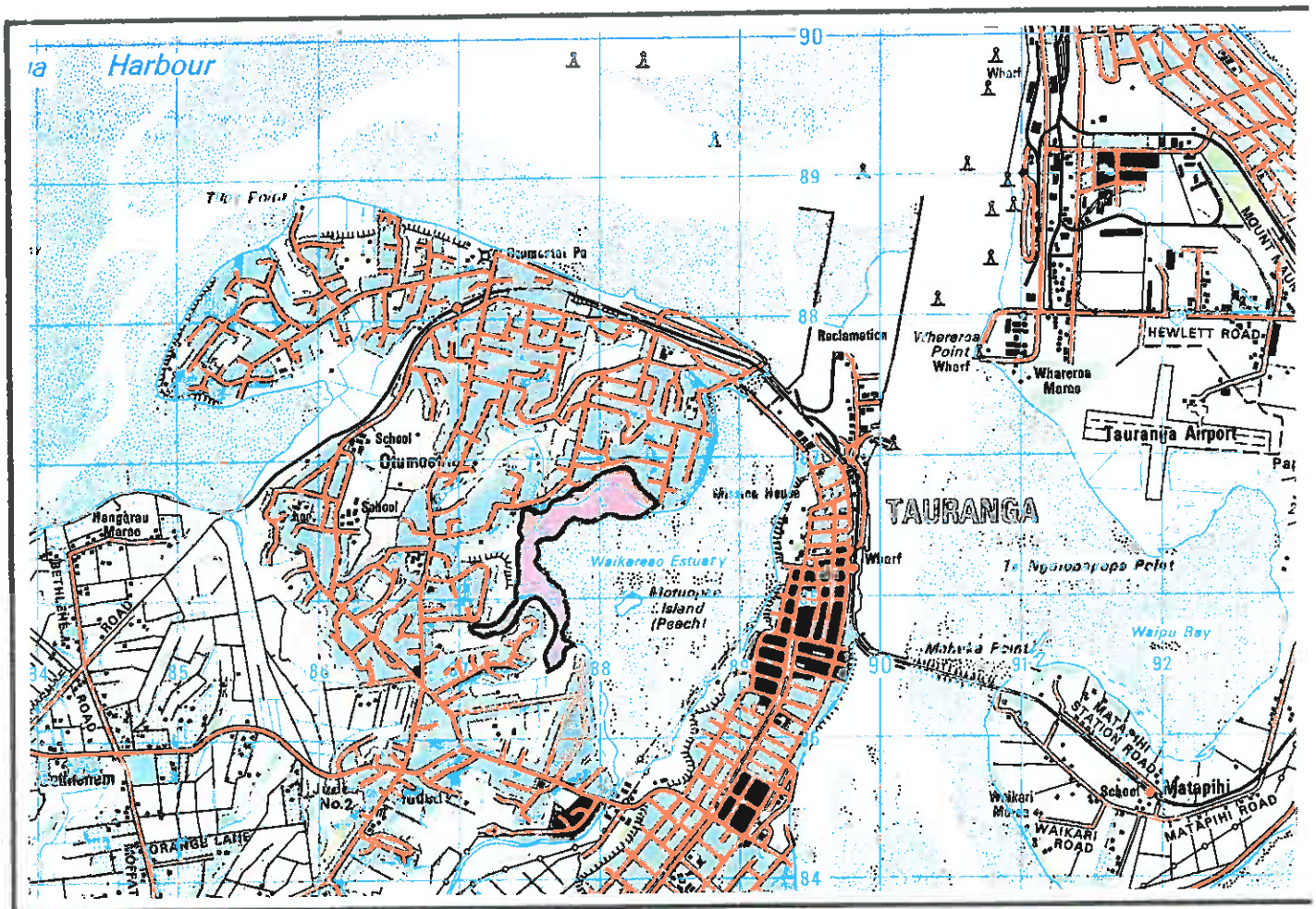
(Beadel 1992a)

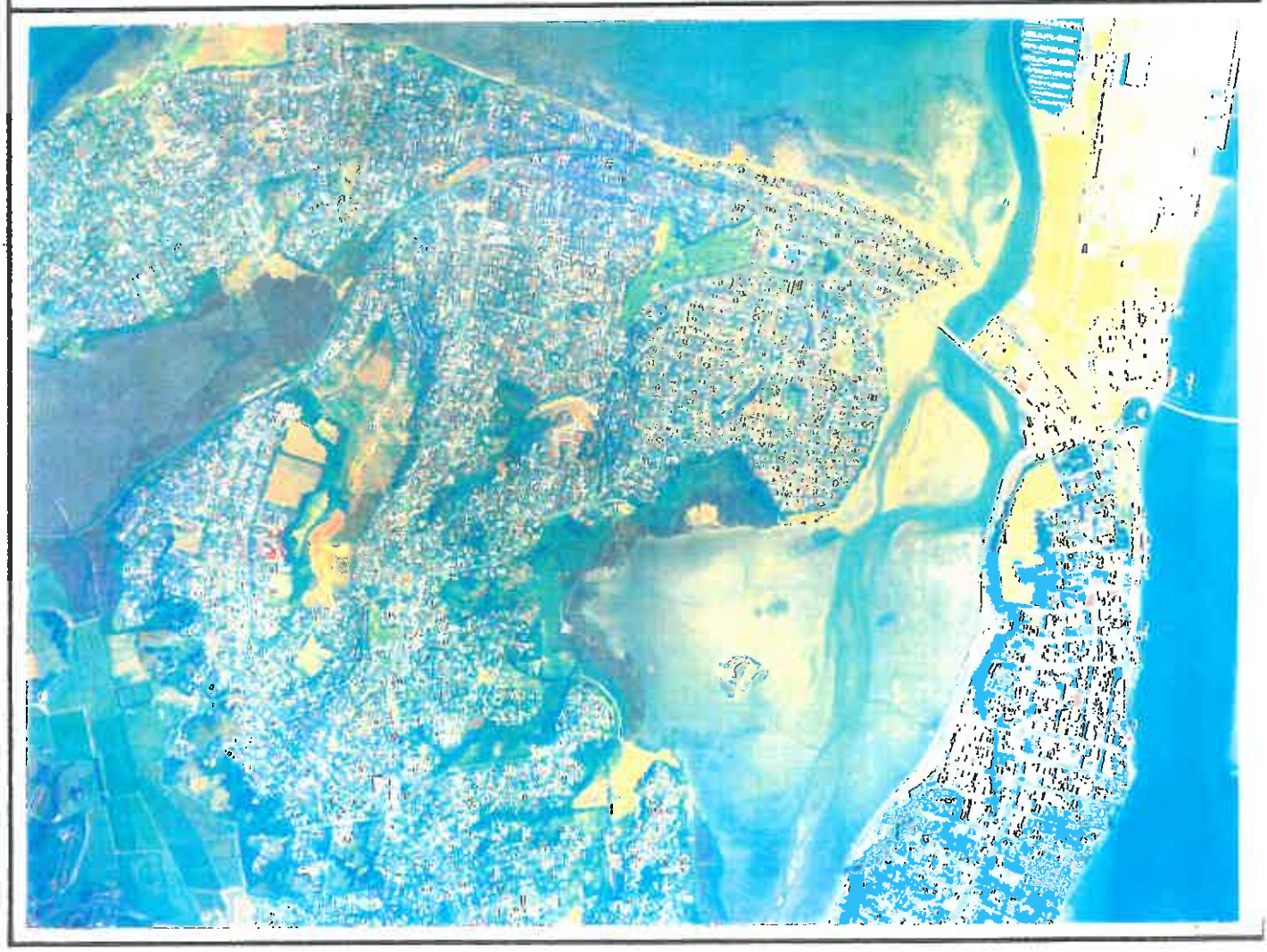
Vegetation map: Beadel 1992a

Justification

A relatively large example of estuarine vegetation with contiguous freshwater wetlands characteristic of the vegetation of Tauranga ecological district. This area has been substantially modified in the past, and old drains and fencelines are present. It was identified as a category two area by Beadel 1992a (defined in Appendix 5.4).

SS WAIKAREAO ESTUARY





WAIMAPU ESTUARY 2.

Area	Approx 16 ha
Altitude	0m
Grid reference	NZMS 260 U14 8788815
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical area
Mangrove scrub	Saline wetland
Manuka scrub	Freshwater wetland
Mangrove shrubland	Saline wetland
Searush tussockland	Saline wetland
Oioi sedgeland	Saline wetland
Oioi-*Baumea articulata* sedgeland	Saline wetland
Estuary margin vegetation	Saline wetland
Sandspit vegetation	Dune and beach sands

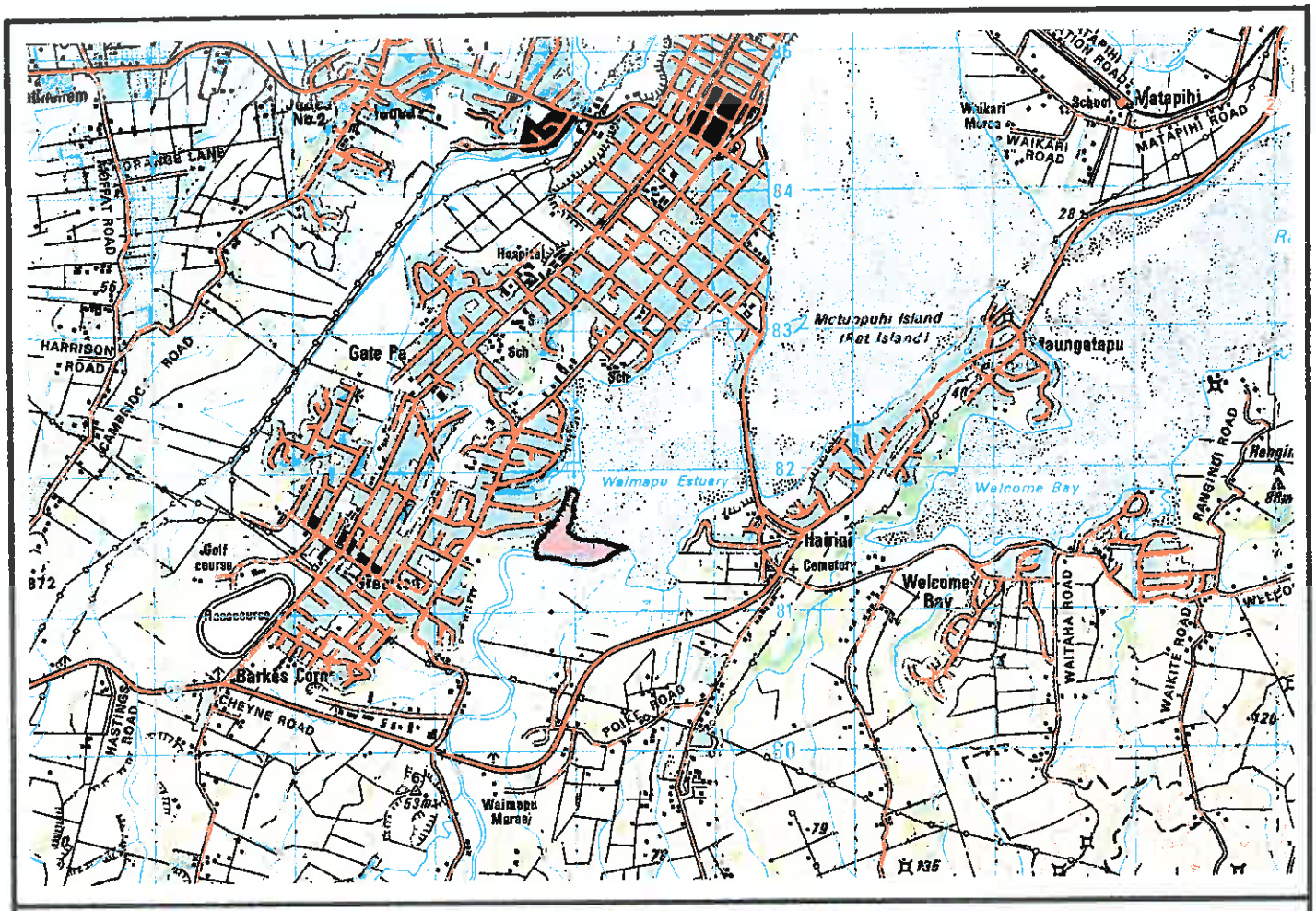
(Beadel 1992a)

Vegetation map: Beadel 1992a

Justification

This area contains good examples of these wetland vegetation types which are characteristic of Tauranga Harbour. It was identified as a Category Two Area in Beadel (1992a) (defined in Appendix 5.4) and is contiguous with and complementary to SS Waimapu Estuary 1 (a Category One Area in Beadel 1992a).

SS WAIMAPU ESTUARY 2



PAPAMOA SAND DUNES

Area	Approx 58 ha
Altitude	0m
Grid reference	NZMS U14 260 010838
Bioclimatic zone	Coastal
Ranking	District

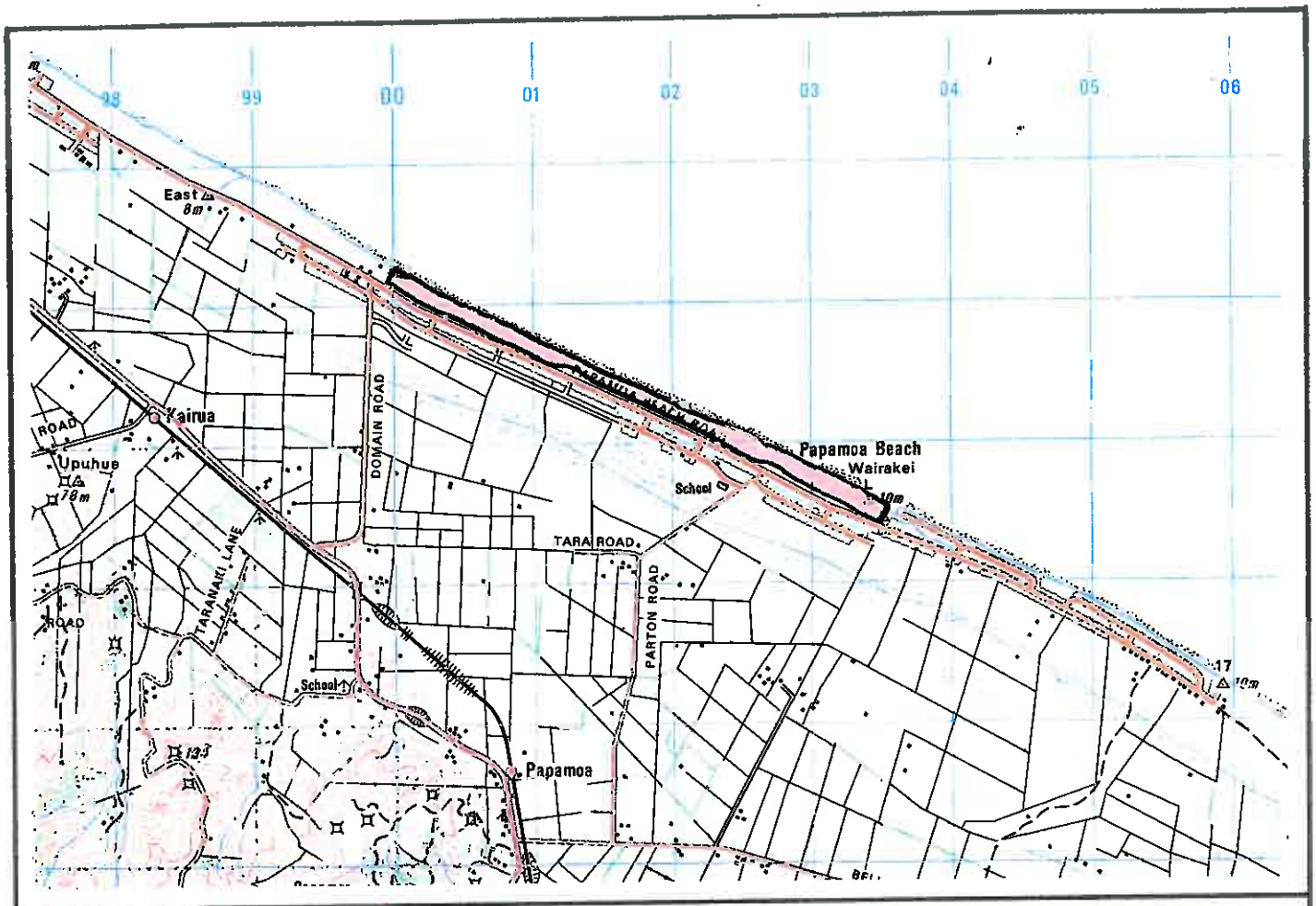
Vegetation type	Physical area
Isolepis nodosa/Muehlenbeckia complexa vineland	Dune and beach sands
Spinifex/Muehlenbeckia complexa vineland	Dune and beach sands
Isolepis nodosa/Carex testacea-Senecio elegans-Muehlenbeckia complexa sedgeland	Dune and beach sands
Spinifex-pingao sandfield	Dune and beach sands

(S. M. Beadel pers. obs. 1992)

Justification

A relatively good quality representative example of sand dune vegetation characteristic of Tauranga ecological district. Two threatened and local plants occur at this site; *Pimelea arenaria* (classed as rare Cameron *et al.* 1993) and pingao (classed as local).

SS PAPAMOA SAND DUNES



KAITUNA RIVER

Area	Approx 34 ha
Altitude	0m
Grid reference	NZMS 260 V14 108774
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical area
Manuka scrub	Freshwater wetland
Coprosma propinqua subsp. *propinqua*-pampas/harakeke shrubland	Freshwater wetland
Baumea sedgeland	Freshwater wetland
Bolboschoenus sp. (*B. fluviatilis?*)-raupo sedgeland	Freshwater wetland
Harakeke/raupo reedland	Freshwater wetland
Raupo reedland	Freshwater wetland

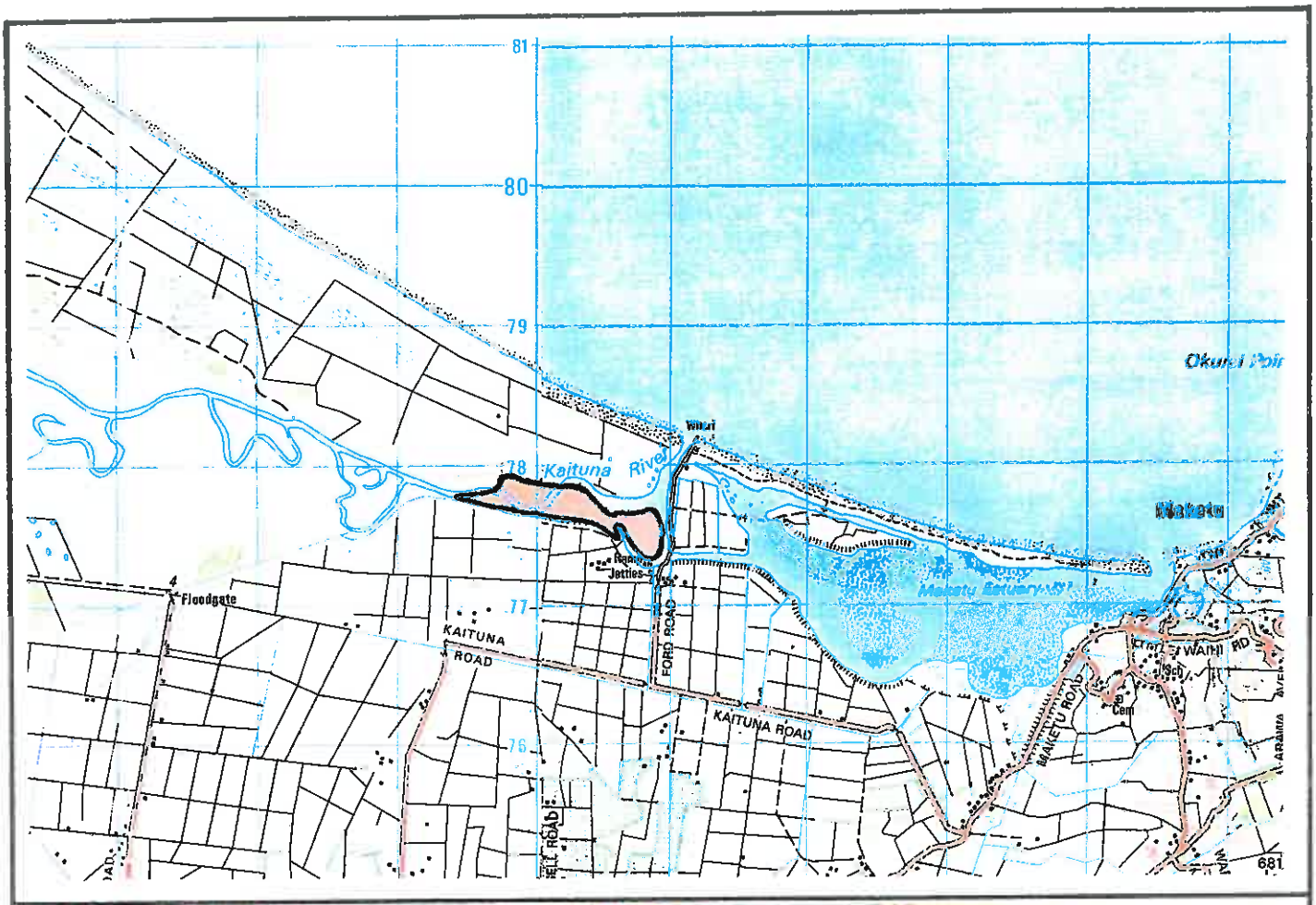
(S. M. Beadel pers. obs. 1992)

Justification

This site contains one of the last small remnants of the Kawa swamp, a once large wetland covering much of the Maketu Plains. Some of the vegetation types present here are not well-represented at other sites in the ecological district. Only a brief field inspection has been made of this site and other vegetation types and rare or interesting plant species may occur here. A higher ranking for this site may be appropriate and the site should be re-evaluated when further information is available.

This site is contiguous to a larger area, outside of the coastal zone.

SS KAITUNA RIVER



MAKETU SPIT

Area	Approx 4 ha
Altitude	0m
Grid reference	NZMS 260 V14 143773
Bioclimatic zone	Coastal
Ranking	District

Vegetation type

Spinifex sandfield

Physical area

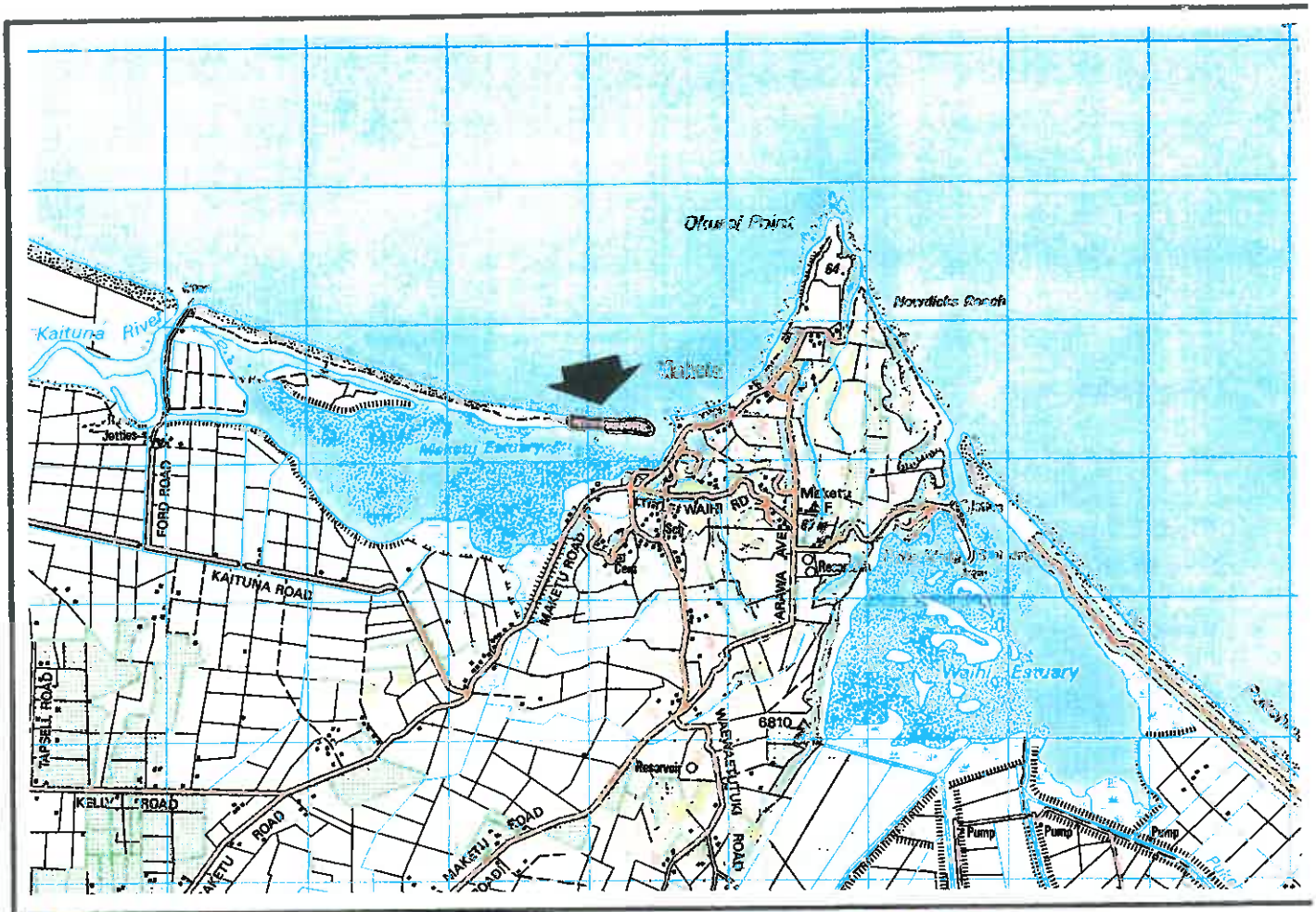
Dune and beach sands

(S. M. Beadel pers. obs. 1992)

Justification

This site contains a small population (five plants) of *Austrofestuca littoralis*, a species classed as rare (Cameron *et al.* 1993). This species was once relatively common in sand dune communities in New Zealand; however, only 13 locations are now known to occur in the North Island (Partridge 1992; Beadel 1990c & 1992d).

SS MAKETU SPIT



WAIHI ESTUARY (Part Wildlife Management Reserve)

Area	Approx 39 ha
Altitude	0m
Grid reference	NZMS 260 V14 170749
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical area
Marsh ribbonwood/sea couch-searush-*Baumea juncea-oioi* shrubland	Saline wetland
Olearia solandri/marsh ribbonwood shrubland	Saline wetland
Marsh ribbonwood shrubland	Saline wetland
Oioi-searush tussockland	Saline wetland
Searush tussockland	Saline wetland
Oioi sedgeland	Saline wetland
Schoenoplectus pungens sedgeland	Saline wetland
Raupo reedland (minor area)	Freshwater wetland
Raupo-*Bolboschoenus* sp. (*B. fluviatilis?*) reedland	Freshwater wetland
Searush/bachelor's button-*Mimulus repens* herbfield	Saline wetland

(Beadel 1991a)

Vegetation map: Beadel 1991a

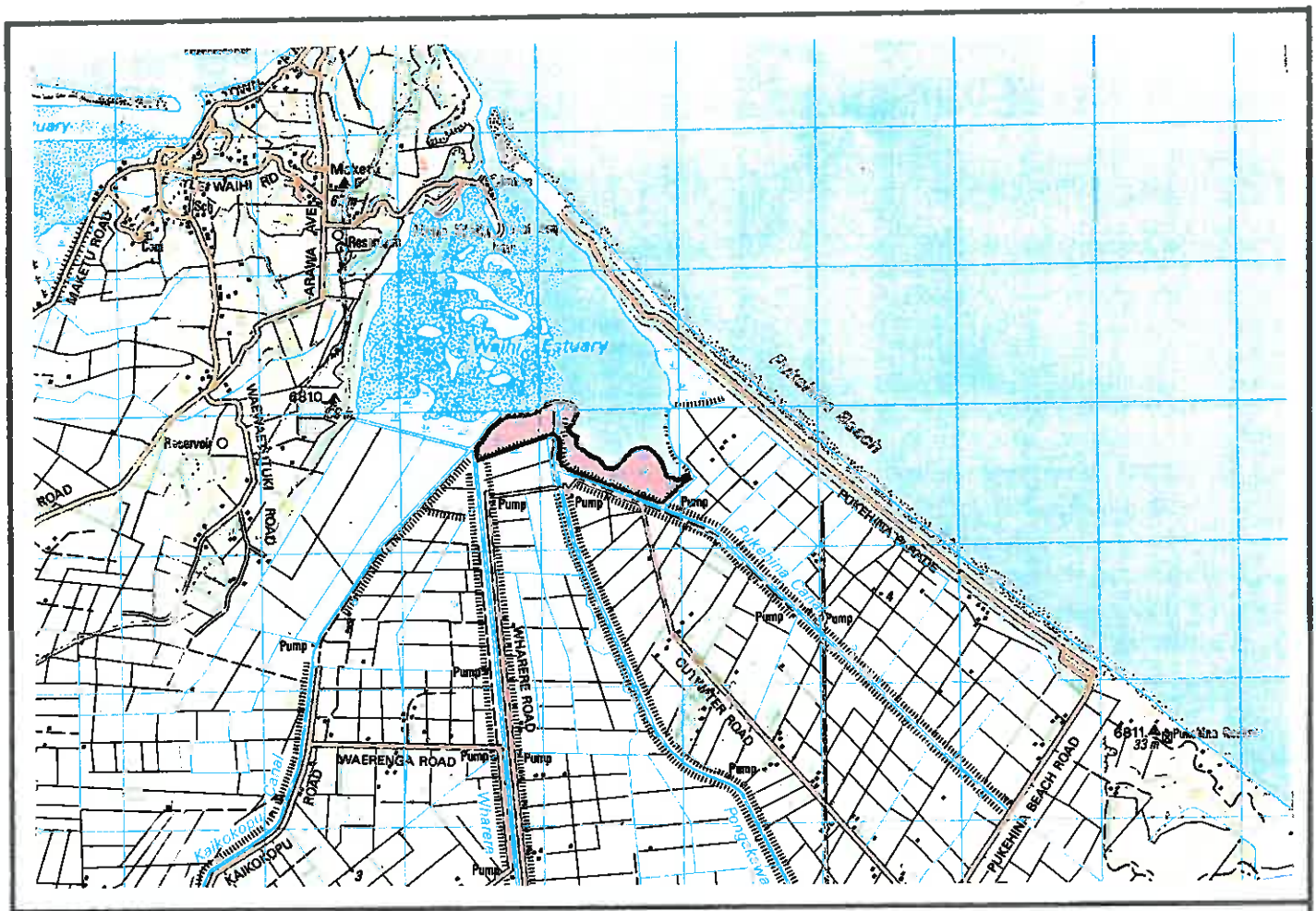
Justification

Waihi WMR contains relatively intact saltmarsh vegetation that together with saltmarsh in the Waewaetutuki wetland, is representative of the remaining saltmarsh in Waihi Estuary.

There are two regionally uncommon species present at this site, being *Mimulus repens* and *Bolboschoenus caldwellii*. Whilst *Mimulus repens* occurs locally throughout New Zealand, it is known from only one other site in the Tauranga Ecological District and is not currently known from elsewhere in the Coromandel-Bay of Plenty-East Cape region. It is likely to have occurred elsewhere around this estuary and other harbours and estuaries of the district in the past. However human modification has reduced the extent of suitable habitat (e.g., although it was recorded from Ohiwa Harbour in the early 1980's (Daniel 1984) a recent survey of the harbour failed to relocate it.)

Bolboschoenus caldwellii is known from only a few locations between East Cape and Cape Colville (including the west side of the Coromandel Peninsula) (Regnier 1988; Heginbotham and Esler 1985; Beadel 1991a).

SS WAIHI ESTUARY



(PART) WAEWAETUTUKI

Area	Approx 75 ha
Altitude	0m
Grid reference	NZMS 260 V14 156745
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Cabbage tree/grey willow-(*Coprosma propinqua* subsp. *propinqua*)/*Lemna minor*-sedges-*Blechnum minus* forest	Freshwater wetland
(Cabbage tree)/*Muehlenbeckia complexa*/harakeke-*Coprosma propinqua* subsp. *propinqua*-*Baumea articulata*-*B.* sp. (*B. rubiginosa?*)-raupo shrubland	Freshwater wetland
Saline wetland vegetation	Saline wetland
Mosaic[2]	Freshwater wetland

(S. M. Beadel pers. obs. 1989)

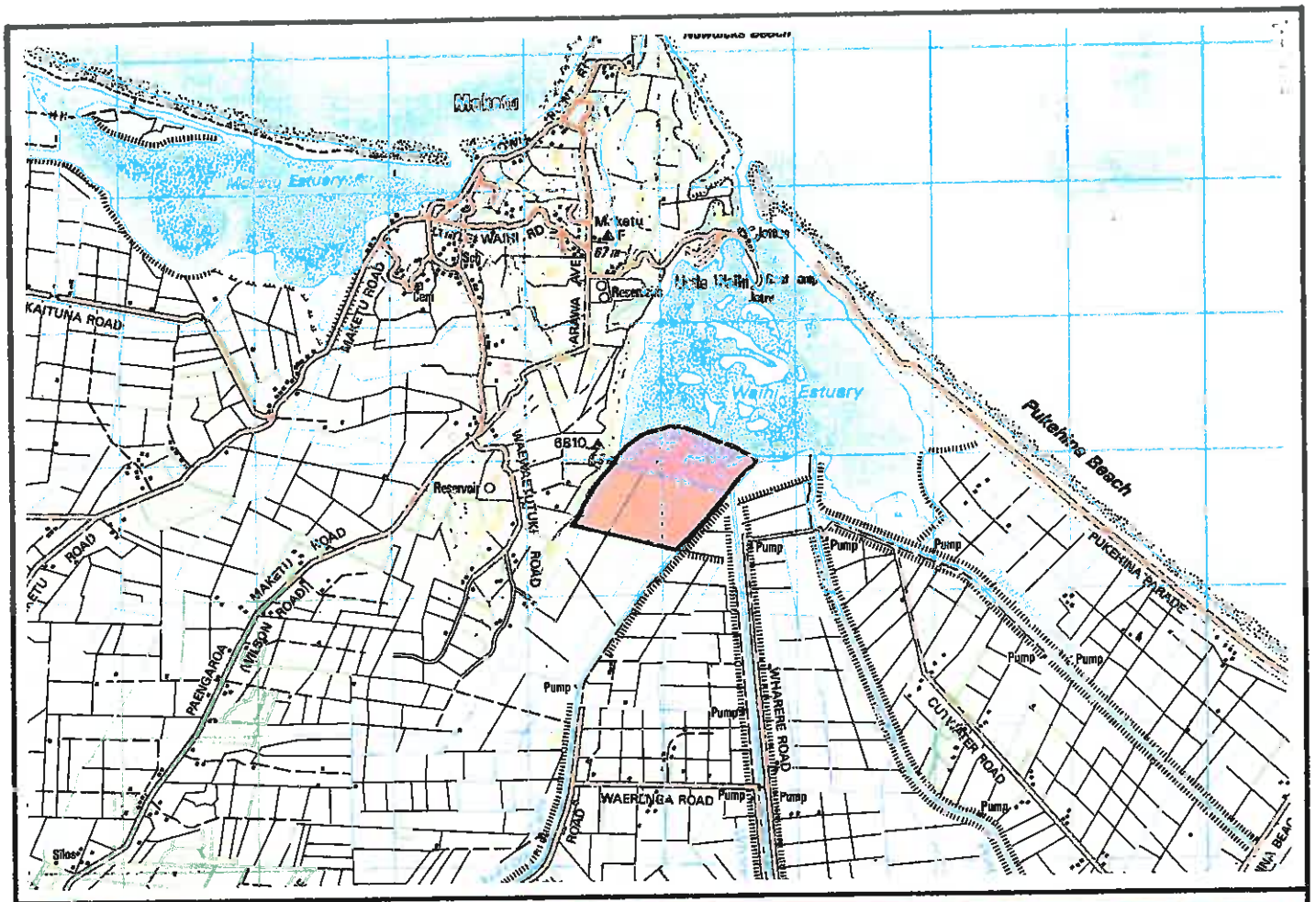
Justification

This site is part of one of the last substantial examples of freshwater wetland vegetation on the Pongakawa Plains. Prior to drainage the plains were largely wetland. The saline vegetation, together with Waihi WMR is representative of the remaining saltmarsh in Waihi Estuary. Another significant feature is the contiguous sequence of freshwater and saline wetland vegetation. Only a brief field inspection has been made of this site and other vegetation types and rare or interesting plant species may occur here.

A higher ranking for this site may be appropriate and the site should be re-evaluated when further information is available.

[2]This area contains a mosaic of vegetation types (comprising sedges, rushes, grasses and herbs) with areas of open water. Species present include *Carex subdola, Lemna minor*, exotic grasses and herbs, *Juncus effusus, Callitriche stagnalis* and *Carex virgata.*

SS (PART) WAEWAETUTUKI



PUKEHINA 1.

Area	Approx 1 ha
Altitude	0-20m
Grid reference	NZMS 260 V14 216726
Bioclimatic zone	Coastal
Ranking	District

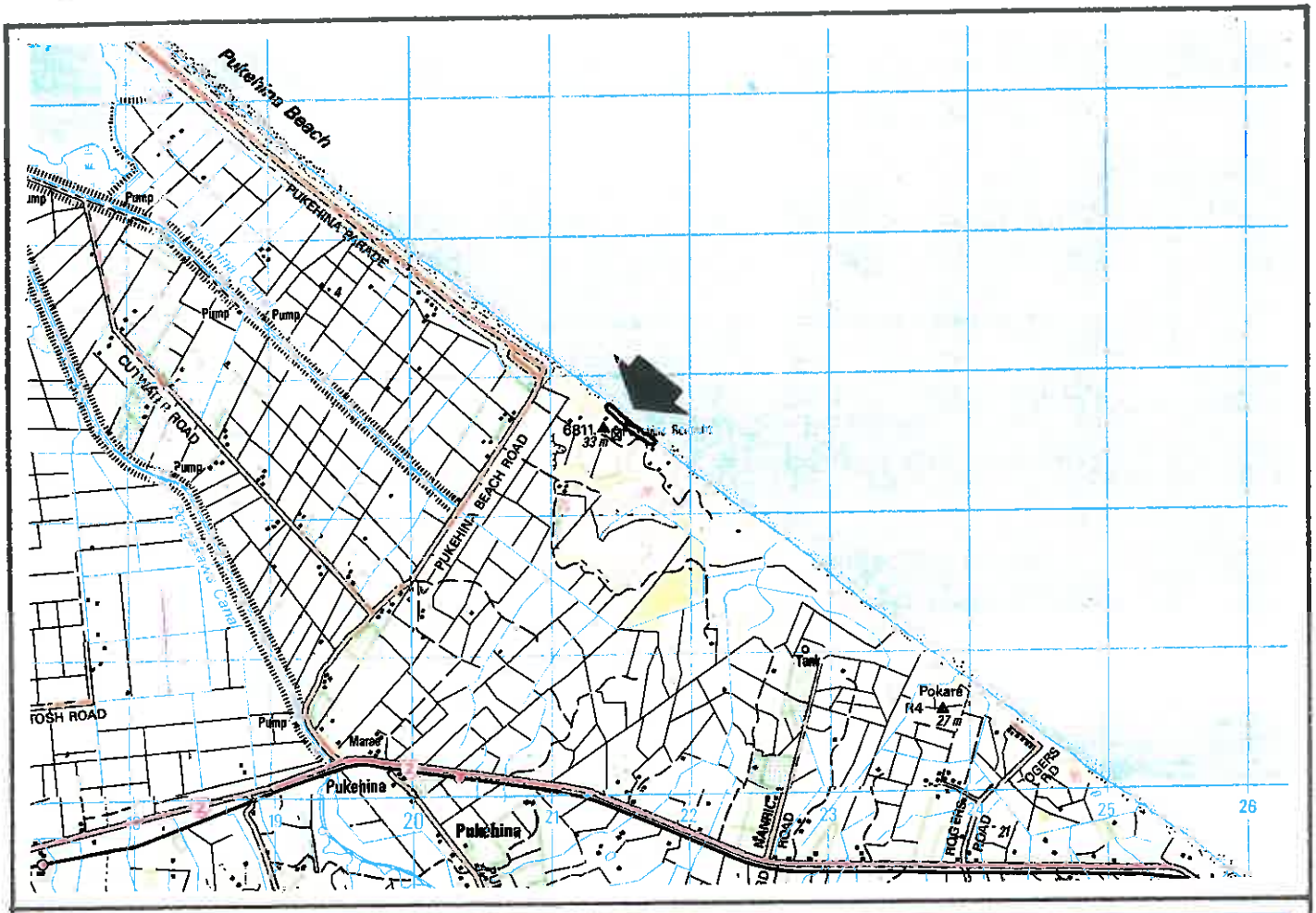
Vegetation type	Physical character
Taupata/*Muehlenbeckia complexa-Isolepis nodosa* shrubland	Volcanic soft coast (cliff)

(S. M. Beadel pers. obs. 1992)

Justification

This site contains a representative example of a landform and vegetation that is characteristic of the coast between Pukehina and Otamarakau. The site selected is the best remaining example of this feature in Tauranga Ecological District.

SS PUKEHINA 1



6.2 MOTITI ECOLOGICAL DISTRICT

Motiti Ecological District includes several islands. The largest of these is Motiti (approx. 685ha). Motiti is plateau-like and low-lying, reaching only 57m a.s.l., with low coastal cliffs. Motiti would once have been covered in pohutukawa forest and mixed coastal forest (canopy dominants including pohutukawa, puriri, karaka, kohekohe, tawa and rewarewa). However, it has a long history of Maori occupation and has also been farmed for the past 100 years. The remaining indigenous vegetation is restricted to the cliffs around the island margin and is predominantly pohutukawa forest and treeland. These are minor remnants in gullies.

Karewa Island (approx. 3.6ha) is rugged, rising steeply from the rocky coastline to 93m a.s.l., with the south and west falling away more gently to the coast. Motunau (Plate Island) is also rugged. Other islands in the district are Motuhaku Island (Schooner Rocks) which is a stack, and the several small islands around Motiti (i.e. Taumaihi, Motuputa, Motupatiki and Motukahakaha).

The vegetation on Karewa Island has been modified and today only a small area of karaka forest remains. However there is coastal scrub and shrubland. Taupata (*Coprosma repens*) and *Melicytus novae-zelandiae* are common on Karewa and Motunau Islands, and the coastal rocks and faces on these islands have mats of New Zealand iceplant and *Sarcocornia quinqueflora*.

Karewa Island is the present day southern limit of distribution for parapara (*Pisonia brunoniana*) (classed as local, Cameron *et al.* 1993). *Euphorbia glauca* (classed as vulnerable) and *Lepidium oleraceum* (classed as rare) are also found in this district.

6.2.1

SPECIAL VEGETATION TYPES & THREATENED AND LOCAL PLANTS	
MOTITI ECOLOGICAL DISTRICT	
Vulnerable taxa:	
Euphorbia glauca:	Taumaihi Island (off Motiti Island) (Shaw and Clarkson 1991).
Rare taxa:	
Lepidium oleraceum:	Karewa Island and Motuputa Island (off Motiti Island) (A Jones pers. comm.).
Local taxa:	
Pisonia brunoniana (parapara):	Karewa Island (A Jones pers. comm.).
Distribution; Southern limit:	
Pisonia brunoniana:	Karewa Island.

6.2.2 SIGNIFICANT SITES: REGIONAL

KAREWA ISLAND
[Wildlife Sanctuary; (Crown land)]

Area	3.6 ha
Altitude	0-79m
Grid reference	NZMS 260U13 870033
Bioclimatic zone	Coastal
Ranking	Regional

Vegetation type	Physical character
Karaka-parapara forest	Volcanic hard coast
Taupata-Melicytus novae-zelandiae forest	Volcanic hard coast
Muehlenbeckia complexa-akeake shrub-vineland	Volcanic hard coast
New Zealand iceplant-*Sarcocornia quinqueflora* herbfield	Volcanic hard coast

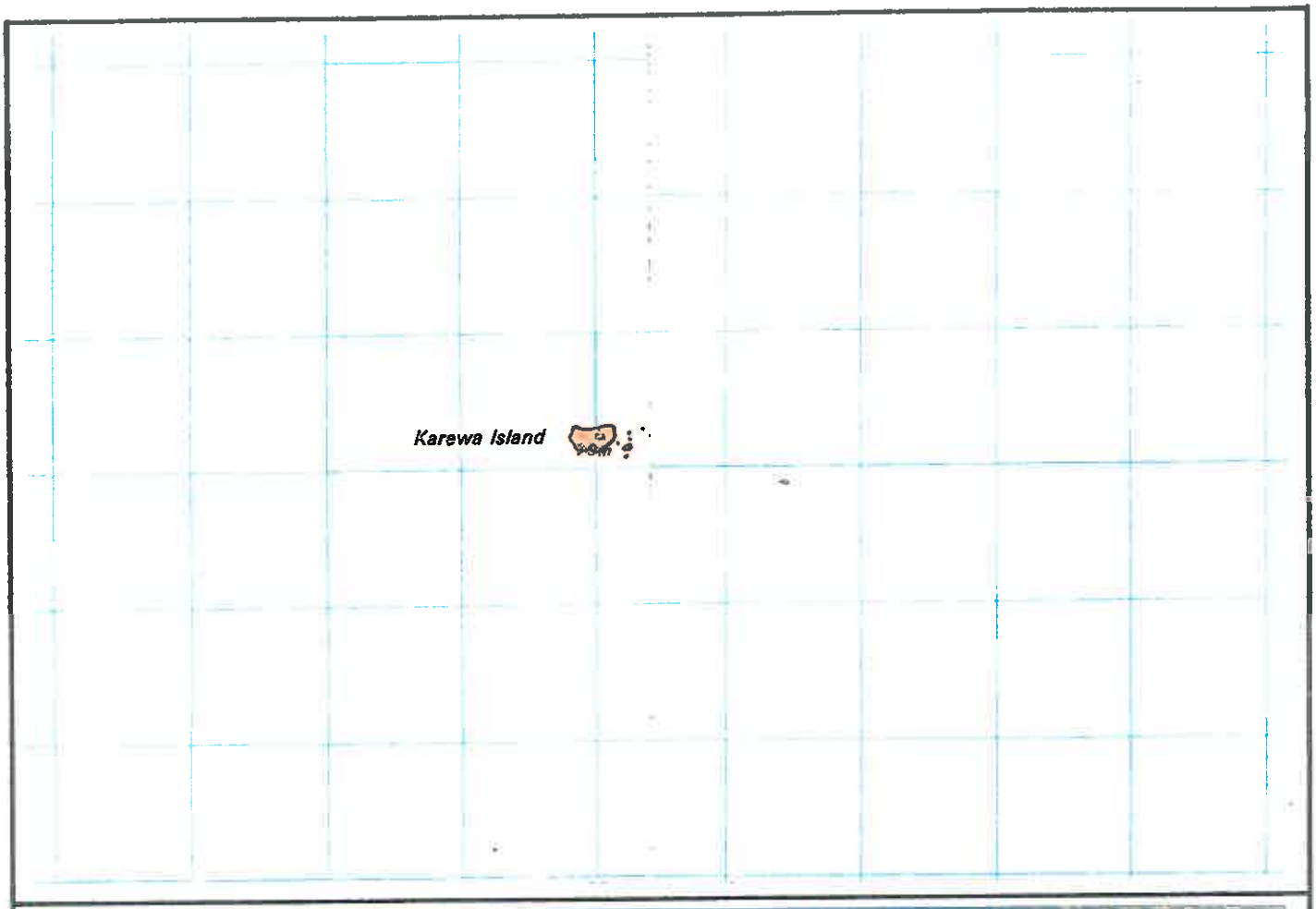
(A. Jones pers. comm. 1992) (See also Sladden 1924)

Justification

Karewa Island contains a good quality, representative example of the vegetation of Motiti Ecological District. No introduced animals occur on the island (P. Jansen pers. comm.).

Lepidium oleraceum (classed as rare) and *Pisonia brunoniana* (classed as local) occur on the island. *P. brunoniana* reaches its present day southern limit of distribution on the island.

SS KAREWA ISLAND



MOTUNAU
[Plate Island Wildlife Sanctuary; (Maori owned)]

Area	Approx 2.8 ha
Altitude	0-40m
Grid reference	NZMS 260 V14 243872
Bioclimatic zone	Coastal
Ranking	Regional

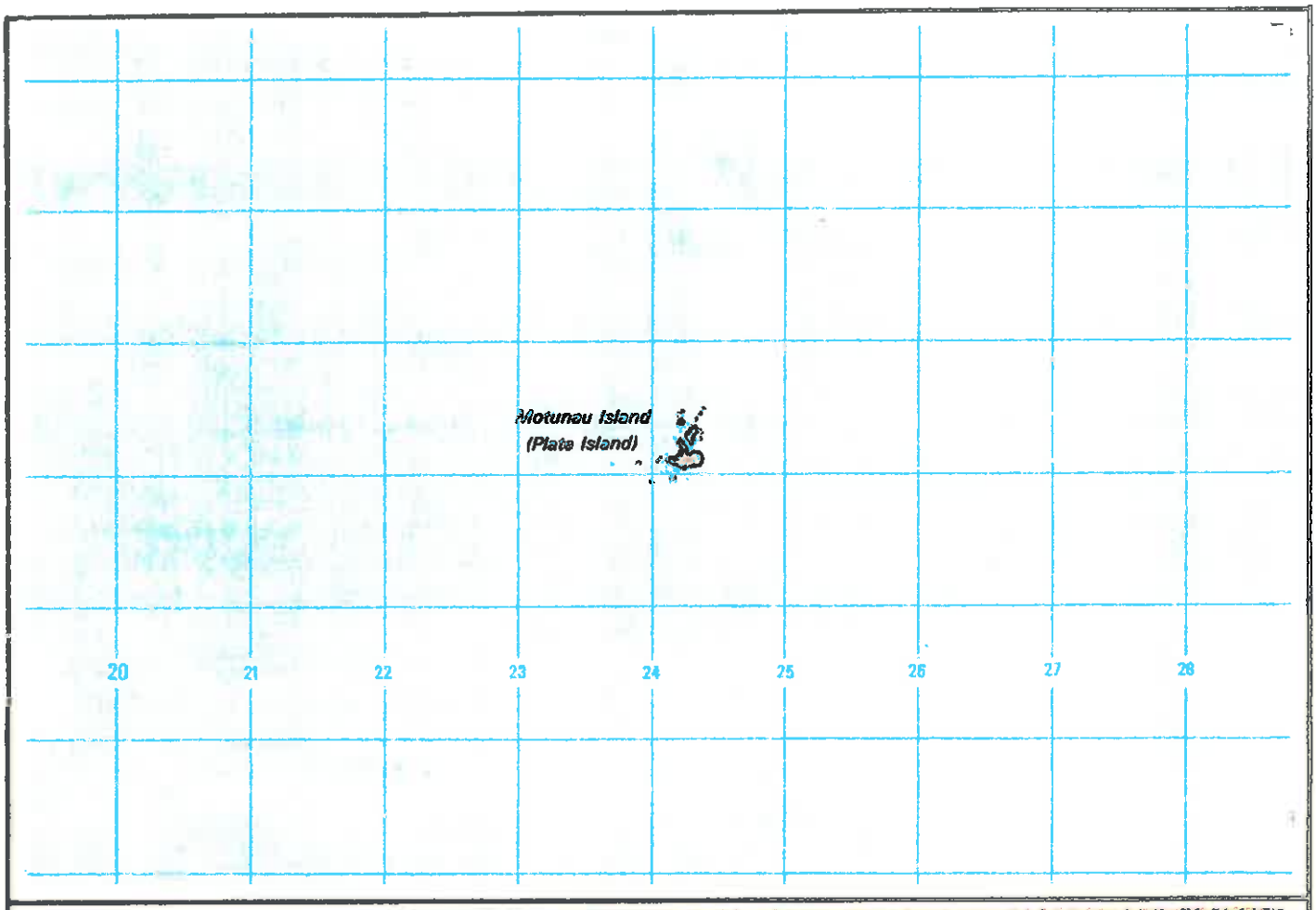
Vegetation type	Physical character
Karo forest	Volcanic hard coast
Pohutukawa forest	Volcanic hard coast
Taupata forest	Volcanic hard coast
Karo-taupata scrub	Volcanic hard coast
Pohutukawa/taupata-karo scrub	Volcanic hard coast
Taupata scrub	Volcanic hard coast
Taupata-(karo) scrub	Volcanic hard coast
Karo-taupata shrubland	Volcanic hard coast
Poa anceps subsp. *anceps*-New Zealand iceplant-*Isolepis nodosa* sedge-herb-grassland	Volcanic hard coast
New Zealand iceplant herbfield	Volcanic hard coast
New Zealand iceplant-*Sarcocornia quinqueflora* herbfield	Volcanic hard coast
New Zealand iceplant-*Sarcocornia quinqueflora-taupata-Poa anceps* subsp. *anceps* herbfield	Volcanic hard coast
(Taupata)-(karo)/New Zealand iceplant-*Sarcocornia quinqueflora* herbfield	Volcanic hard coast

(W. B. Shaw pers. comm. 1992) (See also Taylor 1991)

Justification

Motunau (Plate Island) contains good quality representative examples of these vegetation types, characteristic of Motiti Ecological District. No introduced browsing animals occur on these islands.

SS MOTUNAU ISLAND



TAUMAIHI ISLAND

Area	Approx 3 ha
Altitude	0-20m
Grid reference	NZMS 260 V14 108886
Bioclimatic zone	Coastal
Ranking	Regional

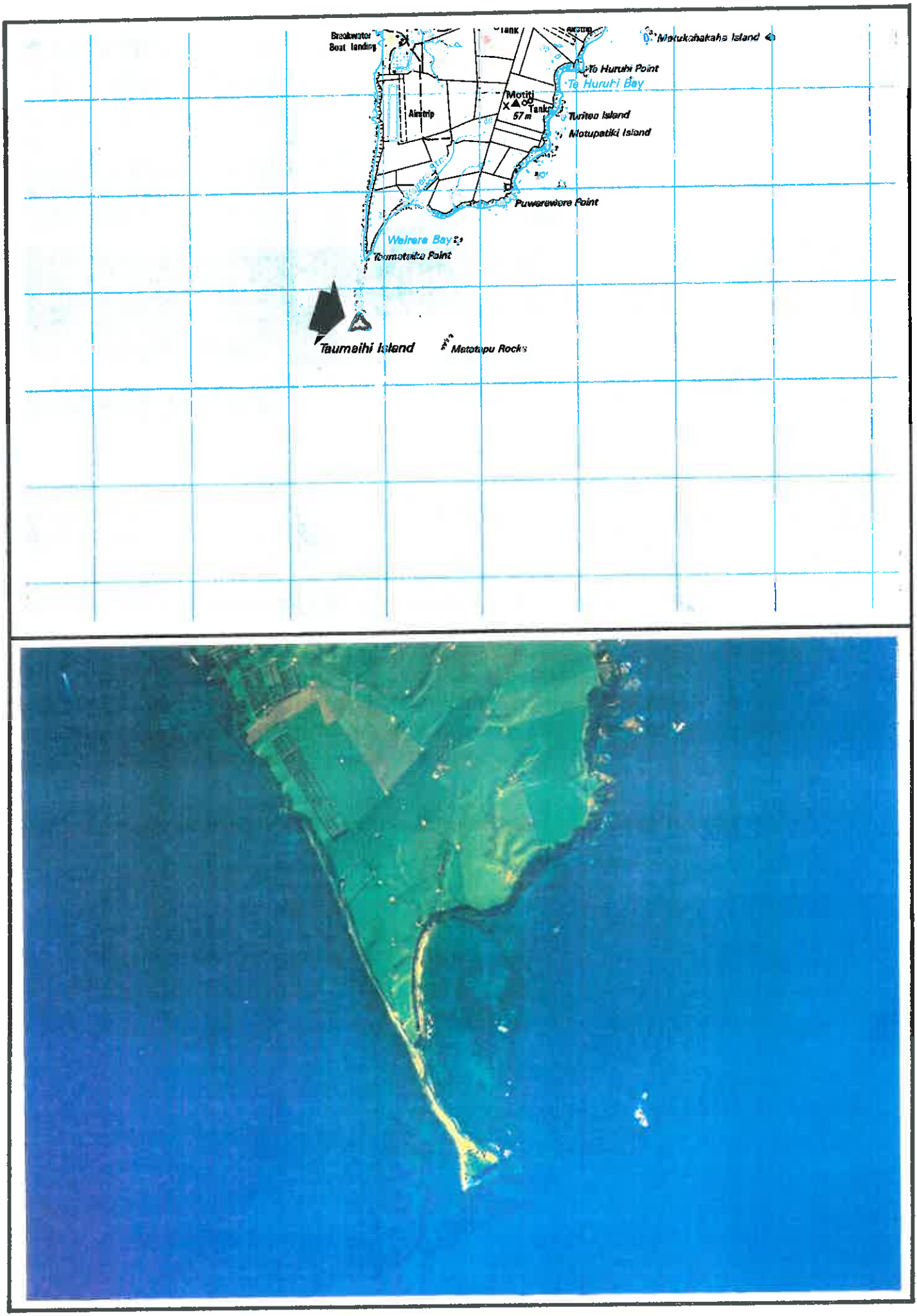
Vegetation type	Physical character
Pohutukawa forest	Sedimentary coastal hinterland
Pohutukawa/whaririki flaxland	Sedimentary coastal hinterland
Bracken fernland	Sedimentay coastal hinterland
Apium prostratum var. *filiforme-Sarcocornia quinqueflora*-New Zealand iceplant herbfield	Sedimentary coastal hinterland
Calystegia soldanella boulderfield	Sedimentary coastal hinterland
Sarcocornia quinqueflora-Apium prostratum-New Zealand iceplant herbfield	Sedimentary coastal hinterland
(Spinifex)-*Isolepis nodosa* sandfield	Dune and beach sands

(Shaw and Clarkson 1991)

Justification:

Taumaihi Island is a small island to the south of Motiti Island (accessible by foot at low tide). It contains a small population of *Euphorbia glauca,* ranked as vulnerable (Cameron *et al.* 1993). Kiore are the only introduced animals that occur on the island (P Jansen pers. comm.).

SS TAUMAIHI ISLAND



6.2.3 SIGNIFICANT SITES: DISTRICT

MOTUPUTA ISLAND

Area	Approx 0.5 ha
Altitude	0-20m
Grid reference	NZMS 260 V14 146923
Bioclimatic zone	Coastal
Ranking	District

Vegetation type	Physical character
Taupata-*Melicytus novae-zelandiae* forest	Volcanic hard coast
New Zealand iceplant-*Sarcocornia quinqueflora* herbfield	Volcanic hard coast

(A. Jones pers. comm. 1992)

Justification

Motuputa Island is a small island to the east of Motiti. It contains a small population of *Lepidium oleraceum* (A. Jones, pers. comm.), classed as rare (Cameron *et al.* 1993). No introduced animals occur on the island (P. Jansen pers. comm.).