

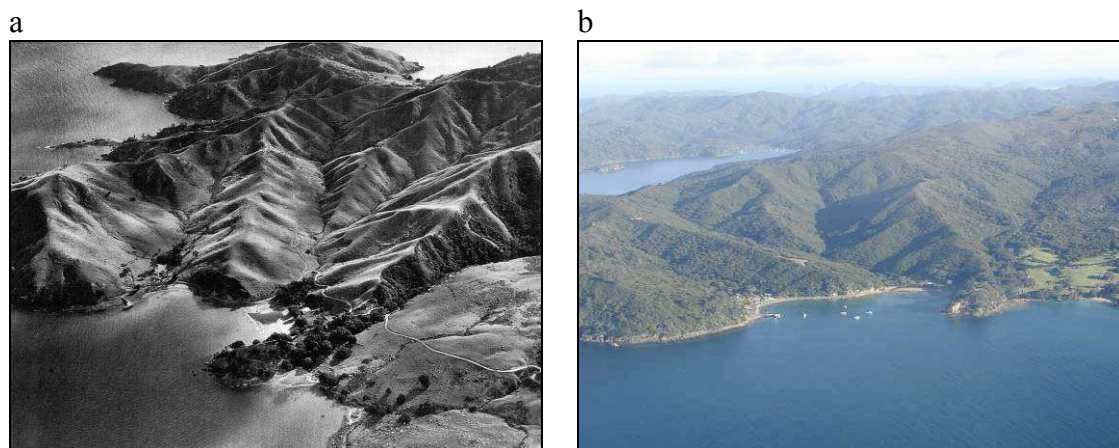
1 Introduction

Great Barrier Island is the largest island off the North Island of New Zealand. It is about 40km long, about 15 km in maximum width, and about 273 km² in area. It lies 98 km northeast of downtown Auckland on the outer edge of the Hauraki Gulf.

The Island is rural in character, though much of it is covered in native vegetation. More than two thirds is managed as public conservation estate by the Department of Conservation (DOC). The remainder is mainly private land governed by Auckland City Council through the District Plan. Thus, unlike other large tracts of public conservation estate, such as Stewart Island, Great Barrier Island sits at the door step of a growing and lively city of more than one million people. The presence of a large population nearby has both positive attributes for the economy, and potentially negative aspects for the conservation of endangered biota.

The area being farmed has declined since the early twentieth century. Even within the lifetimes of many inhabitants, dramatic changes of landscape have occurred, as former pasture is covered by regenerating 'scrub' of manuka and kanuka - now the dominant aspect of the scenery (Fig 1.1). Remnants of former forest, wetlands and dune systems have also survived, and the island contains examples of many different eco-systems and habitats.

Fig 1.1 The changing face of Great Barrier Island. (a) The bones of the land: grass covered hills at Blind Bay, Okupu in 1948. (b) The same landscape, from a slightly different angle showing the extent of manuka and kanuka scrub at present.

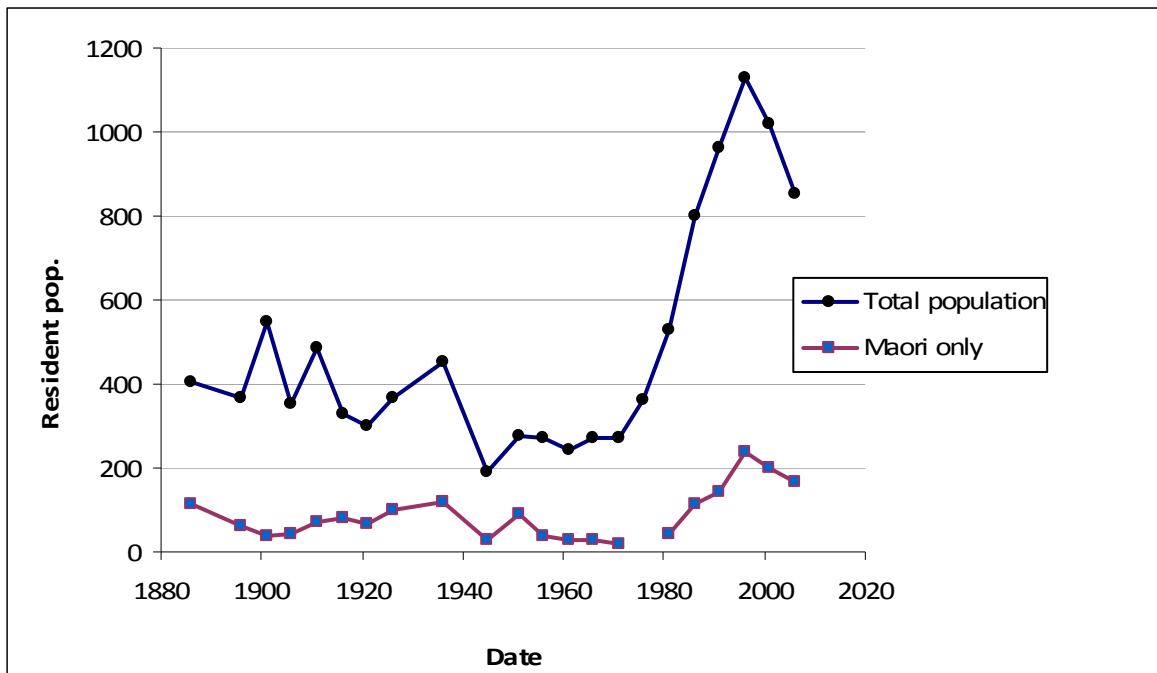


Photos: C Young Collection; John Kjargaard 2008.

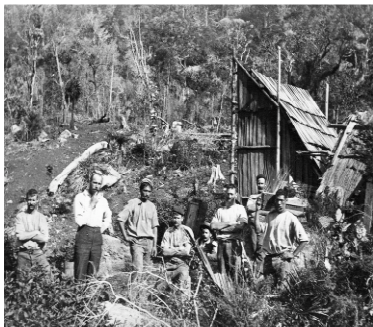
The Great Barrier Island human population has gone through several cycles of increase and decrease. It reached a peak in the mid 1990's (Fig 1.2). Economic activity has waxed and waned with the population, but has always been largely driven by exploitation of natural resources. Its current 'resources' include natural scenery and beautiful beaches, which drive tourism and holiday-home activity. Unlike the earlier exploitation of natural resources, with planning and forethought, these resources are potentially capable of sustainable use. The economy is now largely reliant on tourism and the provision of island services from Auckland City. Retaining some of the rural life style and maintaining the 'unspoiled' environment, while boosting sustainable tourism, presents a challenge for management and democratic governance.

Fig 1.2. The changing population: (a) Population of Great Barrier Island from Statistics New Zealand, based on census data; (b) Logging camp at Okiwi, 1902 – all men; (c) “Excursionsts” – mostly women – visiting Port Fitzroy from the Union Company’s intercolonial steamer Marama, February 1933. (J.F. Loudon).

a: Population Graph (Totalⁱ, Maoriⁱⁱ)



b: Workers – 1902



c: and tourists – 1930's



Photos: C Young Collection

The Great Barrier Island Charitable Trust was formed in 2002 with the aim of eradicating rats and feral cats from the Island, in order to protect the beleaguered native fauna and flora, and allow the re-introduction of species already lost from Great Barrier Island. From the inception it was clear that this idea had economic implications. The initial costs and inconveniences of an eradication programme would necessarily be followed by increased biosecurity measures. However, the trustees believe that a pest-free island would have long-term benefits, allowing the economy of the Island to capitalize on the natural features and its many endangered species. Several previous surveys and reports have emphasised the importance of these aspects in enhancing the lives of the inhabitants and promoting informed tourism. We believe that a pest-free island could form the basis of a new ecology-based economic framework.

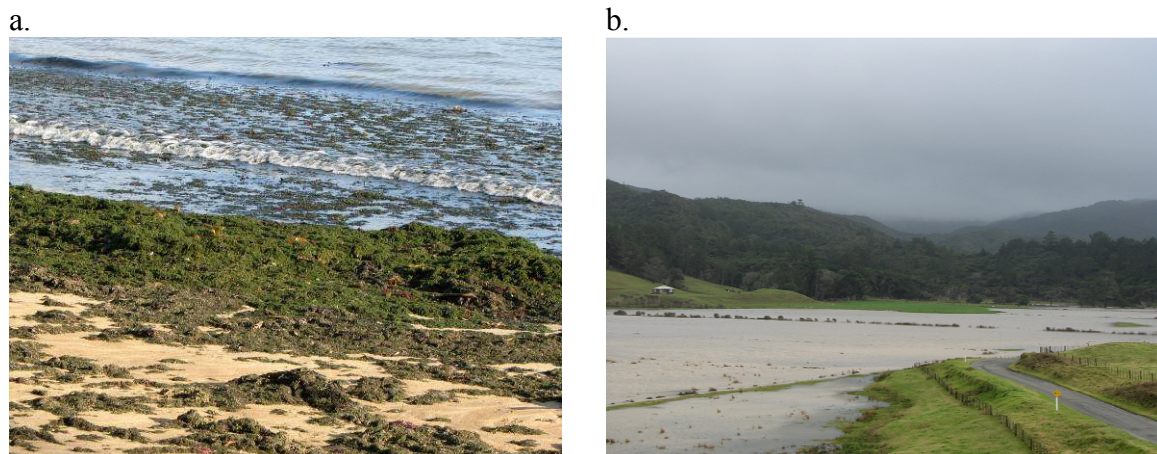
It was in this context that the Trust decided to compile a ‘State of the Environment’ report. This report, unlike all going before, has been written voluntarily by people resident on the

Island. Although some limited financial support has been received, the research work and reporting is independent of any governmental organization.

This State of the Environment Report is intended to outline the way the Great Barrier Island environment has changed, and is changing, under human influence, and to assist in planning for the future. Under each main heading we describe what we have been able to discover about the state of the Island's current environment, outlining some historical changes where these seem relevant. More information than we have found may be available under some topics, and hopefully this will now come forward to expand our knowledge. Also, some facts and figures may have changed slightly since we started this in 2008. Some such 'errors' are inevitable.

Much of this report deals with what is known of the biota, which we can call the 'biodiversity environment'. However, we wish to emphasise also the human component of the environment, including the effects of economic activities and of plant and animal introductions. While the latter are often seen as 'weeds' or 'pests' with negative effects on the 'natural' environment, the values we place on the latter will colour our views. Future planning requires detailed analysis of data on the 'human environment', including human well-being, employment, recreational activities and aspirations, just as much as it requires data on environmental changes or on birds and plants. However, we believe the health of the natural environment is fundamental (Fig 1.3).

Fig 1.3 Is our environment changing? a. Masses of the seaweed *Microdictyon mutabile* washed up on Tryphena beaches in 2009. b. Flooded paddocks at Awana following heavy rain in winter 2008.



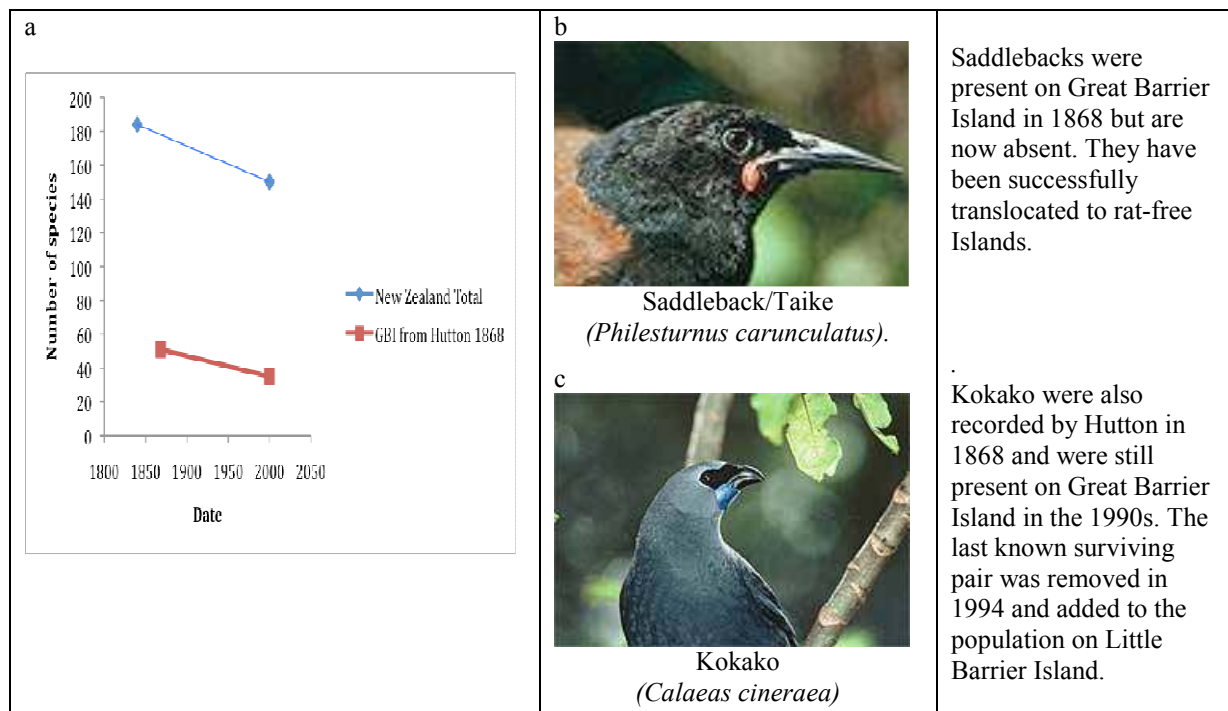
Photos: John Ogden

Because one of our concerns is the role of pests on the Island's ecology, we have concentrated on the terrestrial environment and the terrestrial biota. This is not because we undervalue the importance of the marine environment; clearly on a small island the surrounding sea is crucially important for the livelihood of many inhabitants, providing employment in transport, fishing and recreational activities. The sea, the harbours and the beaches, define Great Barrier Island for many islanders. However, the limits of the marine environment are diffuse, and its biota less well known than that of the land. Moreover, as a nation New Zealand has only recently become conscious of the effects of fishing, sea-going transport and terrestrial activities on the marine environment. For the seas around Great Barrier Island a start has been made with the two "State of the Environment" reports produced by the Hauraki Gulf Forum (2004, 2008, www.haurakigulfforum.org.nz). and these

can be taken as the best summary for Great Barrier Island's marine environment until a more specific report is compiled.

The Island's history and economy largely reflect events on the mainland: the exploitation of natural resources and indiscriminate destruction of indigenous ecosystems has followed the same pattern. The rate of loss of native birds for example, has followed a similar pattern to that experienced throughout New Zealand since 1840 (Fig 1.4). The causes of these extinctions are addressed in a later chapter. However, isolation has allowed some components of New Zealand's pre-European biota to survive here better than elsewhere. This is, at least in part, because some pest species have never established on the Island.

Fig 1.4. (a) Extinction of bird species on Great Barrier Island compared with extinction for New Zealand as a whole. Data from Tennyson & Martinson 2006ⁱⁱⁱ, Hutton 1868^{iv}, and the Great Barrier Island Charitable Trust checklist (Appendix 2). (b) and (c) Species extinct on Great Barrier since Hutton's visit in 1868.

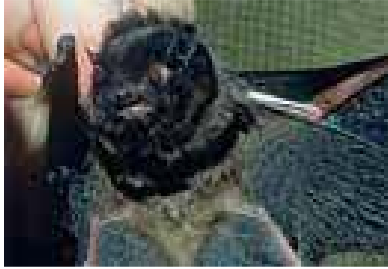





Photos: Department of Conservation website

Endangered species present

The endangered biotas are dealt with in detail in the relevant chapters. Here (Fig 1.5) we simply introduce some of the key species, either because they are nationally endangered or because they have restricted ranges and are characteristic of Great Barrier Island. The Island, as demonstrated in later chapters, contains high species diversity in many groups of organisms. For example, Great Barrier Island is home to c. one quarter of New Zealand's bird species and vascular flora, and 13% of the known lizard taxa. However, in many cases species are represented only by small populations. Where these species are endangered or vulnerable elsewhere in New Zealand (roughly 40% of the birds of Great Barrier Island, 13% of the flora and 60% of the reptiles), the significance of these species, and the ecosystems which maintain them on the Island, is greatly enhanced. Alternatively, it could be said that Islanders, visitors, and the various managing agencies, have increased responsibility for their continued survival.

Fig 1.5 Some Great Barrier Island rarities you may or may not know. “Status” is from Hitchmough et al. (2007), with the category followed by its numerical designation, and from Miskelly et al (2008).

Species Size and weigh		Status (numbers in brackets refer to National Classification ^v)
Long tailed bat/Pekapeka <i>Chalinolobus tuberculata</i> Length 5cm Wingspan; 26cm Weight; 9g		Endemic and nationally vulnerable (3). Data poor. Confirmed on Great Barrier Island in 2004/05
Brown teal/Pateke <i>Anas aucklandica (chlorotis)</i> Length: 48cm Male: 600g Female: 500g		Endemic and nationally endangered (2). Miskelly et al. (2008) class brown teal as ‘At Risk: recovering (D2)’ c. 2000 birds remain in New Zealand. Great Barrier Island is national stronghold with about 800 birds.
Bittern/Matuku <i>Botaurus poicilopterus</i> Length: 71cm Male: 1400g Female: 1000g		Nationally endangered native (2). Miskelly et al. (2008) class bittern as ‘Nationally endangered (B2)’. Has declined on Great Barrier Island since 1980s. Occasionally seen at Kaitoke swamp and Okiwi in 2008.
North Island Robin/ Toutouwai <i>Petroica australis (longipes)</i> Length: 18cm Weight: 35g		Endemic. Reintroduced to pest-managed properties at Windy Hill (2004) and Glenfern Sanctuary (2005).

New Zealand
dotterel/
Tuturiwhatu
Charadrius
obscurus
(*aquilonius*).

Length: 25cm
Weight: 145g



Endemic and nationally vulnerable (3). Miskelly et al. (2008) class this species as 'Nationally vulnerable B3'. Possibly 2000 birds throughout NZ. Great Barrier Island has c. 50 resident birds.

Reef heron/
Matuku moana
Egretta sacra

Length: 66cm
Weight: 400g



Nationally vulnerable native (3). Miskelly et al (2008) class this species as 'Nationally vulnerable B3'. Great Barrier Island may have a few resident birds, plus visitors.

Kaka
Nestor
meridionalis
septentrionalis.

Length: 45cm
Males: 475g
Females: 425g



Endemic. In decline, nationally vulnerable (4). (Miskelly et al. 2008). Great Barrier Island has a key North Island population: probably 200-300 birds (see Great Barrier Island ENV NEWS 13 and 16 for summaries of counts).

Banded rail/
Moho pereru
Rallus
philippensis
assimilis

Length: 30cm
Weight: 170g



Native. Sparsely distributed throughout NZ (6), but common on Great Barrier Island. Population size not known. Miskelly et al. (2008) class banded rail as 'At risk, naturally uncommon, D4.

Shrub daisy
Olearia allomii

Height: 1 – 2m



Endemic and found only on Great Barrier Island. Mainly in Hirakimata (Mt Hobson) region.

Sinclair's tea tree
Kunzea sinclairii

Height: < 1m



Endemic and found only on Great Barrier Island. Mainly in Hirakimata region. A low creeping relative of the common kanuka.

Chevron skink/Niho
Taniwha.
Oligosoma homalonotum

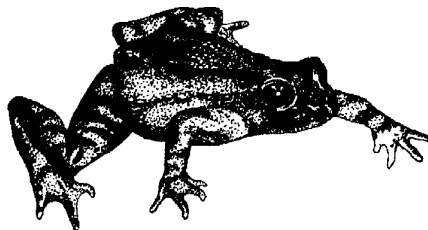
Length: c. 300mm
(including tail)
Weight: 29g



Nationally endangered endemic (2). Found only on Great Barrier Island and Little Barrier Island (Hauturu). Last record from Little Barrier Island (Hauturu) 2007.

Hochstetter's frog
Leiopelma hochstetteri

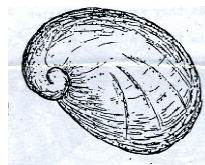
Length: 48mm
Weight: ?



An endemic genus. Declining and sparsely distributed nationally (6). A few surviving on Great Barrier Island. "The native frogs of New Zealand, *Leiopelma* spp., are regarded as amongst the most primitive living in the world today".

Paua slug
Schizoglossa novoseelandica barrierensis

Length of shell:
c. 1cm.



Variety endemic to Great Barrier Island.

"Members of this genus are nowhere common and it is pleasing to see them so numerous here"

J. F. Goulstone 1990.

Photos (from top): Long-tailed bat; Dick Vietch, Dept. of Conservation (DOC). Brown teal; Department of Conservation website. Bittern; M.F. Soper, DOC photo library. Robin; Kevin Parsons (Windy Hill photo collection). NZ dotterel; Halema Jamieson, (DOC). Reef Heron; John Ogden (GBICT). Kaka; DOC Website. Banded rail; John Ogden, (GBICT). Shrub daisies; Ewen Cameron, (Auckland Museum). Sinclair's tea tree; Ewen Cameron, (Auckland Museum). Chevron Skink; Ben Barr and Halema Jamieson. Hochstetter's frog; drawing by Sonia Frimmel, (DOC). Photo Kevin Parsons. (Windy Hill photo collection) Paua slug; drawing by J. F. Goulstone.

Pests - present and absent

The Island has no mustelids (weasles, stoats, ferrets) or possums, and this has been important for the survival of species which have declined on the mainland. However, ship rat and kiore are present in abundance, and with feral cats, pose a well-documented risk to the continued existence of many rare species of birds and lizards. Although many pest animals are present on the Island, some key pests have been eradicated (wallaby, goat and fallow deer) or are absent (Norway rat, mustelids, possum)^{vi} (Chapter 11). This probably explains the survival of some of the endangered species illustrated above.

At least 25 species of introduced birds and more than 30 different weed species have arrived on Great Barrier Island since 1868, and some are now abundant (Fig 1.6). While their individual effects are rarely obvious, taken overall they represent a huge change in the habitats for those species which were here before them. We will outline some of these changes in later chapters. Next we present selected environmental parameters impinging directly on the lives of Great Barrier Island inhabitants; conservation is about people living in the environment.



Fig 1.6. Myna (*Acridotheres tristis*) in a flame tree. Both are recent arrivals on Great Barrier Island.

Photo Department of Conservation website

i Census populations: usually resident from 1971, from contemporary published results. Note that Maori were counted separately prior to about 1945, and the non-Maori and Maori totals have been added together.

ii Broader definitions of Maori have generally been used. For Example 1996-2006 includes all who include Maori as one of their ethnic groups

iii Tennyson, A. & Martinson, P. 2006. Extinct Birds of New Zealand. Te Papa Press.

iv Hutton, F. W. 1868. Notes on the birds of Great Barrier Island. *Transactions and Proceedings of the New Zealand Institute* 1: 104-106.

v Hitchmough, R. Bull, L. & Cromarty, P. (Compilers). 2007. *New Zealand threat classification system species lists 2005*. Science & Technical Publishing. Department of Conservation, Wellington, New Zealand (ISBN 0-478-14128-9). Updated in: de Lange, P.J. et al. 2009 *Threatened and uncommon plants of New Zealand (2008 revision)*. *New Zealand Journal of Botany* 47: 61-96; and: Miskelly, C.M. et al. 2008. *Conservation status of New Zealand Birds, 2008 Notornis* 55:117-135.

vi Auckland Regional Council, *Proposed Auckland Regional Pest Management Strategy 2007 - 2012*, 18 June 2007, p173