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MOTUIHE ISLAND
DEVELOPMENT PROPOSALS FOR A RECREATIONAL RESOURCE

A major design study submitted for the Diploma of Landscape Architecture in the University of Canterbury by DJScott

Lincoln College 1974
CONTENTS

<table>
<thead>
<tr>
<th>CONTENTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF FIGURES</td>
<td>III.</td>
</tr>
<tr>
<td>LIST OF MAPS</td>
<td>IV.</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>V.</td>
</tr>
<tr>
<td>BRIEF</td>
<td>VIII.</td>
</tr>
</tbody>
</table>

THE HAURAKI GULF MARITIME PARK

<table>
<thead>
<tr>
<th>THE HAURAKI GULF MARITIME PARK</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BACKGROUND OF THE PARK</td>
<td>1.</td>
</tr>
<tr>
<td>LOCATION AND DESCRIPTION</td>
<td>4.</td>
</tr>
<tr>
<td>ACCESSIBILITY OF THE ISLANDS</td>
<td>8.</td>
</tr>
<tr>
<td>THE MANAGEMENT PLAN</td>
<td>11.</td>
</tr>
</tbody>
</table>

MOTUIHE ISLAND

<table>
<thead>
<tr>
<th>MOTUIHE ISLAND</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCATION AND BRIEF DESCRIPTION</td>
<td>15.</td>
</tr>
<tr>
<td>HISTORY</td>
<td>19.</td>
</tr>
<tr>
<td>ARCHAEOLOGY</td>
<td>31.</td>
</tr>
</tbody>
</table>

ENVIRONMENTAL FACTORS

<table>
<thead>
<tr>
<th>ENVIRONMENTAL FACTORS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CLIMATE</td>
<td>34.</td>
</tr>
<tr>
<td>GEOLOGY AND SOILS</td>
<td>38.</td>
</tr>
<tr>
<td>TOPOGRAPHY AND DRAINAGE</td>
<td>43.</td>
</tr>
<tr>
<td>VEGETATION</td>
<td>45.</td>
</tr>
<tr>
<td>FAUNA</td>
<td>62.</td>
</tr>
<tr>
<td>MARINE ECOLOGY</td>
<td>65.</td>
</tr>
<tr>
<td>SITE APPRAISAL</td>
<td>Page</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>66.</td>
</tr>
<tr>
<td>VISUAL SURVEY</td>
<td>68.</td>
</tr>
<tr>
<td>PHYSICAL SURVEY</td>
<td>89.</td>
</tr>
<tr>
<td>SHORELINE SURVEY</td>
<td>99.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MOTUIHE ISLAND AS A RECREATIONAL RESOURCE</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>117.</td>
</tr>
<tr>
<td>RECREATION TRENDS</td>
<td>119.</td>
</tr>
<tr>
<td>MOTUIHE'S ROLE</td>
<td>123.</td>
</tr>
<tr>
<td>MANAGEMENT OBJECTIVES</td>
<td>126.</td>
</tr>
<tr>
<td>CARRYING CAPACITY</td>
<td>131.</td>
</tr>
<tr>
<td>CONTROLS ON USE</td>
<td>148.</td>
</tr>
<tr>
<td>THE FARMING STATEMENT</td>
<td>151.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CONCEPT AND DESIGN PROPOSALS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESIGN CONCEPT</td>
<td>153.</td>
</tr>
<tr>
<td>DETAIL PROPOSALS</td>
<td>166.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APPENDIX</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPENDIX A - ISLANDS OF THE HAURAKI GULF MARITIME PARK</td>
<td>190.</td>
</tr>
<tr>
<td>APPENDIX B - MAORI PLACE NAMES</td>
<td>207.</td>
</tr>
<tr>
<td>APPENDIX C - CLIMATIC DATA</td>
<td>218.</td>
</tr>
<tr>
<td>APPENDIX D - THE FLORA</td>
<td>223.</td>
</tr>
<tr>
<td>APPENDIX E - ANIMAL AND BIRDLIFE</td>
<td>233.</td>
</tr>
<tr>
<td>APPENDIX F - COASTAL BIOLOGY</td>
<td>235.</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>239.</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

OCEAN BEACH
LOGAN CAMPBELL'S OLIVE GROVE 26.
BIG MOTUIHE PA 33.
METEROSIDEROS EXCELSA 35.
TOPOGRAPHY OF ISLAND 44.
NORFOLK PINE AVENUE 47.
CONCENTRATED RECREATION AREA 49.
MARITIME PINE SHELTER BELT 53.
PURIRI STAND 54.
FLOOR UNDER TARAIRE STAND 57.
POHUTUKAWA ON 'ELBOWS' 59.
SHAGS NESTING 64.
VISUAL SURVEY ILLUSTRATIONS 69 - 88.
PHYSICAL SURVEY ILLUSTRATIONS 89 - 98.
SHORELINE SURVEY ILLUSTRATIONS 101 - 116.
LIST OF MAPS

HAURAKI GULF MARITIME PARK - LOCATION MAP 5.
MOTUIHE ISLAND - LOCATION MAP 16.
ARCHAEOLOGY SITES 32.
SOILS 39.
GEOLOGY 40.
SHORELINE SURVEY GUIDE 100.
MAORI PLACE NAMES 209.
<table>
<thead>
<tr>
<th>Acknowledgments</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>
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Marlene Neems  
Typist.
The Lands and Survey Department (Hauraki Gulf Maritime Park Board) is desirous of upgrading Motuihe Island as a recreational resource. It is envisaged that Motuihe Island will continue its role within the park as a multi-purpose farm unit and recreational facility.

Research and study are to focalise upon an inventory, analysis and evaluation of the natural and scenic resources of the island, to explore development potentials with consideration for the impact and effect of existing and potential land uses upon the environment, and to determine the role of Motuihe Island more fully in relation to the rest of the Hauraki Gulf Maritime Park.

The study is required to produce a design concept recognising the problems of economic maintenance, and which shows detailed placement of buildings and general facilities.
The Hauraki Gulf Maritime Park
BACKGROUND OF THE PARK

"The creation of a Maritime Park embracing islands and coastal areas in this region represents a completely new concept in reserves . . . . a Maritime playground within easy reach of New Zealand's most heavily concentrated urban area. At the same time it ensures the conservation and protection of areas containing outstanding natural features of geological interest as well as the preservation of native and plant life."


The idea of a Maritime Park in the Hauraki Gulf was first mooted in 1955/56. The value of this maritime playground close to New Zealand's most heavily concentrated urban area had long been appreciated and several trends prompted this development, viz:

- Many of the islands were already under public control as domains or reserves but responsibility, administration and policy were varied.

- Other areas were under private ownership and several of the islands were changing hands at inflated prices, some of these had traditionally been open to public but there were signs that conditions may alter.
The explosion of the boating population in Auckland brought within the reach of the public, areas which previously had been relatively safe. The areas rich in scientific material required greater safeguards and demands increased for recreational facilities on some of the other islands.

These trends and increasing pressure of population demanded that some of the islands be preserved completely or conserved for their wisest use in public ownership. Fortunately the Lands and Survey Department had reacted to the needs and it was with this background that the Government announced the proposal to establish a Maritime Park.

The Hauraki Gulf Maritime Park was established in 1967. It is made up of dozens of islands and certain coastal areas which by purchase, deed or gift, or transfer from local authority, have been added to those already publicly owned Crown lands and established as a Maritime Park by Act of Parliament. The Hauraki Gulf Maritime Park Act 1967 created both the Park and its controlling Board. This Act should be read together with and deemed part of the Reserves and Domains Act 1953.

The Park is administered by a Board which is known as the Hauraki Gulf Maritime Park Board to consist of:
The Commissioner of Crown Lands.
A representative of the Auckland City Council.
A representative of the Devonport Borough Council.
A representative of the Auckland Regional Authority.
Not more than nine other members to be appointed by the Minister.

At present the Board comprises:

Mr. J.D. O'Brien - Chairman
Mr. J. Seabrook
Mr. A.J. Holdaway
Mr. D.A. Parsons
Mr. H.E. Walls
Mr. C.A. Lavell
Mr. A.D. Baldwin
Mr. D.E. Lees
Mrs. R.N. Zister
Mr. J.M. Butland.
The Hauraki Gulf lies between the eastern side of North Auckland and the western sides of Coromandel Peninsula and Great Barrier Island. It has no natural boundaries to the north but Bream Head, the Hen and Chickens, Moko Hinaus, Great Barrier and Cape Colville are often regarded as its seaward limits. This contains over 7450 square kilometres of South Pacific Ocean but the areas and islands in the Park at present end well beyond this area as far north as the North Head of Whangaruru Harbour and south to the Alderman Islands off the east coast of Coromandel Peninsula. Altogether it covers 13600 square Kilometres of ocean (See location Map).

The Gulf is fronted by the Auckland Metropolitan Region, the largest urbanised area in New Zealand as well as the City of Whangarei. It is within four hours driving of 1,246,928 people, concentrated in the South Central and North Auckland Regions, which represents 42.8% of New Zealand's total population.

The Gulf itself is a large, relatively shallow bay, extending from the fertile tidal mudflats of the Firth of Thames and sheltered Auckland Harbours, out to the exposed outer islands. The western and southern coastline of the coast is deeply indented with bays and harbours, and the sea-floor shelves gradually out to a depth of 20 metres. On the north-eastern side the sea-floor drops steeply down to 40
metres and 100 metres deep. Bottom sediments range from fine mud in the shallow water to sandy mud at 100 metres depth, with areas of fine sand in Colville channel and off the beaches north of Jellicoe Channel.

There are over 40 islands scattered across the Gulf - more if the many rocky outcrops are included. Not all of these are in the Hauraki Gulf Maritime Park and in some cases only certain portions of an island are included. Indeed, of the two largest islands in the Gulf - Waiheke and Great Barrier, the Park Board administers only 6 hectares on the latter. However, the Board controls islands outside the Gulf area, south, to include the Alderman Islands. In all it is responsible for all of or parts of forty-four islands, which constitute twenty-two main islands or groups. Two mainland coastal areas on North Head of Whangaruru Harbour and North Head of Waitemata Harbour are also in the Park. Total land area of the park is 8514 hectares. The islands and areas in the Park are set out in Appendix A.

Most of the islands have been gazetted either flora and fauna, scenic or Recreation Reserves. Seven of the island groups (4613 hectares) are at present primarily preserved for the preservation of the flora and fauna and require a permit for landing. Beehive Island off Kawau is administered by the Park Board for its private owner, and Browns Island was gifted to the citizens of Auckland by Sir Earnest Davies.
and is administered by the Board for them as a recreation reserve. The islands are varied in their size, topography and accessibility; in their geology, vegetation cover and wildlife they support; in their interest and use together they provide a natural resource, important to the national interests as well as the Auckland, Northland and Coromandel regions.

Use of the islands varies considerably some are so remote and difficult of access they are not suitable for direct physical recreational activity and yet, by their very isolated nature they are ideal for the preservation and study of New Zealand vegetation and wildlife in its natural state. Some have been closely linked with the history of the Hauraki Gulf and Northland and carry reminders of early Māori life, exploration and European settlement of Auckland, including its development through threats of Russian invasion and two World Wars. Many of the inner islands have been traditional holiday areas and offer many opportunities for outdoor recreation. They continue to offer scenic settings for both land and water based activities. Some of the islands or areas in the Gulf but not in the Park, particularly Waiheke, Kawau and Great Barrier support quite large residential population, either of a holiday or permanent nature."

Bob Lang - Surveyor-Planner.
Lands & Survey Department, Auckland.
- From Draft Management Plan Hauraki Gulf Maritime Park.
ACCESSIBILITY OF THE ISLANDS

"Because of their very nature, the islands are only accessible by water or by air. The use of the Park is therefore restricted mainly to boat owners or those prepared to use public transport. The concept of the Park has often been criticized because of the limited opportunity to use the islands. While the need for aquatic transport does restrict access to the islands, in many ways there is more freedom, particularly, in terms of access, than presents itself for example, in a National Park comprising mountainous terrain or dense bush.

Mainly because of the public transport inadequacies to the residential areas of Waiheke Island and problems relating to the harbour ferry services, a Committee of Inquiry is currently investigating the Harbour and Gulf transport services. The Park Board has made submissions to this committee. At present, there is a regular daily service to Waiheke Island and regular passenger services to Great Barrier, Kawau, and Rangitoto Islands and a weekend service to Rakino Island. Motuihe is served on a regular, although less formal basis and some other islands are served occasionally by Government or charter boats. There is an airfield on Great Barrier Island and a commercial firm runs routine flights and charter services or promotions comparable to those provided in the Bay of Islands, in spite of the fact that there is a much greater resident and tourist population in Auckland.
Many of the islands are only small and others have been set aside primarily for the protection of flora and fauna, so regular transport services are neither required nor desirable, except in some cases for servicing ranger staff or for transporting scientific parties or Park staff.

Wharves or jetties are required in association with ferry transport and the Board currently owns and maintains seven. These are located at:

- Motutapu - Home Bay.
- Rangitoto - Islington Bay.
- Rangitoto Wharf.
- Motuihe - Motuihe Wharf.
- Kawau - Mansion House Bay
- Two House Bay
- Sunny Bay.

The only revenues earned by the Board in respect of the wharves is by tolls of ten cents for adults and five cents for children. These are inadequate to cover maintenance and replacement costs. For example, the replacement of Motuihe Wharf is estimated to be $250,000.

The larger islands with residential population have internal road systems with private motor cars. Some of the inner Park islands are rooded and used by farm and management vehicles. Both of the mainland coastal areas within the
park are serviced by formed roads and the public is allowed controlled use of these by motor vehicles."

Bob Lang. Surveyor-Planner
Lands & Survey Department, Auckland.

Much of the physical recreational use of the inner islands of the Gulf is related directly to the routes and timetables of the passenger ferry services. Compared with the general boating public, the passengers disembarked from the ferries are less mobile and more reliant upon the facilities and amenities provided on the island. The planning and development of the park is therefore closely linked with the future of the transport services. As stated the smaller and protected islands do not require regular servicing, however the more intensively used islands present greater difficulties. The real needs for transport to these is difficult to assess, particularly in regard to likely future needs. One of the more critical planning issues involved with the park is in establishing the desirable intensity and frequency of use which any particular island or area can tolerate, and thereby deciding upon what level transport services should be allowed to operate to the island concerned. However, on this point there must also be an awareness of the conflict that can occur between the objectives of improvement of services and the preservation of natural assets.
Many of the initial problems that could only have been expected with the constitution of a park containing scattered areas of widely differing character and state of development have been largely overcome and the park is now being treated more as one entity. With increasing demands on the usage of the Gulf and with the continuing expansion of the park it became increasingly necessary to make decisions affecting its future. To facilitate management there was an immediate need to justify and give stability to the principles underlying Board policies and decisions made over the first tentative years and to establish goals and formulate further policy on this basis.

Because the Park was the forerunner of maritime parks in New Zealand and not a park constituted under the National Parks Act and therefore not subject to the principles or policies of the National Parks Authority, there was also a need to clarify its function in terms of the total park system of this country. A management plan has been produced to satisfy both these needs.

What was required for the Park was a broad statement of objectives and policy to provide a framework within which the Board could make decisions when the need arose. This was based on the idea that the best way to plan for the future is to understand the present and within this framework of know-
ledge operate to influence or direct change towards an ultimate goal.

The plan set out to understand the present overall situation in the Hauraki Gulf by having regard to the existing needs or proposals of the community and to the particular problems and conflicts. After identifying the purposes of the park within the region and in terms of the total park system, the plan established the objectives of the Board and set up a number of restraints which provides the basis by which park use, management and development are reconciled with the perpetuation of the Park's natural value and amenity.

The plan draws attention to the need for a more detailed resource assessment and for more information. It establishes objectives and policies based upon certain suppositions and therefore sets the parameters for data collection. The collection of data should be a continual process to test or support the Park objectives and policies - these will be influenced by increased knowledge and in turn will provide a clearer idea of data requirements.

The management plan is therefore only one stage in the planning of the park and satisfies only the immediate requirements in a continuing process. It needs to be subject to continual review and professional advice should be availed
upon to evaluate each and every proposal in terms of the overall concept of the Park before the Board makes a final decision.

PREPARATION OF THE PLAN:
The scattered nature of the Park lent itself to the preparation of a management plan in stages. This was convenient in that certain decisions relating to specific areas were required to be made urgently and to delay the whole plan because of the need to complete certain policies relating to some remote island would only compound problems and difficulties of management in relation to more intensively used areas of the Park. However, each sector of the Park contained in the different stages of the plan must be considered in relation to the total park and overall concept.

The team approach to planning with many disciplines being represented was preferred. Although the plan was basically prepared by the Board's planning officer it was undertaken in close consultation with the Chief Ranger and his staff, Park Board members and with scientific advisors. Also the Board was fortunate in having access to many planning studies undertaken in the region by the Auckland Regional Authority and to many reports on scientific research carried out in the Gulf area.
Several interests: geology, flora and fauna, marine biology, history, and access and transportation; and activities: recreation, commercial shipping, commercial fishing, marine farming, mining, defence and coastal development; as well as other parks and reserves of the Gulf: Regional Parks, Forest Parks, New Zealand Walkways, Coastal and Local Reserves, Coromandel Park and Bay of Islands; were examined to illustrate the extent of demands made upon the region to serve these activities or uses, each will require some permanent provisions in the way of the use of water space, or of the islands or surrounding coastal areas of the mainland. These requirements will often be in conflict with those of other competing uses. In conclusion the Hauraki Gulf Maritime Park is only one component of a comprehensive recreation and open-space system which would be more effective if each component was required to be located and managed in terms of the total system so that the values of any one can contribute significantly to the values of another.
Motuihe Island
LOCATION AND BRIEF DESCRIPTION

Motuihe Island lies in the Hauraki Gulf and is situated between Rangitoto-Motutapu Islands and Waiheke Island, some 15 Km east of Auckland City. (See Location Map).

It has an area of 180 Hectares its longest dimension is 2.5 Km, and it encompasses some 8 Km of shoreline.

Due to its proximity to New Zealand's largest urban population this attractive island has become a popular pleasure area in a basically rural setting for thousands of boat-owners and day trippers.

The island is farmed on behalf of the Park Board by the Lands & Survey Department, in this way both maintaining the greater portion of the island and providing a certain amount of revenue for development within the Hauraki Gulf Maritime Park in general.

There are three formal picnic grounds which may be booked in advance by organised parties. Facilities include changing sheds, toilets, barbecues and a canteen.

As this is one of the closer islands of the Gulf in relation to the mainland it is a popular day trip for boat owners, the varied aspect of beaches offering sheltered conditions in any prevailing wind. A ferry service operates from Auckland daily for the period between Labour and Easter weekends.
Motuihe Island Location Map

TOTAL AREA
441.1.30.4.

MOTUIHE
Sections 1 and 2 Part
Block XIII Rangitoto
Survey District.
MOTUIHI:

"Motu-ihi (motu means island), one of the extended line of barriers screening the placid Waitemata from the pounding of the long green surges welling up from the Pacific ocean that stretches away to distant South America, records in its place names a typically Polynesian story of race movements during long ages. The headland names tell of men who left the land of their birth for an unknown and far off foreign shore; the romance-tinted names of the beaches speak of fairy-haunted mystery lands; while around the clearings cling narratives of heat-breaking efforts to grow sun-loving tropical plants in temperate southern dells; places so idyllically beautiful that a Dryad might have been found frolicking there, but which were, nevertheless, quite unsuited for rearing fruits native to tropic lands.

The island is closely connected, too, with early European colonisation, for in 1839 it passed into pakeha ownership. In 1843 Messrs. Brown and Campbell, the then owners of Brown's Island and among the first actual European landowners in the Waitemata, bought it from the original Crown grantee. In turn the lessees during many years included Mr. Thos. Duder and the Alison Bros.; it has been a farm, a quarantine station; a war prisoners' and enemy subject internment camp, a children's paradise (where civilisation crushed youngsters are "doctored" by Mother Nature aided by sympathetic women and men), a
Marine Park under the administration of the Auckland City Council, a Naval training centre for ratings, and finally it has become part of the Hauraki Gulf Maritime Park, under the administration of the Lands and Survey.

- Lorrie Walsh. (1937)
HISTORY

The history of Motuihe Island up to 1930 has been adequately covered in an essay by Lorrie Walsh, thus the following is largely direct extracts from this work.

POLYNESIAN HISTORY:

Pre-Statement:

"New Zealand, known to the Polynesians as Aotearoa, was colonised at some early date, which has yet to be determined, by people from the Pacific Islands to the north and west. About 925 A.D. a Polynesian sea rover, Kupe, while exploring this land visited the Waitemata, and returned to Tahiti to tell of finding "a mist moistened land in a far away southern sea." His information sent other adventurous folk to seek a homeland in this new country. A sudden storm at Tahiti about 1150 A.D., was responsible for the visit of another prominent Tahitian, Toi-te-Huatahi. His grandson, Whatonga, was blown out to sea while racing his canoe in a challenge match and the grandfather, in his search for him, came to New Zealand; calling in at the Waitemata and Tamaki; eventually settling in the Bay of Plenty. The grandson, surviving the buffeting of the waves, returned home to learn that his grandfather was searching the south Pacific for him. Immediately he set out to seek his relative; finding the old gentleman comfortably settled here in Aotearoa, he promptly joined forces with him. The Tine-o-Toi (Toi's people) possibly because of superior methods of warfare, gradually subdued many of the sea coast tribes.
around the Bay of Plenty and worked right up to the Waitemata where they established themselves on the islands, including Motuihi, and on the adjacent mainland. In the middle of the 14th century political upheavals in the Pacific islands sent many refugees to Aotearoa; the last big migration (known to historians as the Seven Canoe migration) being dated about 1350. Some of these people made a base in the Waitemata, and overran the northern half of the North Island, being the dominant caste when European migration began in the early 19th century. One of their tribal subdivisions, the Ngati-paoa, were in occupation of the Hauraki Gulf islands when European settlement commenced.

MOTU-THENGA:

Was Maori Name of Island:

"The Maori folk had named practically every mountain, hill, valley, river, lake and promontory in Aotearoa; a natural result of many centuries of intimate and thorough knowledge of the islands. Just as the Europeans have brought Auckland and Queen Street, Princes Street, Waterloo Crescent, etc. so the Polynesians brought innumerable old place names with them and attached them to places in this new country; some of these place names are repeated about the Pacific, bestowed by the Polynesians wherever they have rested, and form in themselves a highly interesting record of thousands of years of restless migrations ever towards the rising sun; each name a revealing light in a glamorous heroic narrative."
Some of the names, of course, are merely descriptive, Long Beach or Red Hill; others arose from some incident of local war or a deed of valour or maybe a tragic happening; many are unmatchable gems of poetic clarity as Waitakerei, "The Tinkling of Hidden Cascades", Waitangi, "The sighing of the Waters", Manapouri, "The Lake of the Sorrowing Heart."

Thoroughly Polynesian are the names given to the parts of this small island in the Hauraki Gulf. The island name as used by Europeans, often pronounced "Mota-hee," is not the Maori one; it should be Motu-a-Ihenga, (in early European documents it appears as Motu-ihe), Ihenga's island; from the historic fact that it was appropriated by Ihenga, a son of Tametekapua, commander of the Arawa canoe which arrived in New Zealand from Tahiti about 1350 A.D. The island was inhabited originally by Maru-iwi folk, the first native people of whom we have definite information; they were dispossessed by descendants of Toi (who came about 1150 A.D.) who, in turn, were conquered and assimilated by Arawa people who had reached here in the middle of the 14th century. These newcomers eventually owned the gulf islands with some of the mainland and were known as Ngati-Huarere (Ihenga mentioned above being Huarere's brother). In time, some of the descendants of the Tainui canoe migrants asserted control over the islands and the Tamaki area (called by the Maori poets "Tamaki-maka-rau," "Tamaki of the Hundred Lovers," from the continual struggles
to possess the fertile district. When Captain Cook visited the gulf he passed outside the islands of Waiheke and Motuihi, at that time these places were dominated by Ngati-Paoa; and despite repeated attempts to dislodge them they were still in possession in 1839 when much of the land about the Waitemata was being sold to Queen Victoria, or "any man or woman who might be king or queen of England;" as the old deeds quaintly phrased it.

EUROPEAN HISTORY:

A Brief Chronological Survey:

"1837 - About 1837, a man named Butler appears to have negotiated with the native owners, or some of them, for the purchase of the island; it is very likely that he came from Sydney. On a well executed lithographed chart of the Waitemata and Hauraki Gulf, issued in Sydney in 1837, the island appears as Butler's Island.

1839 - On November 5th, 1839 a Mr. W.H. Fairburn bought the island from the native owners (see copy of deed printed in this booklet); the island is called Motu-ihe in the deed recording the sale.
The Native owners parted with possession of their island in 1839, on the basis set out below, to the purchaser mentioned. In turn, he sold to Mr. Henry Taylor on the 21st of March 1840, for £200. In his application for a Crown Grant of the island Mr. Taylor gives the value of the goods, handed over by Mr. Fairburn to the vendors of the island, as £103/5/0.

Copy of Deed:

Know all men who shall see these documents that we (viz.) William Jowett of Te Iwi Tutu a native chief, Ko Nuku of Te Ngatitai, a native chief, and Te Manago of Ngatiwaki also a native chief, have parted with and alienated for ever that Island known by the name of Motuihe with all things either above or below appertaining to the before named island (which Island is situated in the channel running into Waitemata known by the name Huhuanui which is the name of that part of the Frith) to Mr. Fairburn and to his children to cultivate, to sell, or to dispose of in any way he pleases for ever. On the Eastern side of the above named Island stands Waiheke, on the northern Motutapu, on the Western Motukorea, and in the centre of these islands stands Motuihe.

The herein mentioned articles were given to William Jowett to Nuku to Manako as payment for the said Motuihe (viz.); one heifer, twenty blankets, ten axes, ten hoes,
ten spades, six gowns, two red blankets, twelve Dutch pipes, six iron pots, and one shawl. See our marks written on the fifth day of November in the year of our Lord one thousand eight hundred and thirty-nine, New Zealand.

These are the witnesses.

Henry Taylor, Ko William Jowett.
Ko Hemi Pepene, The mark x Nuku
Hoani Pepeni, The mark x Manako
Rawiri, Tamati,

1840 - On March 21st, 1840, Mr. W.H. Fairburn, who had negotiated the purchase of the island in 1839 sold the island, for a sum of £200 to Henry Tayler, who, on September 8th, 1843 obtained a Crown grant title to the island (defined in the grant as "the island known by the name of Motu-ihe in the Parish of Waiheke"), the area given at 300 acres. Mr. Taylor appears to have lived at Tamaki at a date subsequent to this deed. Messrs. Fairburn and Taylor were partners in other land deals in the Gulf.
1841 - On July 7th, 1841, Mr. Henry Tayler, apparently from Sydney, but whose address was then given as "of River Thames" filed an application for a Crown Grant deed of title to the island; alleging the purchase by Mr. Fairburn on November 5th 1839 and the subsequent sale by Mr. Fairburn to him. In the application the island is called "Motu-the, in the Frith of Thames." At that date, following Cook's chart, the Hauraki Gulf was known as the Frith of Thames. In the application the area of the island was estimated at 400 acres.

1843 - On September 13th, 1843, five days after obtaining his title to the island, Henry Taylor sold the property to William Brown and John Logan Campbell for the sum of £220.

Various species of olives were planted by John Logan Campbell in the N.W. end of the island and these groves can still be seen today.

1858 - On February 1st, 1858 the island was sold by Messrs. Brown and Campbell to Mr. John Graham, for £2,000.

The property was mortgaged in 1858, 1862, 1863 (for £3,000 to Robert Graham, Superintendent of the Province of Auckland.)
View under the canopy of Logan Campbell's olive grove.
On December 24th, 1872, the island was conveyed to Her Majesty, Queen Victoria for a consideration of £2,500, under a power of sale in the mortgage deed.

The island was proclaimed a Quarantine Station thus; "The whole of the island known as Motu-ihe situate in the Harbour of Waitemata and the water frontage around the said island within half a mile from its shores." A ship with cases of small pox on board, had arrived in the harbour and the authorities had to act quickly in providing a quarantine station; a lonely overgrown grave on the island dates from that episode. The buildings erected for the quarantine station were constructed, in part, with timber obtained by demolishing the Albert Barracks, situated in what is now Albert Park. The most important use of the island for quarantine purposes was in 1918 when the mail steamer Niagara was detained there during the tragic epidemic of influenza that ravaged Auckland and the Dominion.

Prior to the establishment of the quarantine station on the island, the area was used for farming purposes by the late Mr. Alex Alison, and by the late Mr. T. Duder. Since the island was gazetted as a quarantine area, the portion not required for the use of the Health Department was leased for farming.
In the early seventies, when a portion of the island was still bush covered, a number of deer had a home there; who first brought them to the island is not known now. In dry summers there is not any water in the springs on the island, water having to be pumped for the stock; and it happened that one very dry year during the occupancy of the island by Mr. Thos. Duder, the deer, frightened to come near the homestead for water, perished with the exception of one small doe, which was rescued and became a great pet, being brought to Devonport at a later date.

1914 - In 1914 the quarantine station was utilised for the accommodation of some of the prisoners of war who fell into the hands of New Zealand military forces when Samoa surrendered. Later, the famous Count Felix Von Luckner and his boat's crew were imprisoned on the island. The Count made a sensational attempt at escape on December 13th, 1917, reaching the Kermedecs before his recapture. A second escape was planned but the war ended.

(In the gully in the South side of the island there is the remains of a dugout measuring 9ft. by 10ft. by 8ft. Count von Luckner, in a second attempt at escape, planned and directed the construction of this dugout, which was timbered up, fitted with bunks and equipped with stores to last 5 men for at least six weeks. The plan was for the prisoners to vanish by hiding
in this dugout, and to remain hidden for some weeks. When the hue and cry had subsided somewhat they would then attempt to seize a boat and sail away. The plan was on the point of being carried out when news of the armistice arrived.)

Subsequently a number of New Zealand residents of German and Austrian nationality were interned there.

1918 - An influenza epidemic swept the country and a small line of seaman's graves to the north dates from this time.

1929 - About 1929 the Community Sunshine Association was permitted to use the Quarantine Station for the establishment of children's health camps; this organisation, with others, cared for a large number of children who were hurriedly evacuated from Napier after the severe earthquake in 1931 and sent to Motuihi.

1930 - Legislation was enacted declaring that a portion of the island (410 acres) not required for quarantine purposes should be set aside for recreation purposes under the provisions of the Public Reserves, Domains and National Parks Act, and the Auckland City Council was constituted the Motuihi Island Domain Board."
1939 - At the outbreak of World War II the quarantine station was commissioned as H.M.N.Z.S. "Tamaki" to train some 600 ratings per year. It continued in peacetime to be used for basic training in seamanship, fitness and discipline.

1963 - H.M.N.Z.S. "Tamaki" was moved to the North Shore and the base reverted to Domain Board control. The larger portion of the Island was farmed and maintained by sheep and fat cattle by farm manager Darryl Cotter on behalf of the Auckland City Council.

1967 - The Hauraki Gulf Maritime park was established and the Auckland City Council handed over Motuihe Island to be part of the new Park.

It is now farmed and maintained on behalf of the Hauraki Gulf Maritime Park Board by the Lands and Survey Block development under the management of Bert Screen.

A full time ranger, Jim Paul, is responsible for recreation activities and public relations. Also full-time resident on the island is a couple Mr. & Mrs. H. Morton who manage the canteen.
Motuihe Island exhibits a number of historical sites, however only one of these 'Big Motuihe Pa' (See Map) is of major archaeological importance.

The site is located on Pa Point, an excellent view and vantage point and exhibits a well defined trench enclosing a large area, some very large pits, flattened areas, and an inner ditch and bank.

The site as classified by the inspection officers falls into Classification 'A', that is, "Sites essential for protection." It is in reasonable condition, but has suffered some stock damage and also a farm access track crosses an outer trench. A farm fence bisects the site.

Although the site is partially protected, according to the inspection officers report it requires proper management and should be recognised in the Management Plan for the Island. The added protection could take the form of additional fencing coupled with control of the scattered gorse. Paspalum is also a problem on the outer ungrazed portion of the site. Puriri trees have been planted out in this portion of the site and apparently if left could destroy archaeological features such as storage pits.
MOTUIHE ISLAND

PAPK Archaeology Sites

FORMER SITE NOW DESTROYED
N42/145

INDISTINCT
N42/147

Pits were checked on ground 163

N42/145 ARCHAEOLOGY NUMBER

LEGEND

PA
PITS
MIDDENS

MOTUIHE ISLAND
HAURAKI GULF MARITIME PARK

Archaeology Sites

200 Metres
500 Chuns
Probably the most appropriate method of protecting this site would be to remove the existing fence and replace this with a permanent fence immediately south of the site with both gate and style access. The site could then be maintained by control grazing using sheep only. Grazing could extend as close to the cliff edge as practical by the use of electric fencing.
Environmental Factors
Motuihe Island experiences a climate typical of that found in the Auckland Region.

Temperatures are not a major limiting factor in the choice of plant species, the mean temperatures being in the 19 - 20°C range around January and February, and mild in winter in the 9 - 11°C range around July and August. This is also reinforced by the fact that ground and screen frosts are unknown on the island due to the marine influence. However in spite of this reasonably non-limiting factor plant specie choice does tend to be limited more to those of a salt-tolerant nature, this being especially so in close proximity to the sea and exemplified by the profusion of Pohutukawa (Metrosideros excelsa) growing out over the cliffs and beaches.

Relative humidity of the area is high, ranging from 85% in July to 72% in December.

Motuihe Island received approximately 970.00 m.m. of rainfall last year (1973) and although this was an atypically dry year for Auckland (approximately 1000 m.m. in 1973) which usually receives a mean annual rainfall of 1270 m.m., this shows that the Island receives slightly less rainfall than the mainland.
Metrosideros excelsa - illustrating the ability of this species to withstand conditions of extreme exposure.
Although this seems more than sufficient rainfall for plant growth it does not preclude the necessity of watering new plantings as summer rainfall is often low, Auckland experiencing a winter maximum of approximately 400 m.m. mean in June, July and August. Local records show that January and February (1974) received 25.4 m.m. of rain, indicating the necessity of watering for at least the first two years in the establishment of any new planting. The occurrence of sudden "squalls" which catch picnickers unawares indicates a requirement for shelter.

Due to its isolated nature Motuihe Island is afforded little protection from any larger land mass in respect to the influence of winds. The prevailing wind is from the south-westerly direction although the strongest winds come from the North to North-easterly direction. It is interesting to note that the most frequent and strongest occurrence of south-westerly winds coincide with the period of peak recreational use. Also the smallest percentage of calms coincides with this period. (See Wind Roses in Appendix C.) Much of the island, especially the higher altitude areas are protected by the high cliffs that surround much of the island, although this also has the unfortunate result of creating a micro-climatic effect and wind funnel at the narrow and low isthmus. When a wind is blowing from either direction, temperatures are markedly cooler in this area as compared with higher areas to the North West and bulk of the island in the East.
The occurrence of winds has little effect on plant growth other than the fact that these obviously are salt-laden and only species tolerant of this condition are likely to establish well.

Relevant climatic data can be found in Appendix C and although the charts are not specific to the area under study, they are a record of the closest comparative figures available and are thus included for the completeness of the record.
GEOLGY:

Motuihe Island is an irregularly shaped island, roughly 30 to 80 chains wide. It lies to the east of Rangitoto Island near the entrance to Waitemata Harbour. Apart from the isthmus of sand which joins the small western portion to the main part of the island, Motuihe is composed of Tertiary rocks (Waitemata Formation) overlying Mesozoic greywacke.

The Waitemata Formation strata of probable Otaian age, uncomfortably overlie a highly irregular, unweathered surface cut in rocks of Mesozoic age. A tuffaceous sandstone within the former is correlated within the Parnell Grit horizon. It contains large blocks of Waitemata sandstone and mudstone.

The majority of dips are considered to be the result of compaction rather than tectonic movement.

Although the island is 205 feet above mean sea level, except for a grass-covered raised beach at a little more than 1.5 m above mean sea-level, no terrace remnants exist. Outcrops are mainly confined to the coast.
SOILS:

The soils of Motuihe Island are Secondary Podzolic soils. These are formed from sediments relatively high in silica and have usually developed under a forest cover where the rainfall exceeds 1016 m.m. per annum. These soils have formed over a longer period than have the primary podzolic soils and hence the degree of weathering of their mineral constituents is more closely related to the climatic conditions of the various districts in which they are formed.

These soils are derived either from aeolian sands or from sedimentary rocks and are classified according to the degree of development reached under different conditions of climate, vegetation and parent rock - i.e. young, immature, semimature, and mature. The soils of Motuihe Island are derived from sedimentary rocks and only two stages of the classification exist, viz: immature and semimature.

The immature soils (a Waiotira clay loam) have been formed under mixed forest in which mull-forming trees predominated. They are characterized by brown to grey-brown granular topsoils and yellowish-brown, blocky or nutty subsoils with some irregular prismatic structure especially in the heavier soils. The topsoils are for the most part somewhat lighter in texture than the subsoils but the difference is not a marked one. The soils are moderately acid in reaction and contain a moderate supply of exchangeable bases.
From site observations the soils of the island do not appear to be extremely limiting to plant growth. It is not considered that fertilizer applications will be necessary for plant growth, the island already receiving adequate aerial topdressing. However, some form of organic matter or animal manure could boost establishment of any hand-planted trees.

Although these soils are basically a wet soil type this does not preclude the necessity of watering new plantings due to summer droughts, and it must be stressed that this form of maintenance is especially critical in the former years of tree establishment. The wet soil type does, however, indicate a problem with soakage in terms of sewerage. This is especially noticeable at peak recreational periods when natural soakage is insufficient and effluent overflow discharges into West Bay. This problem is not insurmountable, however it is important to be conscious of this problem in the siting of buildings in order that correct and feasible measures can be taken to provide safe and economic effluent disposal.
Motuihe Island generally is a pleasant undulating landscape, the bulk of the island being a substantial height above sea-level and almost exclusively surrounded by high steep cliffs. As most of the farmland is located on this rolling landscape, with grades in the medium slope range. Slope stability under farming conditions is good, with only a few potentially unstable slopes existing, mainly on the S.E. side of the island.

Much of the visual character of the island is a result of the topographical pattern, with good visual containment emanating from vantage points in lower areas to expansive views both across the island and out over the Gulf from higher vantage points.

The drainage pattern and topography are closely interrelated, with the major surface water run-off being directed into a few major drainage channels leading to the sea, this reinforcing the visual character resulting from the topographical pattern. Also directed surface run-off into the gullies could partially account for the remnant patches of bush, especially the taraire gullies in the S.E. During the higher winter rainfall period, water does collect and lie in these larger gullies, this giving opportunity for the planting of water loving species and the creation of wildlife habitats.
Aerial showing the nature of the topography of the island.
The vegetation of Motuihe Island is reasonably abundant and due to the impacts of a varied number of activities throughout history, it exhibits a wide range of species, from pure stands of native bush to single isolated exotic specimens.

In a botanical report (1974) A. Esler a D.S.I.R. Botanist notes the following:

"The first reference to the plant cover of Motuihe seems to be a brief account by T. Kirk in 1876. He wrote Motuihi contains about 460 acres, more than half of which is pasturage. The open uncleared portion is chiefly covered with manuka or fern, the patches of large arboreal vegetation are to be found on the slopes, the most important member being the pohutukawa, which attains great dimensions. On a charming miniature sandy beach, *Dichelachne stipoides* *Pimelea arenaria*, *Paspalum distichum* and *Sicyos angulatus* are plentiful. The last-named has not been observed on any other of these islands."

To date nearly all of the scrubland has been converted to good pasture. Relatively large tracts of relic forest persist and the shoreline is fringed with mature pohutukawa. Mature shelter belts and clumps of pohutukawa and puriri are a feature of the farmland. Contrasted with this are the more ornamental plantings of the concentrated recreational area.
As the northwestern end of the island, including the narrow isthmus, has been the site favoured by any concentrated development activities it is here that there can be found a more varied type of vegetation in the form of aesthetic and ornamental plantings. The visual character, resulting largely from the type of vegetation present, is therefore very much different to that of the island as a whole.

Norfolk pine, being the most dominant specie, and well-suited to a marine environment, leaves a lasting visual impression on the visitor. Other prominent species in this area include Maritime pine, Aleppo pine (many of which are past their best - although still functioning in a shading capacity for picniers) and macrocarpa.

An avenue of alternating Norfolk pine and pohutukawa (stunted due to inhibited light) leads to the north-western headland where many additional and varied species are growing, probably planted during the navy's occupation of the island. A subsidiary avenue of puriri trees leads to a series of spaces (formerly containing naval buildings) delineated by ornamental plantings including species such as *Eugenia paniculata*, *Pittosporum* sp, *Quercus* sp, *Cupressus* sp, and *Eucalyptus* sp. (See Site Survey Plan.)
The Norfolk pine avenue.
An olive grove, said to have been planted by Logan Campbell in about the 1840's still exists today in this area.

A thick naturally maintaining area of vegetation exists on the northwestern headlands in the fenced-out portions surrounding the coastal cliffs. This contains both native and exotic plantings, pohutukawa and maritime pine being the dominant species. Much of the maritime pine within this belt are becoming remnants, are "topping out" and generally deteriorating in condition. They however add much to the atmosphere of the area and often enclose and frame views out across the harbour. This area should remain fenced out and be perpetuated using native species only.

Patches of Rhamnus exist on the headland and will tend to suppress regenerating native seedlings. Control of this weed plant is difficult, however in some areas here it should be cut and controlled until some form of natural control takes over. Gorse also exists in small patches. It is probably not necessary to control it however, especially within fenced out areas, as it acts as a good nurse crop for native seedlings and is ultimately naturally suppressed.

The condition of trees in the northwestern area range from excellent to poor and it may be necessary to remove those trees of little worth at the time of implementing new planting proposals. (See Site Analysis Plan for more detailed information)
Aerials of the concentrated recreational area. (Top) The north-west headland and (Right) The isthmus and picnic ground No. 1.
It is important to note that the planting of ornamental trees has extended in recent years, many of which are doing well especially in fenced out portions of the coastal fringe where they are being supported and protected by existing vegetation. However, some of these newer plantings are not establishing well, this being mainly due to lack of care and maintenance. Motuihe Island owes much of its character today to plantings by previous inhabitants who saw the value and necessity of care and attention as a prerequisite to the successful establishment of healthy vegetation. It is basically the results of this that has determined the character of the recreation area as it stands today.

THE FARMLAND:

Pasture occupies the greater part of the island presenting an open and 'clean' appearance to the farmland.

"The pasture is of good quality, the major components being perennial rye grass, Yorkshire fog, white clover narrow-leaved plantain and fiddle dock. Paspalum is dominant in a few places. Danthonia, microlaena and dicanthium grow on the coast in dry areas of a limited extent. Indian doab, buffalo grass, goose grass and some others occur mainly near the shore. Barley grass is of some importance as a weed. In wetter places pennyroyal is prominent."
There are a number of weeds of some significance. Variegated thistle grows up to nearly 3m tall. Although there are some large patches, it is not as widespread as slender winged thistle. Winged Scotch and Californian thistle appears to be of less importance.

Apple of Sodom is very troublesome and is most plentiful on those parts of the coast which have been fenced out. There is little gorse on the farmland but it is plentiful in places where control is not practicable. Inkweed persists around trees on the farmland, particularly."

(A. Esler, 1974)

Where practicable large areas of thistle has been controlled by aerial spray using helicopters, but weed control in isolated areas is often a difficult task. It is probably better not to control gorse but rather let it act as a nurse for seedlings which will lead to ultimate natural suppression.

SHELTER:

Many of the existing shelter belts on the farm area have ceased to fulfill their specified functional role, and although they add to the visual quality of the farm thought should be given to their replacement. The programme for replacement would not be an immediate measure, but rather a phased
programme taking into account initial shelter requirements and the consequential removal of 'spent' shelter together with a policy for shelter replacement in the future as it becomes necessary.

Species used to date on the island for this purpose have been the common species used nationally such as macrocarpa and pines. As a replacement programme is necessary opportunity exists for recommendation of suitable native species. A more detailed discussion and recommendations for types of species will follow in a later section.

Included under this heading are those clumps of trees offering shade to stock. Puriri and pohutukawa are distributed around the farm and function in this capacity. However most are mature and in some parts have fallen, this being a danger to stock. Therefore an overall replacement policy is necessary. Also additional shade giving planting is required as at the moment stock are forced to use the taraire gullies and other forest tracts in the west for shade, this being detrimental to the continued survival of these areas of bush, due to trampling and grazing of undercanopy species and seedlings.

Puriri

VITEX LUCENS.
The main maritime pine shelter belt. (Top) Showing condition from the outside. (Right) Under the diminishing canopy.
The puriri stand - one of the few stands of shade trees on the farmland.
THE TRACTS OF FOREST:

"The largest forested tract lies west of the trig. It is an area which was probably cleared of woody vegetation except for numerous large pohutukawas. Among the pohutukawas there are now scattered small trees (mahoe, Karaka and Kohekohe), shrubs (tea tree, mapou, gorse and Rhamnus) and New Zealand flax. Although a stock-proof fence bounds this vegetation cattle have been given access at times. The unfenced remnant close to Bald Knob has mostly large pohutukawa and puriri."

(A. Esler, 1974.)

This tract is an asset in terms of its visual resource and if it is to continue as such stock maintenance methods must be restrained. The unfenced remnant close to Bald Knob contains quite mature trees and some thought is required here for clearing any unwanted specimens and replanting new seedlings to aid regeneration and ensure perpetuity. Fencing would probably be required in this event, but more specific policies are outlined in a later section.

"Two large gullies draining onto South East Beach are heavily forested, with taraire the principal component, but with local dominance of Kohekohe. There are also a few puriri and karaka. The pohutukawa growing there is mainly on the margins of the gullies, particularly near the coast. Most of
the taraire have stems with diameters of 30 - 40 cm. and are apparently not old, probably having established last century after a fire. The ground beneath the trees is almost devoid of vegetation. This is caused in part by the trampling and browsing by farm animals but it is common for dense stands of taraire elsewhere in N.Z. to have little undergrowth because of the close canopy and very heavy litter fall."

(A. Esler, 1974.)

These taraire stands are also a recreational asset, both from the visual experience had when viewing from higher areas of rolling extremely dense crowns and the enclosed experience had while walking beneath the dense canopy. As the stands are situated in extremely steep-sided gullies surface erosion and subsequent root exposure has taken place due to stock browsing and trampling. Therefore a stock proof fence will need to be erected here in order to preserve this asset.

THE COASTAL FRINGE:

"The pohutukawa fringe has been grossly modified, the degree indicated by the number of its associated species which have persisted. Normally pohutukawa would have these species growing with it - Astelia banksii, karo, houpara, kawakawa, Gahnia lacera and Coprosma macrocarpa."
View of the floor under the tarairae stand - showing under canopy condition due to browsing stock.
In many places these are absent, their place being taken by grasses where grazing animals have access and by *Rhamnus* and gorse where they have been excluded. These two shrubs have now occupied the open eroding sites where pohutukawa seedlings would have established. Consequently, natural spread of pohutukawa has almost ceased. The larger trees which are becoming undermined by erosion are not being replaced naturally. Some which have been dislodged are still rooted to the bank while the tree rests on its 'elbows' on the sandy beach. There are some good examples of these on Ocean Beach."

(A. Esler, 1974)

The coastal fringe presents a pleasant visual feature both from the sea; with the rounded forms of pohutukawa giving a soft undulating form to the coastline; and from the land; directing and framing views out and across the harbour. The vegetation also affords physical protection to eroding cliff tops and also aids in deflecting winds and sheltering stock. It also functions in a shading capacity for stock. It is therefore important to ensure the conservation of perpetuation of this area. This may require additional effort in terms of physical maintenance to establish new plantings in order that ultimately a naturally maintaining and regenerating area of bush is established. This will ensure the suppression of gorse and grass and will negate the necessity of giving stock access to these areas at regular intervals for maintenance purposes.
Shade giving pohutukawa resting on its 'elbows' on the beach.
THE CLIFF FACES:

"The cliff faces are almost devoid of vegetation because erosion is too active to allow taupata, the New Zealand ice plant and Senecio laetus to take root. Consequently these plants are very poorly represented in the island's flora. In the limited areas where Parnell grit outcrops on the cliffs the face is more convex and offers a potential foothold for native plants but Rhamnus and Aleppo pine establish first. However it matters little what the vegetation is because it eventually slides off with the soil it is rooted in."

(A. Esler, 1974)

THE SANDY BEACHES:

"The sandy beaches have little of their natural cover remaining. Where the beaches are backed by cliffs vegetation has little chance to establish because the highest tides reach to the base of the cliffs. South East Beach has an accumulation of sand a metre or two above the high tide mark. There is enough moving sand in some places for spinnifex to grow but it is not a thriving species. The more stable sand behind it is occupied by exotic annuals such as King Island meliot, hawksbeard, harestail and Bromus diandrus. At a higher level there are the perennial grasses, cocksfoot, rye grass, ratstail, Indian doab, paspalum and buffalo grass.
the latter growing down to the high tide mark in some places. About the strand line sand convolvulus and orache are common and there are a few plants of *salsola*. It is not unusual to find tomato seedlings here, also pumpkins and some other cucurbitas. Seeds are carried by the sea but are seldom washed ashore high enough for them to survive beyond the seedling stage.

(A. Balker, 1974.)

A list of the flora of Motuihe Island appears in Appendix D.
"Wildlife is an integral part of the constant interplay between the many forces of the environment, and both the competition and co-operation of animals and plants contribute to keeping equilibrium".

(R. Arvill, 1969)

Plant life, the primary source of food for all animal life, is itself modified by the activity of animals. The variety and abundance of wildlife species is often a reflection of the nature of the vegetation, this being modified by the presence or absence of natural predators and by the degree of interference by man.

The importance of wildlife as an item in this inventory is a twofold one. Firstly, the Landscape Architect can consciously create suitable habitats by providing conditions favourable to certain species, and he can also preserve existing habitats, in both capacities aiding conservation. The converse is also true and the Landscape Architect should be aware of any detrimental effects a design may have as "the extermination of animal and plant species may start a chain reaction of whose long-term effects we are ignorant".

(B. Colvin, 1970).
Motuihe Island supports a variety of wildlife species although many existing on the mainland are absent. Development proposals and future management policies should not interfere with those existing but preferably provide for increasing populations, especially native birds such as pukeko, fantail and tui. Wetter areas could support suitable plant species, and farmland larger berrying trees providing homes and subsistence for wildlife. Mature pohutukawa overhanging shoreline areas support sea-birds such as shag and suitable nesting sites should be preserved and thought given to replacement and support planting to attract nesting and provide protection to suitable bird species as well as adding to the visual character of the shoreline.

Secondly unawareness on the part of the Landscape Architect can create over-simplified habitats, resulting in favourable conditions to unwanted species which ultimately become a pest and a nuisance. In conjunction with this the Landscape Architect should be able to assess damage to existing vegetation and resulting indirect consequences of this damage to other facets of the environment such as loss of soil stability. Rabbits exist in large quantities on the island but it is difficult to estimate direct vegetation damage or if they are a threat to the vegetation of the island. Luckily no oppossum exist on the island.
Wildcats present a problem, their existence attributed to unwanted pets abandoned on the island. These present a special threat to ground nesting birds such as the white-fronted tern and to other birdlife species. It is predators of this nature that have an impact on other species which contribute to the refreshment and stimulus of an area and the joy of its wildlife.

A list of probable animal and bird species of Motuihe Island is in Appendix E.

Example of one of the main shag nesting sites over-hanging the cliff tops.
Owing to the island nature of this site a mention here is made of the marine biology for completeness of the inventory.

The marine biology of the Motuihe Island shoreline is both abundant and diverse and a complete recording here is beyond the scope of this treatise. Again, the Landscape Architect must be aware of the impact of any development proposals on this resource.

The main likely impact on marine resources in relation to recreation would be in depletion of shellfish populations under this form of exploitation but any conclusions as to the effect of this on shellfish populations could only be the result of an independent in depth study. In relation to this point it has been observed that it is in fact "dangerous" to collect shellfish from West Bay at peak recreation periods as raw sewerage overflow empties into this area due to inadequate physical facilities.

A coverage of the likely Coastal biology type to be found on Motuihe Island is in Appendix F.
Site Appraisal
Following on from the detailed natural factors inventory is the site appraisal. This assessment is undertaken in order to grasp the intrinsic nature of the site and give a basic appreciation of the overall existing character.

The site appraisal primarily takes the form of a visual record. A mental picture of the spatial form of the site, the character of the spaces and their relationships to one another is essential for reference during the design process. An appreciation of this allows outstanding views to be preserved and any focal points and positive visual features to be enhanced and emphasised. An analysis of the interrelationships of the natural factors together with the visual scene allows the designer to consciously produce the overall visual framework within which richness, variety of interest and stimulation can be achieved.

Included within the site appraisal chapter is a survey of the physical elements existing on the site as these are quite often a dominant visual element in the scene being viewed.
For completeness of the record a shoreline survey has been included. Because of the island nature of the site, the shoreline plays a large part in the visual impression of the overall site. It is also the shoreline which becomes the dominant use area for recreational activity. It is therefore important to assess the existing character of these areas in order to become fully aware of the consequences of recreational impact on them.
To facilitate an overall appreciation of the visual character of Motuihe Island the approach to the following survey has been to provide a series of illustrations that depicts the broad image that the observer receives, and at the same time provides a coverage of the rich and varied detailed visual stimulation experienced during sequential movement about the site.

It is important that following information is read in conjunction with the Analysis drawings (Plans 2 and 4) which are an interpretation of this survey into a useable form whereby site re-development proposals can reflect and enhance this existing visual character.
THE RECREATION AREA.
View from wharf on approach to recreation area.
- Much of scene is revealed immediately on approach (e.g. canteen, toilets, changing sheds, and picnic ground 2.)
- However, there is a sense of anticipation as to what lies to the left around corner, and beyond the narrow sandy isthmus.
- Good sense of enclosure given by vegetated cliff on left directing views out to the right over West Bay and the southern end of island.
- The vertical accent of Norfolk pines contrasts with softer flowing shapes of native vegetation on the bulk of the southern shoreline.

View back to wharf from immediately below canteen.
- Pleasant soft edge to cliff results from overhanging vegetation.
- Spoilt to a certain degree by messy appearance of dying maritime pines.
- Relaxed feeling indicated by gentle curvilinear alignment of road to wharf.
Views of canteen and toilets from West Bay (top) and Ocean Beach (bottom).

- Siting of buildings acceptable visually.
- Mature, randomly spaced trees give a sense of cohesion to the overall composition.
- Vertical accent of trees emphasises the pleasant "nestling" of the buildings into the knoll.
Picnic ground No. 1.
- relatively bare open space orientated north with directed views to sea.
- spatial character due to enclosure by tall, mature massed vegetation.
- gives a strong sense of identity to space.
- this is emphasised by flat usable ground being lower than the surrounding planted ground.
Picnic ground No. 2.
- very narrow platform approximately 1 metre above beach level.
- presents unnatural hard visual edge to the beach bluff.
- this is accentuated by the vertical backdrop of Norfolk pines.

Picnic ground No. 3.
- a rather flat, open and static space (originally football fields during naval era)
- rigid nature of space emphasised by fringe of peripheral planting, resulting in an abrupt edge.
- little used as a picnic area due to distance from beach.
Main avenue created by close lineal planting of Norfolk pine and pohutukawa (stunted due to shading).
- rigidly defining in its effect it tends to be directional
- importance of original destination now historical.

View to right at northern end of avenue
- a pleasant shaded area beneath the close canopy of Logan Campbell's olive grove.

To the left the puriri avenue
- less rigidly defining than previous example.
A glimpse to the right from within the puriri avenue.
- enframed view of the top of the old water tower in distance.
- gives impression that an expanse of flat land awaits the observer at the top of slope.

Open flat ground of old naval parade ground.
- generally a messy appearance due to inadequate clearing of naval debris.
- tower acts as landmark due to its cliff-top location.
- despite the condition of remnant maritime pines they give character to the area and allow filtered views out across harbour.
distination of jurici avenue.
- roads in a pattern of spaces well defined by ornamental vegetation.
- originally enclosing sites of senior officers' houses during naval occupation of island.
- lack of maintenance has left much of this vegetation in a poor condition.
- examples of ornamental species growing:
  Pittosporum tenufolium, Podocarpus totara, Metaya sinclairii, Quercus, Euonymus and Eucalyptus sp. and Aconis flexuosa.
View to south-west from the old water tower.
- large open space gradually narrowing and terminating in dense vegetation at cliff-top.
- space rigidly defined on left by dense mass of macrocarpa shelter belt.
- this directs pleasant filtered and framed views out to Rangitoto Is. and Auckland city through remnant maritime pines.

View in opposite direction towards north-western end of island.
- undulating open space bordered on right by a fringe of mixed native and exotic vegetation.
- relatively open views to sea on the left.
- area is little used for recreation purposes.
- a line of graves dating from 1918 situated at the north-western corner adds interest to this area.
THE FARM LAND.

- PA POINT
- BILLY GOAT POINT
- GOLDEN BAY
- RANGER STATION
- OCEAN BEACH
- WEST BAY
- MATURE PINE SHADE TREES
- MARITIME PINE SHELTER BELT
- MAIN NATIVE BUSH TRACT
- WATER TANK AND TRUG
- FALED KNOB
- FARM COMPLEX
Transition from the recreation area to the farm area.

- (left) the Norfolk pine avenue
- leads off the narrow isthmus from behind the canteen
- destination is the space (below) where the ranger station is situated.
- although the area is grazed it retains an identity of its own thus acting as visual transition zone.
- ranger station unfortunately sited in the centre of this large open space.
- this also tends to act as a deterrent to visitor use of the farm area in its true multi-use role.
- however, this is a relatively sheltered area and commands good views out to sea, Auckland City and the harbour, and across the south-eastern part of the island.
Ranger station area passes into yet another avenue (Top) - leading to the farm complex. (Right).

- Avenue is very densely enclosed on the left by a macrocarpa hedge directing views out to the harbour beneath a sparse and somewhat untidy stand of remnant maritime pines.

- Destination of avenue is the farm complex (a private area) - however a crude sign directs the visitor to a farm walk enroute to the various beaches.
The farm complex.
- a relatively sheltered area situated at the top of a south-west facing vertical cliff (wind tends to be deflected over the top).
- situated in a convenient position in terms of farm operations.
- reasonably functional in layout, however it suffers due to a lack of an overall visual cohesion.
- house sited good in relation to rest of complex and in terms of its visual setting - commanding good views across the harbour to Auckland City.
Central farm block viewed from near Pa point looking north-west.
- pleasant area of undulating farmland giving a well-managed and tidy impression.
- strong sense of visual containment offered by the macrocarpa shelter belt at the top of the slope on the left, contrasting with open views to sea on the right.
- strong lineal element exists with the macrocarpa climbing the slope at right angles to the contours.
A stand of mature puriri trees.
- gives a sense of relief to an otherwise barren but open area.
- utilised by stock for shade.
- backdrop of remnant maritime pine gives character to area.

Example of looser planting in the fields.
- random location of trees tends to break up any potential spaces.
- almost a restless scene where the eye is unable to dominate but rather tends to search and 'see through' to the denser shelter planting beyond.
Looking across a major gulley leading down to Snapper Bay.
- higher moisture content enables these areas to support vegetation.
- strong lineal element presented by maritime pine shelter belts.
- contrasts with looser informal stand of puriri.
View from Billy Goat point.
- a high platform with extensive views across the island in all directions and out to sea.
- shows the open tidy appearance of the bulk of the farmland and the predominantly peripheral planting that occurs.
- Rangitoto Island, a familiar Waitemata Harbour landmark can also be clearly seen from this vantage point.
(left) View of trig and water tank.
- situated on a dominant flat ridge in the south-western portion of the island
- although the tower and tank are reasonably inoffensive structures, the safety fence and general messiness inside the fence tends to degrade.

(below) View across the farmland to Billy Goat point
- extensive views to other outlying islands.
- again the random occurrence of farmland trees contrasts with the stronger form of gully and peripheral vegetation.
View of Bald Knob (above) and the south-east coast (right) showing the relative bareness of the area, and the resulting character.
Aerial view of the farmland from the south.
Physical elements introduced into a landscape are an influencing factor in the resulting visual statement. For this reason an inventory is made here of the existing man-made physical elements on the island together with an analysis of the effect of them on the character of any one area. The buildings, the most dominant of the built structures on the island are considered first, followed by a detailed appraisal of the other elements, such as the roads, fences, wharf and naval remains.

BUILDINGS:

The existing buildings in the recreational area are inadequate for the purpose they are serving, and in the main are in an unacceptable condition. This includes the canteen, toilets, changing sheds, first aid post, boat shed and H.M.N.Z.S. Tamaki (the sea cadets clubhouse.) Necessary replacement thus gives the opportunity for an overall building resiting programme.

An analysis of the existing buildings individually is as follows:

Canteen:
- situated on a high knoll at the south-eastern end of picnic ground No. 1.
- reasonably acceptable siting both functionally and visually.
- the visual statement is supported by the random location of isolated maritime and norfolk pine trees.
  Colour - brown and yellow with white trims.
  Condition - average, however storage for stock is inadequate as canteen manager's residence is inclusive in the structure. To be replaced.

Toilets:
- acceptable visual siting in manner these two buildings 'hug' the slope of the knoll.
- however, functional siting questionable due to inadequate soakage.
  Colour - Buff with dark brown roofs - a pleasant combination suited to the natural surrounding colours.
  Condition - deteriorating - to be replaced.

Changing Jheds & Shelter Jhed:
- situated on the beach front of west bay.
- prominence of these three buildings tends to detract from the functional use of picnic ground No. 2.
  Colour - light green, dark green roofs.
  Condition - poor. To be replaced.
Boat Shed:
- situated on the southern edge of picnic ground 1.
  **Colour** - light green with dark green roof.
  **Condition** - Poor - to be replaced.

Wharf Shelter Shed:
- located at wharf-road junction.
- functional in terms of sheltering visitors while waiting for ferries.
  **Colour** - light green - dark green roof.
  **Condition** - Average - Fate unknown. (Probably replaced when wharf rebuilt)

First Aid Post:
- sited close to recreation area immediately below canteen on ocean beach side.
  **Colour** - light green - dark green roof.
  **Condition** - Poor - to be replaced.

Buildings in the farm area in general are in a reasonably good condition, and those that are not are in the process of being phased out in a rebuilding programme. The farm complex is well-sited functionally, and facilitates convenient access to all parts of the farmland. As the detailed layout of the complex is somewhat fixed a planting programme for this area
could serve to upgrade the visual statement. Building colours to date are not totally unacceptable, but it is suggested that in future painting programmes, colour choice should be a reflection of those existing naturally in the area. More specific examples are given in a later chapter.

Other buildings on the farm area include the various isolated pump houses, most of which are in relatively poor condition, but possibly serving their required function adequately. Replacement policy is unknown. In order to soften their impact in the landscape a sensitive colour scheme together with support planting could be implemented.

Occupying a prominent situation is the reservoir and water tank, an aged and run down structure, however still serving its functional purpose. Again some form of support planting here could soften the visual impact.

Also occupying a position on the farmland is the ranger station. As this building is relatively new it is in excellent condition. However, unfortunate siting tends to create a barrier to visitor use of the island as a whole. In order to overcome this some sort of a support planting programme, defining and directing circulation movements, is necessary to encourage diverse use of the island.
View of the reservoir (above) and the ranger station (right).
ROADS:

The minimal roading network existing on Motuihe Island functions in a service capacity both for the recreational and farming activities. The hierarchy of roads being tarseal, formed and farm track.

The tarseal roads and areas remain from the naval era and their condition varies according to the amount of current use. The main access road from the wharf is in a deteriorated condition and will require upgrading or replacing. Areas of tarsealing in the ex-navy encampment should be removed as they provide no functional purpose to the current use of the island. Tarseal roads leading up to the headland are in reasonably good condition, due to minimal use, however, removal or replacement policies for these will depend on new development proposals and corresponding circulation patterns.

The single formed road leading from the narrow isthmus up to the ranger station and farm complex consists of a scoria mix top course. As this road is not in good condition and is not suited to walking with light footwear, it is suggested that it be reformed of a material both in keeping with the marine character of the island and of a suitable walking surface. Further details will be given in a later chapter.
The farm tracks are naturally worn areas that have formed during the course of normal farming activities. They follow lines at least resistance giving a circulation pattern which facilitates functional movement around the farm paddocks. In general they are in an adequate condition although slight 'bogging' occurs in the wetter areas during winter.

**FENCES:**

As there is a re-fencing programme currently underway most of the fences on Motuihe tend to be in good condition, and those that are not are in the process of being replaced. Fencing patterns and the resulting line can often have a dominant visual effect on an area, however in the case of Motuihe Island, topographical undulations form a more dominant visual element often masking the effect of conflicting fence alignments.

Fencing recommendations are covered in a later chapter.

**THE WHARF:**

The Motuihe Island wharf is in a state of disrepair and estimates for replacement tend to be high, if not prohibitive. Repair work is undertaken at intervals to keep the wharf in a safe condition for holiday season use, but the expected life of the wharf at the most is five years.
The following article appeared in the Auckland Star, in October, 1974:

"MOTUIHE WHARP DANGEROUS' 
The wharf at Motuihe Island is dangerous and beyond repair, according to the report of the Hauraki Gulf Transport Improvement Committee.

Early approval should be given to its reconstruction, says the report.

It adds that park facilities on the island are insufficient and inadequate to meet the needs of visitors."

Another article appeared in the Auckland Star, in December, 1975:

"SECTION OF MOTUIHE WHARP CLOSED
Deterioration and lack of finance caused the outer section of the Motuihe wharf to be closed to traffic yesterday.

The chairman of the Hauraki Gulf Maritime Park Board, Mr. J.D. O'Brien, said the wharf would have to be replaced but the board had not been able to obtain from its own or government sources the $200,000 required.

Meanwhile, the inner section would remain and be available for public use but the depth of water available at low tide would restrict the type of vessel that could berth there.
Mr. O'Brien said the park board had not given up the idea of wharf replacement. The board recognised the important part Motuihe played in the park in providing an island picnic ground easily accessible by public transport.

But the board had to be realistic because there were many demands on public funds.

The cost of building a new structure would be high because of the length of wharf required.

Special consideration would be given to the question of picnic areas."

This later move has a great bearing on the level of recreational use, and also on the type of user. More discussion on this aspect will follow in the next chapter.

**NAVAL REMAINS:**

The remains of partly demolished naval buildings and other elements cause quite a significant amount of visual clutter, especially on the north-western headland. Some add historical interest to the island and these should be identified and be retained. However, remains without historical merit should be removed.
It is suggested that debris from demolition operations is removed completely from the island to a mainland deposit site, rather than the adoption of an "out-of-sight-out-of-mind" policy that has been accepted to date.

Example of naval remains (right) causing 'visual clutter'.

Detail of wharf (left) showing state of disrepair.
SHORELINE SURVEY

A survey of the shoreline is included as part of the overall site appraisal for completeness of the record. It is these parts of the island that attract the major portion of recreational use.

Due to the varied nature of the shoreline, no two shorelines could be typed. It is therefore proposed to analyse each beach and rock outcrop area individually in terms of the physical features, access, vegetation, existing use and potential recreational use.

On the following page appears a map, identifying the various beaches and rock outcrops.
WEST BAY:

Physical Features:
This is a soft sand beach which slopes gently to a mud flat. The beach is backed by a narrow flat grassed platform which forms picnic ground No. 2.

Two changing sheds and a shelter shed are sited at the northern end of the picnic ground.

Access:
The beach is accessible both on foot and by boat and offers shelter in north-westerly to north-easterly winds. Care should be taken with deep draft boats as at low tide the flat is extremely shallow.

Vegetation:
A backdrop of norfolk pines is the major vegetation type.

General Notes:
A peak recreational use area. Swimming and shellfish collection is potentially dangerous due to sewerage overflow discharging into the bay at peak use times.

Development:
Existing - changing sheds, shelter shed, picnic ground, tables and barbecues.

The changing sheds and shelter shed are to be re-sited, and potential exists for upgrading the picnic ground area.
View to the south-east - showing recreational use of the bay.
NORTH-WESTERN HEADLAND:

Physical Features:
Almost the entire length of this shoreline is a rock platform backed by steep cliffs. Low tide exposes the platform and leaves rock pools rich in minute marine life.

Access:
Access is by foot from either West Bay or Ocean Beach. No boat access.

Vegetation:
The steep cliffs are almost devoid of vegetation, what vegetation managing to establish soon slides with the eroded soil it is rooted in. The cliff tops support varied species such as pohutukawa, ngaio, other native shrubs and maritime pine.

Development:
Potential of this rock outcrop is purely in a passive recreational capacity as a pleasant half-hour rock walk. Possible only at low to mid-tide.
(Top) View to the north from Ocean Beach.
(Right) Aerial of the northwestern headland.
OCEAN BEACH AND GOLDEN BAY:

Physical Features:
This is a long sandy beach divided at high tide into two beaches by a wave platform. The northern section of the beach encompasses the main recreation area of the island, this being backed by a flat area of land approximately two metres above the beach phasing to the south into steep cliffs. The southern section of the beach is almost totally backed by steep cliffs, excepting for a low area where farm access is possible.

Access:
Access is possible via West Bay from the wharf to the northern part of the beach, and via the farm area to the southern part of the beach, although at low tide the full length of the beach is accessible on foot. Sea access is also possible.

Vegetation:
Except for isolated pohutukawa and scattered maritime pine on the cliff top and picnic area bluff, the northern section of the beach is relatively unvegetated. The southern section of the beach however is densely clothed in pohutukawa along the cliff tops, and in lower areas large trees extend down onto the beach offering shade to recreationists.

Development:
All development on Ocean Beach exists in the northern section. The low area to the south provides potential for an isolated picnic area, to diversify recreational activity and relieve pressures. Toilet and changing facilities would need to be provided.
View to the north-east - showing recreational use of the beach.
View to west from Pa Point.

View east to east of the southern end of Oceam Beach.

View of Golden Bay looking east towards Pa Point.
PA POINT:

Physical Features:
Pa Point is a mixed platform and loose rock outcrop backed by vertical cliffs.

Access:
Access is possible from the adjoining beaches only at low tide.

Vegetation:
The cliffs are devoid of vegetation, but pohutukawa extend out from the cliff top.

Development:
None.

SNAPPER BAY:

Physical Features:
This is a small secluded sandy bay bounded by the cliffs of Pa Point to the north, and Billy Goat Point to the south. It is backed by a low bluff through which a major farm gully drains.

Access:
Main access is via the farm area or by sea. Access is also possible on foot at low tide via Pa Point rock outcrop.

Vegetation:
Predominantly pohutukawa with some massive specimens resting on the sandy beach.

Development:
None. The provision of facilities could tend to cause crowding and unnecessary pressures.
(Top) Aerial of Snapper Bay showing gully and fringe vegetation. 
(Right) View from Snapper Bay east to Billy Goat Point.
BILLY GOAT POINT:

Physical Features:
This rock outcrop consists of an extensive low platform, strewn in places with loose boulder material. Numerous rock pools and a large lagoon are exposed at low tide. It is backed entirely by high vertical cliffs.

Access:
This outcrop is confined to foot access from either Snapper Bay or Calypso Bay.

Vegetation:
Predominantly pohutukawa on the cliff tops. Some gorse exists, especially at the Calypso Bay end of the cliff.

Development:
None.

Further round the point looking west into Calypso Bay.
CALYPSO BAY:

Physical Features:
Calypso Bay is a small, sheltered sandy beach, backed by a well treed steep bank.

Access:
Access is possible via the farm area, on foot from either Billy Goat Point or South East Beach at low tide, or by sea.

Vegetation:
The most prominent vegetation is an almost pure stand of excellent blue gum specimens on the steep bank backing the beach. Other vegetation includes pohutukawa on the cliff tops, and scattered native shrubs, with the occurrence of pockets of gorse.

Development:
To date only refuse facilities have been provided. The recent advent of an access road through the gum stand has made the siting of toilet and changing facilities feasible.
SOUTH-EAST BEACH:

Physical Features:
This is a long white sandy beach which remains unpopular due to a shallow mixed mud and rock bottom. The sand meets a wide flat grassy platform which stretches for almost the entire length of the beach. At the northern end this stops abruptly at the foot of steep cliffs. At the southern end the platform phases into steep rolling farmland. Three gullies drain onto the beach.

Access:
Access is possible via the farmland or around the shoreline at low tide. Sea access is possible only at high tide due to the risk of stranding boats on the shallow flat.

Vegetation:
The gullies consist mainly of taraire. Some patches of gorse exist. The southern section consists of open improved pasture.

Development:
None.
(Top) South-east Beach looking north-west from above on the farmland.
(Right) The beach from the air - showing the taraire gullies.
SOUTH AND SOUTH-WEST SHORELINE:

Physical Features:
This is the longest and least used section of the islands shoreline. It is of a varied nature: the southern section consisting of four small open beaches, two being sandy and two with pebble foreshores; this phasing into the south-west section consisting of untraversable rocky shoreline. This is broken just south of the farm complex by a small pebble beach where a major farm gully drains.

Access:
Access is possible only to the beaches on foot via the farm area or by sea.

Vegetation:
The southern shoreline is devoid of vegetation except for isolated pohutukawas on the two pebble beaches. This phases to denser stands of pohutukawas finally merging to a thick canopy of mixed native bush.

Development:
None.

View south towards Beacon Point.

View west from Beacon Point.
(Top) View west towards Mangitoto Island - showing the first pebble beach.
(Right) View west - showing the second pebble beach.
(Top) View east from the small pebble beach showing the native bush.
(Right) View towards West Bay from the small pebble Beach.
Motuihe Island as a Recreational Resource
In New Zealand recreational development has been modifying our coastal areas for over a century and with the unprecedented rise in recreational activity over the last two decades modification is accelerating at an ever-increasing rate. Motuihe Island has not escaped the impact of this modification.

The island has been modified by several types of development throughout history, the emphasis today being on recreation and farming. Most of the recent development, especially that of a concentrated and physically changeable nature (also visual change) has occurred at the north-western end of the island. It is this that is the primary concern of this chapter. The rest of the island has remained unchanged in recent years and has rather mostly being improved by farm management.

As it is the north-western end of the island that exhibits most recreational potential it is also the area that exhibits many of the detail environmental and recreational problems to be solved.

In order to solve these problems, it is proposed to briefly outline the recreation trends of Auckland that effect Motuihe Island and from this assess its role in the Hauraki Gulf Maritime Park and thus the type of experience that is required there. Broad management objectives (both regional and within the park in terms of how they affect Motuihe) can be briefly covered
together with detailed management objectives (facility needs on the island.)

After the parameters of development are achieved it is feasible to attempt to arrive at a carrying capacity figure for the concentrated recreational area. It is envisaged that establishing the 'logic of the approach' will be a more important end point than establishing some 'correctness' of the results.

The outcome of this will be valuable to arrive at conclusions as to the amount of control on use that will be necessary for the ability of this resource to continue supplying the required recreational experience.

For completeness a statement on the impact of farming activities will conclude this chapter.
RECREATION TRENDS IN AUCKLAND CITY THAT EFFECT MOUNTAIN ISLAND:

Increased leisure time, more discretionary income, greater mobility and modern educational methods available today has tended to diversify recreational opportunities available to a larger proportion of the population. This has led to a recent rapid rise in the levels of participation in recreation in general in the Auckland region, but in particular water-based activities, particularly on the Waitemata harbour have accelerated, and will continue to do so.

The Waitemata Harbour may be regarded as the focal area for coastal recreation in the Auckland region and for the large numbers of pleasure boaters using the harbour perhaps its most valuable attribute is the high level of natural protection it affords. Another factor contributing to the harbour's popularity is its accessibility to the large urban population clustered around its shores. Despite the greatly increased mobility of today's society there is a significant section of Auckland's population who, for a variety of reasons, take their recreation pleasures close to their places of residence. At present, it is possible for these people to engage in a wide range of water-related recreation activities without having to travel long distances. In relation to this another aspect contributing to the harbour's value is its strategic location relative to the waters and islands of the Hauraki Gulf. Increasingly,
activities such as power boating and yachting are using the harbour as a base from which to venture out into more distant waters.

As the Waitemata is suitable for a wide range of recreational activities increased demands and pressures for facility development is going to be generated by an expanding and increasingly leisure-conscious population. This facility development demand is going to be especially high in both the already popular areas of the mainland coast and the closer outlying islands of the Hauraki Gulf, this including Motuihe Island.

In order to place this demand in some quantitative perspective, a brief summary of the levels of participation in the water-based activities in Auckland will follow.

The following figures are from Auckland Regional Authority Publications on 'Recreation Patterns in Auckland' (1971) and 'Recreation - Waitemata Harbour' (1973).

Results from the former publication found that swimming at 21% participation was by far the most popular activity participated in, and 25% of the people interviewed said they would like to participate. The participation level for boating/sailing/yachting at 7% seems low but comparisons with other
popular recreational activities such as rugby, tennis and camping are favourable. This figure contrasts markedly with the "would like to do" figure of 13% for boating/sailing/yachting, if the opportunity presented itself.

Actual numbers participating in the water-based activities are given in the latter report. The Auckland Yachting Association places the total membership of Yachting clubs in the Auckland region at approximately 8,000 with perhaps an overall total of 40,000 persons participating, to some extent, in yachting. The greatest proportion of these people sail on or from the Waitemata Harbour.

Power boating in Auckland has, in recent years, experienced a remarkable growth in popularity. A survey undertaken by the Auckland Regional Authority Planning Division revealed that in the period 1962 - 1969, an estimated 1,300 outboard motors were sold annually in the Auckland Metropolitan area. In 1969 there were, in the same area, approximately 6,400 inboard and 13,100 outboard power boats. Trends since that time point to even greater increases in the total number of power craft, a large proportion of which have made use of the harbour.

While the general growth is evident in all types of power boats it appears to have been most pronounced in the case of outboard runabouts. This is a significant factor as there is
good evidence to suggest that a large proportion of this type of craft are purchased for the sole reason of obtaining access to beaches, such as those existing on the various islands of the Hauraki Gulf, that would otherwise be inaccessible by other means.

In addition to this private boat use of the Waitemata, is the large number of both regular and hired ferry services which transport people from the mainland to the various recreational opportunities available on the outlying islands of the Hauraki Gulf.

From the potential level of use that is promulgated from this intense recreational activity outlined above, it can be established that certain pressure spots are going to occur in various popular areas. Motuihe Island presents one of these pressure spots, and from a conscious appraisal of the facility needs on the island, the level of use that can be tolerated, and the manner in which this use is going to be catered for it is hoped that the effect of recreational pressures can be lessened.
MOTUIHE'S ROLE

The role of Motuihe Island within the Hauraki Gulf Maritime Park to date has been to provide a recreational opportunity in terms of picnicng and swimming together with the experience of a boat trip across the Waitemata Harbour. The three formal picnic grounds also cater for organised outings such as staff or school picnics. Although there is no control on levels of use by the general public while these organised picnics are in progress, crowded conditions at peak use times and the inadequacies of the physical facilities has not produced any decline in the popularity of the island for general use. It can be inferred from this that the type of recreational opportunity offered by Motuihe is in demand and the level of use is not likely to decline.

Although the bulk of the island with its rural activity is open to public use, it appears that few people are aware of this accessibility and the facility is little used - even for the purpose of gaining access to less crowded conditions of the other periphery beaches. These beaches are used mainly by private boat owners.

Therefore there seems to be a contentment on the part of the recreationist to use the easily accessible area close to the wharf. Thus, the experience in demand on Motuihe seems to be a boat trip, leading to pleasant picnic conditions in semi-natural surroundings, close to the point of access. Motuihe's major role must be compatible with this.
DEMANDS ON THE RESOURCE:

Uncontrolled use, however, could put unnecessary demands on the concentrated recreation area. The area in question being picnic grounds 1 and 2 and their immediate beach environs. If capacity of the resource is increased beyond its limit:

- the resource itself will be abused or destroyed beyond its power to provide recreation experience, and

- the congestion of human beings on the land and water will reduce the recreation experience to a nominal or non-existent state.

Physical crowding in terms of space available has probably not been the greatest factor in the recreational impact on Motuihe Island, except on the occasional peak day where perfect weather, fully booked picnics, crowded ferries and myriads of private boats have produced crowded, unpleasant conditions. However, a problem does exist with the effects of large crowds creating added pressures on already inadequate facilities that exist on the island.

Toilet facilities are old and inadequate and at peak loads cease to work due to poor soakage causing raw effluent to be discharged into West Bay. As water supply on the island comes from artesian wells, the capacity of these lowering during summer, critical levels of water for stock mean that supplies to the recreation area are often ceased.
To date provision for inorganic refuse disposal has been inadequate. Dumping of waste products in open gullies (such as that on the North-western headland) is not an adequate or conscious form of refuse disposal.

Other impacts on the area tend to be light. Due to both the seasonal use factor and weekend peak use only, biological impact is low, the area receiving adequate rest during off-season and off-peak times. Minor erosion occurs on the two beach bluffs and some check to this will be necessary to prevent any further erosion.

At the present time, therefore, Motuihe Island is supplying a recreation demand greater than its actual carrying capacity. However, carrying capacity is not a primary factor in the interaction of people and a resource but is a derived or dependent factor which is subject to precise definition after the parameters of park development have been determined. As outlined by the brief Motuihe Island is to be upgraded as a recreational resource, and any number estimates or guidelines can only evolve after the primary factors of carrying capacity, the elements to be planned and developed that determine how people are to be accommodated and contained within the park, have been determined.
BROAD OBJECTIVES:

Capacity should be judged in the light of the particular management objectives for a given area. These objectives and thus the policies of management are to determine the type of use appropriate to the area, the proper intensity of use, the degree of impact which can be considered reasonable, and the seasonal distribution of visitors. Without definite objectives, trying to manage a location for its carrying capacity will be an exercise in futility.

These objectives should take into account the broader aspects of recreational planning. For example, the goal of maximizing user satisfaction for a given geographic area such as the Auckland region can be met only by the provision of a spectrum of opportunities that meets the diverse and often conflicting tastes of the public. Regionwide planning, such as that existing in Auckland, helps to meet the diversity of recreational tastes. No one recreation supplier need feel obliged to meet all demands. Each public agency could aim clearly at part of the demand, and refer people who want something more, less, or different to a more appropriate area. Only by making sure that a full range of opportunities exists (regardless of the organisation that provides them), will there be a situation matching visitor needs with opportunities rather than trying to develop recreation areas for the mythical "average user."
In terms of this, I.R. Atkinson of the Botany Division, D.S.I.R. has written a paper outlining measures for protection and uses of the islands of the Hauraki Gulf Maritime Park.

He says "the type of use and degree of protection that can be given an island is related partly to its distance from the nearest human settlements. An arbitrary distinction between the outer islands (lying at distances greater than 10 km from the mainland or from settlements on other islands) and the inner islands, which are closer, is therefore useful."

Atkinson further classifies these on a three point system (Classes A, B and C), saying "each island has its individuality but a classification, based on use and the degree of protection needed is necessary for long-term planning.

Motuihe Island is one of the inner islands which "hold an exceptional range of recreational opportunities and in some instances have high scientific value and potential for wildlife as well," and comes under Class C - "Islands whose recreational values should be considered paramount - unrestricted landing."

Having classed Motuihe in this broad category, it is now the purpose of this report to define more closely the type of recreational experience that the island should provide, the facilities required to supply that experience and some order of the level of use that can be tolerated."
OBJECTIVES FOR NOTUIHE ISLAND:

Notuihe Island should, as its major role, continue that same recreational experience it has been providing since its inception as a recreational resource in 1930 under the Auckland City Council. That is, to provide safe and pleasant picnic conditions in semi-natural surroundings with a minimum of introduced facilities. In addition, more diverse use of the island can be gained by:

- providing additional picnic facilities for ferry-borne recreationists at the southern end of Golden Bay where access via the farmland is possible.
- encouraging people to use the farmland and bush areas via sign-posted walk-tracks.
- providing the opportunity and associated facilities for organised groups to use the island both in-season and out-of-season for extended stays for purposes pertinent to that groups interests.
- encouraging small parties, under permit, flexible use of the island for short periods of modified camping for certain purposes.

It is considered compatible for the maintenance role of the farming activities to continue, completing the multi-purpose role of Notuihe Island.
The most critical area in terms of facility needs is the concentrated recreation area. As it is envisaged that the essential character of the area is not going to be changed, but be strengthened, facility needs are going to be similar to those already existing. In keeping with the requirements of the brief, the facilities are to be upgraded, which in terms of this study calls for an overall replacement programme. This enables complete site re-organisation, especially in detail building siting with correspondingly improved spatial organisation of the area.

If Motuihe Island is to retain its present quality it must remain essentially a 'soft' landscape free from introduced hard elements of surfacing and an over-encumberance of built-forms. Therefore it is envisaged that the built facility needs in the concentrated recreation area are:

- Canteen
- Information Centre
- Ranger's Office
- First Aid Post
- Toilet
- Changing facilities
- Bar-b-que facilities

All within a single structure
Facility needs in the additional picnic area at Golden Bay will be minimal and comprise:

Toilets
Changing facilities

Facilities for the organised groups - sited away from the main recreation area on the north-western headland will consist of:

Cabin
Ablution block
Mess room
Games Room - associated with an outdoor camp-fire area

As vehicle movement is minimal on the Island and confined to farm and maintenance vehicles, materials used on circulation routes can be of a 'soft' nature in keeping with the natural surroundings.

(Further detail design discussion of the above facilities will appear in the following chapter.)
It is considered that some estimate of the maximum daily visitor numbers is necessary to prevent adverse effects of overuse of planned facilities on Motuihe Island.

Based on developed facilities of known capacity, known rates of movement into and out of developed facilities and established optimum use levels the actual numerical carrying capacity of a park may be able to be determined. However, the carrying capacity will not relate to the number of acres of natural area within the park boundary, but will relate to the population capacity of the developed areas of the park. The determination of the carrying capacity of a park therefore requires some qualification. For example, on Motuihe Island it is not the total 195 Hectares which is in question, but rather the small isthmus area where recreational use is concentrated.

The carrying capacity of a park, then, is determined by the capacity of the developments and facilities, and whether occupation is to be maximum or optimum is determined by the extent to which occupancy affects maintenance, including maintenance of the natural resource. There is no magic formula for determining carrying capacity of an area such as this, and the determination can be made only after the developments are incorporated into it, for without them the concept of carrying capacity has no practical meaning.
The area in question then, is the relatively small area on the isthmus incorporating picnic ground 1 and 2 and the associated service facilities of a canteen, information centre and toilets and changing facilities.

In order to carry out a capacity study, assumptions must be made using data which is available, viz:

- yearly visitor numbers to date.
- capacities of ferries servicing the island.
- estimates of private launches visiting the island.
- personal observation, and
- personal communication with those living on the island.

The figures derived must be regarded as extremely crude but an any more sophisticated approach is considered unwarranted because of the limited amount of data available. In addition to this the figures required need only be estimates to the order of recreational capacity, not an exact estimate.

As it is the capacity of the activity 'containers', 'compartments' and 'facilities' that are the ultimate
parameters of carrying capacity, and each facility will have a capacity maximum, the overall maximum will ultimately be that of the most fragile facility.

The major items which limit recreational of Rotuiho Island appear to be:

- The area of land available for intensive use (crowding).
- Sewerage disposal.
- Water availability.
- Refuse disposal.
- Biological impact.

It is proposed to analyse existing data, and from this assess levels of use to date. Using space availability, a nominal figure can then be arrived at as the basic upper limit to daily capacity. Following this it is then feasible to adjust this figure either way by assessing whether or not the proposed supportive facilities can cope with this level of use, adjusting that initial basic maximum either way to arrive at the overall daily carrying capacity figure.
Numbers of people using the island over the last 5 years are as follows:

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Number of People</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969 - 1970</td>
<td>21,501</td>
</tr>
<tr>
<td>1970 - 1971</td>
<td>22,251</td>
</tr>
<tr>
<td>1971 - 1972</td>
<td>15,186</td>
</tr>
<tr>
<td>1972 - 1973</td>
<td>23,000</td>
</tr>
<tr>
<td>1974 - 1975</td>
<td>25,000</td>
</tr>
</tbody>
</table>

The source of these figures is from ferry company counts of people using the service that operates between Labour Weekend and Easter (i.e. approximately 20 weekends/year) at the weekend only, except over the school summer holiday period when it operates daily. However, from observation, by far the heaviest use level is at the weekends and the above figures will be interpreted as such.

For the last five years therefore the average use level has been approximately 21,105/year.

i.e. \[
\frac{21,500}{22} \quad \text{(number of weekends island used/year)}.
\]

or approximately 1,000 each weekend.

or 500 people/weekend day.
However, this is only an estimate of the number of people using public transport. It can be assumed that this figure is at least doubled by the number of private boat owners visiting Ocean beach and West bay, giving a total of approximately 1,000 recreationists / weekend day on average.

It must be remembered that this figure is only an average (and an estimate at that) and that it can fluctuate (and has fluctuated) from as low as under 100 visitors/weekend day to over 1,000/weekend day. These peak use days occur on fine weekends when Auckland recreationists are out in their myriads and when the island is being used to cater for large organised picnics.

It is these peak days with large crowds that lead to the pressures on existing facilities and their resulting inadequacies.

From this it can be seen that without a sewerage system, adequate water supply and an efficient healthy refuse disposal system to cope with this, pressures are afflicted on this resource. In turn this undermines management objectives, and maintenance programmes become inadequate, leading to a decline in the quality of both the recreation resource and experience.

CARRYING CAPACITY ASSESSMENT:

The first estimate therefore will be the figure that the area of picnic ground available will comfortably hold before crowding decreases the recreational experience. (Psychological capacity):

The area of land available for picnicking is...

approx. 16,000 sq. m.

plus beach area ... ... " 4,000 " "
giving a total of ... ... " 20,000 " "

and if each group of an average of 3 persons required 20 sq. m. of picnic space (i.e. approximately 5 m. between each group)

this gives an area capacity of \( \frac{20,000}{20} \times 3 \)

= approximately 3,000 persons.

This capacity can easily be reached with:

* 1 Harbour Board Ferry ......................... 1250 1.

2 Blue Boats ................................. 300

and 500 pleasure craft at an average of

3/craft .......................... 1500

approximately 3000

* Figures from L.S. Dromgoole - Ferry Operator.

1 Accuracy of figure questioned.
The question now is - can the more fragile variables contributing to recreational pressure withstand peak use of up to 3,000 people on the island at any one time.

THE PHYSICAL CAPACITY:

SEWERAGE:

From personal communication with health engineers (M.H.E.), it seems that there are three methods of sewerage disposal economically feasible for Motuihe Island.

1. Septic Tank (with intermittent sand filter and disposal into running sea water)

2. Clivus Multrum

3. Deep Fats

The former method can be designed to cope with a maximum of 3,000 people, although the size of the filtration plant and quantities of sand required to operate the system would tend to suggest a maximum figure below that of 3,000 people. The quantity of water available however (a minimum of 2-3 gallons/person to operate such a system) would be a limiting factor. (Sewerage and water availability being interdependent.) Taken on yearly averages, this system would require a water supply of 75,000 gallons (25,000 x 3) annually.
(for sewerage alone without taking into account other recreational needs) and unless this amount of water could be drawn off during winter months and stored in tanks, the system seems to have limitations.

Clivus Multrum (or a modified form of) is a Swedish composting unit where waste, urine etc. decompose in the presence of air. Water vapour and carbon dioxide rise up through the exhaust duct. The waste mass decreases in volume during the decomposition and drops slowly to the final storage chamber where it accumulates as compost suitable for putting on the garden, initially after 2 years in the unit and then at intervals of 1 - 2 years. This unit presupposes a compost user - this being possible on Notuihe with three family gardens. The author prefers this method, however expense and the difficulty of controlling picniers to separate out inorganic refuse could make the unit impractical in this situation.

Therefore deep pits is the method recommended. The method has two distinct advantages in that it is not water borne, and also a series of single or double units can be dispersed throughout the recreation area overcoming the problem of a centralised inconvenient toilet block (See Plan 7 for siting, and plan 9 for construction details). Also it is not considered necessary to provide water-borne sewerage systems in recreational areas such as this, especially where

* By the Author,
  'Gordon Fox - Health Engineer - M.W.D.
  'W.W. Hill - Engineer - Environment. M.W.D.
water supplies are critical during summer periods.

From U.S. Public Health Service recommendations:

In picnic areas

350 people require 6 female and 3 male water closets.

i.e. a total of 9 W.C.'s / 350 people

or a total of 27 W.C.'s/1000 people

This figure seems to be excessive, as it is designed to cope with continual use. At Malua Bay, peak weekends only occur on a limited number of times a year. Some degree of overcrowding is considered acceptable, provided an adequate period for recovery is given, i.e. during the week and winter.

It is proposed to supply 16 W.C.'s.

i.e. 5 units disposed around the site containing:

3 x Double F and Double II = 6
2 x Double F and Single M = 6
1 x Single F and Single II = 2

Total = 16 W.C.'s

giving a ratio of DF : 7M.
(Ratio higher than U.C. standard as urinals are not being supplied).

CHECK:

Take a peak use period - say 2 hrs around mid-day.
- 16 U.C.'s.

2 minutes average use
or 30 people/hour/U.C.

or 16 x 30 = 480 people/hour/16 U.C.'s.

= approximately 1,000 people accommodated over that peak mid-day use period.

If this is one third of a peak day crowd, it is considered that the number of U.C.'s proposed could accommodate the usage. Some queuing would be inevitable and capacity of these toilets would be stretched on a peak usage day. Also in reality usage would be distributed throughout the day, and the facilities would not be subject to such constant peak usage.

Therefore, although it is considered that peak usage could be accommodated, sewerage facilities tend to suggest an ultimate peak figure lower than that of 3,000. Optimum usage would certainly be lower.

WATER AVAILABILITY:

The essential elements of water demand include the average
daily water consumption and the peak rate of demand. The average daily water demand should be estimated.

* to determine the ability of the water source to meet continuing demands over critical periods when the water-table level is low, and

* for purposes of estimating quantities of stored water which would sustain demands during those critical periods.

Peak demand rates should be estimated to determine the storage requirements necessary to supply sufficient water during periods of peak recreational use.

It is considered that water availability on Motuihe is an extremely critical factor in the recreational capacity. (Choice of sewerage system consistent with this.) Concern in this direction was expressed by the farm manager in personal communication with him on this problem. Hence the complete severance of water supply to the recreational during the summer period of 1974-75.

Water availability sets up one of the few conflicts between recreational requirements and farming activity requirements, peak recreational use coinciding with critical summer water shortages. Livestock, especially cattle are high consumers of water. Even without water-borne sewerage facilities, recreational water demand is going to be considerable.
Therefore it is considered essential that a separate in depth study by a professional hydrologist be carried out to determine water availability, the possibilities of drawing off excesses during winter for storage for farm and recreational requirements. Concern was expressed by a M.I.M. engineer on the condition of the water lens in communication on this problem.

It could be that water availability is going to be the most fragile factor of the capacity variables and probably therefore the ultimate determinant of peak and optimum recreational capacity.

REFUSE DISPOSAL:

Motuihe, being an island situation, presents a special problem in terms of refuse disposal as it is not close to any form of central collection point, and therefore:

- special arrangement must be made on the island itself, or
- arrangement may be made to periodically remove accumulated refuse from the island to a mainland disposal point (e.g., use of bins), or
- a take-your-litter-home policy could be introduced.

Ideally the third suggestion would be worth achieving. In Britain, the National Trust has successfully removed bins from some sites, with the policy working.
Economics of the second method could be prohibitive, however the possibility should be explored before resorting to the first method, which is basically that which has been operating to date. However, it is considered that more thought and care be exercised with refuse disposal policies in the future, with provision of a properly screened area using a controlled system.

As peak use only occurs at weekends, refuse disposal will probably not pose a great limiting problem to the recreational system. It would also be difficult initially to assess amounts of refuse left by recreationists, therefore some assessment may be required after the upgraded facility has been in operation for a season.
BIOLOGICAL IMPACT:

For completeness, some discussion is necessary to determine the ability of the biological factors, the vegetation, fauna, and marine life to tolerate varying intensities and types of recreational use.

Impact on the existing vegetation has been light. The grass cover on the picnic grounds shows little signs of wear, probably due to the fact that weekly use is light allowing the cover to recuperate after intensive weekend use. Signs of wear occur on the knoll where the present canteen is sited, due to the numbers of people using the facility together with the sloping nature of the site. Wear also occurs at abrupt changes in topography at black bluff edges. Some root exposure has occurred at the edge of the Norfolk Pine stand on picnic ground No. 2. Other vegetation is little affected by recreational activity.

Proposed vegetation will be ecologically suited to the site, coastal vegetation normally being hardy to other physical pressures also. Therefore it is not considered that the vegetation will be a severely limiting factor to carrying capacity. However, in the first years of establishing, such vegetation will require due care and attention, and protection will be required at times of peak recreational usage.
Birdlife resting sites are not prevalent in the concentrated recreational area, recreational pressures therefore having little bearing on this resource. Similar characteristics apply to marine life, however, shellfish populations are likely to decrease if the excessive amounts taken to date are perpetuated.

**SUMMARY:**

As far as the figures go maximum peak use of island seems to be established at 3,000 people/day. However, if the resource was subject to this level of use constantly, degradation of the resource would take place. Therefore the optimum level of recreational use is going to be a somewhat lower figure than that of 3,000 people/day.

Also realistic results are not going to be obtained by only assessing the daily maximum and optimum, but to be of use the figures must be applied to seasonal use, that is over 20 weekends.

At the maximum peak use, seasonal numbers would be:

\[ 6,000/\text{weekend} \times 20 \text{ (number of weekends in season)} \]

\[ = 120,000 \text{ visitors/year} \]
Comparing this with levels of use to date:

e.g. 1973-74 season, an estimated 50,000 people visited the island.

Hotulha Island, even with upgraded facilities could not withstand the pressure of 120,000 visitors/year, and continue to provide the recreational experience that is in demand there. Some controls would need to be established before levels of use attained these dimensions. Without the assessment of the most fragile variable, the water availability, accurate assessment is impossible.

However, to complete the exercise, an optimum use level somewhere between levels to date (50,000) and the excessive seasonal assessment (120,000) would seem comfortable.

i.e. 80,000 visitors/year.

giving an optimum use level of 2,000 people/weekend day.

Results may seem arbitrary, but due to the restricted nature of backup data and information available, more accurate assessment (if that is attainable) was not possible. The validity of the exercise is in the progression through the process, establishing the various limits of recreational capacity, and finally arriving at a figure giving some order of carrying capacity.
From personal experience and close observation obtained from long periods on the island, 2,000 people/weekend day, would seem to be a comfortable and feasible optimum recreational carrying capacity for Motuihe Island.

(Note: Since the capacity study was done, the outer part of the wharf has been closed (see additional newspaper item in previous part of text). This naturally controls levels of use until such time as the wharf is replaced. This also gives opportunity for the implementation of new development proposals, especially the more fragile facilities. Less pressures will also be beneficial in terms of establishing new planting.)
CONTROLS ON USE

To protect this resource from overuse, implementation of controls is going to be necessary. Private boat owners are going to be the most difficult to control. Public use could easily be controlled by limiting the numbers of people boarding ferries at Auckland.

However, several queries can be raised from this.

1. Should Rotuihe Island be reserved solely for use by those fortunate enough to own or have access to boat transport of their own, and

2. In terms of this pressure would be bought to bear by the fact that 10 cents / ferry passenger is levied by the Hauraki Gulf Maritime Park Board which goes towards upkeep of Island facilities. Private boat owners have free access.

Therein lies a dilemma. Other suggestions are:

1. Restricted landing for private boat owners in West Bay and Ocean beach. (However, this may not be compatible with Atkinson's class C classification.)

2. Levies on private boat owners (difficult to enforce)

3. Public relations between Hauraki Gulf Maritime Park Board and boat clubs, the former outlining problems existing which the
latter pass on to members suggesting they use their own discretion and judgement.

control on organised picnic size.
CONFLICTING USE.

In terms of recreational pressures, one conflicting use that occurs is worthy of mention. This is the continual conflict of water-skiers with swimmers and other moored boats. To date this has proved a problem and has been difficult to control.

The provision of water-ski lanes is absolutely essential on both sides of the island for adequate control of this use. (see Plans for detail siting).
For completeness, a statement about the impact of the farming activities is included here. The main role of the farming activity on the island is in a maintenance capacity. In this role it is accomplishing the task more than adequately with yearly economic profits to show. The 1,000 yews and 250 head of cattle succeed in maintaining a clean appearance to the open far land, and in this respect management is extremely well executed.

Conflicts between farming activity and recreational activity are few, the main two being:

- the water situation. It may well be that a simple solution may be found after thorough investigation. If water conflicts arise only after seasons of drought, solutions may be able to be found.

- perpetuation of the existing areas of native bush. It is important, if Notilna Island is to continue as a recreational resource that these areas of native bush be preserved and enhanced both for visual and amenity reasons. As A. Eisler says in his botanical report on Notilna Island "the management of the lightly forested area is not good farming, good conservation or good landscaping. Irregular grazing and lack of fertilisers result in poor pasture among
the trees and inadequate control of weeds. At the time
browsing is intense enough to prevent regeneration of most
of the forest species. In its present state the area is
not particularly attractive except at a distance." He
 goes on to say that "total exclusion of stock is not the
answer". However, the author strongly disagrees. It is
imperative all existing areas of native bush be perpetuated.
It is impossible for this to happen with the presence of
grazing animals. All existing areas of native vegetation
must be fenced and stock totally excluded. If difficulties
in suppression of grass and weeds occur, hand cutting of
growth accompanied by hand-seeding or physical planting of
seedlings should take place to assist natural processes. It
is agreed that an area could be fenced to become part of the
farmland with grazing taking place beneath. This to function
as additional shelter and shade to animals.

Grass should not be removed from areas of native bush
because it forms a nursery and eventually native plants will
naturally suppress it.
Concept and Design Proposals
As stated by I.A.E. Atkinson, Motuihe Island comes under a classification where "recreational values should be considered paramount". Therefore the basis of the design concept is to upgrade the whole island as a recreational resource, whilst at the same time -

- integrating the recreational and farming activities, and

- preserving and enhancing all site qualities and restoring those diminished through historic development.

In order to upgrade the island as a recreational resource, re-development proposals are required to -

- accommodate intensive seasonal use without destroying the essential character of the island, or increasing maintenance, and

- diversify recreational use, both site use and seasonal use.

The design concept is therefore based fundamentally on the following items, all of which have both visual and functional significance -
. the activity areas
. the circulation system
. the facility provision, and
. the re-vegetation pattern,

and the inter-relationships between them.
ACTIVITY AREAS

Broadly, the activity areas will remain as they traditionally have: the concentrated recreation remaining on the narrow isthmus and North-Western headland, due to ease of access, development opportunities and proximity to two good beaches; while the farming activity, (although basically a maintenance role) due to the size of operations, will continue on the bulk of the island.

It is proposed in the recreation area to -

. retain picnic grounds 1 and 2, extending picnic ground No. 1 into the existing H.M.N.Z.S. Tamaki site. Improvement within these two areas as 'activity containers' is necessary by upgrading spatial disposition.

. site a small cabin development in the southern portion of the North-Western headland. It is envisaged that this will be for organised groups and will function in facilitating development of site potential for further activities and diversify seasonal use of the island.

. provide open areas on the North-Western headland where larger organised groups could site short-term camps. The purpose of this being similar to that of the above mentioned development.
In the farm area -

. the farm complex and ranger station will remain where they are.

. field layout will change slightly to accommodate areas of re-vegetation and other minor activity areas.

In addition, in order to integrate recreational and farming activities, and to develop the whole site for further activities, and diversify use, it is further proposed to -

. relieve pressure of the intensive recreation area by developing other beach picnic sites with access from the farm area, especially the low area at the junction of Ocean Beach and Golden Bay.

. encourage day visitors to use the farm area for walking purposes.

. suggest potential areas where small organised groups could camp informally under permit for certain purposes.
CIRCULATION SYSTEM.

As Motuihe Island is free from any major vehicle movement (other than farm vehicles) circulation patterns can be both minimal in extent and in the width of carriage-way.

Circulation requirements are as follows -

. The main access road from the wharf to the recreation area is in a state of disrepair and will require upgrading.

. Existing sealed roads leading to the north-western headland are now obsolete, and not all are compatible with circulation patterns of re-development. Other walk-tracks will be provided to encourage visitors to 'explore' this area.

. It is not considered necessary to provide formed walk-tracks within the concentrated recreation area, in this way keeping the area informal in character. It is hoped control of visitor use and adequate rest periods will relieve pressure and negate the need for a formalised path system in this area.

. The existing road from the recreation area to the farm complex will require upgrading, up as far as the stock-pens. It is considered that the scoria top-course is not in keeping with the character of Motuihe Island.
Other farm tracks are adequate and will remain as they are.

A formed track is required to link the existing recreation area to the proposed pressure-relieving picnic area at Golden Bay. Access tracks only are required at Snapper and Calypso bays.

The only other requirement for formed tracks is in the footpath system through areas of fragile bush, designed to lead the user over durable ways. In areas of extreme fragility (e.g. steep gully bottoms) parts of this track may need to be elevated to a board-walk system. It is considered unnecessary to provide formed tracks across open farmland, but rather, to provide suitable signposts to indicate routes providing sequential movement around the site, incorporating viewpoints and areas of interest to stimulate recreational experience.

Styles will be required to protect fences.

Coastal walks can be left totally to user discretion.
FACILITY PROVISION.

Pressures on this resource and already inadequate facilities has prompted an overall re-development programme for the recreation area. All facilities required are to support recreational activities, and for this reason nearly all of the built forms will be re-sited in the concentrated recreational area. Man-made structures can be detrimental factors, however with sympathetic development, careful siting using existing forms and natural materials, the impact of buildings in the landscape can be lessened.

Facilities for the general public will add to the human resources of the island and might help to conserve the natural ones. Facilities required are as follows –

- The centre, with provision to sell light refreshment and hot water. It is proposed to include in the one structure, a visitors' centre, ranger's office and first aid area. The summer holidays draw the crowds, and if the numbers increase, the future of the island as a piece of natural beauty will be in danger. Therefore, a visitors' centre would be a good place to begin a programme in environmental education, and this could help to safeguard the island's resources. Displays, pamphlets and maybe even talks would instill greater awareness towards
proper use of this resource.

It is convenience and compactness that prompts siting of these facilities together. The ranger's office would be part of the public relations venture; the first aid post close to areas of intensive use, and the wharf in emergency. (See plan 7 for detail siting).

- Toilets and changing facilities - these to be dispersed around the site for convenience, control of use, and to disperse loads.

- Simple shelter structures are required, as sudden squalls often catch picnickers unawares.

- One way to make the island available to more people without overstocking it is to encourage off-season use. Biological processes run around the clock; they are not confined to the summer holidays. As the island is attractive at all times of the year - but the ice-cream is not, it is proposed to provide a development catering for this purpose. The visitors' centre could also aid in promoting interest in activities that might help to disperse visitors throughout the year.

A small cabin development is proposed to cater for
organised groups that may want to use the island for special purposes. The development will be simple - two long-huts, an ablution block, mess area and games hall associated with an outdoor camp-fire area. It is envisaged that the sea-scouts use this development instead of re-establishing their own area. (See details later - Plan 7 for detail siting).

Up to date the canteen manager has lived on the premises, not a totally satisfactory situation due mainly to storage and domestic space conflicts. In light of new developments, it is proposed to site the manager his own dwelling, the position to be let on contract as is the situation now. It is envisaged that the canteen manager would also control the proposed cabin development and other camping ventures. This leaves the ranger free for public relations, and other immediate problems involved in the intensive recreation area.

Minor picnic facilities in the way of tables and barbeques will be provided in suitable areas.

Step access will be required to the two beaches to avoid continued erosion of the beach bluff.

It is envisaged that part of the experience offered
to organised groups using the cabin development would be boating opportunities. This will mean the provision of a shed and storage on the shoreline. Also the ranger will require storage space (and boat storage) to replace the existing shelter shed near the wharf. The sea-scouts will also require these facilities. Shelter is also required for waiting ferry passengers. There is opportunity therefore for a compact development providing for the above requirements in conjunction with the re-building of the new wharf. This will require sensitive execution in order that it does not visually detract.

Toilet and changing facilities will be required on the periphery beaches to cope with increasing demands, especially at the picnic ground proposed at Golden Bay. For the Golden Bay picnic area to function in a pressure-relieving capacity encouragement for use will be necessary. For example, some form of transport will be necessary, even if it is only to transport prospective picnickers gear and relieve them of this burden for their short walk over the farm area. This could be simple, a tractor drawn cart, or a more novel suggestion is a horse-drawn cart to transport the gear, children and aged. The horse and cart could further be employed for farm excursions.
RE-VEGETATION PATTERN.

The vegetation pattern is ultimately the overall visual framework within which the previous items such as the activity areas, circulation system and facilities are situated. The re-vegetation pattern needs to be developed within the existing landscape framework in order to complete a total relationship without artificial imposition.

Therefore a pattern of vegetation has been proposed that -

- produces a visual result that is a reflection of the natural pattern of landscape development.

- respects the natural ecology of the island.

- reflects the land-use pattern and allows for the perpetuation of functional and economical recreation and farming activities.

- promotes more diverse recreational use of the island as a whole, providing varied and stimulating spatial patterns during movement around the site.

The re-vegetation pattern therefore is primarily based on the topography, following the major gully systems.
Justification for this is -

- Results in a natural visual 'flow' to the overall island.

- Follows the pattern of vegetation existing in the south-western gullies.

- Negates the necessity for fencelines along ridge tops, improving the visual aspect of the farmland.

- precludes the planting of ridge-tops, with improved visual results.

- Frees flats and more gentle undulating land for farming activities giving optimum usage of available ground.

- precludes the need for excessive fertilizer application to maintain grass swards to stabilise slopes - thus acting in an erosion control capacity.

- acts in a water quality control capacity - i.e. reduces fertilizer run-off, especially at the inter-tidal zone.

- encourages the establishment of wildlife habitats.

- ultimately established vegetation will give complete edge shelter to grazing animals. Also, it provides shelter
without any conflicting lineal patterns such as those existing.

... contributes initially to ease of establishment of the vegetation.


DESIGN PROPOSALS

(Detailing to the level of Plan No's 8 and 9 for the entire project is beyond the scope of this report.)

The following proposals therefore are intended to be a general clarification of the previous design concept (Plan No. 5) and should be read in conjunction with the Master Plan (No. 6) and the Detail Design (No. 7). These proposals are not intended to be exhaustive, but are rather a further explanation of the designer's ideas in order that those who carry out any detailing may act in sympathy with them. Ultimately the visual results will be a reflection of how skilfully the design detailing is carried out.

PICNIC GROUNDS:

These have been extended and upgraded. By removing the existing buildings, i.e. Canteen, toilets, changing sheds and shelter, boat shed and H.M.N.Z.S. 'Tamaki' and re-siting these, it has been feasible to extend the usable area for picnic grounds. This also results in a variety of areas previously not available for intensive picnicing - for example, the mound where the canteen and toilets were previously situated and the high area to the north where H.M.N.Z.S. 'Tamaki' was situated. Removal of the foreshore buildings in front of picnic ground No. 2 has also produced more effective usable ground here too, with the additional benefit of improved visual presentation from the wharf and West Bay.
Upgrading of the picnic grounds includes building re-siting and planting. Buildings have been re-sited for maximum function and visual integration with the site. For compactness the canteen, visitors centre, ranger's office, and first aid post have been included under one roof. This building has been sited on a flat area to the north of the main wharf road, at the junction of the roads serving the farmland and the rest of the recreation area. This central location allows convenience of access, with sufficient space for casual sitting on grassed and treed surrounds, with views retained both out to sea past Ocean Beach and over West Bay. (See detailed relationship of building to external spaces under heading 'Buildings'). Five small toilet and changing buildings have been sited at strategic points around the picnic grounds to overcome the inconvenience of a single centralised block, and to control use. (See details later). Three shelter buildings are also strategically located.

Planting, to modulate the spaces, and give better spatial definition to the area, will actually also increase the amount of usable space available for picnicking. This is due mainly to the fact that people do not like to linger in the middle of empty spaces, instead they prefer defined spaces. Trees also provide shade and shelter - a special requirement to lessen the wind-funnel effect across the narrow sandy isthmus. Foreshore planting shelters and protects against continued erosion of the steep bluff. Step access to the beach is provided.
Barbeques and picnics under a well-treed open glade area will be a featured addition to the northern end of picnic ground No. 1.

In addition a new picnic ground is proposed at the junction of Ocean Beach and Golden Bay. (See location on Map No. 6.) Facilities here will be minimal; toilet and changing will be all that is required. Extensive planting will delineate spaces and provide shade and shelter.

**CABIN DEVELOPMENT:**

Using an existing framework of planting it has been possible to site the required buildings for this development in regular formal juxtaposition, and at the same time retain an atmosphere of informality and naturalness. Selective thinning of existing vegetation of poor quality, together with proposed group planting around the existing framework of trees, compliments the buildings in defining the appropriate associated outdoor spaces.

To obtain unbroken flow of spaces between buildings the access road serving the development does not penetrate the immediate building environs. Terminating this road in a service area for the toilet block and kitchen/mess building results in function and ease of access. Pedestrian movement between the buildings is informal, with no defined pathways. It is...
envisaged that levels of use will be compatible with this. (See details on Plan 8 and under heading 'Buildings').

CAMP GROUNDS:

The large open areas on the north-western headland are well-suited to camping activities. It is envisaged that this be an extension of the proposed cabin development, in that the facility be used for organised groups on special purpose camps. In this way it is possible to overcome the necessity of providing permanent facilities (as would be required if the opportunity was to be extended to the realms of casual public campers). It is envisaged that these organised groups provide their own temporary facilities.

At other times these two large open spaces can be used for general recreational use: passive and active pursuits by picniers, additional picnic areas on days of peak recreational use, and active recreation areas in relation to the proposed cabin development.

Two other areas on the farmland also have potential for a similar style of camping on a smaller scale. These are:

- south-east of the farm complex in the proposed grazed park-like area, and
- just west of the major tarai-re gully on a high, flat,
sheltered area of ground. (See Plan 6 for location of these).

It is envisaged that these are only potentially useful - and that they should only be opened up for this purpose should this form of camping prove popular and water availability permits.

Note: The above two areas and associated potential camping uses should not be confused with the idea stated in the concept for small organised groups camping under permit for special purposes. This latter idea is considered to give more diverse opportunity and should be encouraged as soon as possible. (e.g. half-a-dozen scouts on a special course or assignment etc.)

RESIDENT SITES:

These include the farm complex, ranger station and canteen manager/caretaker's area.

As the first two areas in question, the farm complex and ranger station, are existing, improvement by building siting is limited. Broad planting frameworks within which the respective residents can 'do their own thing' would be appropriate.

Planting is required, however, to screen and direct visitors past the ranger station. This planting (shown generally
on Plan 6) is outside the private environs of the station, allows for sun and shelter, and retains views out.

The proposed canteen manager/caretaker's dwelling has been sited in a prime position, on the north-western headland. This allows privacy, good views out beneath the canopy of existing mature periphery vegetation, sun and shelter, ample space for servicing, outdoor living and gardening, and is not situated too distant from areas of his concern. Periphery planting around this complex completes privacy.

**ROADING:**

Minor changes to the existing roading pattern occur. The main access way remains in its present alignment, as do the roads leading to both the farmland and the north-western headland. The road to the proposed cabin-development initially follows the existing alignment of the puriri avenue, but veers off to terminate at the edge of the building site. These roads allow functional movement about the site, and in addition retain historical interest. The only entirely new road is that serving the proposed canteen manager/caretaker residence. This curvilinear alignment is in sympathy with the ground form through a proposed major area of vegetation.
The width and surfacing of these roads are major design considerations. The main determinant of these is the level of use, which is extremely low. Three metres is considered to be an adequate width for all formed roads. Surfacing needs to tolerate wear and tear, but sealing is considered to be urban and out of character with the atmosphere of the island. It is considered that a well-formed, compacted base-course with a sand and shell composite top-course, well compacted with a slight crown to facilitate drainage would be adequate. Existing roads of this type on the farm area have proven to be adequate. All existing scoria and tar-seal roads are in a state of disrepair, are out of character, and should be removed and replaced by the above mentioned construction.

BUILDINGS:

Although building design is not the concern of the Landscape Architect, the following suggestions outline principles that will allow those who carry out building detailing to act in sympathy with overall proposals. Further, these suggestions demonstrate how the designer is attempting to establish both visual and functional coherence between exterior and interior.

The design concept for the overall island is one of informality and semi-naturalness in the basically rural setting. Therefore, building forms must reflect this atmosphere and be
of a design in harmony with the site. It is envisaged that the form of the buildings be simple, not over-designed, and of materials and colours that fit the setting. It is suggested therefore that the buildings be of timber construction, being either tanalised or pressure-treated creosote, these left to naturally weather - the ultimate colour being evident.

Canteen, Visitor's Centre, Ranger Office and First Aid Post:

These have been included within the same structure for compactness and convenience.

For detail siting see Plan No. 7.
Toilets and Changing:

Siting of these is dispersed (See location on Map 7):

- to avoid inconvenience of centralised toilet block.
- to enable siting of smaller buildings in harmony with the setting.
- to control use. For example during times of low use, certain units could be locked for 'recovery', to ensure breakdown of wastes, and avoid pressures at peak use times (when all units will be required to be functioning). (For details see Plan 8.)

Shelter:

Due to the occurrence of sudden squalls of rain which catch picnickers unaware, minimal shelter buildings have been sited at three points around the picnic grounds. (See Plan 7 for detail location.)

Canteen Manager/Caretaker Residence:

This building should be of a style in keeping with that of other proposed building, and of a less suburban nature than the other residences built on the island to date. It is important, also, on this and other islands in the Gulf that are not supplied with mainland power, to explore the potentials of alternative sources of natural energy, rather than to rely on noisy generators.
Cabins and Associated Facilities:

Overall detail layout and suggested building layouts appear on Plan No. 8. (See Plan 10 for perspective of development).

Below is a notated sketch of the layout.
Boat Sheds and Wharf:

The boat shed development presents a tight cluster of foreshore buildings adding to the marine character of the island. As visitors alight from the ferry they will pass through a pleasant space enclosed by these buildings and cliff-top vegetation.

The existing shelter-shed will remain. The storage shed is primarily intended for use by the ranger. However, the sea-scouts may require space here if they continue to use the island for activities. One boat shed is intended for the ranger's boat, (which to date has been stored up at the station). The other shed will house small boats (e.g. dinghys or sailing dinghys) that are intended to become part of the experience for those organised groups using the proposed cabin development.

It is suggested that the new wharf be sited in basically the same alignment as that existing, and be of natural timber materials, if these are deemed durable. A concrete structure may detract from the atmosphere of the island.

Building Colours:

Colours of proposed buildings as previously mentioned should ultimately become the colour of the naturally weathered material of which they are constructed. It is suggested that when painting existing farm buildings (including those in the
farm complex, pump-houses and gates) that colours be chosen from combinations of the buff, brown, brown-green and brown-red range.

OTHER PHYSICAL ELEMENTS:

This includes items such as picnic tables, barbeques, refuse bins, signs, steps, styles and fences.

These items are covered quite extensively in such publications as 'Designed for Recreation' by Elizabeth Beazley and the U.S. Forest Service Manuals. For more complete and additional information these two publications should be consulted.

Tables - can be out of character and have an urbanizing effect, or they can be used as decoy to suggest where people might picnic - therefore having uses. As the picnic areas on the island are grassed and major use is in summer, the ground is quite conducive to picnicking. Therefore it is envisaged that very few tables need be supplied. The elderly may require this facility and tables can also be handy in barbeque areas. Siting is important. Tables dumped at random can look absurd. Therefore it is important to integrate them into the landscape, for example, grouped in a space defined by trees. Timber tables of the styles outlined in 'Beazley' would be more appropriate than the bright blue and white metal tables used to date.
Barbeques - these can be minimal and sited in the area designated (See Plan No. 7) away from general picnic facilities. This overcomes smoke annoyance to other picniers. Wood should be supplied to avoid visitors cutting their own. As no natural rock suitable for barbeque construction exists on the island, dark red fire bricks would be the preferred construction material.

Refuse Bins and Disposal - this is dependent on the system chosen out of the three mentioned in a previous chapter. Whatever system is chosen (unless a take-your-litter-home policy is adopted) bins will be required. Siting of these is important - at the greatest potential sources of litter. Some suggestions are - in the immediate vicinity of the canteen, at toilets and changing sheds, at the top of steps and at barbeque sites. Some experimentation with sites may be inevitable. The style of bin is important; it must be easy to deposit in, easy to empty, visible but absorbed into the landscape. The blue drums to date are inadequate. Lids will be required to deter birds and cats.

Disposal of litter should be confined to one site. (See location on Plan No. 6). The site should be adequately screened by vegetation, and a system of controlled disposal be implemented. An incinerator to assist decomposition should be provided.
**Signs** - natural timber signs are preferred. Positioning of signs is important in order that they can be clearly seen and read. Signs will be required for the canteen, toilets and changing sheds, and for directions to farm walks.

**Steps** - these are required in order to control beach access and prevent further erosion of the foreshore bluff. (See Plan No. 7 for detailed location). Steps are to be of timber (e.g. tanalised pine), have non-slip treads and a smooth non-splinter hand-rail.

**Styles** - these are required to protect fences and prevent the necessity of opening gates and letting stock wander. (See references for designs).

**Fencing** - the general fencing pattern has changed due to planting proposals, and the resulting fencing requirements. Fencing patterns that follow natural boundaries and contours result in improved visual results. Future fencing programmes should take this policy into account.

**VEGETATION:**

**Species:**

It is proposed to use those species naturally occurring on the island. Apart from the aesthetic merits of this approach,
other functional benefits accrue, these being the ecologically based factors of ease of establishment and maintenance. Also it is hoped that this will encourage the establishment of suitable habitats for native birds, these aiding in the perpetuation of naturally maintained areas of native vegetation.

Species have been chosen in groups, depending on their suitability to the conditions in which they will be growing and the function they are to fulfil.

Therefore the major groups that have been set aside are: the coastal fringe, larger areas of re-vegetation, and the shade and shelter trees for both the recreation area and the farmland.

The species are as follows:

**The Coastal Fringe:**

- *Meterosideros excelsa* and *pohutukawa*
- *Myoporum laetum* and *ngaio*
- *Pittosporum crassifolium* and *karō*
- *Dodonea viscosa* and *akeake*
- *Macropiper excelsum* and *kawakawa*
- *Pseudopanax lessonii* and *houpara*
- *Coprosma repens* and *taupata*
- *Coprosma macrocarpa* and *shore coprosma*
- *Phormium tenax* and *flax*
- *Cortaderia fulvida* and *toetoe*
- *Astelia banksii* and *wharawhara*
It is not envisaged that every single one of the above mentioned species be used in a random fashion. Group planting using a few species is preferred. The effect required or function to be fulfilled will determine the species to be used in detail. For example, at strategic points around the periphery of the farm area where views are to be retained out, lower growing species in the list would be used. Similarly, in the recreation area, on the foreshore of both picnic ground 1 and 2, low shelter and erosion control is required, this depicting the use of suitable combinations.

It is important, however, to completely 'cover' the ground, especially in the fenced off portions of the coast. This is necessary in order to suppress other potential competitors, such as gorse, \textit{rhamnus} and long grass. On the picnic ground foreshores, it is also necessary to plant thickly in order to encourage visitors to use the step access to the beach provided, to prevent further erosion to the bluffs.

\textbf{Mid-zones:}

\begin{itemize}
  \item \textit{Meterosideros excelsa} \hspace{2cm} \textit{pohutukawa}
  \item \textit{Corynocarpus laevigatus} \hspace{2cm} \textit{karaka}
  \item \textit{Knightia excelsa} \hspace{2cm} \textit{rewarewa}
\end{itemize}
Vietex lucens  puriri
Brachyglottis repanda  rangiora
Carmichaelia aligera  tutu
Coriaria arborea  broom
Cordyline australis  cabbage tree
Geniostoma ligustrifolium  hangehange
Hedycarya arborea  pigeonwood
Leptospermum ericoides  kanuka
Leptospermum scoparium  manuka
Macropiper excelsum  kawakawa
Melicope ternata  wharangi
Melicytus ramiflorus  mahoë
Myrsine australis  mapou
Phormium tenax  flax
Sophora microphylla  kowhai
Cyathea dealbata  ponga
Cyathea medullaris  mamaku
Dicksonia squarrosa  wheki
Parsonsia heterophylla  kaihua
Rubus cissoides  lawyer

In addition to these there are also the numerous ferns and herbs (see lists in Appendix) that will establish naturally with the provision of suitable conditions.

In very wet gully bottoms, especially nearer the coast where water tends to collect, the mid-zone vegetation could phase to almost pure stands of Phormium tenax. Sedges and
other water-loving herbs will also establish in these areas.

There is also a special area within the mid-zone which will require different treatment - the taraire gullies. It is intended to extend these areas using similar species to those existing. These are coastal gullies and are characterised by almost pure stands of taraire (Beilschmedien tarairi), local dominance of kohekohe (Dysoxylum spectabile), and the occurrence of scattered karaka (Corynocarpus laevigatus) and puriri (Vitex lucens).

Species of these mid-zones therefore closely follow those existing in the larger tracts of forest. These species have been chosen as they are natural associations suited to the conditions, will establish well, and will maintain and perpetuate as natural systems.
The large areas of re-vegetation follow natural topographical features, resulting in strong definition to the spatial pattern of the island. They also offer additional recreational opportunity and fulfil functional requirements - especially to ultimately give shelter of a natural form without imposed lineal elements.

At a mature stage it is hoped that clumps at the edge and end of the main gullies could be fenced off (see diagram) to become part of the grazed area. This will result in more functional groups of shade trees for stock, and will retain the strong and dense form to the vegetated areas.

An area south-west of the farm complex on the edge of the main forest tract could afford this treatment immediately. The further addition of cabbage trees to the existing stand would make this area a pleasant park-like grazed space.

Access to adjoining fields, both for stock and visitors will be required across certain planted gullies. These grassed swathes can be minimal, 3m for tractor access, fenced both sides, with a dividing gate. This access therefore, will be via a canopied 'walkway' which does not break the continuous flow of the gully planting.
Shade and Shelter Trees:
Combinations using species selected from:-

- Meterosideros excelsa
- Corynocarpus laevigatus
- Knightia excelsa
- Vitex lucens
- Myoporum laetum
- Pittosporum crassifolium
- Macropiper excelsum
- Pseudopanax lessonii
- Coprosma repens
- Phormium tenax

- pohutukawa
- karaka
- rewarewa
- puriri
- ngaio
- kawakawa
- houpara
- taupata
- flax.

- this list covers both those species suggested for shade and shelter on both the farmland and in the recreation area.

The effect required on the farmland is to have large canopy trees under which stock can graze and rest. Therefore the first four species in the above list would be the most appropriate. Protective fences will be required until individual trees are hardy enough to withstand pressures of browsing stock. (Special care should be taken with karaka, as it is considered to be toxic to stock). The number of species in each group should be kept to a minimum, and should be planted to produce effects similar to the existing puriri stand.

In the recreation area, the required effect is slightly different. Canopy shade trees are also required. In addition
lower growing species planted in association with the larger trees are needed. The purpose of this is to provide smaller scale spaces within those defined by the larger trees, thus producing more secluded picnic 'spots'.

Techniques for Planting:

It is envisaged that the following methods of re-vegetation could be used:-

- hand-planting of suitable seedlings.
- distribution of appropriate seed beneath a suitable hand planted or seed-established nurse crop.
- combinations of the above two methods.
- hydroseeding.

Hand-planting - this method can be carried out where
- difficulties occur with other competing plants.
- certain desired effects are required and defined detail placement is necessary. (e.g. to define spaces)
- special functions (such as erosion control on cliff tops) are required.

Care should be taken in planting out young seedlings. Trees respond to good treatment, but only too frequently they are given little care at planting or subsequently. Watering and weeding (if these are competing) will be required for at least the first two years of establishment.
Seeding - In large areas where it is not practicable to hand-plant out seedlings, seeding out with appropriate seeds from a suitable source is recommended. For best results it is recommended that the areas for re-vegetation be fenced off and a nurse crop such as manuka (*Leptospermum scoparium*) be established. The purpose of this is to shelter and protect young seedlings and also to suppress undesirous competitors such as *rhamnus* and gorse. To ensure establishment of the nurse crop it may be best to hand plant, manuka being a poor 'striker' from seed. Benefits could also accrue from the inclusion at this stage of some of the native nitrogen-fixers such as broom (*Carmichaelia aligera*) and tutu (*Coriaria arborea*).

Hand-seeding can then take place beneath the established nurse crop. It is envisaged that the most suitable source for seed collection would be from the trees existing on the island. (For information on seed collecting and preparation see the 'National Conservation Campaign Activity Leaflet No. 1').

Alternatively, appropriate seedlings could be randomly hand-planted beneath the nurse crop, these ultimately to act as mother plants and a potential seed source to aid natural processes.

As stated previously, one of the purposes of establishing large areas of native bush on the island, is to provide suitable habitats for native birds. An increased bird population would aid in establishing these new areas of vegetation by distributing seed.
Hydroseeding - this is a method of seeding by machine. The hydroseeder sprays a mixture of seed in a mulch which adheres to the soil and promotes growth. Its application on Motuihe Island would be for areas such as banks and cliff tops where difficulty in establishing vegetation is experienced.

Experimentation using native seeds directly in the mixture has been carried out lately. (More research may be needed in this area). Alternatively, grass seed is used. Once established this prevents slips and forms a basis for the growth of native plants.
ISLANDS OF THE HAURAKI GULF MARITIME PARK:

* Permits are required before landing on those islands marked with an asterisk.

POOR KNIGHTS *
482 acres of park land.

Situated fifteen miles north-east of Tutukaka, this group has an abundance of relatively undisturbed wildlife.

The policy of the Board is to issue landing permits to scientific parties, and then only under strict conditions.

Scientists are attracted to the Poor Knights for many reasons - the rare Xeronema callistemon lily, the abundance of lizard species and tuataras to be found, the rare marine life in the surrounding waters, and the nesting grounds of the sea birds.

Tawhiti Rahi and Aorangi are the largest of the group. On Aorangi there are stone walls, cultivation pits and other signs of the residence of Maoris, who left the island following an inter-tribal massacre in about 1823.
WHANGARURU:
688 acres of park land.

This is the most northern area in the Park, and just south of the Bay of Islands. A small peninsula of rolling bush and pasture, it is partly farmed. There are limited camping facilities for a small charge on its unspoiled beaches, where there are fresh water and toilets. A rare New Zealand land snail and its albino sub-species are found among the dry leaves on the forest floor of isolated parts of the coast.

A farm manager is resident and controls the camping facilities.

GREAT BARRIER ISLAND:
16 acres of park land.

Fourteen acres in Kairara Bay, Port Fitzroy, are included in the park. This very attractive headland on the western coast has a sheltered anchorage, although there are no facilities for public accommodation at the moment.

A further area of 2 acres on the foreshore behind the shop at Port Fitzroy has also recently been included in the Park.
BREAM ISLANDS:
19 acres of park land.

These four rugged islands are little more than rocky outcrops where the taupata is all that protects the nesting burrows of the petrels. Apart from Moturaku, where access is possible from the mainland at low tide, it is not easy to land.

There is no restriction set by the Park Board on landing, but it does ask that the public take care, as thoughtless stumbling through the bush can easily destroy the burrows.

HEN AND CHICKENS:
2082 acres of park land.

This group is designated a scenic reserve, although it is not yet formally added to the park.

At Taranga (the Hen), largest in the group, there is an automatic light serving the growing amount of tanker movement to and from the Marsden Point oil refinery.

Another automatic light is situated on Coppermine Island.
There are eleven islands in the Marotiri group, known as the "Chickens", including Coppermine, Lady Alice and Whatapuke Islands. The smaller, western Chickens are known to be biologically different from the rest of the group, and several species of plant and animal are found here that are no longer present on the mainland.

Among the bush birds the saddleback is important, having been re-established on Whatapuke and Lady Alice Islands by birds taken from Taranga.

The nesting grounds of sea birds are an important feature of the group. Fluttering shearwaters, diving petrels, Pycrofts petrel and the flesh footed petrel are some which nest here.

**LITTLE BARRIER ISLAND:**

6960 acres of park land.

Largest of the islands controlled by the Park Board, it is a reserve for the preservation of flora and fauna.

It has been a bird sanctuary since 1895 and among the prolific bird life, tuis and bellbirds abound. The stitchbird is particularly important because it is now confined to Little Barrier, having been widespread in the North Island at one time.
This island is also a main nesting ground for the Cooks petrel.

Mountainous and heavily forested, it is possibly the only remaining large forest area in New Zealand which is undisturbed by introduced browsing animals.

A Park Ranger and his family are the only residents on the island. All visitors require a permit to land.

MOKOHINAU ISLANDS: * 267 acres of park land.

The largest of these, Burgess Island, is not included in the park, being a lighthouse station.

There are three other main islands and seven smaller ones with many rocks and reefs. Vegetation is stunted and the fauna population is in the main made up of gulls and tuatara.

Despite the difficulties of landing on the raggy coastline, the Maori people of Great Barrier, 15 miles to the south-east, still exercise a traditional privilege to land and snare mutton birds for their own use.
Deep sea fishermen in the area find great sport in the kingfish, hapuku, shark and marlin to be found.

**GOAT ISLAND:**

23 acres of park land.

A small bush-covered island near the settlement of Leigh, which is used a great deal by the students of the University of Auckland in their studies of marine life.

**CUVIER ISLAND:**

423 acres of park land.

Steep hill sides rise straight from the sea around this island, which has a dual role in the Hauraki Gulf.

Fifty-eight acres is Marine Department reserve, where three lighthouse keepers live with their families. The rest, 423 acres, is a reserve for the preservation of flora and fauna, and included in the park.

In 1960 it was considered by ecologists to be depleted, goat-ridden, cat-infested and apparently of little value.

Today it is a valuable reserve. The Wildlife Service eradicated the cats and goats, thus allowing the rest to
regenerate and become a suitable habitat for the reintroduction of the North Island Saddleback.

A number of these birds were then transferred from the Hen and Chickens Islands, their only location until then, and have established a breeding population which is thriving.

MERCURY GROUP:
856 acres of park land.

Although Great Mercury is privately owned, six islands of the group are included in the park. Four of them were gifted by the Karaua, Whanaunga and Hako families of the Ngati-Maru on the understanding that they be kept as a reserve for scenic purposes.

They are particularly valuable to ecologists at present for the study of the effects of the kiore, or Polynesian rat. Those islands in the group where the kiore lives show a marked difference in vegetation and bird life to those free of the rodent.

Landing is very difficult, even dangerous on some islands in the group.
Red Mercury is one of the islands in the park selected for the re-introduction of the North Island saddleback, a bush bird found only on off-shore islands, although formerly widespread in the North Island.

THE ALDERMEN:  
330 acres of park land.

This group, comprising three main islands in a triangle, with a chain of pinnacle rocks across the centre, was named "The Court of Aldermen" by Captain Cook, no doubt because of its imposing appearance and formation.

They were gifted to the Crown by the descendents of Maru-tuahu, Hako and Hei of the Ngati Maru, in 1970 and are now reserved as a sanctuary.

Their appearance from the sea is one of craggy and forbidding rocks, and apart from occasional fishing and mutton-birding parties, have been little visited. Despite this appearance, there are some workable landings, and a permit is required for all visitors.

The vegetation is prolific in sheltered areas, while in exposed places it is scrubby but it supports a considerable native bird population.
On one, Flat Island, exists the largest colony in New Zealand of the white-faced storm petrel, usually known as "Mother Carey's chicken" or the "Skip Jack".

International interest is focused on the abundance of tuataras living on the islands.

KAMAU ISLAND:
366 acres of park land.

This public domain situated in the south-west of this island with Mansion House as its hub, is one of the most popular parts of the Gulf.

At one time the island belonged to Sir George Grey, a New Zealand Governor in the early colonial days, and his home has since become established as a licensed hotel.

Governor Grey was a much travelled man and he introduced dozens of exotic plant species and many animals, such as wallabies, emus, zebras and monkeys. Some of the vegetation is still growing there, and the wallabies are prolific. Kookaburras and rosella parakeets are occasionally seen, but the other introduced animals have all died out.
The area offers walks through pine forest and ferny glens, secluded beaches, the ruins of old coppermine workings and there are picnic and barbecue sites.

A small camping area is situated near the hotel.

Services for pleasure boats include fresh water and marine fuel available for sale.

Other small areas on Kawau are included in the Park: there are 3 acres at the head of Smeltinghouse Bay; another 7 acres at the entrance to North Cove, called Edwards Point; while Sharp Point, which was gifted to the Park by Mr. H.E. Goodwin, includes 10 acres at the entrance to Vivian Bay.

A Park Ranger lives in the bay adjoining Mansion House.

BEEHIVE:
2 acres of park land.

Privately owned by Mrs. I.H. Wilson, this island is a small knoll surrounded by broken shells, making it appear to float above the water.
MOTUORA:
197 acres of park land.

An attractive farm that is leased for grazing. The public has access to the foreshore, and on the northern coast there are some good beaches with anchorage in south easterly conditions.

MCTUTARA:
2 acres of park land.

Most of this island is privately owned, but the western end, where a quarry was sited some years ago, is included in the park.

The old quarry is arena shaped and with the remnants of a sturdy stone wharf still standing is an ideal place for boating parties to land and picnic.

SADDLE ISLAND: (Te Haupa)
12 acres of park land.

A feature of this small island is a long curving beach on the western side where some old pohutukawas cast their shade on the soft sand. It is ideal for water skiing. The bush includes mature pohutukawa and kowhai.
It is a traditional picnic place for boat-owners as it is a short run from Wenderholm Reserve and the Mahurangi Peninsula.

Visitors are asked to take care when walking inland not to destroy the burrows of nesting sea birds.

CASHMILL:
17 acres of park land.

In the sheltered Mahurangi Harbour, this island is linked to the mainland by a natural causeway or ridge which can be walked along at low tide. This ridge extends right around the island and there is no sandy beach. However, several tracks among the trees make pleasant exploring and it is a short boat run to nearby holiday settlements.

RAKINO:
24 acres of park land.

Various small reserves amounting to some 24 acres are owned by the park on Rakino.

One such spot is on the western coast, where there is very attractive headland and beach included in the park. Sheltered anchorage makes it ideal for family boats. Another small area
of park land is adjacent to the wharf in the south east.

NORTH HEAD:
21 acres of park land.

A long-time military fort, where emplacements and tunnels date from every time of military crisis in Auckland since 1865, it was originally called Fort Cautley. The fort was Regimental Headquarters for the 9th Coastal Regiment of the New Zealand Artillery during World War II and during the latter part of the war was Fire Command for all Coastal Batteries from the Bay of Islands to Waiheke.

The summit area is closed to the public and under Navy control, but the rest is open for the public to view the Gulf and harbour.

A track at water level circles the hill and another half way up takes the pedestrian visitor past many abandoned gun sites. Cars may be parked in an area half way up the hill.

TIRITIRI:
350 acres of park land.

Eighteen miles north of Auckland, Tiritiri is the site of an important lighthouse station and has a vital role in
communication for the port of Auckland. The Marine Department Reserves includes 194 acres while the rest of the 544 acre reserve is included in the park.

This land had been grazed by stock for most of this century but recently the Board decided to terminate the grazing lease and allow the island to revert to native bush.

There is only one good sandy beach, the rest of the coastline rising sharply in cliffs. Several forested gullies with giant pohutukawas and fresh water streams hold promise of attractive camping sites, but until facilities are built public access is limited to daylight use only.

RANGITOTO:
5709 acres of park land.

The youngest of the islands in the Hauraki Gulf, it is a volcano thought to have erupted for the last time about 250 years ago. Today, bare lava alternates with remarkable vegetation where plants grow in fissures and thrive in apparently barren conditions.

It is a favourite picnic place for Aucklanders, small launches ferrying visitors out every holiday morning.
Runabout owners enjoy the only sandy beaches on the island, Whites Beach and McKenzie Bay, on the north-west side.

Roads and other facilities were built by prisoners in the 1920's, the flat surfaces and meticulously built walls bearing witness to their very hard labour.

There is a shop and Post Office at both Rangitoto Wharf and Isllington Bay. The wharf area has the added attractions of swimming pool and tearooms. Evening barbecues are popular.

MOTUTAPU:
3728 acres of park land.

This large island is farmed extensively on behalf of the Park Board. For this reason, public access is restricted to the landings at Isllington Bay and Home Bay and on other parts of the island up to the cliff top or nearest fence line.

Located on the farm is an 8 acre youth camp leased by the North Shore Y.M.C.A. There is limited space for camping near the causeway at Isllington Bay, with toilets and fresh water nearby. Above the causeway is the house of the Park Ranger.

SPECIAL NOTICE.
Motutapu Island is a hydatids control area. No visitors' dogs can be allowed on the island at any time.
Rangitoto, Motuihe and Motutapu Islands played an important part in the coastal defence network of Auckland Harbour during World War II. Barracks, gun and searchlight installations are to be seen on all three islands.

**Motuihe:**
441 acres of park land.

Another small farming island being worked on behalf of the Board. Here the public is allowed access to all parts except the homestead area. There are toilets and changing sheds for the many visitors who come on day trips during December to February. A canteen operated during these months sells refreshments.

Attractive beaches on the south east are favourites with the boating public.

A Park Ranger lives at the top of the hill behind the canteen. Landing on Motuihe after dark is forbidden.

**Browns:** (Motukorea)
148 acres of park land.

A low volcanic hill of pastureland which has been farmed ever since 1840 when John Logan Campbell and William Brown
set up a pig farm there the year before the settlement of Auckland was founded. Both men were to become prominent in the growth of the city.

Today it is administered by the Park Board on behalf of the Auckland City Council, to whom it was presented by Sir Ernest Davis, its last private owner, and another benefactor of the city.

Although it is leased for grazing, access to it is quite free in the hours of daylight, and it is a pleasant destination for runabouts, being only a short run from the suburbs of Howick and St. Heliers.

A shallow coastline dotted with rocky outcrops means that care is required in landing which is only advisable for two hours before and after high tide.
MAORI PLACE NAMES, MOTUIHI

"A number of the Maori names of places on this isle of story have been preserved. They are listed here with the necessary explanations in English. Corresponding numbers will be found on the map printed on the opposite page.

(1) Mango-pare-rua; the two hammer headed sharks.

(2) Wai-hao-rangatahi; the waters where the net was cast; (this was a favourite place for piper fishing). The name also was given to a naval battle which took place when one party was enmeshed or netted.

(3) One horahia; Long Beach; literally, the sands stretching out.

(4) O-Ruru-Tumaro; the place where "immovable owl" was kept; this was a kind of tutelary guardian of a local cultivation.

(5) Maaru-whiu (or ruia) pungarehu; the cultivation cast round with ashes. (See legend).

(6) Te-uru rua-o-Paoa; Paoa's grove of trees.

(7) Nga-Taikorapa; the place of the tide rip or cross current.

(8) Te Whatu-tatangi; the sounding stone.

(9) O-Hinerau; belonging to Hine rau, who was a fairy woman.
(10) Te Kohi; the headland.

(11) O-Tamarau; Of or belonging to Tamarau who was a man of the fairy peoples.

(12) Matai-takiara; the place for observing the morning star.

(13) Te-Rae-o-Kahu; Kahu's headland, or Kahu's point.

(14) Taku-tai-razoe; a sunlit expanse of sea, long sunlit sea.

(15) Hine-Rehia; Belonging to Hine Rehia; the Sea-Reed Maid (Sea legend).

(16) Te-tumu-rae; the frowning height of cliff brow.

(17) Pare-toro-tika; the cliff with the perpendicular or abrupt front.

(18) Turanga-o-Kahu; Kahu's landing or place for beaching his canoes. Kahu was a son of Tametekapua; navigator of the Arawa canoe and had a residence at Motu-ihi."
Far back in story, perhaps before William the Norman had forced himself on the English people, an enterprising Maru-iwi settler, named Te Ihu Pare, had made a home for himself and his folk on Motuihi; trusting to the encircling sea to save him from sudden raids by envious neighbours. In a clearing he planted hue (gourd) and taro, which foods his fathers had brought to these islands, but when the sun rose one morning after a very foggy cold night, the plants were blackened and wilted. Te Ihu knew then that his crop had been raided by the Patupaiarehe folk (fairies), who had come, under cover of the fog, to the island in their phantom canoe, "Te Rehu O te tai," and had stolen the "shadows of the plants" as Te Ihu said, "the life essence," that is, and therefore the plants had died.

Assuming that these acquisitive people having once succeeded so easily, would risk coming back again, Te Ihu, in the next crop season set an ambush for the fairy raiders. He knew by legend that they did not cross wood ashes, so he laid a line of ashes around the confines of his plantation except on the seaward side. One foggy night, when his guardian owl, Ruru tumaro, had solemnly forewarned that a visit from the plunderers was imminent, Te Ihu gathered his folk for battle with the mystery men.
As expected, the all but invisible Patupaiarehe walked up the beach from their canoe and unsuspectingly entered the patch. Thereupon Ruru tumaro loudly called to Te Ihu, "E Ihu Pare e! Kua tomokia te tomokanga ka riro nga kai ora mai; Hawaiki tawhitinui; Hawaiki pa ma mao; Hawaiki patata. E Koiti! A kati ra!"

("O Ihu Pare! The entrance has been passed and there will be taken away the life giving foods of the distant Hawaiki; of Hawaiki the far; that came from Hawaiki the nearer. Close up! O, close up!"

Te Ihu and his band sprang from their concealment at this warning and hurriedly closed up the gap in the ring of wood ashes. The entrapped Patupaiarehe all perished when the bright sun arose and never again were the crops on Motuihi raided by the mystery folk from the sea."
"Edible sea weeds, gathered on the beaches of many of the islands in the Hauraki Gulf formed a welcome change in the somewhat monotonous diet of the aboriginal families who lived there before the white man. Busied at break of day on the eastern beach at Hotuihi in collecting the sea weed food and placing it to dry in the sun, a maid of the Patu paiarehe or fairy folk, was surprised and taken captive by a chief of the Maru iwi, by name Karanga roa, who had landed on the island. The Maru iwi never learned the fairy girl's real name and to them she was always the "Maid of the Sea weed." The place where she was seized is still known as C Hine Rehia (see map).

Karanga Roa made a romantic marriage with his fairy prisoner and legend depicts her as a model wife and mother; her amazing deftness in preparing flax fibre, dyeing it and weaving it into beautiful garments was the talk of the tribe. She was equally clever at basket making and other handicrafts and had a wonderful knowledge of the culinary art. She had been taught these things by her own folk, who were much further advanced in these branches of knowledge than were the Maru iwi. It was inevitable that her accomplishments should be the subject of many "catty" remarks (as we moderns would say) on the part of the less skilled Maru iwi women and the fact that she did
her weaving and other work at night or on foggy days when the
sun was not visible made matters much worse, for it excited
suspicions that she was not willing to impart her knowledge to
the other women. In vain she pleaded that by the teachings of
her people she would lose the deftness of her hands if any un-
finished work was exhibited in the sunshine; and that Tamatea
nui, the Sun God, would destroy or undo the work in punishment
for breaking the laws.

The Maru iwi women then planned with an evil tohunga to
bewitch Hine Rehia, so that she would not know the correct time
and would work on into daylight while some of their number
would secretly watch and discover the methods of weaving etc.
The scheme succeeded admirably. The chief's wife worked away
patiently, until utterly wearied she laid down her work only to
realise that the sun was shining brightly. Surmising the ruse
played on her she bravely faced the crowd gathered to witness
her discomfiture and with infinite pathos sang a song of regret
for the deception practised by the Maru iwi women. A dense
fog settled over the island of Rotuihi and drifted slowly to-
wards the Moehau (Coromandel Ranges) and Hine Rehia was seen
no more. Her irirangi, or breeze-wafted lament for her husband
and children was heard as the fog-cloud moved away eastwards
across the sea. Sometimes, when the mist envelops the island,
this lament may be heard as if coming through the rafters of
the whare, or maybe, echoing down a valley; and then the people
know that death is near for someone.
The knowledge filched from Hine Rehia by deception has to be carefully guarded; unfinished work must be covered when night approaches; nor must work be carried on after the sun has set behind the Waitakeres, for otherwise the Patu paiarehe may recapture the knowledge stolen from them."

- from Lorrie Walsh, whose information was supplied by the Auckland Maori Association and Mr. George Graham.
"Motu-ihi (motu meaning an island) has had many names, particularly in the last century. The most ancient Maori name recorded is Motu-ihenga, which even in pre-European times seems to have been shortened to Motu-ihe. Baron Dumont D'Urville, who visited and charted the Hauraki in 1827, noted the island as Ile Ilie, which is presumably the Ihe of his Maori informant.

On a very excellent chart of the Waitemata River and islands at its mouth, published in Sydney in 1837, our Motuihi is shown as Butler's Island; in all probability Mr. Butler was a trader from Sydney. In the deed dated 1839, by which Mr. W.H. Fairburn obtained a transfer of the native owners' rights to himself, the island is designated Motu-ihe. In 1841, Mr. Henry Taylor, "of the River Thames", filed an application for a Crown grant title to the island and in all the printed references, extending over a period of nearly two years, to this application the island is referred to as Motu-the. There is, however, one printed mention during that period of the island as Motu-a-ihe.

On a plan published at an early date by the Department of Lands and Survey the island is labelled Mea-ihi. Among the very first European settlers the island was known as Taylor's Island; from the fact that Mr. Taylor had at one time owned it.

The present spelling of Motu-ihi seems to have become general about the late '80's of last century; a corruption of Motu-ihe, possibly, but it is also claimed that the name signifies Piper Island, as that fish was plentiful around the coasts."

- from Lorrie Walsh
"The spelling Motuika is an approved form and decisions were taken first by the Honorary Geographic Board in 1933, ("Nomenclature in New Zealand" by Johannes C. Anderson for the Honorary Geographic Board and published in 1934.) and again by the N.Z. Geographic Board in 1951.

The island was formerly a home of the Maruiwi, a pre-Maori people. At about A.D. 1200 they were conquered by Te Tini-o-toi, whose people were in possession when the Arawa canoe arrived about A.D. 1350. Kahumatamoomoe, son of Tama-te-Kapua, named various places after himself and the island itself he named Te Motu O Ihenga (Ihenga being his nephew) this being given as the original name of the island or the original form of the name. Huarere, a brother of Ihenga was the founder of the Arawa sub-tribe Ngati Huarere who dispossessed Te Tini O Toi. Later in warfare with the Tainui tribes (the Marutauhu) the Ngatihuarere were displaced by the Ngatipaoa which people held the islands until European times despite much fighting with Ngatewhata of Tamaki and Ngapuhi under Hongi Hika and others and were the vendors to the Crown."
The Act provides a penalty (a fine not exceeding £5) for using a name other than the name approved by the Board.

However, the use of the spelling Motuihi, is doubtful cause for a charge:

1. The Act uses the word publish and publications, so excludes noticeboards.
2. The Act includes a proviso excluding any name (which appears) on a map previously published by the Surveyor-General! The name Motuihi was the accepted spelling on early maps and appeared on the 2nd edition of the Auckland mile cadastral map as late as 1964 before being altered."

Members of the Board included Hon. Sir Apirana Ngata, Pei Te Hurinui Jones, and Johannes C. Anderson.
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<td>4.9</td>
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<td>1.2</td>
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<td>13.3</td>
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<tr>
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<td>3.7</td>
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<td>5.5</td>
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<td>5.1</td>
<td>4.7</td>
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<td>0.9</td>
<td>5.2</td>
<td>6.2</td>
<td>1.1</td>
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SURFACE WINDS PERCENTAGE FREQUENCIES

MECHANICS BAY
1966 - 1968 INC.

JAN

FEB

MAR

APL

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

CALMS AND

3-13 Knots

14-27 Knots

28-40 Knots

10%
### AUCKLAND, NEW ZEALAND

#### SUNSHINE

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<td>196.0</td>
<td>189.9</td>
<td>161.5</td>
<td>135.4</td>
<td>113.2</td>
<td>134.0</td>
<td>152.2</td>
<td>162.0</td>
<td>186.1</td>
<td>202.9</td>
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<td>189.8</td>
<td>157.0</td>
<td>136.6</td>
<td>120.2</td>
<td>130.3</td>
<td>133.1</td>
<td>161.6</td>
<td>182.4</td>
<td>202.2</td>
<td>223.8</td>
<td>2084.5</td>
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**Bright Sunshine Hours (Mean)**

| Street 1950-1970 | 256.3 | 266.4 | 253.4 | 200.9 | 191.2 | 174.1 | 182.2 | 187.7 | 214.7 | 239.2 | 240.2 | 297.0 |

**Highest Total Recorded each Month 1909-1970**


| Cloud Amount (Mean) 1909-1955 | 4.7 | 4.8 | 4.5 | 4.6 | 4.5 | 4.6 | 4.6 | 5.0 | 4.9 | 4.8 | 4.6 |

#### RAINFALL

<table>
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<td>126</td>
<td>95</td>
<td>102</td>
<td>86</td>
<td>81</td>
<td>1270</td>
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</table>

**Rainfall in mm (Mean)**

<table>
<thead>
<tr>
<th>Year</th>
<th>1909-1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>1853-1970</td>
<td>97.0 162.3 116.1 131.6 91.4 91.2 85.9 99.1 62.0 63.8 80.0 136.9 162.5</td>
</tr>
<tr>
<td>1940 1869 1866 1945 1924 1920 1735 1956 1960 1890 1894 1863 1869 1897 1909</td>
<td></td>
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</tbody>
</table>

**Maximum Fall in 24 Hours**

<table>
<thead>
<tr>
<th>Year</th>
<th>1955-1970</th>
</tr>
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<tbody>
<tr>
<td>1994</td>
<td>162.3 116.1 131.6 91.4 91.2 85.9 99.1 62.0 63.8 80.0 136.9 162.5</td>
</tr>
<tr>
<td>1940</td>
<td>1869 1866 1945 1924 1920 1735 1956 1960 1890 1894 1863 1869 1897 1909</td>
</tr>
</tbody>
</table>

**Wettest Month 1853-1970**


**Driest Month 1853-1970**

| Year | 1854 1909 1856 1864 1881 1942 1877 1914 1951 1870 1945 1897 1909 |

**Wettest Year**

| Year | 1917 1956 |

**Driest Year**

| Year | 1959 1868.5mm |

**Rain Datas 1909-1970**

<table>
<thead>
<tr>
<th>Sites</th>
<th>Domain 1868-1893 alt. 258 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Museum Roof 1883-1909 alt. 125 ft.</td>
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**Mechanics Bay Highest Barometric Pressure**

<table>
<thead>
<tr>
<th>Year</th>
<th>1041.2 = 30.747</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>15 July 1952 10 a.m.</td>
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</table>

**Mechanics Bay Lowest Barometric Pressure**

<table>
<thead>
<tr>
<th>Year</th>
<th>972.8 = 28.727</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>19 May 1954 2110M.</td>
</tr>
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</table>

**New Zealand Highest Barometric Pressure**

<table>
<thead>
<tr>
<th>Year</th>
<th>954.5 = 28.19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>16 January 1939 at Tairoa Head</td>
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**New Zealand Lowest Barometric Pressure**

<table>
<thead>
<tr>
<th>Year</th>
<th>1045.9 = 30.885</th>
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</thead>
<tbody>
<tr>
<td>Year</td>
<td>30 August 1889 at Wellington.</td>
</tr>
</tbody>
</table>

221.
| Year   | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Year |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| 1926   | 20  | 25  | 17  | 19  | 17  | 11  | 11  | 11  | 13  | 13  | 15  | 17  | 14  | 1922 |
| 1927   | 17  | 17  | 16  | 16  | 15  | 12  | 10  | 9   | 10  | 9   | 11  | 13  | 14  | 16   |
| 1928   | 73  | 73  | 73  | 76  | 80  | 82  | 80  | 80  | 81  | 79  | 76  | 73  | 72  | 70   |
| 1929   | 21  | 21  | 19  | 19  | 15  | 12  | 9   | 9   | 9   | 12  | 12  | 15  | 17  | 20   |
| 1930   | 22  | 23  | 21  | 27  | 17  | 13  | 11  | 11  | 11  | 13  | 15  | 16  | 16  | 17   |
| 1931   | 20  | 21  | 20  | 19  | 17  | 17  | 17  | 15  | 13  | 15  | 15  | 16  | 18  | 17   |
| 1932   | 127 | 121 | 111 | 114 | 116 | 118 | 127 | 131 | 139 | 132 | 121 |
| 1933   | 16.1| 16.4| 16.0| 14.3| 12.6| 11.3| 10.8| 11.7| 12.5| 13.5| 14.3| 13.4|       |
THE FLORA:

"The following list contains the names of wild plants recorded on Motuihe in April 1974. As only two part days were spent on the island it is certain that there will be some omissions.

Although the native vegetation is now only a minor part of the plant cover, native species are still numerous (97 species) and only slightly exceeded by the exotics (118 species). There is no way of knowing how many native plants have been lost from Motuihe. Sicyos angulatus (a native cucumber) and Pimelea arenaria recorded by Kirk have certainly gone. Paspalum distichum, a grass of salt marshes and coastal rocks, was not seen recently on Motuihe but is easily overlooked. Kirk's "Dichelachne stipoides" is the coastal grass we know now as Stipa teretifolia. It still survives.

In this list the following symbols are used:

= occasional
m = many
p = plentiful

"Grassy places" refers to pastures and other places where grasses are prominent i.e. on beaches, under trees in open forest, in former pastures now fenced from grazing animals."
Native trees, shrubs and climbers:

Beilschmiedia tarairi (taraire) m in two gullies
Brachyglottis repanda (rangiora) o in forest
Carmichaelia aligera (NZ broom) o in forest
Coprosma macrocarpa (shore coprosma) m with pohutukawas mainly
Coprosma repens (taupata) o on coastal rocks
Coriaria arborea (tutu) o on forested shores
Corynocarpus laevigatus (karaka) o mainly in forests
Dysoxylum spectabile (kohekohe) m in gullies
Entelea arborescens (whau) o on forested W shores
Geniostoma ligustrifolium (hangehange) o in forest in W
Hebe stricta (koromiko) o on forested shores in W
Hedycarya arborea (pigeonwood) o in forest in W
Knightia excelsa (rewa rewa) o in forest in W
Leptospermum ericoides (kanuka) m W of trig
Leptospermum scoparium (manuka) m W of trig
Macropiper excelsum (kawakawa) o in forest
Melicytus ternata (wharangi) o in forest in W
Melicytus ramiflorus (mahoe) m in forests
Metrosideros excelsa (pohutukawa) p the most prominent trees
Myoporum laetum (ngaio) o some in farmland near Ta Point
Myrsine australis (mapou) m in forest
Muehlenbeckia australis o in forest
Muehlenbeckia complexa m in forest and on shore
Parsonsia heterophylla o in forests
Pittosporum crassifolium (karo) m on coast with pohutukawa
Planchonella novae-zelandiae (tawapou) seen by Nat. History Club 12.3.73.
Pseudopanax lessonii (houpara) m on coast with pohutukawa
Rubus cissoides (lawyer) o in forest
Senecio kirkii o in forest in W
Sophora microphylla (kowhai) o in forest
Vitex lucens (puriri) m in forest and as isolated trees

Native Ferns:
Adiantum hispidulum m in forest
Asplenium lucidum o in forest
Blechnum capense o in creeks
Ctenitis decomposita o in forest
Ctenitis glabella o in forest
Cyathea dealbata (silver tree fern) o in forest
Cyathea medullaris (mamaku) o in forest
Doodia media m in open forest
Histiopteris incisa o in forest in W
Paesia scaberula o in open forest
Phymatodes diversifolium o in forest
Pteris tremula o in forest
Pteridium aquilinum o in forest mainly
Pyrrosia serpens o on trees
Thelypteris penigera o in creek
Native Herbs:

Acena novae-zelandiae (bidibidi) o in forest
Apium australe (NZ celery) o on coastal rocks
Astelia banksii m with pohutukawa
Callitricha stagnalis m in creeks
Callitricha muelleri o in creeks
Calystegia sepium (convolvulus) o in wet places
Calystegia soldanella (sand convolvulus) p on beaches
Calystegia sp. o near shore
Carex flagellifera (sedge) m near shore, usually with trees
Carex inversa (sedge) o on forest margins
Carex lambertiana (sedge) o in forest
Carex ochrosaccus (sedge) o in forest
Carex pumila (sedge) p on some beaches
Carex virgata (sedge) p in forest and creeks
Cortaderia fulvata (toetoe) m on NW headland
Cyperus brevifolius (sedge) o in wet pastures
Cyperus ustulatus (mariscus sedge) m on shores and in creeks
Dichelachne crinita (plume grass) o on coastal rocks
Dichondra repens m in forest, pastures and on coast
Disphyma australe (NZ ice plant) o on coastal rocks
Earina mucronata o in taraire forest
Erechtites scaberula var. hispidula m on coast
Gahnia lacera (sedge) m with pohutukawa
Gahnia xanthocarpa (sedge) o in forest
Geranium homeanum o in ungrazed places
Geranium solandri o in ungrazed places
Juncus australis (rush) m in pastures
Juncus pallidus (rush) o in pastures
Juncus sarophorus (rush) o in pastures
Juncus usitatus (rush) m in pastures and open forest
Lachnagrostis filiformis (grass) o on beaches
Lobelia anceps o on wet coastal rocks
Microlaena stipoides (grass) p in forest and some pastures
Notodanthonia penicillata (danthonia) p in dry pastures
Notodanthonia racemosa (danthonia) p in dry pastures
Oplismenus imbecillus (grass) m in forest
Oxalis corniculata m in pastures and open forest
Peperomia urvilleana o in forest
Phormium tenax (NZ flax) p in forest in W
Poa aniceps (grass) o with trees on coastal slopes
Salicornia australis o on rocks washed by sea
Samolus repens o on wet coastal rocks
Scirpus cernuus (sedge) o on wet coastal rocks
Scirpus medianus (sedge) o at outfall of creek
Scirpus nodosus (sedge) o on beaches
Senecio lautus o on coastal rocks
Spinifex hirsutus m on some beaches
Solanum aviculare (poroporo) o in forest
Solanum nodiflorum p in forest
Stipa teretifolia (grass) o on rocks washed by sea
Triglochin striatum o on wet coastal rocks
Exotic plants:
Agrostis semiverticillata (grass) p on beaches
Agrostis tenuis (browntop) m mainly on beaches
Allium vineale (wild onion) p on beaches
Amaranthus deflexus p on paths
Amaranthus hybridus p in cultivated soil
Amaranthus lividus p in cultivated soil
Ammophila arenaria (marram) p on Ocean Beach only
Anagallis arvensis (scarlet pimpernel) p on coast
Anthoxanthum odoratum (sweet vernal) p in grassy places
Araujia hortorum (moth plant) p in forest
Arrenatherum elatius (tall oatgrass) p in grassy places
Atriplex hastata (orache) p on beaches
Bellis perennis p in pastures
Briza minor (shivery grass) p in grassy places
Bromus breviaristatus (grass) p in grassy places
Bromus diandrus (grass) m in grassy places, except pastures
Bromus mollis (goose grass) p in some pastures
Bromus unioloides (prairie grass) m in grassy places, mainly beaches
Carduus pycnocephalus (slender winged thistle) p in pastures
Carduus tenuiflorus (winged thistle) p in grassy places
Carex divulsa (sedge) p in pasture on NW headland
Centaurium erythraea (centaury) p on disturbed ground
Cirsium arvense (Californian thistle) o on beach
Cirsium vulgare (Scotch thistle) m in pastures mainly
Chenopodium album (fat hen) o in disturbed ground
Chenopodium murale (red fat hen) o in disturbed ground
Coronopus didymus (twin cress) pastures and disturbed ground
Cortaderia selloana (pampas) o on NW headland
Cotoneaster glaucophylla var. serotina o on NW headland
Crataegus monogyna (hawthorn) m in forests mainly
Crepis capillaris (hawksbeard) p in all open places
Crocotis crocosmiflora (montbretia) o near houses
Cynosurus cristatus (crested dogstail) o in grassy places
Cynodon dactylon (Indian doab) p mainly near beaches
Cyperus eragrostis (sedge) o in wet places
Dactylis glomerata (cocksfoot) m in grassy places
Dicanthium annulatum (grass) m in some dry pastures
Elaeagnus pungens o in forest mainly
Erechtites atkinsoniae (Australian fireweed) o under pohutukawas
Erigeron floribundus (flea bane) m in open places
Euphorbia peplus (spurge) m in open places
Festuca arundinacea (tall fescue) o mainly on beaches
Galium aparine (cleavers) o in some ungrazed places
Geranium dissectum (cut-leaved geranium) o in disturbed soil
Geranium molle (dovesfoot) p in open places, particularly on sand
Gnaphalium simplicicaule (cudweed) o in open forest
Holcus lanatus (Yorkshire fog) p in grassy places
Hordeum murinum (barley grass) p in pastures and on beaches
Hypochaeris radicata (catsear) m mainly on beaches
Juncus effusus (rush) o in pastures
Lagurus ovatus (harestail) p on beaches
Leontodon taraxacoides (hawkbit) m mainly on beaches
Lolium perenne (perennial ryegrass) p the main pasture grass
Lotus angustissimus o on disturbed soils
Lotus pedunculatus m in grassy places
Malva nicaeensis (French mallow) p in open places in pastures
Medicago arabica (spotted bur medick) p in sandy soils mainly
Medicago lupulina (black medick) o mainly on beaches
Medicago polymorpha (bur medick) o mainly on beaches
Melilotus indica (King Island melilot) p on beaches
Mentha pulegium (pennyroyal) p in wet pastures
Modiola caroliniana (creeping mallow) o in grassy places
Nasturtium officinale (water cress) o in creeks
Olea europaea (or C. africana?) (olive) seedlings in many places
Orobanche minor (broomrape) o in ungrazed places
Oxalis pes-caprae (oxalis) o on beach
Parapholis incurva (sickle grass) o on coastal rocks
Paspalum dilatatum (paspalum) p in some pastures and on some beaches

Paspalum paspalodes (grass) m on beaches
Physalis peruviana (cape gooseberry) o in forest
Phytolacca octandra (inkweed) m mainly near trees in pasture
Picris echioides (oxtongue) m on beaches
Pinus halepense (Aleppo pine) m - above Ocean Beach
Poa annua (grass) p in open places
Poa trivialis (grass) m in pastures
Polycarpon tetraphylla (all seed) m in droughty places
Polygala myrtifolia o in ungrazed places
Polypogon monspeliensis (beard grass) o on beaches
Portulaca oleracea (portulaca) p in open pasture and on beaches
Plantago lanceolata (narrow-leaved plantain) p in pastures

Plantago major (broad-leaved plantain) o on disturbed ground
Prunella vulgaris (selfheal) o in some grassy places
Ranunculus sardous (hairy buttercup) o in moist grassy places
Rhamnus alaternus p in ungrazed places around trees
Rosa rubiginosa (sweet briar) o in open places
Rumex brownii (hooked dock) o on coast
Rumex conglomeratus (clustered dock) o in wet places
Rumex crispus (curled dock) o mainly on beaches
Rumex obtusifolius (broad-leaved dock) o in moist places
Rumex pulcher (fiddle dock) p mainly in pastures
Salsola Kali o on beaches
Senecio vulgaris (groundsel) o in disturbed soil
Silique marianum (variegated thistle) p mainly outside farmed areas
Sisymbrium officinale (hedge mustard) o in disturbed ground
Solanum mauritianum (woolly nightshade) o on N Coast
Solanum nigrum (black nightshade) o mainly on disturbed ground
Solanum sodomaeum (apple of Sodom) p mainly outside farmed areas
Soliva valdiviana (Cnehunga weed) o in grassy places
Sonchus asper (prickly sow thistle) o in disturbed ground
Sonchus oleraceus (sow thistle) m on beaches and disturbed ground
Sporobolus africanus (ratstail) p on beaches and other grassy places
Stellaria media (chickweed) o in disturbed ground
Stenotaphrum secundatum p on beaches and picnic grounds
Taraxacum officinale (dandelion) o in pastures and disturbed soil
Trifolium dubium (suckling clover) m in grassy places
Trifolium repens (white clover) p mainly in pastures
Trifolium resupinatum (reversed clover) o on road margins
Trifolium striatum (striated clover) m in grassy places
Trifolium subterraneum (subterranean clover) p in some pastures
Ulex europaeus (gorse) p mainly outside farmed areas
Veronica arvensis (veronica) o on disturbed soil
Veronica serpyllifolia (speedwell) o mainly in pastures
Vicia tetrasperma (four-seeded vetch) o in ungrazed places
Vicia sativa (vetch) m in ungrazed places
Xanthium spinosum (Bathurst bur) o in grassy places
Zantedeschia aethiopica (arum lily) o about houses
ANIMAL AND BIRDLIFE OF NOTUIHE ISLAND:

Probable species list. (Those with asterisk only possible.)

**Animals:**

- Erinaceus europaeus
- *Mustela erminea*
- Rattus rattus
- Rattus norvegicus
- Mus musculus
- Felis catus
- Cryptolagus cuniculus
- *Lepus europaeus*

**Birdlife:**

**Open Country Birds**

- Acridotheres tristis
- *Gymnorhina leuconota*
- *Hirundo tahitica*
- Sturnus vulgaris
- Fringilla coelebs
- Passer domesticus
- Turdus merula
- Turdus philomelos
- Carduelis chloris
- Carduelis carduelis
- Emberize citrinella

*Those with asterisk only possible.*
Alauda arvensis
Circus approximans

Native:
Rhipidura fuliginosa
Gerygone igata
Anthus novaeseelandiae
Halcyon sancta
Porphyrio porphyrio
Prosthemadera novaeseelandiae

Sea-birds:
Larus novaehollandiae scopulinus
Stern striata
Larus dominicanus
Phalacrocorax varius varius
Eudyptula minor

Skylark
Harrierhawk

Pantail
Greywarbler
Pipit
Kingfisher
Pukeko
Tui

Red-billed gull
White fronted tern
Black-backed gull
Shag
Little-blue penguin
COASTAL BIOLOGY:

The following is the coastal biology of the sheltered inner islands in the Maureki Gulf Maritime Park. - Kaua, Motuora, Rakino, Motutapu, Motuihe, Motukore, from a leaflet prepared by John Norton. (Co-Author of "The New Zealand Seashore")

"In the inner islands of the Park, on coasts not reached by heavy seas, the shoreline has a shelving inter-tidal platform.

Where the coasts are built of papa mudstones, the platform is generally near low tide, with a wide expanse of loose boulders. On greywacke islands, as at Kaua, there will be a narrower, high tidal shelf of hard, but brittle rock, without much loose cover.

See diagram on next page.
As pictured, a greywacke platform and slope has strictly horizontal zones of animals and plants. These cut clearly across the dark rock face. A pohutukawa fringe (1) generally overhangs, from coastal bush above. On the rock face may be prostrate mirror-leaf, Coprosma repens (taupata).

The first of the shore zones, moist with spray will be of grey and greenish white lichens, often splashed with yellow patches (Xanthoria) (2). Further down is a regular band of the sooty black lichen, Verrucaria (3).

At the platform level, the rock is bare or with only stubby black lichens (Lichina) and many small pools (4). Two high tidal snails live here on lichens and blue green algal films: Melarapha oliveri (5) and the larger Merita melanotragus (6).

Below this ledge the shore falls steeply and becomes grey-brown with a zone of barnacles: Chamaesipho columna (7) with a few larger C. brunnea near the top. Next below is a conspicuous band of white, crinkle-edged oysters, Crassostrea glomerata (8); or where the shore is more wave exposed there may be the large, ridged surf barnacle Elminius plicatus forming its own zone.
Beyond here the algae begin. The first is a crust looking like dull red congealed blood; it is the alga *Apophloea sinclairii* (9). Next, like a dull pink paint, comes a film of the calcareous red alga *Corallina officinalis*, sometimes mingled with white tubeworms *Pomatoceros caeruleus* (10).

Further down, the coralline paint may produce small limey segments (11) forming a compact pink or mauve-grey turf; and amongst this are scattered the strings of bladders known as *Hormosira banksii* (Venus' necklace)(12).

Finally, just visible at low tide come the tresses of large brown algae, buoyant in the breaking waves. The commonest on inner Park islands is the flap-jack, *Carpophyllum maschalocarpum* (13) with small, dark leaves, finely pointed. Above it is sometimes a fringe of another brown alga, *Xiphophora chondrophylla*.

This is a basic zonation scheme for sheltered Hauraki Gulf coasts, Mainlands and islands alike. It varies with different sorts of rock, and changes with greater exposure or shelter. But you can pick out its same elements wherever you go."
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