

## WHC Nomination Documentation

File name: 877.pdf UNESCO Region ASIA AND THE PACIFIC

SITE NAME ("TITLE") New Zealand Sub-Antarctic Islands

DATE OF INSCRIPTION ("SUBJECT") 5 / 12 / 1998

STATE PARTY ("AUTHOR") NEW ZEALAND

CRITERIA ("KEY WORDS") N (ii)(iv)

### DECISION OF THE WORLD HERITAGE COMMITTEE:

#### 22nd Session

The site consists of five island groups (the Snares, Bounty Islands, Antipodes Islands, Auckland Islands, and Campbell Island) in the Southern Ocean south-east of New Zealand. The islands, lying between the Antarctic and Sub-tropical Convergences, and the seas have a high level of productivity, bio-diversity, wildlife population densities, and endemism among birds, plants and invertebrates. The bird and plant life, especially endemic albatrosses, cormorants, land birds and "megaherbs" are unique to these islands and are clearly of outstanding universal value under criterion (iv). Under criterion (ii) the islands display a pattern of immigration of species, diversification and emergent endemism. Several evolutionary processes such as the development of loss of flight in both birds and invertebrates offer particularly good opportunities for research into the dynamics of island ecology. Human impacts are confined to the effects of introduced species at Auckland and Campbell islands but their ongoing eradication is leading to a recovery of native vegetation allowing evolutionary processes to continue.

The Committee inscribed this property under criteria (ii) and (iv). The Committee noted the Bureau's comments, which commended the State Party for submitting a model nomination but at the same time expressed its concern over the integrity of the marine area and the conservation of the marine resources. The need for co-operation with the Secretariat of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) in elaborating strategies for strengthening the protection of the marine environment (especially regarding fishery by-catch) was noted. The Committee recalled that at its twenty-first session it had encouraged the Australian authorities to consider for the future a re-nomination of Macquarie Island with the Sub-Antarctic Islands of New Zealand as one single Sub-Antarctic site. It invited both States Parties to continue to liaise on this possibility.

The Delegate of Australia underlined the willingness of her Government to co-operate with New Zealand in considering a single site. The Observer of New Zealand informed the Committee that the responsible Minister would meet his Australian counterpart the following week and would discuss this issue, and that New Zealand is in contact with the Secretariat of CCAMLR. His Government participated in the seventeenth CCAMLR meeting in Hobart, which discussed prohibition of daylight fishing and alternative mitigation measures for the Antarctic waters.

### BRIEF DESCRIPTION:

The New Zealand Sub-Antarctic Islands consist of five island groups (the Snares, Bounty Islands, Antipodes Islands, Auckland Islands and Campbell Island) in the Southern Ocean, south-east of New Zealand. The islands, lying between the Antarctic and Sub-tropical Convergences and the seas, have a high level of productivity, bio-diversity, wildlife population densities and endemism among birds, plants and invertebrates. They are particularly notable for the large number and diversity of pelagic seabirds and penguins that nest there. There are 126 bird species in all including 40 seabirds of which 5 breed nowhere else.

1.b. State, province or region: Five island groups of the N.Z. subantarctic zone: The Snares, Bounty Islands, Antipodes Islands, Auckland Islands and Campbell Islands.

1.d Exact location: Snares: 48°02' S / 166°35' E - Bounty Islands: 47°45' S / 179°03' E  
Antipodes Islands: 49°41' S / 178°48' E - Auckland Islands: 50°29' to 59' S / 165°52' to 166°20' E

N 877

Nomination of the  
New Zealand Subantarctic Islands  
by the  
Government of New Zealand  
for inclusion in the  
World Heritage List

Wellington, New Zealand

June 1997

This nomination has the endorsement of the New Zealand Conservation Authority, the Royal Forest and Bird Protection Society, and World Wide Fund for Nature New Zealand.

*Cover photograph:* White-capped mollymawk at South West Cape, Auckland Islands. Western Arm of Carnley Harbour in the background. *Lou Sanson.*

© Crown copyright

Department of Conservation  
PO Box 10-420  
Wellington  
New Zealand

ISBN 0-478-01910-0



Department of Conservation  
*Te Papa Atawhai*

# Contents

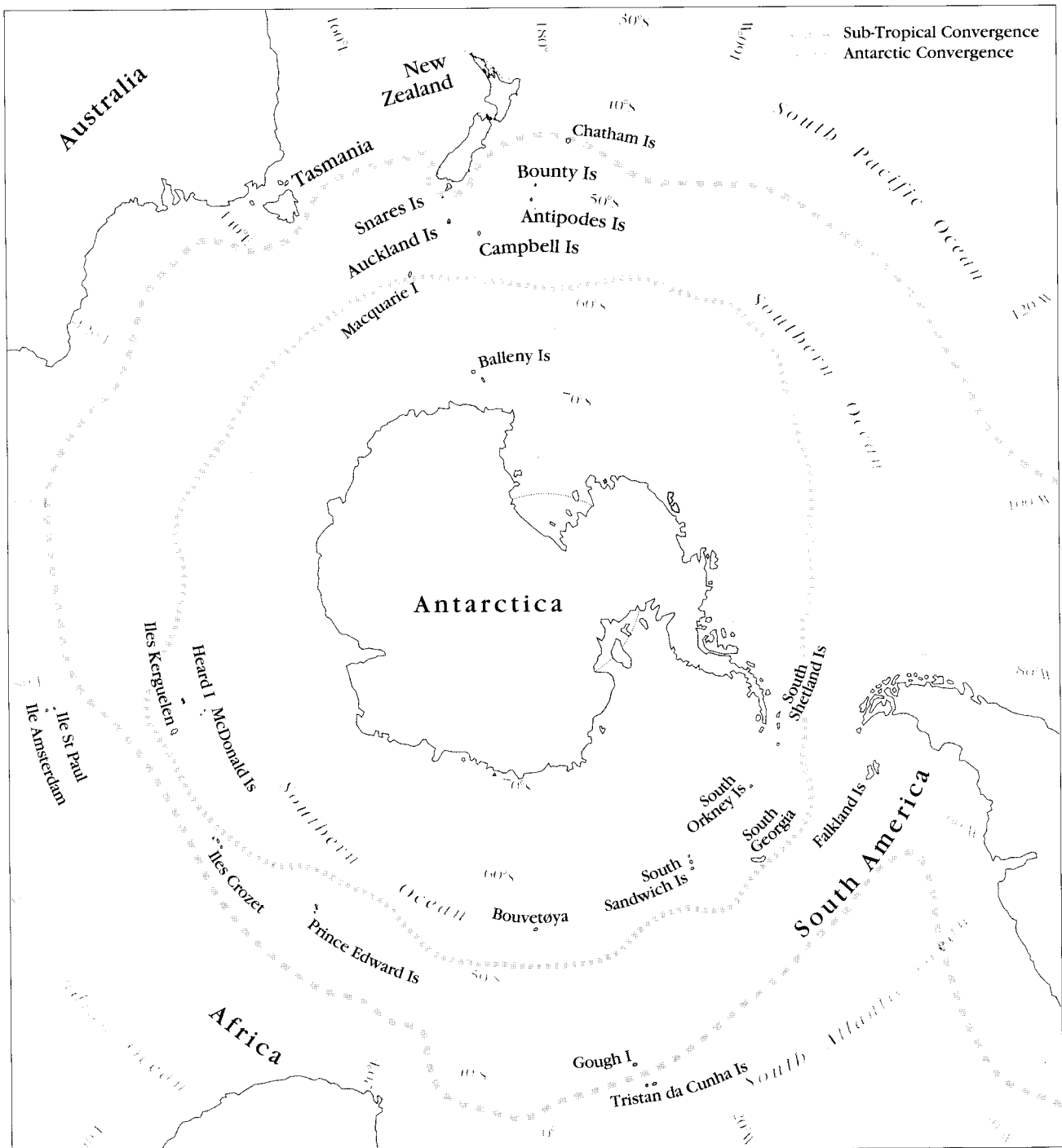
INTRODUCTION	5
Biogeographical note	7
1. SPECIFIC LOCATION	8
1.1 Country	8
1.2 Region	8
1.2 Name of property	8
1.4 Location	8
2. JURIDICIAL DATA	10
2.1 Owner	10
2.2 Legal status	10
2.2.1 The islands	11
2.2.2 Marine environment	11
2.3 A brief history	11
2.4 Responsible administration	11
3. IDENTIFICATION	
3.1 Overview	12
3.2 The Snares	17
3.3 Bounty Islands	21
3.4 Antipodes Islands	23
3.5 Auckland Islands	27
3.6 Campbell Island	35
4. STATE OF PRESERVATION/CONSERVATION	42
4.1 Diagnosis of present condition	42
4.2 Agent responsible for preservation/conservation	43
4.3 History of use and preservation/conservation	43
4.3.1. Significance to Maori and Moriori	43
4.3.2. European Contact: Exploitation, Castaways and Failed Settlements	44
4.3.3. The Turning Point: Conservation Initiatives	45
4.3.4. Tourism	45
4.3.5. Fishing	46

4.4	Measures for preservation/conservation	47
4.4.1	Eradication of Animal and Plant Pests	47
4.4.2	Vigilance and Surveillance	47
4.4.3	Research	50
4.4.4	Historic resources	51
4.	JUSTIFICATION FOR INCLUSION IN THE WORLD HERITAGE LIST	52
<hr/>		
5.1	Criterion IV	52
5.1.1	Biological diversity, productivity, and rarity	52
5.1.2	Sea-bird habitats	53
5.1.3	Endemism in land birds	56
5.1.4	A haven for marine mammals	57
5.1.5	Unique invertebrate communities	58
5.1.6	Distinctive and spectacular subantarctic flora	58
5.1.7	Dependance on the marine environment	59
5.2	Criterion II	59
5.3	Criterion III	61
5.4	Criterion I	63
5.5	Comparison with other Southern Ocean islands	65
5.6	Authenticity	68
6.	SUMMARY	69
<hr/>		
7.	ACKNOWLEDGEMENTS	71
<hr/>		
8.	SELECTED READING	72
<hr/>		
APPENDIX		74
<hr/>		

# Introduction

This nomination for World Heritage Listing encompasses all five island groups of the New Zealand subantarctic zone: The Snares, Bounty Islands, Antipodes Islands, Auckland Islands and Campbell Islands. They form a distinct unit (together with Macquarie Island, an Australian territory) as the only subantarctic islands in the Pacific sector of the Southern Ocean (Figure 1). They lie between latitudes 47° and 52° south in the zone of the fabled “Roaring Forties” and “Furious Fifties”: the persistent westerly winds of the Southern Ocean, collectively known as the West Wind Drift. To the east across the Pacific sector, the map is a blank expanse of ocean. The next group of Southern Ocean islands in an easterly direction, the South Shetlands, is 8,000 km away.

Figure 1:  
Location of the New Zealand Subantarctic Islands in the Southern Ocean, showing their relationship to Antarctica, the southern continents, the other oceanic islands and the marine convergences.





A sight epitomising the wildness of the Subantarctic Islands - light-mantled sooty albatrosses wheeling about the spume-drenched cliffs of Adams Island  
*Kath Walker*

The five New Zealand island groups are located between two circumpolar ocean boundaries, the Antarctic Convergence and the Subtropical Convergence, which define a complex zone of interacting ocean currents. This zone is known as Insulantarctica (see **Biogeographical note** below). In the New Zealand region, some of the currents are cool, some carry relatively warm water from the north and some bring cold bottom water from the region of the Antarctic Circle. The result is a vast melting pot of biological productivity. Marine life abounds.

Geologically, the New Zealand subantarctic islands lie close to the “triple junction” of the Pacific, Australian/Indian and Antarctic Plates. The Campbell Plateau and Bounty Platform, upon which the islands are located, are submerged platforms lying to the south of mainland New Zealand. They constitute the southern extension of the New Zealand “micro-continent”. Here on the continental shelf the seas are relatively shallow — less than 2000 m in depth. Two island groups (The Snares and Bounty Islands), are composed of granite-like rocks that reveal the character of the continental basement; the remaining three groups are predominantly volcanic.

The five island groups, although linked tectonically, have had a long history of geographical isolation from the New Zealand mainland and from each other. They differ from each other not only in size, origin and topography, but also biologically. Each island has its own combination of fauna and flora, although some species are shared by two or more islands. This pattern of distinctiveness is reflected in the ecological map of New Zealand and its island territories. Four of the subantarctic island groups (Bounty, Antipodes, Auckland, and Campbell), are each ecological districts in their own right. The fifth group, The Snares, forms part of the Rakiura Ecological District (Foveaux Strait/Stewart Island/The Snares).

New Zealand’s subantarctic islands are the country’s remotest protected natural areas. They include some of the world’s least-modified islands. There are no permanent human settlements anywhere in the region. Only Campbell Island has been permanently



Young southern Royal Albatrosses 'gamming' (a social activity, a precursor to selecting a mate) on Campbell Island. Perseverence Harbour can be seen in the background  
*Peter Moore*

which marks the limit of New Zealand's territorial sea, is used to define the boundary of a sanctuary for marine mammals.

occupied, by a small number of meteorological staff, since World War II. With the automation of the meteorological station on Campbell Island in October 1995, none of the islands is now inhabited.

In recognition of the dependence of so much of the islands' biota on the sea, this nomination extends to the 12-nautical-mile (20 km) limit surrounding each of the five groups. At the Auckland Islands, the 12-mile limit,

*Biogeographical note*

The islands located on the Campbell Plateau and Bounty Platform south of mainland New Zealand are commonly referred to as the New Zealand subantarctic islands. Some scientists, however, consider the term "cool-temperate" more correctly describes the New Zealand subantarctic zone in view of the fact a wide range of vascular plants, including woody species, are able to grow in the zone.

"Insulantarctica" is the name applied to the oceanic region located between the Antarctic and Subtropical Convergences (refer M.D.F. Udvardy 1975, *A classification of the biogeographic provinces of the world*, IUCN occasional paper 18). A total of 20 island groups (800 individual islands) are located within this circumpolar region. They range in latitude from 37° south (Tristan da Cunha) to 62° south (South Shetlands) (Figure 1). Three biogeographic zones are recognised for Insulantarctica: cool-temperate, subantarctic, and maritime antarctic.

In terms of these three biogeographic zones, a comparative analysis of the attributes of all 20 island groups in Insulantarctica is given in **Section 5.5** and the **Appendix**.



# 1. Specific location

## 1.1 COUNTRY

New Zealand.

## 1.2 REGION

The five island groups of the New Zealand subantarctic zone: The Snares, Bounty Islands, Antipodes Islands, Auckland Islands, and Campbell Islands.

## 1.3 NAME OF PROPERTY

The name, "New Zealand Subantarctic Islands", is suggested for this World Heritage Area nomination. The region is also referred to in New Zealand vernacular as "The Roaring Forties" or as "The Deep South". There are Maori names for The Snares (Hinekete or Hinetiti), and Auckland Islands (Maungahuka or Motu maha) but no Maori name exists that embraces all five island groups.

## 1.4 LOCATION

The nominated island groups lie to the south and south-east of the South Island of New Zealand, between latitudes 47°S and 52° S and longitudes 165°E and 179°E (Figure 2).

### The Snares

Latitude 48° 02' south

Longitude 166° 35' east

200 km south-west of the South Island

### Bounty Islands

Latitude 47° 45' south

Longitude 179° 03' east

700 km east-south-east of the South Island

### Antipodes Islands

Latitude 49° 41' south

Longitude 178° 48' east

820 km south-east of the South Island

### Auckland Islands

Latitude 50 29 to 50° 59' south

Longitude 165° 52' to 166° 20' east

460 km south of the South Island

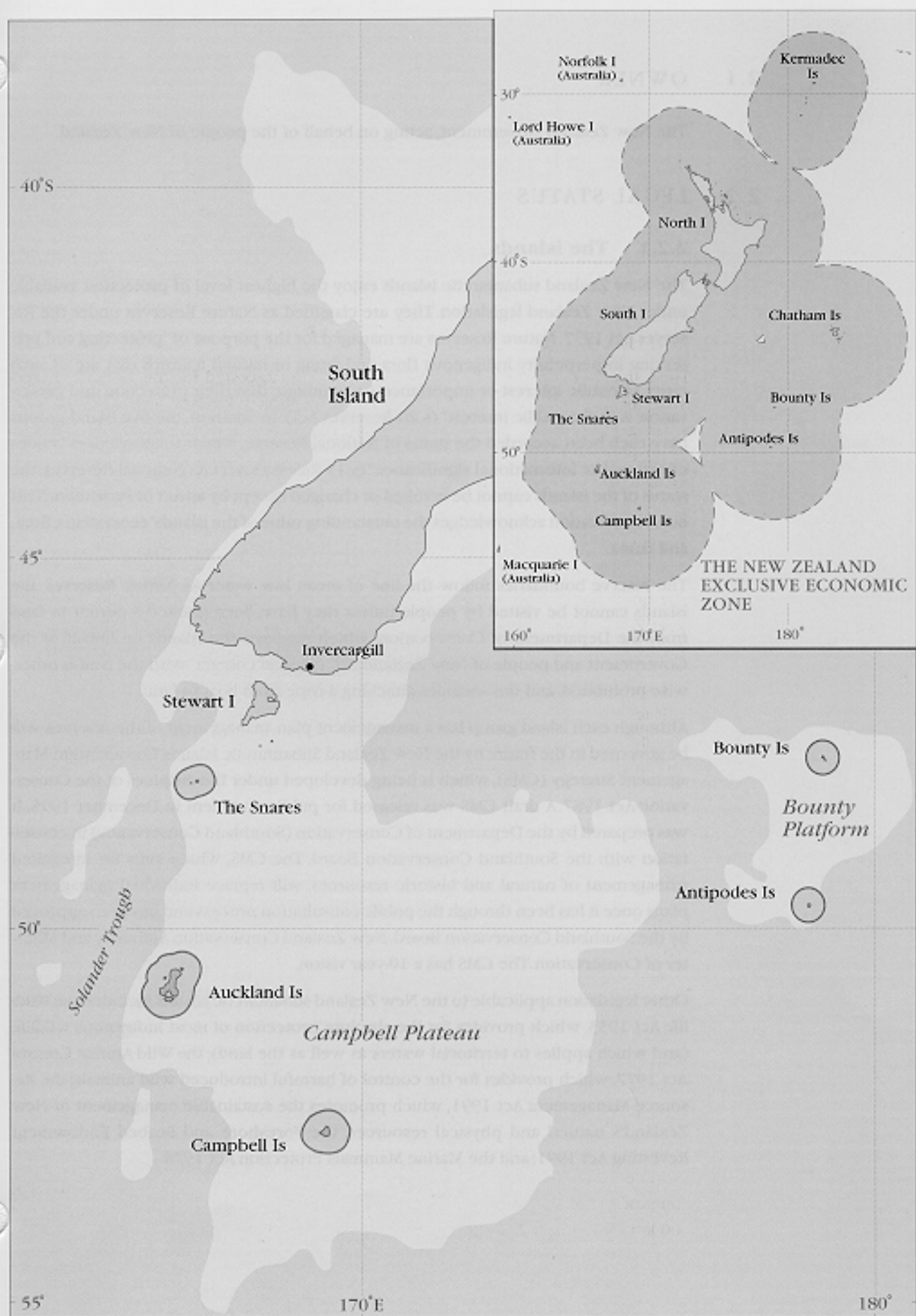
### Campbell Island

Latitude 52° 33' south

Longitude 169° 09' east

660 km south of the South Island

Figure 2: Location of the World Heritage nominated area (subantarctic islands and surrounding territorial seas) in relation to the New Zealand mainland and major oceanographic features.



## 2. Juridicial data

### 2.1 OWNER

The New Zealand Government, acting on behalf of the people of New Zealand.

### 2.2 LEGAL STATUS

#### 2.2.1 The islands

The New Zealand subantarctic islands enjoy the highest level of protection available under New Zealand legislation. They are classified as Nature Reserves under the Reserves Act 1977. Nature Reserves are managed for the purpose of “protecting and preserving in perpetuity indigenous flora and fauna or natural features that are of such rarity, scientific interest or importance, or so unique that their protection and preservation is in the public interest” (s.20 Reserves Act). In addition, the five island groups have each been accorded the status of National Reserve, which acknowledges “values of national or international significance” (s.13 Reserves Act). As National Reserves, the status of the islands cannot be revoked or changed except by an Act of Parliament. This dual classification acknowledges the outstanding value of the islands’ ecosystems, flora, and fauna.

The reserve boundaries follow the line of mean low water. As Nature Reserves, the islands cannot be visited by people unless they have been granted a permit to land from the Department of Conservation, which manages the islands on behalf of the Government and people of New Zealand. All “physical contact” with the land is otherwise prohibited, and this includes attaching a rope from boat to land.

Although each island group has a management plan, management of the reserves will be governed in the future by the New Zealand Subantarctic Islands Conservation Management Strategy (CMS), which is being developed under the auspices of the Conservation Act 1987. A draft CMS was released for public comment in December 1995. It was prepared by the Department of Conservation (Southland Conservancy) in consultation with the Southland Conservation Board. The CMS, which aims for integrated management of natural and historic resources, will replace individual management plans once it has been through the public consultation process and has been approved by the Southland Conservation Board, New Zealand Conservation Authority and Minister of Conservation. The CMS has a 10-year vision.

Other legislation applicable to the New Zealand subantarctic islands includes: the Wildlife Act 1953, which provides for the absolute protection of most indigenous wildlife (and which applies to territorial waters as well as the land); the Wild Animal Control Act 1977, which provides for the control of harmful introduced wild animals; the Resource Management Act 1991, which promotes the sustainable management of New Zealand’s natural and physical resources; the Foreshore and Seabed Endowment Revesting Act 1991; and the Marine Mammals Protection Act 1978.

### **2.2.2 Marine environment**

Marine mammals are protected around the Auckland Islands. The Auckland Islands Marine Mammal Sanctuary, which came into force on 1 April 1993, establishes a protection zone extending from the shore to the 12 nautical mile limit. All commercial fishing is prohibited in the sanctuary. The sanctuary was created specifically to protect sea lions from the threat of fishing vessel bycatch but it also serves to protect other marine mammals and seabirds. Under fisheries legislation, fishing by all vessels over 43 metres and foreign licensed and chartered vessels is prohibited within 12 nautical miles of all five island groups.

## **2.3 A BRIEF HISTORY OF LEGAL PROTECTION STATUS**

The islands became New Zealand territory in 1870. The first island to receive protection for its flora and fauna values was Adams Island, the southernmost island of the Auckland Islands group. In 1910, Adams Island was declared a Reserve for the Preservation of Fauna and Flora. In 1934, the same classification was applied to the whole Auckland Islands group. In 1953, the Campbell Island group was accorded the same protective status, then in 1961 the designation was also applied to the remaining three groups — The Snares, Bounty Islands and Antipodes Islands. In 1977 the reserves were reclassified as Nature Reserves under the Reserves Act 1977, and the designations came into force on 1 April 1978. Subsequently, all five island groups were accorded National Reserve status.

## **2.4 RESPONSIBLE ADMINISTRATION**

The Department of Conservation manages New Zealand's subantarctic islands on behalf of the Government and people of New Zealand. The department's Southland Conservancy in Invercargill has day-to-day responsibility for the reserves, with oversight provided by a regional office located at Christchurch and policy and scientific advice emanating from head office units of the department located at Wellington.

Two statutory authorities, the Southland Conservation Board and its national parent body, the New Zealand Conservation Authority, are appointed by the Government, through the Minister of Conservation, to advise the Minister and assist with the formulation of policy. Both the board and the authority are closely involved in the development of the Conservation Management Strategy for the Subantarctic Islands.

The department acknowledges the Maori interest in the islands and the surrounding maritime waters. Kai Tahu iwi, a principal tribe of the South Island, is able to relate accounts of expeditionary voyages by their ancestors into this inhospitable region. These voyages seeking food and other natural resources, took place long before the arrival of Europeans in New Zealand, and its waters. In the mid-1800s, some Ngati Mutunga and Moriori families from the Chatham Islands established a settlement in the Port Ross area of the Auckland Islands, for a brief period.

As a consequence of these historical factors, the islands and the waters surrounding them are highly significant to these iwi groups. In addition, section 4 of the Conservation Act requires the Department of Conservation to give effect to the principles of the Treaty of Waitangi. Consequently, the Department of Conservation recognises that the involvement of iwi in the management of the islands may need to be provided for in future.

# 3. Identification

## 3.1 OVERVIEW

New Zealand's subantarctic islands are in a world of their own. Isolation from each other and from mainland New Zealand over a long period has resulted in the evolution of distinctive plants, birds, seals, and invertebrate animals. The biota contains numerous endemic or rare elements, and some extraordinary examples of adaptation. Altogether, the biota is of immense international interest for reasons of biological diversity, ecology, taxonomy and biogeography. The five groups include some of the least-modified islands in the Southern Ocean. Here, life is in abundance. It manifests itself in the teeming colonies of penguins, petrels and albatrosses, and the crowded breeding grounds of seals and sea lions. The islands are host to large populations of sea birds and seals because of the high productivity of the surrounding seas, and because they are relatively small areas of land scattered across a vast ocean. There is nowhere else for the seabirds and seals to breed.

The total land area of the five groups is 76,458 ha. The Auckland Islands group is the largest at 62,560 ha (82% of the total); the Bounty Islands are the smallest at just 135 ha. Occupying relatively low latitudes (from 47° to 52° south) in an oceanic belt subject to persistent westerly winds, the New Zealand subantarctic islands experience a climate that is cool, wet and windy. Mean annual temperatures range from 11°C at The Snares, to 6°C at Campbell Island, the most southerly group. In comparison, islands in the region of the Antarctic Convergence record mean annual temperatures from 1° to 5°C. Severe frosts are unknown on the New Zealand subantarctic islands. Snow can fall to sea level but generally does not lie for long. There is no permanent snow or ice.

NW cliffs, Enderby Island, showing the basalt strata and columns, which are so typical of the volcanic islands - the Auckland, Campbell and Antipodes groups.  
*Neville Peat*



### Geology and landform

The five island groups are perched on extensive, relatively shallow areas of continental shelf, comprising the Campbell Plateau and Bounty Platform, which bulge into the Southern Ocean in a south and south-east direction from mainland New Zealand. The

Snares, Auckland, and Campbell islands lie on the Campbell Plateau; the Bounty and Antipodes islands lie on the Bounty Platform (Figure 2). The basement is granite and metamorphic rock more than 100 million years old, similar in composition to the western mountains of the South Island and Marie Byrd Land in West Antarctica. The two most northerly groups (The Snares and Bounty Islands), are the crests of this ancient landmass and their rocks reveal its granitic character. The remaining three island groups are volcanic and considerably

younger. The volcanism in the Auckland Islands occurred 10 to 25 million years ago; Campbell Island 6 to 11 million years ago; and Antipodes is the youngest of them all, with the volcanism there ranging from 5 million years to less than 1 million years in

age. The variation in the ages is explained by a pattern of migrating volcanism in the late Cenozoic that links the volcanic islands of the subantarctic with volcanic features on the east coast of the South Island. The volcanism progressed in an eastward direction as the crustal plate carrying the South Island, Campbell Plateau and Bounty Platform passed over a hot zone within the earth's mantle.

Auckland and Campbell are impressive basalt shield volcanoes, extensive and high enough to have carried large valley glaciers and probably small icecaps during the Pleistocene ice ages of the last two million years. Glacial features are clearly visible on both groups in the form of radiating U-shaped valleys, cirques, moraine-dammed lakes, lateral and terminal moraines, fiords and periglacial sediments on raised beaches. Erosion, especially from wave action, has reduced the volcanoes to remnants of their former extent.

On all of the groups, except the rocky Bounty Islands, the soils are essentially blanket peat, several metres thick in places. This peat reflects the steady accumulation of decomposing vegetation in a cool, moist climate spanning several thousand years.

### **Ocean circulation**

The productivity and exceptional biomass of the seas surrounding these remote island groups is a consequence of the way ocean currents build a food web. In this region the Southern Ocean is a nutrient-rich cocktail of currents. Although the islands lie near the limit of antarctic water, they are also influenced by warmer currents from the subtropics. Surface subantarctic water is driven northwards by the westerly and south-westerly air streams. Of relatively low temperature and salinity, this water meets surface subtropical waters of higher temperature and salinity at the subtropical convergence on the Chatham Rise (at about 43° south). Other water masses affecting the islands are, in order of increasing depth, Antarctic intermediate water (low salinity), which flows north from the Antarctic Convergence at 55–60° south; Pacific deep water, which flows eastwards from the Atlantic Ocean in the circumpolar current, and bottom water, which originates from winter-cooled sinking water on the margins of the Antarctic continent. On the western side of the Auckland and Campbell groups, upwellings occur as the currents meet the comparative shallows of the Campbell Plateau. They carry productivity-boosting nutrients from the ocean depths.

Sea surface temperatures range from a summer monthly mean of 12°C at The Snares to 5.5°C in the winter months at Campbell Island.

### **Flora**

The plant life of the New Zealand subantarctic region, compared with higher-latitude areas of Insulantarctica, is notable for its diversity, special forms and unique communities. In recognition of these features, the New Zealand subantarctic islands (together with Macquarie Island) have been designated by the World Conservation Union (IUCN) as a world centre of floristic diversity. Four of the five island groups are well vegetated. The odd one out is the Bounty Islands group, where the rocky terrain is only sparsely covered by lichen and algae. The patterns in the flora are strongly influenced by the distribution of the island groups through six degrees of latitude, and their separation by large tracts of ocean. Some areas are botanical wonderlands.

The Snares and two islands in the Auckland group (Adams and Disappointment), are among the last substantial areas in the world harbouring vegetation essentially unmodified by humans or by alien animals. On Adams Island there is an area of flowering shrubs and herbs, known as Fairchild's Garden, that is extraordinarily rich and colourful. Nearby Disappointment Island is similarly impressive, and megaherb "gardens" now proliferate on uplands at Campbell Island, following the removal of feral sheep.

There are four main elements to the region's flora:

- Taxa endemic to individual groups;
- Taxa endemic to the region (including Macquarie Island in some cases);
- Taxa that are circumpolar;
- Taxa also found on mainland New Zealand and more distant regions.

A number of species reach the limit of their ecological tolerance in the New Zealand subantarctic region. The Auckland Islands group, which supports the richest flora of any of the Southern Ocean islands, has the southernmost forest in the South-west Pacific. This forest is dominated by southern rata *Metrosideros umbellata*, a flowering tree in the myrtle family (Myrtaceae). Tree ferns also reach their southern limits at these islands. The group supports a total of 233 vascular plants, including 196 indig-



*Anisotome latifolia*  
spectacularly in flower at  
Fairchild's Garden, Adams Island  
Kath Walker

enous and six endemic taxa. More than 30 taxa are classified rare.

The Snares has an extensive forest, dominated by the large tree daisy *Olearia lyallii*. It reaches a height of over 5 m. The Antipodes and Campbell Islands have no comparable forest cover although they do support woody shrubs or dwarf forest. Giant tussock (bunch) grasses and herbs cover much of their land area.

Herbs are conspicuous, especially on the Auckland and Campbell groups. The so-called megaherbs of the New Zealand subantarctic have extraordinarily large leaves and flowers. They include the endemic *Stilbocarpa polaris* and *S. robusta*, which have rhubarb-like leaves, and three species of *Pleurophyllum*, a genus shared only with Macquarie Island. The large foliage is thought to be an adaptive response to cloudy, humid conditions and cool temperatures. An increase in leaf temperatures of up to 15°C has been recorded on the corrugated leaves of *Pleurophyllum speciosum* at Campbell Island. Another feature is the colourful appearance of many of the flowers. Colours include the purple and pink of the pleurophyllums and gentians, mauve in the carrot relatives *Anisotome latifolia* and *A. antipoda*, vivid blue in the forget-me-nots *Myosotis capitata* and *M. antarctica*, and bright yellow in *Bulbinella rossii* and the tree daisy *Brachyglottis stewartiae*. According to one theory, the bright or dark colours absorb more warmth from the diluted sunlight than lighter colours, and they may also serve to attract pollinators.

## Fauna

The most striking feature of life on New Zealand's subantarctic islands is the abundance and diversity of the seabirds. This region supports the most diverse community of breeding seabirds in the Southern Ocean. Altogether, more than 120 bird species, including breeding species, have been observed at the New Zealand subantarctic islands and surrounding seas. They range from tiny delicate storm petrels to large and majestic albatrosses with wingspans in excess of three metres. Forty seabird species breed on the islands — 11% of all seabird species in the world. Many of them are

migratory and return to the same colony, often the same nest site, year after year.

The long-lived albatrosses best illustrate the seabird diversity of the New Zealand subantarctic region. Of the 24 species now recognised worldwide, no fewer than 10 species (42%) breed on one or more of the New Zealand subantarctic islands. Five of these breed nowhere else: three great albatrosses (the southern royal, Gibson's and antipodean albatrosses), and two mollymawks (Campbell and white-capped, although one white-capped mollymawk nest has been found in the Chatham Islands). The Campbell Island group hosts six breeding species of albatross — more than any other island group in the world except for Isles Crozet in the southern Indian Ocean, which has seven species.

Four penguin species breed at the New Zealand subantarctic islands, two of them (Snares crested and erect-crested) being endemic to the region. Besides the breeding species, at least six other penguin species have been recorded in the region as vagrants.

Three cormorants (known as shags in New Zealand and Australia) are locally endemic: the Campbell Island, Auckland Island, and Bounty Island shags, each restricted to its own island group.

Land birds display a surprising diversity considering the limited land area available to them. A closer inspection reveals the recurring theme of endemism. All four indigenous land birds at the Antipodes are endemic; The Snares has three endemic land birds; the Auckland Islands group has six endemics; and Campbell Island has its flightless teal, one of the world's most endangered ducks.

When it comes to abundance, few islands in the world come close to matching the populations that use The Snares over the summer breeding season. The most abundant bird is the sooty shearwater or titi. An estimated 2.75 million pairs breed at The Snares. Virtually every metre of peaty soil suitable for burrowing into is occupied.

The Bounty Islands provide perhaps the most graphic demonstration of the role of these subantarctic islands as breeding grounds. The 20 small islands of the group, devoid of vegetation, provide platforms for large numbers of nesting erect-crested penguins and Salvin's mollymawks, which jostle for space with New Zealand fur seals, Bounty Island shags and Snares cape pigeons.

Rather more spacious breeding grounds are available at the Auckland Islands, where 48 bird species are breeding. A total of 70 bird species have been recorded at the Auckland group. Adams Island supports an impressively large colony of albatrosses in the circumpolar "wandering" group, including the endemic Gibson's albatross *Diomedea gibsoni*.

Among the region's marine mammals, the most significant species is the Hooker's (or New Zealand) sea lion. With a population estimated at between 12,000 and 14,000, this sea lion shares with the Australian sea lion the title of "world's rarest". But unlike its Australian cousin, the Hooker's sea lion has a restricted breeding distribution. The bulk of the breeding occurs at just a few sites in the Auckland Islands. New Zealand fur seals occur in low to medium numbers throughout the New Zealand subantarctic region. Surprisingly, the largest breeding sites are located at the small islands of the Bounty group. Southern elephant seals, a circumpolar species, breed mainly at Antipodes and Campbell Islands. In the early 1800s New Zealand fur seals and Hooker's sea lions were hunted almost to extinction.

Whale stocks were also severely reduced. Today, southern right whales are making a recovery in the region. Breeding occurs at both Auckland and Campbell islands, and



numbers are increasing. New Zealand subantarctic waters are on the migration path of several whale species, including southern right, sei, fin, blue, sperm and orca (killer) whales. A whale sanctuary exists in New Zealand waters south of latitude 40° south. The Southern Ocean Whale Sanctuary, established in 1994 by the International Whaling Commission, covers over 11 million square miles of ocean, including all of New Zealand's exclusive economic zone south of 40° south. New Zealand was a signatory to the establishment of the sanctuary.

The freshwater fauna of the New Zealand subantarctic region is not well known. Only one species of fish, koaro *Galaxias brevipinnis*, has been found in streams on Auckland and Campbell islands. Koaro also occur on mainland New Zealand. Interestingly, no reptiles or amphibians have been found on any of the five island groups.

The invertebrate fauna shows a high degree of endemism at both generic and species level. A recent review of the Lepidoptera of the region, for example, produced a total of 36 endemics (46%) in a total of 78 indigenous taxa. Not surprisingly, the Auckland Islands, the largest group, had the largest numbers — 12 endemics in a total of 44 taxa. For other invertebrate groups the degree of endemism is greater. The seven known species of stoneflies or stoners (four at the Auckland Islands, two at Campbell Island and one at The Snares) are endemic to the region. Endemic genera of weta (Orthoptera) occur at all five island groups. The New Zealand subantarctic invertebrates also display an unusually high degree of flightlessness in groups that are elsewhere mostly flighted. Stoners, beetles and moths are especially affected by this characteristic. The endemic fauna is of particular interest to biogeographers in that it appears to have evolved from a time when the Campbell Plateau was dry land. The presence on the Bounty Islands of endemic invertebrates that could not possibly have blown there (such as the flightless ground beetle *Bountya*), is especially intriguing. Where insect groups are shared with the New Zealand mainland, the subantarctic representatives often have different habits. For example, hydraenid beetles are aquatic in New Zealand, but terrestrial in the subantarctic, and byrrhid beetles feed on moss in New Zealand, but on liverworts in the subantarctic. All island groups have a diverse array of insects inhabiting the littoral zone, notably beetles, flies and parasitic wasps. The closest links in the invertebrate fauna are between the Auckland and Campbell islands, with The Snares, Bounty Islands, and Antipodes Islands each having distinct assemblages of species. Introduced elements of the fauna are very limited, reflecting both the isolation of the five island groups from other land masses, and the limited amount of human contact.

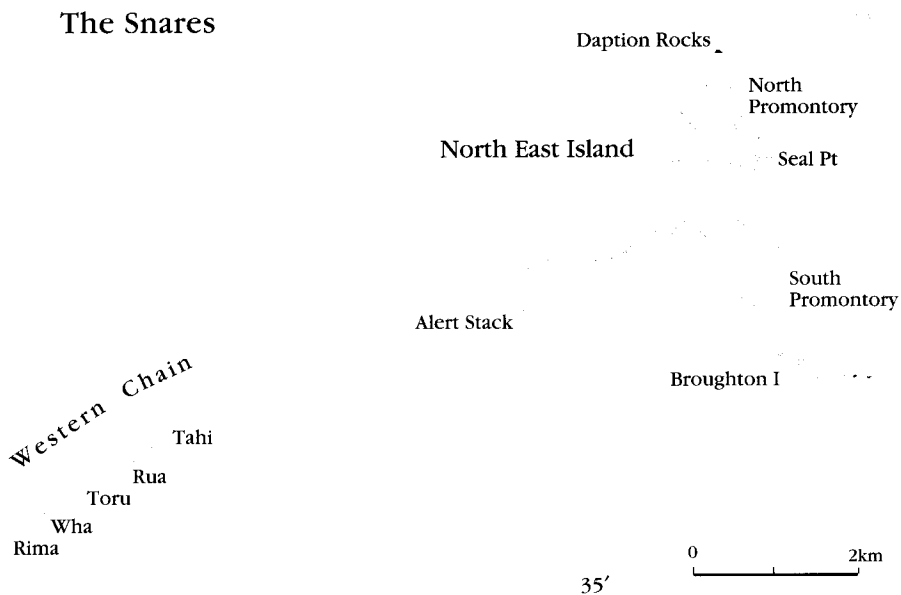
### **Marine environment**

Endemism in the inshore waters of the New Zealand subantarctic islands is less pronounced. The diversity of seaweeds and marine invertebrates is not as great as that of the mainland regions of New Zealand, and the fish communities exhibit limited diversity as well. At the Antipodes Islands a new species of bull kelp *Durvillaea* has been identified, and a new form of another large kelp in the genus *Lessonia* has been found at Auckland and Campbell islands. The absence of the circumpolar bladder kelp *Macrocystis pyrifera* from The Snares is as yet unexplained. The commonest fish are the nototheniid cods. At the Auckland and Campbell islands, a large crab *Jacquintonia edwardsii* is significant. Its carapace can measure more than 150 mm in width.

### 3.2 THE SNARES

The Snares, the closest group to mainland New Zealand, is about 100 km south-west of Stewart Island. The total land area is 341 ha, which is divided into two groups: a main group comprising North East Island (280 ha) and Broughton Island (48 ha); and a line of small islands (the Western Chain), 3.5 km south-west of the main group. The highest point (152 m), is on North East Island.

Figure 3:  
The Snares



The Snares is the only forested group of islands in the Southern Ocean without introduced mammals of any kind. Habitat for birds and seals is intact. All the islands in the group are bordered by steep cliffs except some eastern parts. The ocean currents washing The Snares from southern latitudes are modified by the warm East Australian Current, which brings water from the north. The climate is remarkably uniform throughout the year. Mean annual temperature is 11°C. Rainfall is about 1200 mm a year.

South-west Promontory,  
The Snares  
DOC



Sea erosion has produced deep narrow caverns, sink holes and gulches. Peat soils are widespread, and burrowing seabirds make good use of them.

#### Geology

The Snares are built of Cretaceous muscovite granites about 100 million years old. Crystals of white mica and muscovite lie exposed in cliffs, shore platforms and dome-shaped masses that protrude through the peat.



The vulnerable megaherb *Anisotome acutifolia* is restricted to The Snares  
Paul Sugar

densest on abandoned penguin colonies. It differs from the South Island form by having larger leaves. The ferns *Polystichum vestitum*, *Blechnum durum* and *Asplenium obtusatum* are prominent under the canopy and in the gullies. Where peripheral grasslands have a hold, they are dominated by *Poa tennantiana* and silver tussock *P. astonii*. The megaherb *Stilbocarpa robusta*, which is found elsewhere only on one Foveaux Strait island, is conspicuous in open and bird-manured areas. Despite its relatively small size The Snares has a vulnerable endemic plant in the form of a member of the carrot family, *Anisotome acutifolia*, which grows to a height of about 2 m, with flowerheads up to 1 m tall. The species occurs in only a few patches in coastal grassland on North East and Broughton islands. The largest patches may have 500 plants but the overall population is probably less than 3,000 plants. A threatened mainland plant, Cook's scurvy grass *Lepidium oleraceum*, occurs on The Snares. A member of the cress family, it was collected and brewed by Captain James Cook to prevent scurvy in his crew during his exploration of New Zealand in the 19th century.

Twenty of the 22 vascular plants found on The Snares are indigenous. The only introduced plants are the chickweed *Stellaria media* and an annual grass *Poa annua*, neither of which is a threat to any of the vegetation types. In addition to the vascular plants, there are 77 moss and other bryophyte taxa, at least 6 fungi, and 45 lichens.

## Fauna

Sea birds utilise just about every square metre of The Snares for nesting and resting. Sooty shearwaters *Puffinus griseus* are the most numerous. An estimated 2.75 million pairs inhabit these islands in the summer breeding season. The peat layer is honey-

combed with their burrows, and the skies over the islands are filled by these birds at dusk as they return from offshore feeding grounds. To reach nest sites under the forest, they crash through the canopy. The Snares is thought to support the world's largest population of this species, which breeds mainly around southern New Zealand but also in Australia and southern South America. Several other tube-nosed (Procellariiforme) species have significant breeding populations on The Snares. Probably the second most numerous seabird here is the common diving petrel *Pelecanoides urinatrix*, which reaches its southern breeding limit in New Zealand at

these islands. The largest breeding population of mottled petrel *Pterodroma inexpectata*, a New Zealand endemic, is located here. Up to 100,000 pairs are estimated. The Snares

Sooty shearwaters scramble for their burrows on The Snares, a typical scene at dusk on the forest floor  
Andrew Penniket



cape pigeon *Daption capense australe* is generally a smaller race than the circumpolar cape pigeon. Except for up to 200 pairs on the Chatham Islands, it breeds only in the



Buller's mollymawk at its nest,  
framed by *Stilbocarpa* leaves  
DOC

New Zealand subantarctic region. About 3,000 pairs breed on The Snares, with smaller numbers based at the other four subantarctic groups. Broad-billed prion, fairy prion and the rarer fulmar prion also breed at The Snares.

Three albatross species breed at The Snares. Buller's mollymawk *Thalassarche bulleri* is the most numerous, with up to 9,000 pairs in the population. They breed on North East Island, Broughton Island and Alert Stack, and elsewhere only at Solander Island in Foveaux Strait. The Western Chain is host to about 600 pairs of Salvin's mollymawk *Thalassarche salvini*, whose

only other breeding ground in the region is at the Bounty Islands. There are also a few nests of black-browed mollymawk *Thalassarche melanophrys* on the Western Chain.

Coastal seabirds breeding at The Snares include antarctic tern, southern skua, black-backed gull and red-billed gull.

The Snares crested penguin *Eudyptes robustus*, as its common name suggests, is endemic to the group. Most of the estimated 20,000 pairs breed on North East and Broughton islands, with a few pairs nesting at islets in the Western Chain. Their colonies (of which there are more than 100), spread or contract according to the numbers in them. The penguins kill the vegetation where they congregate, but plants re-establish when the penguins move on. The Snares is the only known breeding ground for the species.

Three land birds at The Snares are endemic to the group. They include two insect-eaters, the Snares Island tomtit *Petroica macrocephala dannefaerdi* and Snares Island fernbird *Bowdleria punctata caudata*, and the less conspicuous, partly nocturnal Snares Island snipe *Coenocorypha aucklandica huegeli*. The fernbird, a weak flier, tends to forage on the ground, especially around penguin colonies. The snipe is a subspecies of the New Zealand snipe, which has been lost from mainland New Zealand because of



Snares crested penguins gathered  
under the *Olearia lyallii* canopy  
at The Snares.  
DOC

Snares crested penguin colonies,  
The Snares, surrounded by turf  
vegetation and *Hebe elliptica*  
shrubland  
Lou Sanson



Snares Island tomtit  
Lou Sanson



A male Hooker's sea lion objects to intruders at his forest haul-out site on The Snares. The large herb in the foreground is *Stilbocarpa*.  
Andrew Penniket

predation. The species survives only in the New Zealand subantarctic, with subspecies also found at Antipodes and Auckland Islands. Other native land birds breeding at The Snares but common on the mainland, are tui, silvereye, grey warbler, and South Island fantail. The fantail is newly established. It arrived at The Snares between 1977 and 1982. Northern hemisphere passerines introduced to mainland New Zealand last century,

including redpoll, chaffinch, blackbird, starling and song thrush, have spread to The Snares, but their numbers are insignificant compared to the abundant populations of the three endemic land birds. The indigenous grey duck and introduced mallard duck are found in low numbers at the main island's small swampy area.

Two marine mammals breed at The Snares: New Zealand fur seals *Arctocephalus forsteri*, and Hooker's (or New Zealand) sea lion *Phocartos bookeri*. The fur seals, virtually wiped out by sealing operations last century, have made a modest recovery here. A count of their numbers in early

1997 found the population to be similar to that in 1970 — about 1,200 adults. The sea lions are in much lower numbers, although they do breed here and use the islands as a hauling ground.

Among the terrestrial invertebrates, some 250 species are known from The Snares. They include several endemic land snails (including one endemic genus) and several endemic worms, one of which grows to a length of 200 mm. A large weevil *Hadramphus stilbocarpae*, endangered on mainland New Zealand, reaches its southern limit at The Snares, as does another large weevil *Lyperobius nesidiotes*. The latter is associated with the Snares endemic plant *Anisotome acutifolia* and is confined to Broughton Island. *Hadramphus stilbocarpae* feeds on the megaherb *Stilbocarpa robusta*. Two weta are endemic: *Zealandosandrus subantarcticus*, and *Insulanoplectron spinosum*. Almost half the Lepidoptera found on the Snares (seven out of 15 taxa, all moths) are endemic to the New Zealand subantarctic region. The Snares are the southern limit of many distinctive New Zealand insect groups. Besides the weevils mentioned above, these include horned casemoths, and *Mecodema* and *Dyglymma* ground beetles.

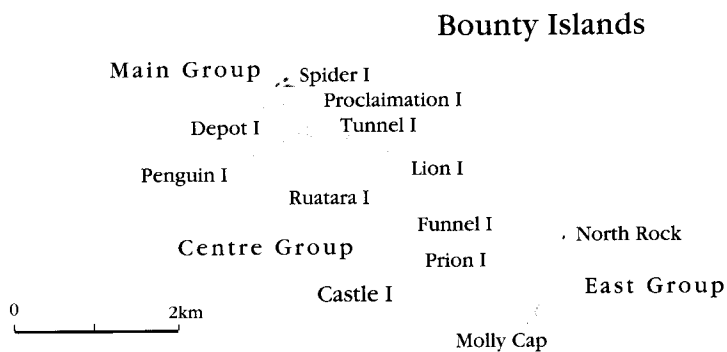
### Marine environment

In the sublittoral zone, the large sea egg *Evichinus chloroticus* reaches its southern limit at The Snares. Two subantarctic cod *Notothenia angustata* and *N. microlepidota* are conspicuous among the inshore fish populations. The dominant seaweed is the bull kelp *Durvillaea antarctica*, which acquires an uncommon golden colour in these waters, due possibly to a bleaching effect from the wave action exposing the blades to more sunlight. Bull kelp at the Bounty Islands is a similar colour. A total of 114 seaweed species are recorded from The Snares, 32 of which are not recorded from any other New Zealand subantarctic island. A significant number of mainland New Zealand marine species reach their southern limit at The Snares.

### 3.3 BOUNTY ISLANDS

The Bounty Islands, northernmost of the five groups, lie 700 km east-south-east of the South Island and about 900 km east of The Snares. The nearest islands to the Bounty group are the Antipodes, 220 km south. The total land area of the Bounty group is 135 ha. There are 20 small islands in three distinct clusters (Main, Centre and East) about 1 km apart. The largest island, Depot Island, is 800 m long. Maximum altitude is

Figure 4:  
Bounty Islands



88 m. The Bounty Islands are located just south of the Subtropical Convergence. Because of its remote location and the difficulty of landing (there are no safe anchorages, and sea conditions allow safe access on only about one day in four), the group has been rarely visited. Climate data are sparse. A mean annual temperature of 10°C is estimated. Persistent westerly winds sweep the islands and cover them in spray during storms.

#### Geology

Mere specks of land, the Bounty Islands are bare, smooth outcrops of coarse granite of early Jurassic age, about 180 million years old. They form the crest of the Bounty Platform, which lies east of the Campbell Plateau. The islands are located close to the eastern margin of an ancient continental shelf (see map of Undersea New Zealand, NIWA 1996). In the vicinity of the group the sea is in the range of 125 m to 200 m deep. The rocks here are more closely related to the Jurassic granite of West Antarctica than to New Zealand rocks. Columnar jointing in cliff faces is a landscape feature. Summit rocks are angular.

There is virtually no soil development on the Bounty Islands. A film of hard polished guano covers the rocks on the higher islands. Winter rains tend to wash away the guano that accumulates over the summer when the islands are crowded with birds. Hollows become filled with brown organic "mud" formed from decaying carcasses, moulted penguin feathers, excreta, food scraps and seaweed washed up by waves or brought ashore by shags as nesting material.

#### Flora

No vascular plants have established. The only plants on the islands are a species of fresh-water algae and crustose lichens.

#### Fauna

What the Bounty Islands lack in plants they make up for in populations of seabirds and fur seals. Seven seabird species breed here, including an island endemic, the Bounty Island shag *Leucocarbo ranfurlyi*, the world's rarest cormorant. A population of 500–600 is estimated. Three other sea birds here are endemic to the New Zealand subantarctic region: erect-crested penguin *Eudyptes sclateri*, Salvin's mollymawk *Thalassarche salvini*, and Snares cape pigeon *Daption capense australe*. Other breeding species are the fulmar prion *Pachyptila crassirostris crassirostris*, which is restricted to the New Zealand subantarctic islands and Heard Island, antarctic tern and southern black-backed gull. The Bounties are the main breeding site of Salvin's mollymawk (75,000 pairs), found elsewhere only at The Snares, with a few nests recorded from the Crozet group. The Bounties are possibly also now the main breeding site for erect-crested penguins,

given the decline in the population (to between 49,000–57,000 pairs) at the Antipodes Islands, the only other breeding ground for the species. (An exception is a record

of one pair at Disappointment Island in the Auckland group.) The penguins are the most numerous species. At the height of the summer breeding season the Bounty Islands become a noisy, bustling city of seabirds. Penguin and mollymawk nests predominate, with mollymawks favouring the gently sloping surfaces and the tops of rock slabs. The shags and cape pigeons nest on narrow ledges where the rock is sheer, and the prions find sites in crevices and holes. Of interest is the way the shags construct their nests



Fulmar prions at the Bounty Islands  
DOC

in the absence of terrestrial plant material. They utilise the brown seaweed *Marginariella*, which they collect from about 10 m below the surface of the sea.

The Bounty Islands are a stronghold for the New Zealand fur seal *Arctocephalus forsteri*. A census in 1980 gave a total of 16,000 seals at the group; in 1992 the number had increased to over 20,000.

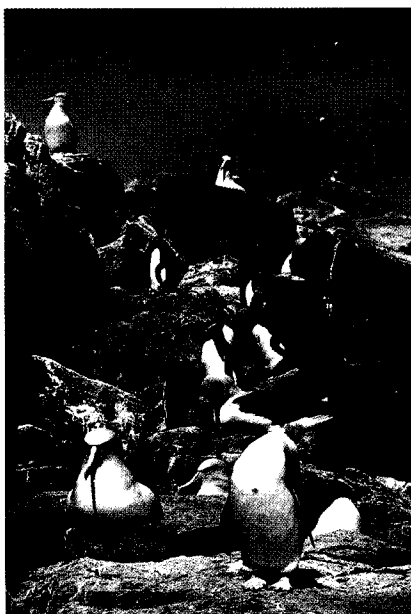
A surprisingly diverse community of terrestrial invertebrates lives here, making the most of the lack of soil and the high-stress environment. Instead of soil and plant life, these small animals depend on the detritus that gathers around the nests. The insects include an endemic weta (orthopteran) *Ischyroplectron isolatum* and a flightless beetle *Bountya insularis*, which is also found only at the Bounty Islands. The beetle's nearest relatives are in Australia and South America. Two spiders have been discovered so far: *Pacificana cockayni*, which is endemic to the Bounties, and *Rubrius nummosus*, which has South American relatives. Both have large bodies, about 15 mm in length. Two moth species, both flightless, are shared with the Antipodes Islands: the case moth *Reductoderces* (a new species), and *Proterodesma turbotti*.

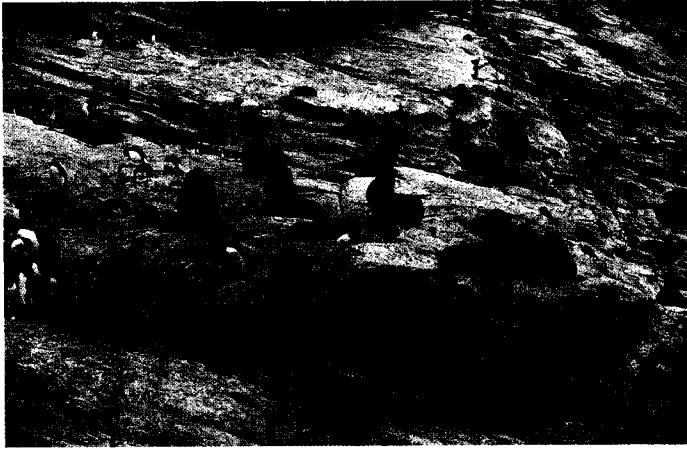
All the fauna, including the scavenging or predatory invertebrates, is directly or indirectly dependent on the sea for survival.

Left: Rare cormorant: the Bounty Island shag  
DOC

Centre: Close neighbours: Salvin's mollymawks and erect-crested penguins at the Bounty Islands  
DOC

Right: Salvin's mollymawk feeding chick, Bounty Islands  
DOC





New Zealand fur seals at the Bounty Islands, which support the largest populations of these animals in the New Zealand subantarctic region  
DOC

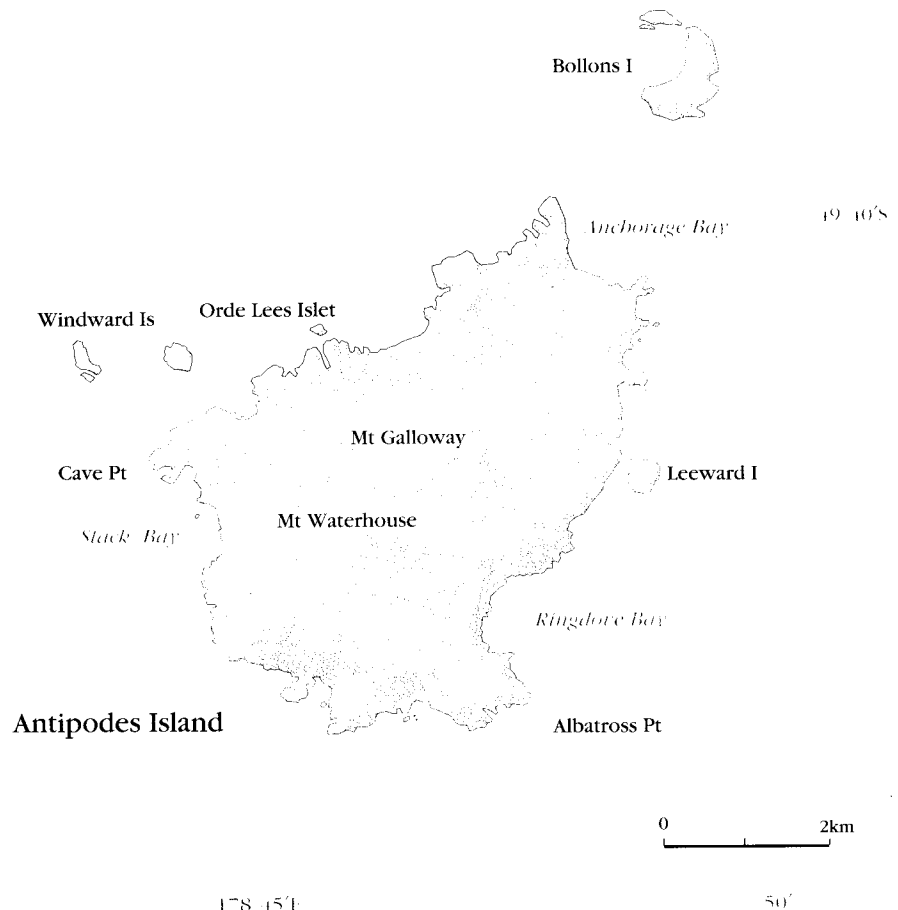
## Marine environment

Krill, cephalopods, and small fish are abundant in the waters around the Bounty Islands. An early study recorded 75 species of marine and littoral molluscs, 18 of which were not recorded elsewhere. Underwater walls are covered with paua *Haliotis virginea* (a form of abalone), anemones, starfish, barnacles, mussels and urchins. The seaweed community includes a new species of *Marginariella*, a brown seaweed up to 60 cm in height, with main stems thicker than other species. It is also found at the Antipodes Islands. As at The Snares, the large leathery blades of the bull kelp *Durvillaea antarctica* are golden rather than the rich dark brown colour found elsewhere. The blades are this colour well below the sea surface, which somewhat defeats the theory they have been bleached by solar radiation to a greater degree here than in other parts of the kelp's range.

### 3.4 ANTIPODES ISLANDS

The Antipodes Islands, 820 km from the South Island, are the remotest of the five New Zealand subantarctic groups, comprising a main (Antipodes) island, six smaller islands close inshore and numerous islets. The total land area is 2,097 ha, with Antipodes Island (2,025 ha) accounting for 97% of the total area. Bollons Island (50 ha) is the largest of the smaller islands. Cliffs up to 150 m high encircle the main island. The smaller islands are also mostly steep-sided. Wave erosion has left its mark in the form of sea

Figure 5:  
Antipodes Islands





caves, narrow coves, stacks, and wave-cut platforms. Measuring about 7 km by 5 km, the main island reaches an altitude of 366 m at Mt Galloway. Much of the island is a rough, undulating plateau, dissected by deep alluvial gullies and bearing several volcanic cones and craters. Bollons and Archway islands, which form a scalloped arc, are the eroding remnants of a crater now mostly flooded by the sea.

The climate is marked by persistent westerly winds, often gale-force. Overcast conditions are common, with drizzle. Annual rainfall is estimated at between 1,000 mm and 1,500 mm.

## Geology

The Antipodes Islands are the remnants of a Pleistocene volcano. They are by far the youngest of the New Zealand subantarctic islands, with some rocks less than one million years old. The main island is dominated by a central volcanic cone (Mt Galloway and Mt Waterhouse), built on an older sequence of reddish volcanic ash and breccia. There are no exposures of the underlying sediments or the ancient granite/schist basement. Basalt boulders mantle the beaches. Deposits of peat up to 5 m deep, blanket most of the main island.

The group lies at the eastern margin of the Bounty Platform. To the east and south, the sea abruptly deepens.

Tussock grassland dominates the landscape of the volcanic Antipodes Islands. In the distance is the sheer-sided Inner Windward Island.  
DOC



## Flora

Forest does not occur at the Antipodes group. Maritime grasslands cover most of the islands. The dominant species is *Poa litorosa*, a pedestal-forming tussock that reaches 2 m in height on the most favourable sites. Progress on foot through tall dense stands is difficult. On inland plains its stature is shorter. Near the coast *Poa foliosa* is common. A broad-leaved grass, softer than *P. litorosa*, it is often associated with the ferns *Blechnum durum* and *Asplenium obtusatum*. The commonest fern, however, especially on wetter sites, is the prickly shield fern *Polystichum vestitum*, which is also abundant on other groups in the subantarctic region as well as on mainland New Zealand.

Only four woody plants inhabit the Antipodes; all are *Coprosma* species. One of them is an island endemic, *C. antipoda* (possibly an endemic variety of *C. rugosa*), which forms scattered areas of shrubland up to 2 m in height. *C. ciliata* occurs in gullies,

where the spectacular large-leaved herb *Stilbocarpa polaris*, endemic to the New Zealand subantarctic region and Macquarie Island, also finds sheltered sites. On the flat-tish summits of Mt Galloway and Mt Waterhouse the commonest species are *Pleurophyllum criniferum* and the carrot relative *Anisotome antipoda*.

Of the 71 taxa of vascular plants, 68 are indigenous and 18 of these are shared with Auckland Islands and Campbell Island. Four taxa are island endemics. The endemic yellow-flowering daisy *Senecio antipodus* grows as small patches in open areas away from the coast, often around the nests of antipodean albatrosses. Two other herbs are endemic: *Gentiana antipoda*, and the native chickweed *Stellaria decipiens* var. *angustata*. The gentian could be considered threatened because of its restricted distribution on a small island group. Its flowers are more colourful than those of mainland gentians. The endemic chickweed is found mainly in grassland near the coast. Two uncommon grasses growing near the shoreline are *Poa tennantiana* and *Puccinellia antipoda*, both of which occur on other New Zealand subantarctic islands. The most recent bryophyte records include 45 liverworts and 26 mosses.

Only three introduced plants survive on the Antipodes. They are not widespread and pose no threat to the indigenous communities.

### Fauna

Special elements of the bird life of the Antipodes Islands include the antipodean albatross *Diomedea antipodensis*, a member of the wandering albatross group, and four land birds that are island endemics. Except for a handful of nests on Campbell Island (fewer than 10 pairs), the Antipodes Islands are the only breeding ground for the antipodean albatross. The total breeding population is estimated at 8,000–9,000 pairs, the largest single population of a “wandering” albatross species anywhere in the world except for Gibson’s albatross of the Auckland Islands. Compared to Gibson’s albatrosses, the female Antipodes birds are darker at all ages. They breed three weeks later and have different feeding grounds, located to the east of mainland New Zealand. Three other albatross species breed at the Antipodes. They include the light-mantled sooty albatross *Phoebastria palpebrata*, of which there are a few hundred pairs (nesting mainly at cliff edges), and the black-browed mollymawk *Thalassarche melanophrys*, of

which there are about 150 nests on Bollons Island only. Both these albatrosses are circumpolar. Small numbers of white-capped mollymawk *Thalassarche steadi*, a New Zealand endemic species, also breed at Bollons Island.

The Antipodes group is an important main breeding ground (with the Bounty Islands) for the erect-crested penguin *Eudyptes sclateri*. A 1995 census produced a total of 49,000–57,000 nests, which is about half the number counted in 1978. Colonies ring the main island. The eastern rockhopper penguin *Eudyptes chrysocome filholi* also breeds at the Antipodes, but in declining numbers. The 1995 survey counted only about 3,400 nests; well down from an earlier estimate of 50,000. This is consistent with the declines of over 90% that have been



Erect-crested penguins at Anchorage Bay, Antipodes Islands  
John Kendrick

guin *Eudyptes chrysocome filholi* also breeds at the Antipodes, but in declining numbers. The 1995 survey counted only about 3,400 nests; well down from an earlier estimate of 50,000. This is consistent with the declines of over 90% that have been

observed elsewhere in eastern rockhopper populations.

Petrels are abundant at the Antipodes. These islands constitute the only breeding ground in the New Zealand subantarctic region for the soft-plumaged petrel *Pterodroma mollis*, a circumpolar species. There are several thousand pairs, and they appear to be increasing. Perhaps the commonest petrel at the Antipodes Islands is the subantarctic diving petrel *Pelecanoides urinatrix exsul*, which occurs also at Auckland and Campbell islands. One of the largest populations of white-headed petrel *Pterodroma lessonii* occurs at the Antipodes, with about 100,000 pairs estimated. The New Zealand region is a stronghold for this species now that cats have reduced numbers at Macquarie Island. Important populations of grey petrel *Procellaria cinerea* and white-chinned petrel *Procellaria aequinoctialis aequinoctialis* occur at the Antipodes Islands. Except for small numbers at the Campbell Island group, the Antipodes supports the only breeding population in the New Zealand region of grey petrel, numbering up to about 50,000 pairs. On Bollons Island there are dense colonies of subantarctic little shearwater. The northern giant petrel *Macronectes hallii* nests in loose colonies above the penguin areas. Among other members of the petrel family breeding at the Antipodes Is-

lands are grey-backed storm petrel, black-bellied storm petrel, sooty shearwater and fairy prion.

The most notable species among the endemic land birds is the Antipodes Island parakeet *Cyanoramphus unicolor*, largest of all New Zealand parakeets (130 g, about 300 mm long). They are restricted to Antipodes Island and its small outliers. Favoured habitat is dense, tall tussock grassland, where the parakeets feed mainly on the tussock leaves. They also eat seeds, berries, flowers and fruits, and scavenge at penguin colonies. An expedition in 1995 reported Antipodes parakeets preying on grey-backed storm petrels. A popu-

lation of from 2,000 to 3,000 Antipodes parakeets is estimated. A second, smaller parakeet, Reischek's parakeet *Cyanoramphus novaezelandiae hochstetteri*, inhabits these islands. It is a subspecies of red-crowned parakeet from mainland New Zealand. Antipodes Island snipe *Coenocorypha aucklandica meinertzhagenae*, a subspecies of New Zealand snipe (which has disappeared from mainland New Zealand), is widespread on Antipodes Island and the larger outliers. A secretive bird, it is most often reported around penguin colonies and petrel burrows. It is lighter than the Snares Island snipe, but has a longer bill. Although essentially a ground bird it is more often seen in the air, performing aerial displays, than is the Snares Island snipe. The fourth endemic land bird is the Antipodes Island pipit *Anthus novaeseelandiae steindachneri*, a subspecies of the New Zealand pipit. The pipit is a bird of grasslands and open habitats, where it feeds mainly on invertebrates.

The only introduced Northern Hemisphere passerines present at the Antipodes Islands are redpoll, dunnock (hedge sparrow) and starling. Altogether 25 bird taxa breed on the Antipodes group.

Among the marine mammals, southern elephant seals *Mirounga leonina* breed at the Antipodes in small numbers. Six breeding sites have been identified. They produce about 100 pups a year. Numbers have remained about the same over the past 20 years. The islands are visited by about 2,000 New Zealand fur seals *Arctocephalus forsteri* a year, mostly yearlings and older juveniles. Little breeding occurs here. Following the elimination of the species from the group by sealers in the early 1800s, the first pups this century were recorded in 1985. On mainland New Zealand numbers are increasing exponentially in some areas.



The Antipodes Island parakeet is endemic to the group  
Rod Morris

Among the invertebrate fauna are a range of endemics, including a weta (orthopteran), two spiders and four moths. Several groups of moth are at their southern limit here, including eocophorid moths (*Atomotricha*), crambids in the genus *Udea* (*Udea antipoda*) and the magpie moth *Nyctemera annulata*. The presence of distinct assemblage of widely distributed New Zealand moths, usually pinkish, is a feature of the insect life. A snail *Kerguelenella flemingi* occurs at the Antipodes and may be endemic to the New Zealand subantarctic region (Antipodes, Auckland, and Campbell islands). At least 50 insect species inhabit the Antipodes Islands, with more than a quarter of them endemic. Many of the insects are dependent on decaying animal matter found around penguin and seabird nesting areas.

The insect communities of Bollons Island are more diverse and abundant than the fauna on Antipodes Island due probably to the presence of mice (the only alien mammal present in the group) on the main island. The paucity of medium-sized flightless invertebrates on the main island suggests widespread predation by mice, a situation that applies also to the main Auckland Island.

### Marine environment

Little study has been done of the flora and fauna of the inshore waters at the Antipodes Islands. Two seaweeds are of interest. One is a new form of bull kelp *Durvillaea antarctica* "Antipodes Island", which is a massive dark-brown subtidal plant with very thick and dense blades. It lacks the usual honeycombed tissue of *D. antarctica*. The other is a new species of the brown seaweed *Marginariella*, up to about 60 cm in height, which has been collected from Archway Island.

## 3.5 AUCKLAND ISLANDS

The Auckland Islands, 460 km south of the South Island, is the highest and largest of the New Zealand subantarctic island groups, and one of the biologically richest places in the Southern Ocean. It comprises a main island, Auckland Island (50,990 ha, 40 km long by 27 km wide and roughly pear-shaped), and Adams Island (10,119 ha) to the south of the main island. A collection of smaller islands are grouped around the northern end of Auckland Island, the most notable of which are Disappointment (566 ha), Enderby (710 ha), Rose (75 ha), and Ewing (57 ha). The total land area is about 62,560 ha. Mt Dick (705 m) on Adams Island is the highest point. Mt Raynal (644 m) is the highest peak on Auckland Island, which is mountainous throughout its length and has numerous peaks over 500 m.

The west coast of the main island is an almost continuous line of spectacular cliffs, attaining heights of 600 m in places. The east coast landforms are gentler, with numerous fiord-like inlets and embayments creating a heavily indented shoreline. Large natural harbours are found at each end of the group: Carnley Harbour in the south, Port Ross in the north. Elongate Adams Island protects Carnley from southerly and south-westerly swells and allows only a narrow western entrance to the harbour. Port Ross is protected by the islands of Enderby, Rose, Ewing, and Ocean.

The climate of the main island is characterised by cloudy, humid conditions, with a high number of rain days (over 300 rain days a year have been recorded). Annual rainfall at sea level is in the range from 1,000 mm to 1,500 mm. Torrential rain is not common, however. Snow, although frequent on the tops, does not lie deeply in the

Towering volcanic cliffs of the south coast of Adams Island

Lou Sanson

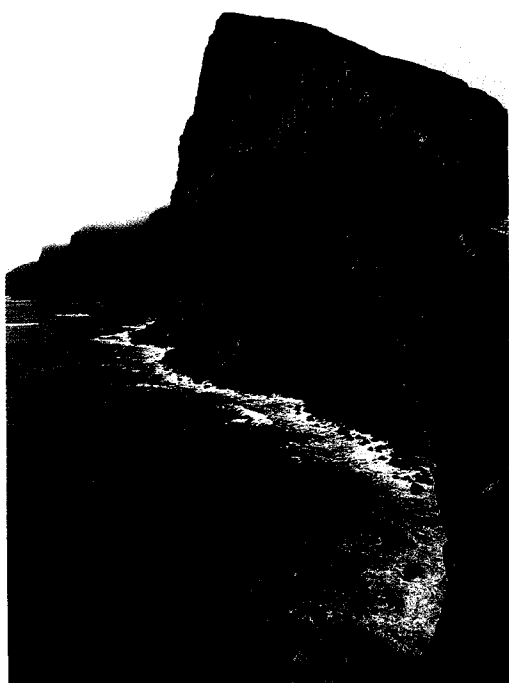
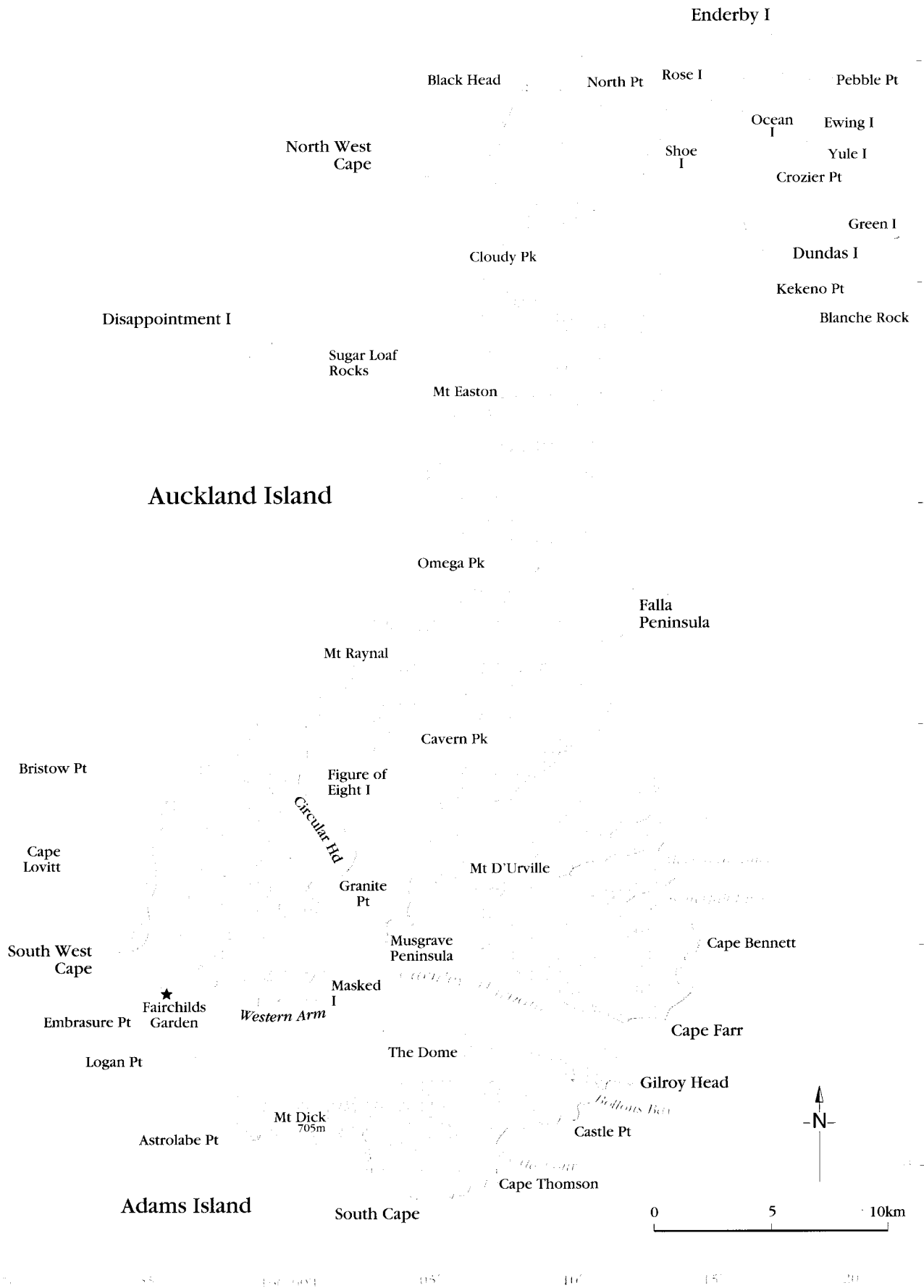


Figure 6: Auckland Islands



colder months. Strong westerly winds are common. The mean annual temperature is about 8°C. In summer the air temperature mostly ranges between 10° and 16°C; in winter the range is from 4° to 10°C. The Port Ross area, especially Enderby Island, is credited with warmer, drier weather than the southern end of the group.

## Geology

The Auckland Islands are essentially the remnants of two dissected volcanoes of Miocene age (12 to 23 million years old), centred respectively on Carnley Harbour and Disappointment Island. Carnley Harbour is an eroded caldera flooded by the sea, with its centre in the vicinity of Musgrave Peninsula. The volcanic formations rest on a basement of coarse-grained biotite granite up to about 100 million years old (the continental crust) which is exposed at Granite Point on Musgrave Peninsula. Pounding seas have stripped away the whole western side of the volcano centred on Disappointment Island, leaving the island, built of more resistant rock, stranded 6 km west of the main island. Subsequent volcanism built the hills and islands surrounding Port Ross. The vertical rock columns at Enderby Island and tiny Shoe Island within Port Ross are thought to be the product of secondary lava flows on the flanks of the Ross volcano. The western cliffs reveal a complex lava/scoria sequence, representing possibly the thickest sequence of lava flows in the New Zealand region.

Lake Speight, at the southern end of the main Auckland Island, fills a glacier-scooped basin whose outlet has been dammed by moraine.

*Paul Dingwall*



During the ice ages of the last two million years, the Auckland Islands group was substantially glaciated. The evidence is boldly imprinted on the landscape. The glacier-gouged valleys contain features such as cirques, moraine-dammed lakes and subsidiary hanging valleys, and the lower reaches of the largest valleys have since been flooded by the sea to become fiords.

The group lies at the western margin of the Campbell Plateau. To the west the ocean deepens abruptly, but north and east of the islands the Auckland Islands Shelf, part of the old continental shelf, maintains gentler slopes.

Blanket peat, which covers much of the group, began accumulating about 10,000 years ago. The deepest deposits are up to 8 m thick.

## Flora

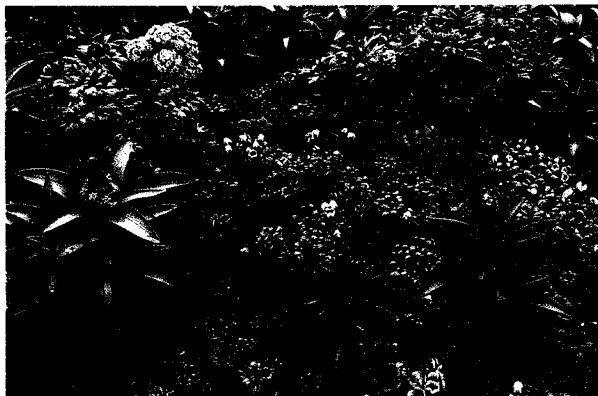
From forest to fellfield, the Auckland Islands group supports a diverse assemblage of plant communities and species. The vascular plant list totals 233 species, of which 196



Southern rata in flower, Enderby Island  
Paul Dingwall

are indigenous. At least five taxa are endemic to the group (two gentians *Gentiana concinna* and *G. cerina*, the buttercup *Ranunculus subantarcticus* subsp. *subantarcticus*, plantain *Plantago triantha* and the grass *Poa aucklandica aucklandica*). Ferns and fern allies (44 species), mosses and other bryophytes are abundant. The ferns include the world's southernmost tree fern, *Cyathea smithii*, which is abundant on the New Zealand mainland. It occurs here only at a few east coast inlets and at one site on Adams Island.

Coastal forest, reaching an altitude of about 50 m, is dominated by southern rata *Metrosideros umbellata* except on Ewing Island, where the tree daisy *Olearia lyallii* is dominant. At their southern limit, the rata trees are less than half their mainland New Zealand height of about 20 m. The canopy is compact and wind sculpted. Woody species found on the main island, but not elsewhere in the group, are the shrub *Hebe odora* and the giant tree fuchsia *Fuchsia excorticata*. The forest grades into shrubland featuring the genera of *Dracophyllum*, *Coprosma*, *Myrsine*, *Cassinia*, and *Pseudopanax*, most of which are understory shrubs



Adams Island flower garden: the mauve-flowered endemic Auckland Islands gentian is surrounded by *Bulbinella rossii* (yellow flowerhead) and *Anistome antipoda* (pale pink)  
Kath Walker

in the forest. The shield fern *Polystichum vestitum* is common. Above 300 m, a grassland of the tussock-forming *Chionochloa antarctica*, elsewhere found only at Campbell Island, is interspersed with herbs, notably all three species of the spectacular endemic daisy *Pleurophyllum*. Other important inter-tussock herbs are the rosette daisy *Damnamenta vernicosa* (formerly *Celmisia*, but now recognised as a different genus by a number of features, including purple disk florets), a low indigo-flowering shrub *Hebe benthamii*, and the mauve-flowered gentian *Gentiana concinna*. Fellfield occurs above 450 m along the main and



Interior of rata forest at Auckland Islands  
Andrew Penniket

Tussock grasses among flowering  
megaherbs on Adams Island  
Kath Walker



lateral ridges where *Pleurophyllum bookeri* is common.

Adams Island supports vegetation in near-pristine condition. Fairchild's Garden, at the north-west tip of Adams, is remarkable for its diversity of megaherbs. Here, large coastal herbs like *Stilbocarpa polaris* and *Anisotome latifolia* are mixed with species that elsewhere are usually only encountered at higher altitudes, like *Pleurophyllum speciosum* and the lily *Bulbinella rossii*. Adams has all three *Pleurophyllum* species: *P. criniferum* on swampy sites from sea level to 400 m, *P. bookeri* above 300 m on exposed and boggy sites, and *P. speciosum* at Fairchild's Garden, in tussock grasslands and above 400 m on disturbed ground and rock ledges.

Disappointment Island, reaches an altitude of 318 m, and is covered in *Poa* grassland, giant herbs, and small areas of shrubland containing species common on the main island. A few cushion species in the genera *Oreobolus* and *Phyllachne*, distributed widely in the New Zealand mountains, also occur here, mostly in fellfield. At Enderby Island the vegetation covering the central part of the island is a hummocky moor of dwarf shrubs, megaherbs, and cushion plants.

A mid-summer's day at Sandy Bay,  
Enderby Island, viewed from the  
air. Breeding Hooker's sea lions  
are dotted along the beach. The  
forest fringe is dominated by red-  
flowering southern rata  
Neville Peat



## Fauna

The fauna of the Auckland Islands (marine mammals, sea birds, land birds and invertebrates) is the most varied of the five groups. There are three outstanding components: Hooker's (New Zealand) sea lion *Phocarctos bookeri*, Gibson's albatross *Diomedea gibsoni*, and white-capped mollymawk *Thalassarche steadi*.

The sea lions breed at only a handful of sites, the main ones being tiny Dundas Island (off the east coast), two places on Enderby Island (Sandy Bay and Pebble Point), and Figure of Eight Island in Carnley Harbour. Small numbers also breed at Campbell Island and Stewart Island, but at least 95% of pup production occurs at the Auckland Islands. The species is endemic to southern New Zealand. The population is estimated at 12,000-14,000. Despite a healthy annual production of pups, total numbers are not growing appreciably. Female sea lions, feeding pups ashore, range up to about 150 km from the main breeding



A Hooker's sea lion beachmaster  
with his harem and new-born  
pups. Enderby Island  
*Paul Dingwall*



grounds, and forage in depths of up to 500 m. On shore, the sea lions utilise forest and shrubland as well as the beaches, coastal sward, and tussock grasslands. Some animals choose to rest on the tundra-like vegetation in the uplands of Enderby Island about 1 km from the coast.

Another significant marine mammal of the Auckland Islands is the southern right whale *Eubalaena australis*. Hunted out last century, the species is making a comeback here. More than 90 right whales have been counted in the sheltered waters of Port Ross during recent winter breeding seasons. Southern elephant seals breed at Dundas Island and haul out to rest at other parts of the Auckland Islands coast. New Zealand fur seals remain at low numbers compared to the populations that existed before the sealing expeditions of last century. Most colonies are located on rocky west coast beaches. The leopard seal is an occasional visitor.

The feature sea birds are two albatross species: Gibson's albatross *Diomedea gibsoni*, (a recently established species in the "wandering" group of great albatrosses), and white-

A southern right whale surfaces at  
Port Ross  
*Neville Peat*



Young (non-breeders)  
'wandering' albatross displaying  
on Adams Island  
*Kath Walker*



capped mollymawk *Thalassarche steadi*. Slightly smaller than the other “wanderers”, Gibson’s albatrosses nest biennially high up on Adams Island (about 6,000 pairs a year), Disappointment Island (250 pairs) and southern Auckland Island (70 pairs). Their breeding range is restricted to the Auckland Islands group. Foraging trips are usually to the north and often extend far into the Tasman Sea. They breed three weeks earlier than the antipodean albatross, the nearest species of “wandering” albatross. White-capped mollymawks nest mainly on Disappointment Island, where there are an estimated 65,000 pairs. A few hundred pairs nest on Adams Island and the main island. White-capped



White-capped mollymawk colony on the slopes of the SE coast of Disappointment Island  
Kath Walker

mollymawks also breed in low numbers at Bollons Island in the Antipodes group, and a few nests were found recently at the Chatham Islands. Two other albatross species breed at the Auckland Islands: the southern royal albatross *Diomedea epomophora*, which breeds in low numbers at Enderby (about 50 pairs) and Adams islands, and elsewhere only at Campbell Island; and the circumpolar light-mantled sooty albatross *Phoebetria palpebrata*, which has a population of about 5,000 pairs at the Auckland Islands.

Among the other tube-nosed birds breeding at the Auckland Islands, there are large populations of antarctic prion *Pachyptila desolata* and white-chinned petrel *Procellaria aequinoctialis aequinoctialis*. The latter breeds on Disappointment Island (100,000 pairs), Adams Island and the main island. The Auckland group also hosts populations of fulmar prion, Snares cape pigeon, white-headed petrel, subantarctic diving petrel, white-faced storm petrel, black-bellied storm petrel, grey-backed storm petrel and northern giant petrel. The giant petrels are commonly based near sea lion breeding areas.

White-fronted tern *Sterna striata* and white-faced storm petrel *Pelagodroma marina maoriana* reach their southern breeding limits at the Auckland Islands. Both are endemic to the New Zealand region.

Three penguin species have been recorded breeding at the Auckland Islands, but the only species in significant numbers is the yellow-eyed penguin *Megadyptes antipodes*, a non-migratory species inhabiting mainly Enderby Island and other islands in the Port Ross area. A population of over 500 pairs is estimated. Eastern rockhopper and erect-crested penguins are in low numbers.



A yellow-eyed penguin attending to two chicks, Rose Island, Port Ross  
TE Atkinson

The Auckland Island shag *Leucocarbo colensoi* is endemic to the group. It is conspicuous on Enderby Island and along eastern shores, where it nests in cliff-edge colonies. A population of fewer than 1,000 pairs is estimated.

In addition to the three species of endemic sea birds, the Auckland Islands has six endemic

taxa among its land birds: a rail, snipe, teal, banded dotterel, tomtit, and pipit. The Auckland Island rail *Rallus pectoralis muelleri*, “rediscovered” in 1989 on Adams Island, is plentiful on Adams and Disappointment islands. The Auckland Island rail is

Auckland Island banded dotterel  
on Enderby Island  
Neville Peat



related to Lewin's rail of south-east Australia, but is smaller than the Australian bird. The Auckland Island snipe *Coenocorypha aucklandica aucklandica*, is closely related to the Antipodes Island snipe and Snares Island snipe. It is the southernmost subspecies of its group. It occurs on all islands of the Auckland group except the main island, where cats and possibly pigs appear to have eliminated it. Probably the rarest of the Auckland Islands endemic land birds is the Auckland Island banded dotterel *Charadrius bicinctus exilis*, which is conspicuous in coastal areas, especially on Enderby Island. There are probably fewer than 1,000 individuals in the population. The Auckland Islands birds are larger than the mainland species. A small brown flightless duck, the Auckland Island teal *Anus aucklandica*, inhabits all the islands except the main island. It is distantly related to the less numerous Campbell Island teal and also the endangered brown teal of mainland New Zealand. The total population probably does not exceed 2,000. They are most often seen feeding in sheltered bays among kelp beds and washed-up seaweed, and on sheltered coastal ponds. Two insectivorous passerines are



Auckland Island flightless teal on  
Rose Island, Port Ross  
John Kendrick

also endemic to the Auckland Islands: the Auckland Island tomtit *Petroica macrocephala marrineri* and Auckland Island pipit *Anthus novaeseelandiae aucklandicus*. The tomtit, a subspecies of the forest-dwelling South Island tomtit, feeds in a variety of habitats: forest, shrubland, grassland and even the intertidal zone, on all islands in the group. The pipit is a conspicuous bird of open habitats across the whole group.

Among other land birds inhabiting the Auckland Islands is a race of New Zealand falcon, a threatened species on the mainland. It is the only raptor in the New Zealand subantarctic region. New Zealand mainland species of yellow-crowned and red-crowned parakeets inhabit the group. Here they feed on the ground more than their mainland counterparts.

Seventy birds are recorded in the Auckland Islands avifauna, of which at least 46 are breeding. One endemic species, the Auckland Island merganser *Mergus australis*, has not been seen since 1902 and is regarded as extinct. The species declined (and was

finally extinguished) as a result of nineteenth century attempts at human settlement, the introduction of mammals, and the collecting of specimens for museums.

Among the terrestrial invertebrates, some 280 insect species have been recorded, with 30% being endemic to the Auckland Islands. An endemic genus of stoner *Aucklandobius* occurs here. Its four species reflect selection towards flightlessness, with only one species being flighted and the rest having short wings or none at all. Twelve of 45 moths recorded from the Auckland Islands are endemic. They include the highly modified sod webworm moth *Protyparcha scaphodes* and several sedge or grass leaf miners (*Elachista* species). The large weevil *Oclandius laeviusculus* is abundant on Adams

A red-crowned parakeet on the megaherb *Stilbocarpa polaris* at Ewing Island in the Port Ross area  
Peter Johnson



Island on *Pleurophyllum criniferum*. New Zealand's largest anthribid beetle, *Cacephatus aucklandicus* occurs in shrubland from sea level to 200 m. The giant wingless kelp fly *Bacopterus* is common in the littoral zone, another example of the larger size that is found in some groups of subantarctic fauna compared to relatives on the New Zealand mainland. No mayflies occur at the Auckland Islands (nor are they present at Campbell Island). This gap in the aquatic fauna is filled by four endemic stoners and four species of caddis, two of which are endemic.

The only alien mammals on the Auckland Islands are feral pigs, cats, and mice on Auckland Island, and cats and mice on Masked Island in Carnley Harbour.

### Marine environment

Arrow squid *Nototodarus sloani*, abundant on the shelf to the north-east of the group, are a major element of the food web that supports the fauna of the Auckland Islands. Inshore, the commonest fish are in the nototheniid cod group, but two fish common in mainland New Zealand coastal waters, blue moki and trumpeter, are also found around the Auckland Islands. The kelp forests along the eastern shores are especially impressive. A new species of large kelp in the genus *Lessonia* combines with the comopolitan *Macrocystis pyrifera* to dominate the sublittoral zone. A large crustacean, the Auckland Island spider crab *Jacquinitia edwardsii*, is abundant. Among the krill species, *Munida gregaria* is common.

## 3.6 CAMPBELL ISLAND

Campbell Island, New Zealand's southernmost subantarctic territory, lies 660 km south of the South Island. Like the other two volcanic groups, it comprises a large main island, Campbell Island (11,268 ha) and several small satellite islands, of which Dent (20 ha) and Jacquemart (19 ha) are the largest. The total land area is 11,331 ha. High cliffs line much of the coast, especially on the west side. Of the main island's several bays and inlets, the longest is Perseverance Harbour. The highest point is Mt Honey (569 m) on the south side of Perseverance Harbour, but the terrain to the north is also mountainous and reaches an altitude of 479 m at Mt Azimuth.

Located midway between the Antarctic and Subtropical Convergences, the group experiences the coolest climate of the islands of the New Zealand subantarctic region, and probably the cloudiest. On an average year, according to data from the head of Perseverance Harbour, Campbell Island receives only 650 hours of bright sunshine, and it can expect less than an hour's sunshine on 215 days (59%) of the year. Annual

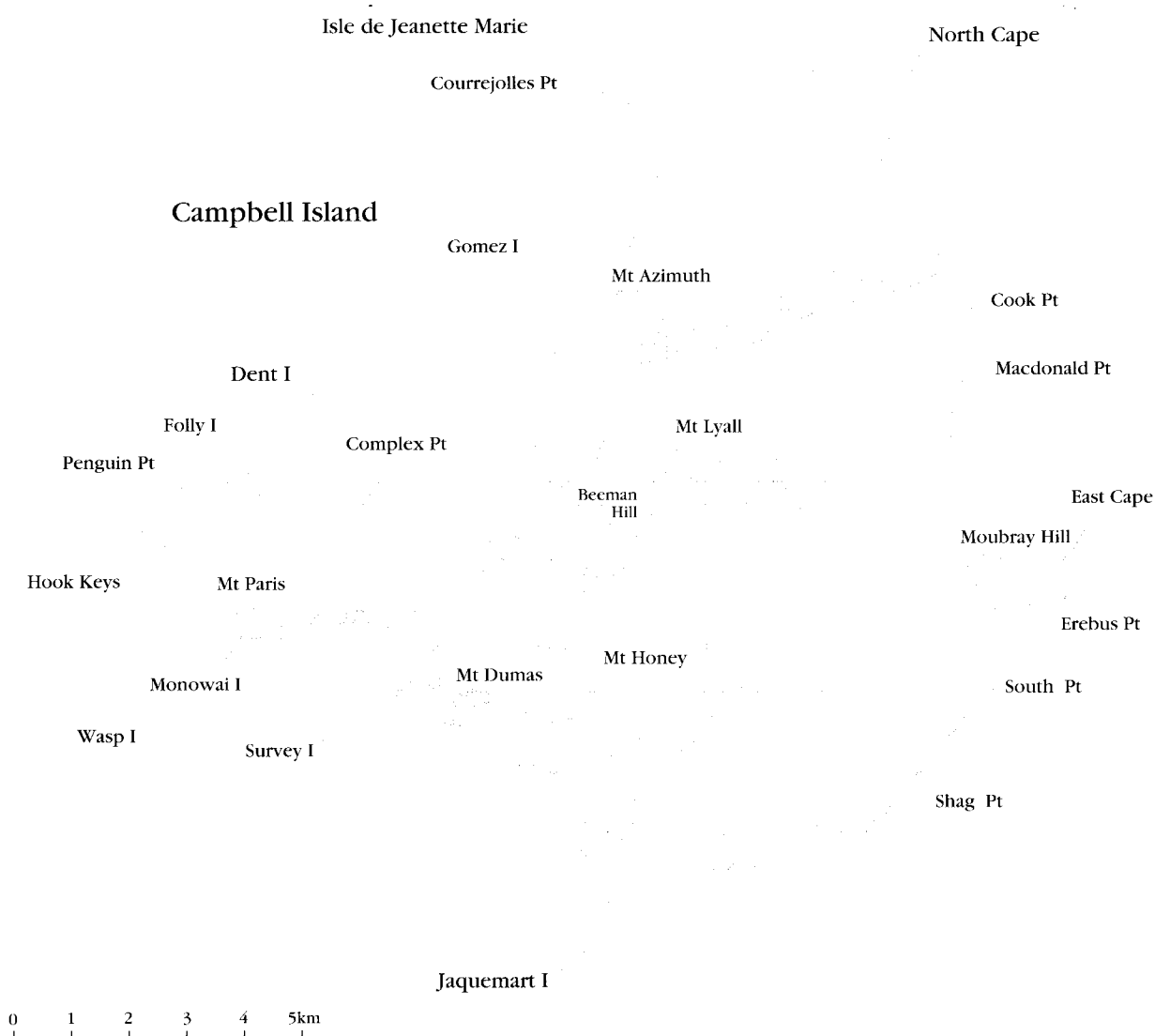


Figure 7:  
Campbell Islands

rainfall is 1450 mm. Rain falls on 325 days of an average year, mostly as drizzle or light showers. Light snowfalls are common in winter and spring. As elsewhere, the winds are persistently from the westerly quarter, and hurricane force at times. Gusts of over 50 knots (96 kph) occur at least 100 days a year.

**Geology**

The Campbell Island group is the eroded remains of a shield volcano of Miocene age that is embedded in continental crust. The volcano, from 6 to 11 million years old, was probably centred on the Dent Island-Northwest Bay area. Marine erosion has dismantled the western side of the volcano, and in the east the sea has flooded a series of radiating valleys to form fiord-like inlets. The ancient Paleozoic basement rock is composed of mica schist at least 450 million years old, some of which is exposed at Complex Point, Northwest Bay. Overlying the schist is a Cretaceous/Cenozoic sequence of sandstone, mudstone, conglomerate, and white cherty limestone, which forms dramatic cliffs above Northwest Bay.



Dent Island off North-west Bay,  
Campbell Island  
DOC

The landforming effects of pleistocene ice has left glaciated features such as U-shaped valleys, cirques and moraines, as in the Auckland Islands. Post-glacial peat deposits mantle much of the island.

Campbell Island lies near the southern margin of the Campbell Plateau. To the west is a deep trench, on the other side of which, isolated geologically, is Macquarie Island. Macquarie and Campbell islands are linked biologically, nonetheless. Macquarie Island, 700 km south-west, of Campbell, has a harsher climate and no

woody plants except for the prostrate and diminutive sub-shrub *Coprosma perpusilla*.

### Flora

The Campbell Island group has no true trees except for a single sitka spruce planted as a memorial early this century. Tussock grassland, herbfield and shrubland predominate. There are 228 vascular plants, 143 of them indigenous. On the main island sheep and cattle farming has modified the grassland/herbfield vegetation, but it is recovering now that the farm animals have been eradicated (see **Section 4.3**, below). The grassland is dominated by the regionally endemic tussock-forming species *Poa litorosa* and *Chionochloa antarctica*. Endemic grasses of shorter stature, such as *Poa aucklandica* var. *campbellensis*, are found in the turf of the uplands. Megaherbs occur from sea level to the summit ridges, although they are commonly mixed with the tussock grasses. All three species of *Pleurophyllum* occur here: *P. speciosum*, *P. criniferum*, and *P. hookeri*. The last-mentioned is also found at the Auckland Islands and Macquarie Island. Two large members of the carrot family are prominent: *Anisotome latifolia* and *A. antipoda*. With leaves like those of rhubarb, *Stilbocarpa polaris* survives despite past browsing by sheep and cattle. It is known as “Macquarie Island cabbage” because early sealers in the region used it to ward off scurvy. The lily *Bulbinella rossii*, largest



This mollymawk chick has a spectacular view over Campbell Island's rugged north-west coast  
Andrew Penniket



This bluff on Campbell Island is covered with megaherbs, the purple flowerheads are *Pleurophyllum speciosum*  
Lou Sanson

Right: One of the most spectacular giant herbs of the New Zealand subantarctic region - *Pleurophyllum speciosum*  
Paul Dingwall

member of its genus, is abundant because it is unpalatable to sheep. It carries a stout yellow flower spike, and meadows of it clearly stand out in the landscape in spring and early summer. Above an altitude of about 300 m *B. rossii*, *Pleurophyllum bookeri* and the rush *Marsippospermum gracile* are prominent on the peat moor. Among the smaller herbs of the uplands are two endemic blue-flowered forget-me-nots, *Myosotis antarctica* and *M. capitata*, neither of which is common. The latter also occurs on the Auckland Islands. A gentian endemic to Campbell is *Gentiana antarctica*, whose flowers vary in colour. Hues between purple-blue and dark pink are typical. The rosette daisy *Damnamenta vernicosa* (endemic to the Campbell and Auckland islands groups), forms tight clusters. Two notable buttercups occur here: *Ranunculus subcaposus*, and *Ranunculus subantarctica* subsp. *campbellensis*.



The shrubland zone ranges from the shoreline to about 180 m above sea level. Where conditions are favourable, *Dracophyllum*

*longifolium* and *D. scoparium* grow densely and up to about 5 m tall to form a dwarf forest. They are the most prominent woody species. *Coprosma* and *Myrsine* are other woody genera represented in the shrubland. The ferns *Polystichum vestitum* and

*Histiopteris incisa* are common in gullies and the shrubland understorey. Mosses abound, with 119 species recorded. Some of them (in the genera *Ditrichum*, *Muelleriella*, *Blindia*, and *Trichostomum*, for example), have a restricted distribution.

A total of 81 alien plant species have been recorded, the result mainly of introductions during the farming era.

### Fauna

Six albatross species breed on Campbell Island and its outliers. This makes Campbell a major world centre of diversity for albatrosses. Only the Crozet group in the southern Indian Ocean supports more breeding species (seven). On



*Bulbinella rossii*, a member of the lily family, in full flower at Campbell Island  
Lou Sanson



A grey-headed mollymawk on its pedestal nest at Campbell Island  
DOC



A light-mantled sooty albatross feeding its chick, Campbell Island  
DOC

Campbell, one of the albatrosses, Campbell mollymawk *Thalassarche impavida*, breeds nowhere else. The population is estimated at 26,000 pairs. They breed in northern parts of the main island, either in almost pure colonies or mixed to varying degrees with the grey-headed mollymawk *T. chrysostoma*. The Campbell mollymawk is distinguished from the similar-looking black-browed mollymawk *T. melanophrys* by a honey-coloured iris, a bolder black eyebrow, and a bill of slightly different colour and shape. The circumpolar black-browed mollymawks also breed here among the Campbell mollymawks, but in very low numbers. There are probably fewer than 20 pairs. The grey-headed mollymawk is also circumpolar, but Campbell Island is its only New Zealand breeding site. About 7,500 pairs are estimated and numbers are declining. Two of the albatross species are New Zealand endemics: the southern royal albatross *Diomedea epomophora*, and antipodean albatross *D. antipodensis*. For the royal albatrosses, which breed biennially, Campbell Island is the main breeding ground, with an estimated total population of 14,000 pairs (8,000 nests per year). Enderby and Adams in the Auckland Islands group are the only other breeding sites. A comparison with a 1958 study, which counted 2,300 nests, suggests the southern royal albatross population has increased since the farming period around the turn of the century when the population was affected by burning and grazing of its habitat, and predation. The antipodean albatross, which breeds mainly in the Antipodes Islands, has fewer than 10 nests at Campbell, most of them located near Moubray Hill on the east coast. The sixth albatross species breeding at Campbell is the circumpolar light-mantled sooty albatross *Phoebastria palpebrata*, which nests at steep locations. At least 1,600 pairs are estimated.

The Campbell Island group is the main breeding ground for the rare yellow-eyed penguin *Megadyptes antipodes*, a New Zealand endemic. The population of yellow-eyed penguins is estimated at 2,000, including about 500–600 breeding pairs. A second penguin species which also breeds at Campbell is the eastern rockhopper *Eudyptes chrysocome filholi*. Numbers have crashed, however, from about 800,000 pairs in 1942 to just over 50,000 in 1985. Decline has also been observed in other eastern rockhopper populations, including the main population of the subspecies at Macquarie Island. Several other penguin species have been



Yellow-eyed penguins  
G Fleming



recorded as occasional visitors or vagrants, including Antarctic species such as gentoo, chinstrap, and Macaroni, and two species that breed in large numbers at Macquarie: the king, and royal.

Most of the tube-nosed sea birds breed on the small islands. After the albatrosses, the petrels are the largest group. These islands around Campbell are home to large numbers of white-chinned petrel *Procellaria aequinoctialis aequinoctialis* and sooty shearwaters. Other petrels breeding at Campbell include northern giant petrel, grey petrel, subantarctic diving petrel and grey-backed storm petrel. The Campbell Island group is the main breeding ground of the New Zealand antarctic tern *Sterna vittata bethunei*, a rare subspecies restricted to the New Zealand subantarctic islands and Stewart Island. The population is estimated at only 1,000 pairs. Several hundred pairs nest at the Campbell Islands. Brown skua, although circumpolar, play an important role in the Campbell Island avifauna.

The Campbell Island shag *Leucocarbo campbelli*, endemic to the group, has a population of under 1,000 birds. Superficially similar to the Auckland Island shag (except that its neck is black instead of white), the Campbell Island shag nests at cliff-edge colonies and feeds in sheltered waters along the eastern side of the main island. Rafts of up to 100 birds are not uncommon.

A rare flightless duck, the Campbell Island teal *Anas nesiotis*, is restricted now to just one small island, steep-sided Dent Island (20 ha), 1.6 km off the west coast. The breeding population is unlikely to exceed 25 pairs. Related to the Auckland Island teal and the endangered brown teal of mainland New Zealand, it was discovered on Dent Island in 1975. The teal feed mainly on aquatic or marine invertebrates. Although the teal is the only terrestrial bird endemic to the group, the Campbell Islands also support an identifiable race of New Zealand pipit.



Elephant seals in a mud wallow,  
Campbell Island  
DOC

A total of 29 taxa are breeding at the Campbell Island group, with 42 other birds recorded.

Among the marine mammals, the three main seal species of the New Zealand subantarctic region (New Zealand fur seal, Hooker's sea lion and southern elephant seal), are all represented at Campbell, although their breeding populations are relatively small. Northwest Bay is a haven for seals. The leopard seal is an occasional visitor and usually solitary.

The only whale known to frequent Campbell's inshore waters is the southern right whale *Eubalaena australis*. During the winter breeding season whales gather, particularly in Northwest Bay, in small but apparently increasing numbers.

The Campbell Islands' invertebrate fauna is reasonably well-studied compared to the other groups. Some 275 insects have been described, 40% of them endemic. The 25 mm-long weevil *Oclandius laeviusculus* occurs in *Pleurophyllum* herbfields, but only on

offshore islands such as Dent and Jacquemart, presumably because predation by Norway rats on the main island. Another large weevil *Heterexis seticostatus* has seen its

food plant, *Bulbinella rossii*, spread out dramatically as a result of sheep and cattle grazing. It is common on its host plant and seems to have survived the presence of rats. A species of weta (orthopteran), the Campbell Island weta *Notoplectron campbellensis*, is endemic to the group, but survives now only on offshore islands. Among the 29 moths (nine endemic), *Campbellana attenuata* is possibly the world's only flightless carposinid. It is known from fewer than 10 adults. An endemic and highly modified sod webworm moth *Exsiliirarcha graminea* has legs modified for jumping to compensate for reduced wings. It is abundant only on Dent Island.

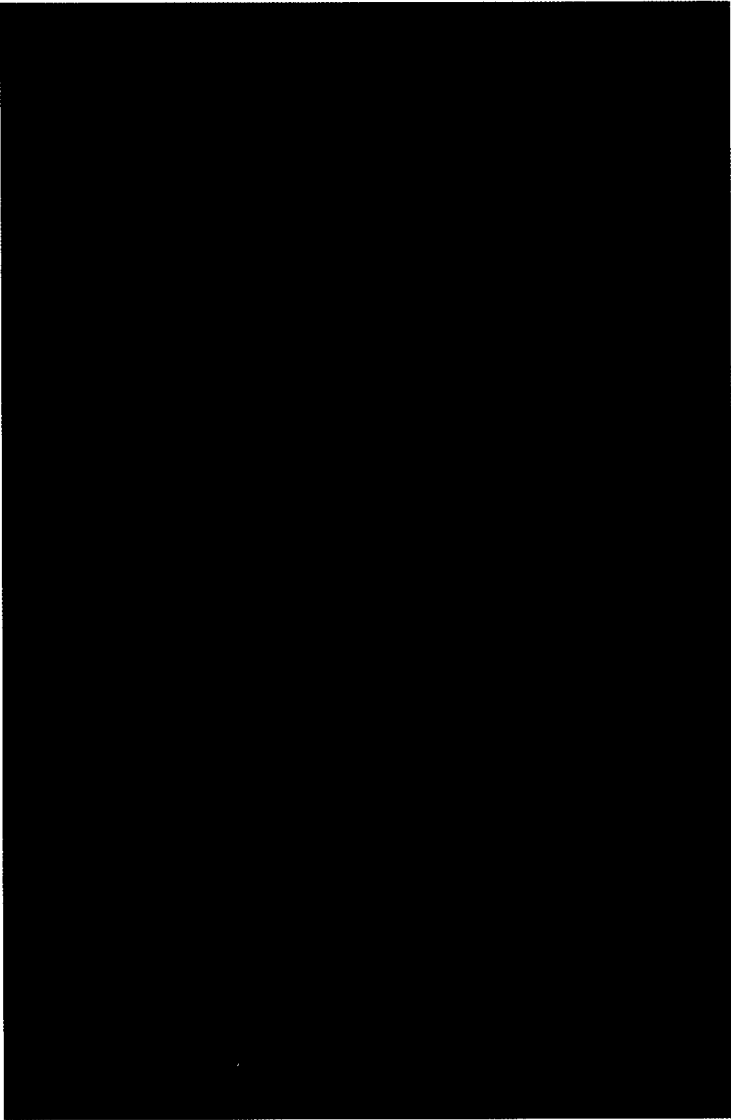
The only alien mammals are an abundant population of Norway rats and a smaller number of feral cats, both of which occur on Campbell Island, with Norway rats on just one of the small islands (Folly Island, 7 ha).

Only one freshwater fish is known from the Campbell group; the koaro *Galaxias brevipinnis*. It is also present on the Auckland Islands and mainland New Zealand. A scaleless fish of dark colour measuring up to about 200 mm in length, it inhabits streams and ponds.

### Marine environment

Impressive kelp forests, featuring the bull kelp *Durvillaea antarctica*, bladder kelp

*Macrocystis pyrifera* and an undescribed form of *Lessonia*, dominate the sublittoral zone at Campbell, especially the more sheltered east coast areas. The Auckland Island spider crab *Jacquinoia edwardsii* occurs at Campbell, but is not as abundant as at the Auckland Islands.



Hooker's sea lions.  
Campbell Island  
Andrew Penniket

# 4. State of preservation/conservation

## 4.1 DIAGNOSIS OF PRESENT CONDITION

Overall, the islands of the New Zealand subantarctic region retain a high level of naturalness and natural vitality. There is no permanent human settlement on any of the groups, and there are no roads or substantial infrastructure. The only people who visit the islands are reserve managers and scientists on infrequent expeditions, and a limited number of tourists whose visits are strictly controlled.

The Snares and Bounty Islands together with numerous islands at the other three groups, notably Adams and Disappointment of the Auckland Islands group, have no alien mammals of any kind. Biologically-rich Adams Island, 20 km long and a maximum of 9 km wide, is one of the world's best-preserved oceanic islands.

Animal introductions have had an impact on the biota of the two largest islands (Auckland and Campbell), but control measures are continuing, and in the case of some introduced animals elimination has been accomplished. On Auckland Island, feral pigs have modified vegetation and are implicated in the decline of ground-nesting or burrowing birds. Feral cats have had an impact on the bird populations on Auckland Island and they also inhabit Masked Island (4 ha) in Carnley Harbour. On Campbell Island the threats are from Norway rats, which are abundant, and to a lesser extent from feral cats. Mice *Mus domesticus* are widespread on Antipodes Island and also Auckland Island.

On the positive side, the New Zealand subantarctic islands have always been free of mustelids (mainly stoats and ferrets) and ship rats, which have devastated vulnerable bird populations on mainland New Zealand. Similarly, the subantarctic islands have never been subjected to the browsing impacts of deer and brushtail possums, which are major pests on the New Zealand mainland.

Introduced plants present no threat to individual indigenous or endemic plant species as far as is known, and no vegetation communities are actively threatened by alien plants. The Snares and the Antipodes Islands have only two exotic species. Both species occur on restricted sites and are unlikely to spread. Auckland and Campbell islands have higher numbers of introduced vascular species, but the indigenous vegetation is not threatened. Experience shows that in this region alien plants mostly survive on artificially disturbed ground and they eventually succumb to competition from indigenous plants. A few adventive plants are being monitored, for example, birdsfoot trefoil *Lotus pedunculatus* (established at Tucker Cove, Campbell Island), and some exotic grasses (tall oat grass, Yorkshire fog, and cocksfoot) which pose a threat to swamp communities on Campbell Island. Campbell has seen the greatest modification to its vegetation as a result of farming activities in the past. Following the removal of the last sheep in 1991, the vegetation is recovering. In particular, the palatable large-leaved herbs are spreading back dramatically into areas of the main island that were grazed in the past. A similar pattern is occurring on Enderby Island in the Auckland group, where the removal of cattle and rabbits has triggered a recovery of palatable herbs.

The presence of the tree daisy *Olearia lyallii* in the Port Ross area of the Auckland Islands poses a dilemma. Although dominant at The Snares, where it forms the main canopy, the tree is a newcomer to the Auckland Islands. It covers much of Ewing Island and has established on the shores of Erebus Cove on the main island. It appears to have

reached the Auckland group less than 200 years ago (well within the time of human contact with the islands), but questions remain as to whether the *Olearia* seed arrived naturally, or whether it established through human agency. The current conservation view is that its presence should be accepted, although perhaps contained within its present range. A similar view applies to the limited presence of flax *Phormium tenax* in the Port Ross area, and at one site in Perseverance Harbour at Campbell Island. The Port Ross plants were almost certainly introduced, probably at the time of the settlement of Maori and Moriori people there in the 1840s. The flax, therefore, has some historical and cultural value. No control measures are required because the plantings are very localised and unable to spread. No seedlings have been found.

#### 4.2 AGENT RESPONSIBLE FOR PRESERVATION/ CONSERVATION

The Department of Conservation, the government agency responsible for the management of all Government-owned protected areas in New Zealand (29% of the country's total land area), is also responsible for the management of the land and seabed of the nominated area. Regulation of commercial activities in the territorial waters of the nominated area is the responsibility principally of the Ministry of Transport and Ministry of Fisheries.

Depending on levels of delegation, management decisions are made by the Minister of Conservation, Director-General of Conservation or the Regional Conservator, Southland Conservancy, in Invercargill. The Department of Conservation receives advice on policy matters from the Southland Conservation Board and its parent body, the New Zealand Conservation Authority, which together represent the wider public interest. Members of the two bodies represent such areas of interest as science, conservation, the Maori perspective, recreation, and tourism. Management plans exist for all five subantarctic island groups, and are legally binding on all parties, including the Government. These plans will be replaced by the Subantarctic Islands Conservation Management Strategy, when it has completed the process of public consultation and official approval, scheduled for 1998.

#### 4.3 HISTORY OF USE AND PRESERVATION/CONSERVATION

##### 4.3.1 Significance to Maori & Moriori

The principal iwi (tribe) of Te Waipounamu (the South Island of New Zealand) and Rakiura (Stewart Island) is Kai Tahu. Kai Tahu holds manawhenua (authority) over its rohe (tribal area) being the central and southern regions of the South Island. Prior to the arrival of Kai Tahu, this southern region had been occupied by two other iwi, Waitaha and Kati Mamoe. By a mix of strategic alliances, intermarriage, diplomacy and warfare, Kai Tahu were able to secure an ascendancy over these iwi, before European colonisation commenced. The Kai Tahu interest in the subantarctic islands is based on their oral records which recount the fishing, hunting and other such resource gathering expeditions that took place in the seas around the islands.

The region is also significant to Moriori and to Ngati Mutunga of the Chatham Islands. Both Ngati Mutunga and Moriori also claim historical links to the Auckland Islands which they know as "Motu Maha" and "Maungahuka" respectively. This association is through an unsuccessful attempt to settle in the Port Ross area during the period 1842 to 1856. From this recorded activity, two land claims have been laid before the Waitangi Tribunal; one from Moriori based on whanaungatanga (relationship), and the other from Ngati Mutunga based on manawhenua.

The proposed World Heritage nomination will not affect the settlement of these claims, or any future claims that iwi may make under the Treaty of Waitangi to any of the islands in the nominated area.

#### 4.3.2 European Contact: Exploitation, Castaways and Failed Settlements

Soon after their discovery and placement on the map by European mariners (between 1788 and 1810), the New Zealand subantarctic islands were heavily exploited for their stocks of seals – largely the New Zealand fur seal, but also Hooker's sea lion and southern elephant seal. The sealers were ruthlessly efficient, reducing fur seal populations virtually to zero at many places. At the Antipodes Islands, for example, the first sealing gang to work at the group, arriving in 1804, collected 60,000 skins in a matter of months. By the 1830s, the sealing era was over because the populations everywhere had virtually been wiped out. Whales were targeted next but they, too, became scarce. In 1850, an English firm, the Southern Whale Fishery Company, set up a shore whaling station at Port Ross in the Auckland Islands but it lasted less than three years. Only one whale was captured. The whalers, on arrival, found a small group of Maori and Moriori from the Chatham Islands occupying Port Ross, but that settlement, too, struggled in the difficult climate and poor growing conditions and finally succumbed in the 1850s. The last Maori departed in 1856.

The castaway era followed. From the 1860s, vessels plying the great circle route from Australia to England via Cape Horn had to negotiate their way past the Auckland Islands and Antipodes Islands and at least 10 sailing ships were wrecked. In response, the New Zealand Government established a network of castaway provision depots, a few of which have been preserved. Live animals were released – notably a French breed of rabbits on Enderby (Rose Island already had English whalers' rabbits), and goats on the main Auckland island. Pigs had already been released at the Auckland Islands in 1808 by their European discoverer Abraham Bristow. They have proved the hardiest survivors, adapting to the point of eating seaweed during leaner months. At Campbell Island, sealers had introduced other domestic animals but none survived more than a few years.

Graveyard, Erebus Cove,  
Auckland Island.  
Neville Peat



Farming brought sheep and cattle to the Campbell Islands and Auckland Islands. There was an attempt at sheep farming at Port Ross in the 1870s but the farming era really did not begin until the 1890s, with Campbell Island the main focus. Sheep numbers peaked on Campbell Island at 8,500 in 1910, when farming shared the island with two whaling stations. Areas were burnt to encourage the spread of introduced pasture species, and grazing of the indigenous plants altered the ecological balance. Shrubland expanded at the expense of the tussock grassland because of the fires, and unpalatable herb species like *Bulbinella rossii* also spread.

But the isolation and, finally, economic depression put an end to the sheep farming in 1931, after which the remaining stock – about 4,000 sheep and 30 cattle – were left to their own devices. The exploitive era was drawing to a close.

At the Auckland Islands, sheep farming never developed to the level achieved on Campbell Island. The focus switched from Port Ross to Circular Head, Carnley Harbour, where 2,000 sheep were landed in 1904. But the sheep died off within a few years. Shorthorn cattle were introduced on to Enderby Island in 1895 and the few remaining stragglers from this herd were finally eliminated in the early 1990s.

### **4.3.3 The Turning Point: Conservation Initiatives**

In 1910, Adams Island was gazetted a flora and fauna reserve - the first reserve in the New Zealand subantarctic region. This marked the beginning of the conservation era. When the pastoral lease at the Auckland Islands expired in 1934, with no farming having taken place for years, the entire group was declared a reserve. The Campbell Islands were made a reserve in 1953 followed in 1961 by The Snares, Bounty Islands and Antipodes Islands.

At this time the reserves were managed by the Department of Lands and Survey, which managed both national parks and developmental blocks of pastoral land on mainland New Zealand. Sheep were retained on Campbell Island, although they were not actively farmed. In 1970, a fence was erected across the middle of the island and sheep found in the northern half were eliminated. In 1984, a second fence was built, confining the remaining sheep to an even smaller area in the south-west corner of the main island. When the Department of Conservation was created in 1987 and took over the administration of national parks and reserves from the Department of Lands and Survey, plans were made for the eradication of sheep from the island. Most of the sheep were shot in 1990 and a few survivors that escaped the 1990 muster were killed in 1991-92. Today, Norway rats and feral cats are the only alien animals left at the Campbell Islands, and they are found only on the main island (except for rats on tiny Folly Island). The cat population is small on Campbell Island but rats are widespread.

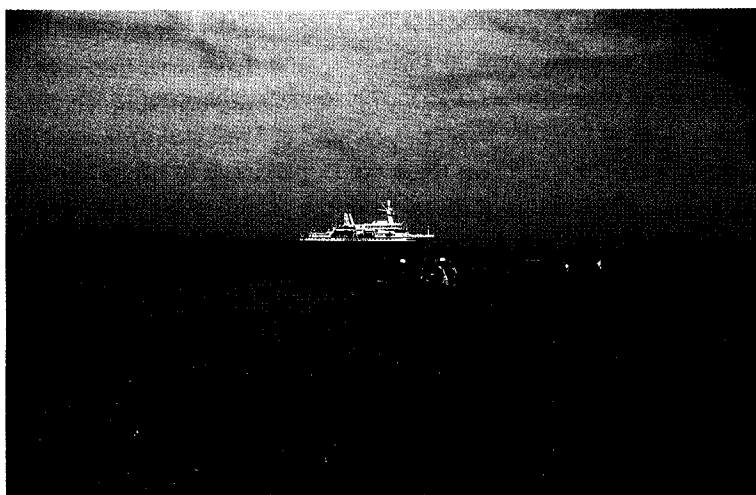
At the Auckland Islands, from the late 1980s, the Department of Conservation began the removal of cattle and rabbits from Enderby Island, and pigs and goats from the main island. The goats had never adapted as well as the pigs and a combination of live capture and hunting have almost certainly eradicated them.

Removal of the cattle and rabbits from Enderby Island began in 1991, after New Zealand animal breeders with an interest in rare breeds had taken live and genetic material. Eradication was completed in 1993. The cattle were shot and the rabbits poisoned, on Rose Island as well as Enderby. Fortuitously, the poison operation on Enderby Island appears to have removed all the mice, too.

### **4.3.4 Tourism**

Tourist activity at the New Zealand subantarctic islands has developed since the late 1960s when the region was included in the first Antarctic cruises between New Zealand and the Ross Dependency. Cruises targeting the subantarctic islands as a destination have become regular since 1979-80. In recent years there have been about 10 ship visits each summer. In view of the vulnerability of the islands and possible adverse impacts from large numbers of tourists, the Department of Conservation has devised a set of regulations, including quarantine provisions to prevent accidental introduction of animal pests (especially rodents) and exotic plants. There is also a code of conduct for all visitors. All tourist visits are governed by permit. No more than 600 tourists are allowed to land at any site in any one season. No tourists are allowed to land at The Snares or Antipodes Islands, and elsewhere visitors are permitted to land at only a handful of designated places. These include Enderby Island, the main Auckland Island (Port Ross and Carnley Harbour) and Campbell Island (head of Perseverance Harbour). Boardwalks are provided to direct visitors and to limit the trampling of soils and vegetation. Each group of visitors is accompanied by a Department of

Tourists follow a boardwalk on  
Campbell Island  
*Wynston Cooper*



Tourists landing at Enderby Island  
*Lou Sanson*

Conservation representative, who enforces the code of conduct (especially with regard to seal and sea bird viewing distances) and who is empowered to refuse entry to sites if conditions are unsuitable. Thus tourism is strictly controlled and no compromise of natural values or protection management objectives is tolerated.

As public interest in the region has increased in recent years, the Department of Conservation has supported efforts by the media to document the outstanding natural values - for example, by supporting film crews in the mak-

ing of television documentaries. The department has assisted the Southland Museum, Invercargill, to develop its major advocacy and public relations project - a special gallery with the title 'Beyond the Roaring Forties Subantarctic Experience'. The displays (and audiovisual) which present the natural and historical values of the New Zealand subantarctic islands, are due to open in 1998.

#### 4.3.5 Fishing

Current legislation excludes any vessel longer than 43 metres from trawling within 12 nautical miles of any of the subantarctic islands. In addition, all fishing is excluded within the Auckland Islands Marine Mammal Sanctuary (again, the 12nm zone).

Within the 12nm zone there are three fisheries; southern blue fin tuna, ling and rock lobster. Surface long line fishing for southern blue fin tuna, occurs between March and August around the Bounty and Antipodes islands and The Snares. Deep sea longline fishing for ling occurs between August and December around The Snares and the Bounty Islands. Rock lobster is caught off The Snares.

Outside the 12nm zone, fishing for southern blue whiting, orange roughy, squid, scampi and oreo occurs. Fishing for southern blue whiting occurs off all islands, with orange roughy fishing off the Auckland, Antipodes and Bounty islands. Squid and scampi fishing takes place off the Auckland Islands, with oreo fishing occurring off the Bounty and Antipodes islands. Squid fishing also occurs around The Snares, again outside the 12nm limit.

## 4.4 MEASURES FOR PRESERVATION/CONSERVATION

The policy framework for the protection of the New Zealand subantarctic islands will be supplied in future by the Subantarctic Islands Conservation Management Strategy (CMS), which in 1998 will upgrade the management plans for each group. The CMS, developed as a requirement of the Conservation Act, contains objectives and plans for implementation in the following policy areas: ecological management, historic resource management, conservation awareness, visitor impacts management, and resource use and estate management. Other legislation relevant to the management of the subantarctic islands - for example, the Reserves Act and the Wild Animal Control Act - is outlined in Section 2.2 of this document.

Funds for the management of the subantarctic islands are allocated through the annual business plan of the Southland Conservancy, Department of Conservation. The business plan is approved in light of national priorities and the level of funding allocated annually by Parliament to the department. In addition to the protective work and scientific research undertaken by the department through its own staff and resources, other institutions are sometimes involved, either on contract or through independent funding. For example, the Forest Research Institute has been involved in developing poison bait techniques to eradicate pigs from Auckland Island, and the National Institute of Water and Atmospheric Research (NIWA) has ongoing studies at The Snares on the population dynamics of Buller's mollymawk. Multidisciplinary expeditions are mounted from time to time, involving personnel from outside the Department of Conservation, but departmental staff invariably have a leadership role.

Conservation measures fall into three broad areas:

- (i) eradication of animal and plant pests
- (ii) vigilance and surveillance
- (iii) research that will enhance the protection of threatened flora and fauna, and as far as possible preserve the islands and their ecosystems in their natural state.

### 4.4.1 Eradication of Animal and Plant Pests

Regarding animal pests, the draft CMS calls for the eradication of all feral pigs from Auckland Island as soon as possible, and also for the eradication of cats from Campbell, Auckland and Masked Islands, Norway rats from Campbell and Folly Islands, and mice from the main Antipodes Island and Auckland Island. Research and development of suitable eradication techniques will be encouraged and assisted. A priority is the development of a poisoning strategy for the Auckland Island pigs, thought to number about 1,000. If required for the protection of vulnerable populations of sea birds, localised control of cats or rats will be undertaken. These control measures will restore large areas of habitat for burrowing petrels, teal and other ground birds, and invertebrate communities.

Regarding plant pests, the draft CMS calls for the eradication of exotic plants where feasible. Eradication of the chickweed *Stellaria media* and grass *Poa annua* from The Snares group is a particular goal.

### 4.4.2 Vigilance and Surveillance

Going hand in hand with intended eradication of problem animals and plants, is the requirement for vigilance to prevent new introductions of alien mammals and to avoid pollution and/or habitat damage from commercial activities in surrounding seas and visitor impacts.



### **Visitor control and education**

Tourist operators and the visitors themselves are required to take precautions against the further spread of exotic species when travelling within or between island groups. All entry permits contain such instructions, and a Department of Conservation representative is assigned to each tourist cruise to provide advice, surveillance and monitoring of visitor behaviour. A considerable amount of information and educational literature is also made available to visitors. In addition, precautionary advice is given to fishing vessels and private yachts or motor vessels that intend closely approaching the islands. A stern-line mooring at Hoho Bay at The Snares is to be removed.

A restricted fire season applies throughout the year at all of the islands. Visitors are warned about fire risk through their permits. Smoking is banned.

### **Rodent quarantine**

A stringent rodent contingency process is in force. Key measures include the compulsory use of rodent-proof plastic crates for landing stores, requirements for rat-guard shields on mooring lines for vessels visiting the subantarctic islands, and the availability of a full set of rodent bait stations, ready for immediate deployment in the event of an accidental introduction of rodents. Rodent bait stations are permanently located around the boat-mooring area at The Snares. De-ratting certificates are required for all ships wishing to visit the islands.

### **Incidental Captures**

Vigilance is especially required in the case of incidental capture of sea lions, fur seals and seabirds by commercial fishing ventures operating in the New Zealand sub-antarctic region. Sea lions are killed by entanglement in nets operated by squid trawlers on the Auckland Islands Shelf during the squid fishing season. Trawling for squid around the Auckland Islands began in the late 1970s and incidental capture of sea lions occurred virtually from the outset. This has led to the development of a voluntary code of practice by the fishing industry to try to reduce the level of sea lion captures. The Department of Conservation has also instigated a long-term research programme to assess the population dynamics of the species and its capacity to sustain fishing-related mortality. This work has resulted in the imposition of maximum fishing-related mortality limits for sea lions for the last five squid seasons. Ministry of Fisheries observers are placed on 20-25% of vessels involved in the squid fishery around the Auckland Islands. Captures reported from these vessels are extrapolated across the whole fleet to give an in-season estimation of the total number of sea lion mortalities. If the established maximum fishing-related mortality limit is exceeded, the fishery is closed for the remainder of the season. The squid fishery around the Auckland Islands was closed early by the Minister of Fisheries in both the 1996 and 1997 squid seasons.

Demersal and surface longline fisheries operating in the Southern Ocean overlap with the foraging zones of a number of seabird species that breed in the New Zealand sub-antarctic region. Seabirds have learnt that longliners provide a predictable and substantial food supply in the form of squid or fish used to bait hooks, and uneaten bait discarded after hauling. Incidental mortality of sea birds occurs when they either swallow a hook or drown after becoming entangled by hooks and pulled underwater by the weight of the mainline. Sixteen bird species that breed in the sub-antarctic have been recorded as incidentally caught on longline operations. Of particular concern are captures of Gibson's albatross, grey-headed mollymawk, Campbell mollymawk, light-mantled albatross and grey petrel. Some seabirds are killed when they collide with trawl warps of trawlers. The netsonde cable used on some trawlers was found to cause considerable mortality of white-capped mollymawks and has been banned from use in the New Zealand EEZ since 1992. The Department of Conservation is working

closely with Ministry of Fisheries officials and fishing industry representatives to reduce the incidental capture of seabirds in fishing operations. Funds collected from the fishing industry (Conservation Services Levy) are being used to collect and analyse longline fishery data on incidental captures of protected species and investigate new measures to reduce the captures. Current studies funded by Government agencies and the Conservation Services Levy are assessing the impact of fishing on sea lions, Gibson's albatross, antipodean albatross, grey-headed mollymawk, Buller's mollymawk, Campbell mollymawk and black-browed mollymawk. Because seabirds breeding in the subantarctic are also caught by longliners operating outside the New Zealand EEZ, the Government is using international agreements such as the Convention for the Conservation of Marine Living Resources (CCAMLR) and the Convention for the Conservation of Southern Bluefin Tuna (CCSBT) to promote existing measures to reduce incidental captures and encourage research into new ways to limit it.

### **Fisheries Sustainability and Mitigation of Fishing-Related Impacts**

The target fisheries around the Sub-Antarctic Islands (scampi, southern bluefin tuna, rock lobster, southern blue whiting, squid, orange roughy, oreo, and ling) are managed either through a Quota Management System or through the establishment of annual catch limits. The only species which currently has a sustainability concern is southern bluefin tuna. Southern bluefin tuna is a highly migratory species which is subject to considerable fishing pressures outside the New Zealand EEZ. The New Zealand Government has been co-operating with Japan and Australia in recent years through the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) to obtain a coordinated approach to the management of the species. Through this Convention, the catch limit of the three parties has been reduced by nearly 70%. Recent scientific assessments suggest these management actions have averted further stock decline. The Government will continue to pursue its interests in the southern bluefin tuna fishery through active involvement in the CCSBT.

The existing level of access for fishing vessels into the 12 mile Territorial Sea surrounding the Subantarctic Islands will remain unaltered by the World Heritage nomination. There are currently mechanisms within Fisheries legislation and legislation administered by the Department of Conservation to ensure that any adverse effects from fishing activity are minimised or mitigated. Indeed, as outlined earlier, the Government is already actively pursuing the implementation of measures to reduce the incidental capture of New Zealand sea lions and seabirds both domestically and, in the case of seabirds, internationally. These issues will continue to be addressed in this manner as required.

### **Petroleum Exploration Implications**

The Government is currently promoting petroleum exploration and the petroleum industry has expressed interest in the Great South Basin and the Campbell Plateau. The proposed World Heritage nomination is unlikely to directly affect exploration for petroleum in those areas as only the territorial waters out to the present 12 nautical mile limit, and the existing marine mammal sanctuary around the Auckland Islands, would be included in the nomination.

### **Prevention of Marine Pollution**

Protection of the coastal marine environment from pollution (contaminating discharges and littering debris) is a concern because of the diversity and abundance of the biota, and efforts are being made to raise awareness of the issue through the Ministry of Fisheries, Ministry of Transport, Maritime Safety Authority and industry groups.

New Zealand is currently amending its domestic legislation in order to ratify MARPOL, the International Convention for the Prevention of Pollution from Ships.

#### 4.4.3 Research

As evidence of the Department of Conservation's commitment to research as an underpinning of management practices at the islands, about 50 entry permits for scientific research have been issued by the department in the past 10 years. Highlights include long-term studies of the population dynamics and foraging habits of Hooker's sea lion, Gibson's and antipodean albatrosses and Buller's mollymawk, all endemic species. Transmitters for satellite tracking studies have been deployed on selected individuals of all four species to obtain knowledge of where they forage. In the case of the sea lions, additional electronic instruments have been deployed at different times of the year to provide a picture of their foraging behaviour - how deep they dive, how frequently, and how long they are submerged. Census work and breeding/productivity studies on all four species are helping determine population growth (or decline). These studies are driven to a marked extent by the fisheries bycatch problem. Wider studies have been conducted to determine the species and numbers of subantarctic sea birds that are being caught or entangled in fishing gear in the region, with indicator populations monitored at The Snares, Antipodes, Auckland and Campbell Islands. Long-term census and breeding studies are also being carried out in respect of the albatross species on Campbell Island, in particular on Campbell mollymawk, southern royal albatross and grey-headed albatross.

A particular target of research is the Campbell Island teal, an endangered flightless duck, restricted to one small island. Population research is continuing in conjunction with a captive-breeding programme on the mainland, based at the National Wildlife Centre at Mount Bruce in the North Island.

Census work is ongoing for yellow-eyed penguins at Campbell and Auckland Islands. DNA studies on yellow-eyed penguins have tried to establish whether the subantarctic and mainland populations mix.

Botanical research features vegetation analysis and monitoring at Campbell Island and Enderby Island following the elimination of feral animals.

The Ministry of Fisheries and the Department of Conservation are currently undertaking research to determine the level of observers required on fishing boats, to provide more statistically reliable data on the impact of fishing on non-target species.

Research themes for the future include:

- vegetation regeneration following the removal of sheep from Campbell Island, cattle and rabbits from Enderby Island, and hopefully in years to come pigs from Auckland Island;
- ongoing visitor monitoring and impact studies;
- monitoring of changes in the marine environment (sea temperatures, ocean currents, food web dynamics);
- establishing population size and distribution of a wide range of breeding sea birds;
- translocation of threatened bird species between or within island groups. (New Zealand is an acknowledged leader in the protection of island ecosystems and threatened species, having built up expertise in predator eradication and the translocation of endangered birds and invertebrates).

#### **4.4.4 Historic resources**

The Department of Conservation has an historic resources conservation plan for the islands that establishes priorities for the preservation of sites according to major themes, including Maori occupation, European discovery and exploration, sealing and whaling, European settlement and farming, the shipwreck era and war-time coast-watching activities.

Only a few buildings exist on the New Zealand subantarctic islands. Most of them are used periodically for scientific research or conservation management. The largest set of buildings is a former meteorological station on Campbell Island, once staffed the year round, but now automated. Several sites are managed for their historic heritage value. They include whaling station remains (Campbell Island, Auckland Islands); Maori occupation sites (Auckland Islands); castaway depots and grave sites (Auckland Islands, The Snares, Antipodes Islands); the 1874 German scientific expedition site (Auckland Islands) and World War II coast-watcher huts (Auckland Islands).

# 5. Justification for inclusion in the World Heritage List (Natural Heritage Property)

The New Zealand Subantarctic Islands are nominated as a World Heritage Area on the basis of their exceptional natural heritage qualities. The key criterion for justifying the nomination is Criterion IV, but there is also a supporting argument in terms of criteria II and III. All four criteria, however, are addressed. They are presented below in a sequence that is considered appropriate for this nomination.

## 5.1 CRITERION IV

**Sites nominated “should contain the most important significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation”.**

### 5.1.1 Biological diversity, productivity, and rarity

Together the New Zealand subantarctic islands and the ocean linking the five groups comprise a region of extraordinary natural diversity and abundance. The region is a cradle for marine life, with the bird and seal components depending on the islands for reproduction. The islands support an array of endemic and threatened species among the marine fauna, land birds, and invertebrates. Some elements of the biota are rare; other elements have a restricted breeding range and should, therefore, be considered vulnerable.

For whales, seals, and seabirds, the five island groups represent important stepping stones or temporary resting places on migration or vagrant journeys as well as vitally important habitats for breeding species. The islands' strategic role is heightened by

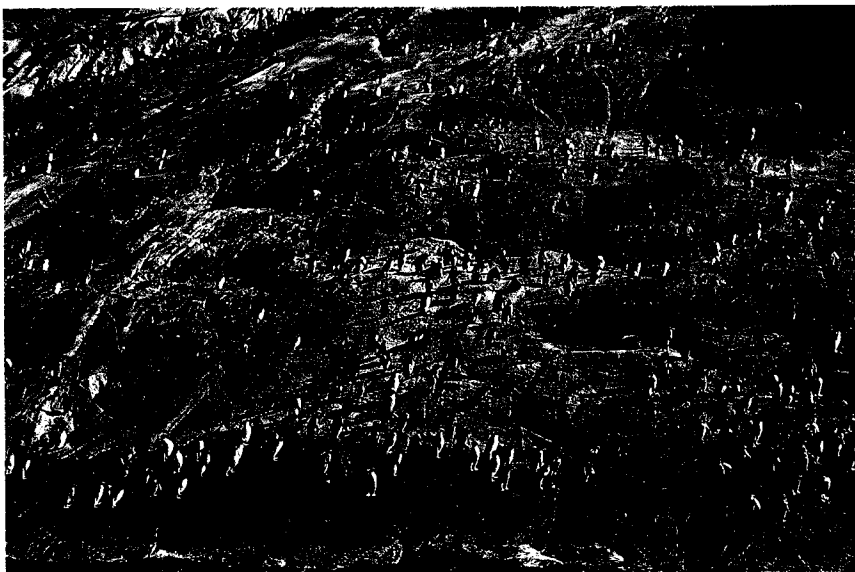
their widespread distribution; they are the only areas of land available for hundreds of kilometres. Much of the marine fauna is at the top of the food chain, playing an ecological role vital to the health of the Southern Ocean.

Diversity and endemism are recurring themes in the New Zealand subantarctic region, not only in the vertebrate fauna, but also in the plant and insect communities.

Where seabirds are concerned, the five subantarctic island groups make a considerable contribution to the

claim that New Zealand is the seabird capital of the world. It follows that if New Zealand is the seabird capital, the subantarctic islands fill the role of principal flag-carriers.

A well-used launching and landing place for Snares crested penguins at The Snares. This smooth bare patch of granite, between high-tide mark and the forest, is known as 'Penguin Slope'  
*Wynston Cooper*



### 5.1.2 Seabird habitats

The New Zealand subantarctic islands support a total of 10 seabirds endemic at an island group or regional level: five albatross species, three cormorants, and two penguins.

The albatross family (Diomedidae), largest and most impressive of all seabirds, are represented at all five groups. Albatross taxonomy is of particular interest at present. In a recent revision of the albatross family, 24 species were identified. No fewer than 10 species breed in the New Zealand subantarctic region. Two species, Gibson's albatross and Campbell mollymawk, are endemic to single island groups. Gibson's albatrosses breed only at the Auckland Islands, where the Adams Island population is (with the antipodean albatross) the world's largest for the "wandering" group. Campbell mollymawks breed only at the Campbell Islands. A further three albatross species are

Campbell mollymawk at Campbell Island. Mutual preening by a breeding pair while brooding a chick.  
*Lou Sanson*



A light-mantled sooty albatross, Campbell Island  
*DOC*

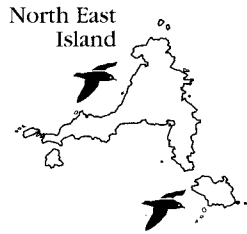
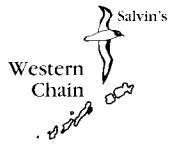


endemic to the New Zealand subantarctic region – southern royal albatross (Campbell and Auckland islands), antipodean albatross (Antipodes and Campbell islands) and white-capped mollymawk (Auckland Island and Antipodes Islands). In addition, Buller's mollymawk (The Snares), breeds elsewhere only at one other site in New Zealand (Solander Island in the Foveaux Strait area), and Salvin's mollymawk is largely restricted in its breeding range to the Bounty Islands and The Snares, with just a few nests recorded from the Crozet group. The remaining three species of the 10 found in the New Zealand subantarctic region are circumpolar in their breeding range: light-mantled sooty albatross (Auckland, Campbell and Antipodes islands), black-browed mollymawk (Campbell, Antipodes, The Snares) and grey-headed mollymawk (Campbell). The Campbell Island group hosts six albatross species. Although Isles Crozet has seven species, a world record, the Campbell group has a more significant albatross community in terms of endemism. Three of Campbell's six species are endemic to the New Zealand subantarctic region.

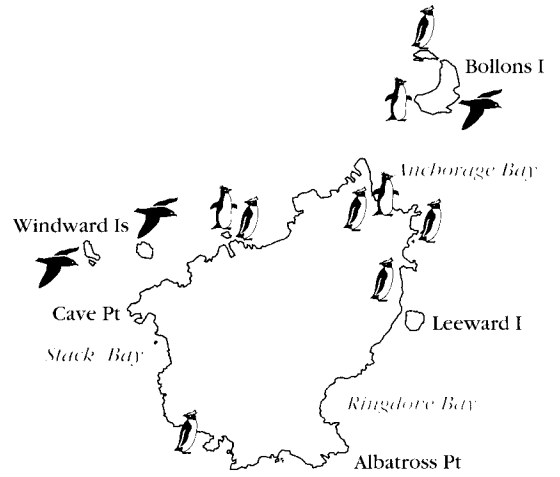
The family containing petrels, shearwaters, fulmars and prions (Procellariidae) — the most diverse family of seabirds in the world (about 72 species) — is conspicuous in the New Zealand subantarctic region, where 21 species or subspecies (almost 30% of the world total) are breeding. All five island groups have breeding populations of

Figure 8: Major breeding localities for seabirds and marine mammals at the New Zealand Subantarctic Islands. Note: These maps are schematic and focus only on the major breeding colonies. They do not show the many scattered breeding sites, especially around the main Auckland Island, for species such as fur seals, yellow-eyed penguins and shags.

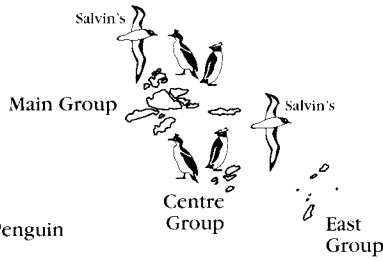
Snares Islands



Antipodes Islands



Bounty Islands

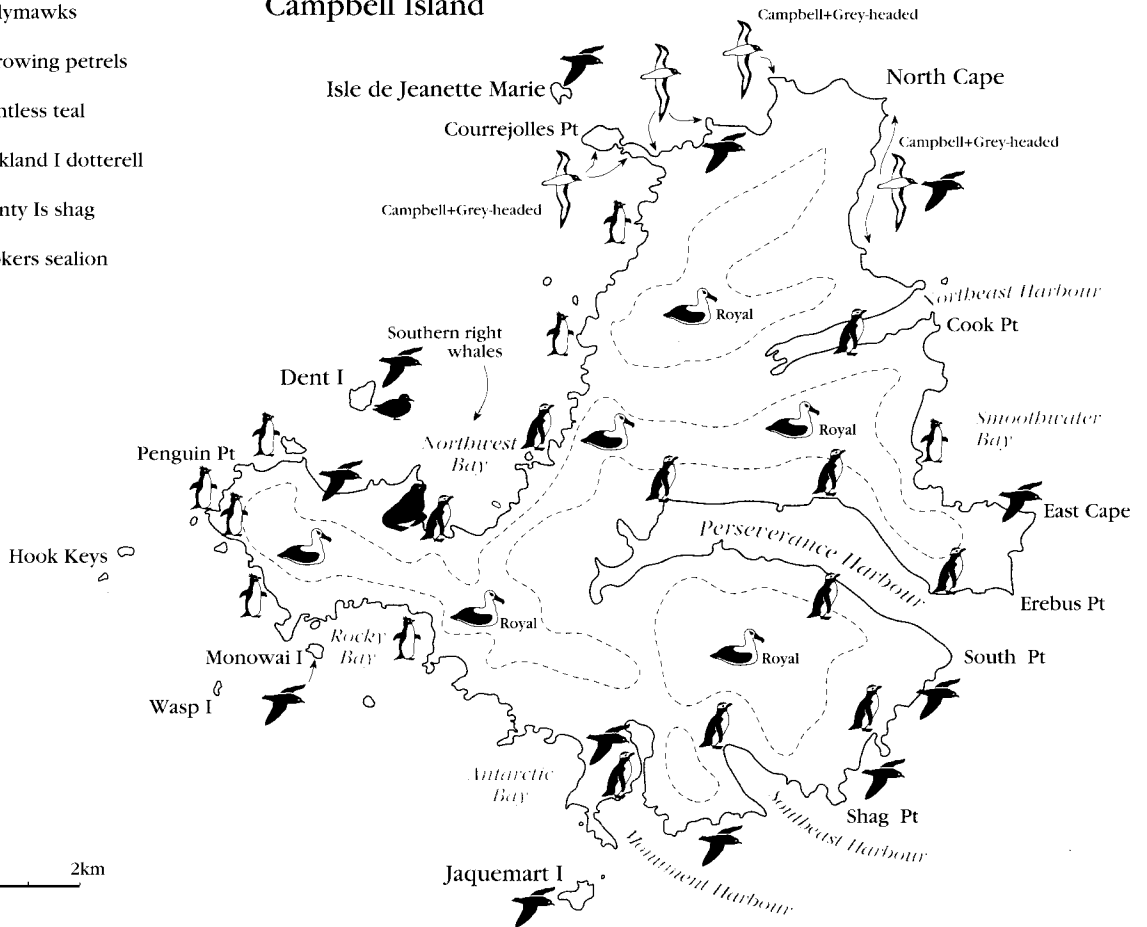


Antipodes Island

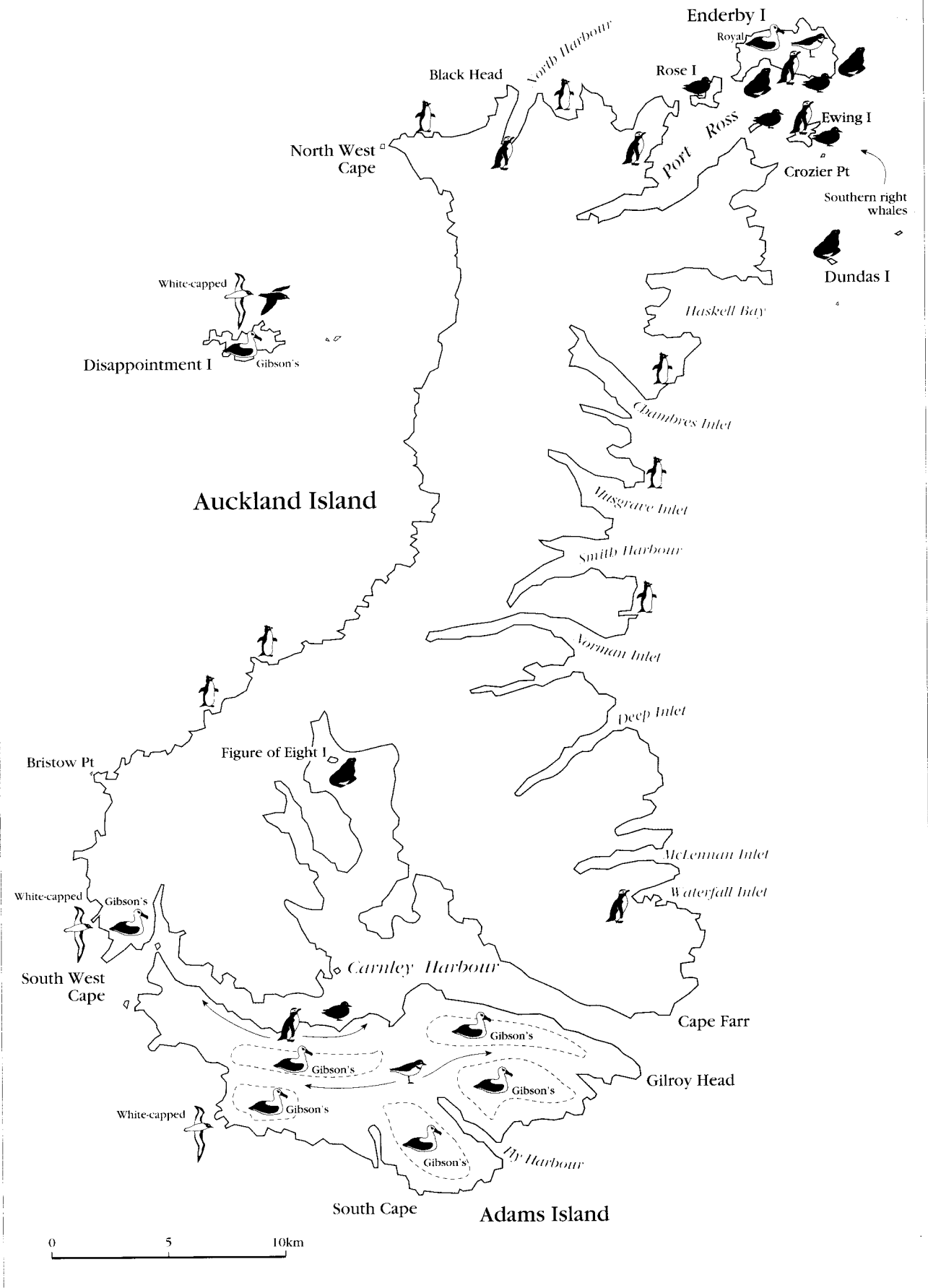


- Rock-hopper Penguin
- Erect-crested penguin
- Yellow-eyed penguin
- Albatross
- Mollymawks
- Burrowing petrels
- Flightless teal
- Auckland I dotterell
- Bounty Is shag
- Hookers sealion

Campbell Island



# Auckland Islands





members of this family. A few species or subspecies are New Zealand endemics (e.g., mottled petrel at The Snares); others have their only New Zealand breeding populations here (e.g., soft-plumaged petrel at the Antipodes Islands). The most abundant species is the sooty shearwater. The Snares group holds possibly the world's largest breeding population of this species — some 2.75 million pairs. The presence of this colossal population at such small islands is a tribute to the immense productivity of the adjacent seas and the integrity of the islands' breeding habitat.

Penguins also figure prominently. Two species are endemic to the region: Snares crested and erect crested, with the former being confined to The Snares group. Of the two other species breeding in the New Zealand subantarctic, the yellow-eyed penguin of Campbell and Auckland islands is considered to be one of the world's rarest penguin species. The eastern rockhopper penguin of Campbell, Auckland and Antipodes islands (also Macquarie Island) appears to be in trouble. Eastern rockhopper populations everywhere have declined markedly in recent decades (see discussion under Criterion II). Besides the four penguin species breeding in the New Zealand subantarctic region, six other species have been recorded as vagrants or stragglers.

Three endemic cormorants or shags occur at Bounty, Auckland and Campbell islands. Each island group has its own species, and each species is sedentary, with the populations ranging between 500 and more than 2,000 pairs. Confined to a group of tiny islands, the Bounty Island shag is considered to be the world's rarest cormorant. It is surely one of the most isolated.

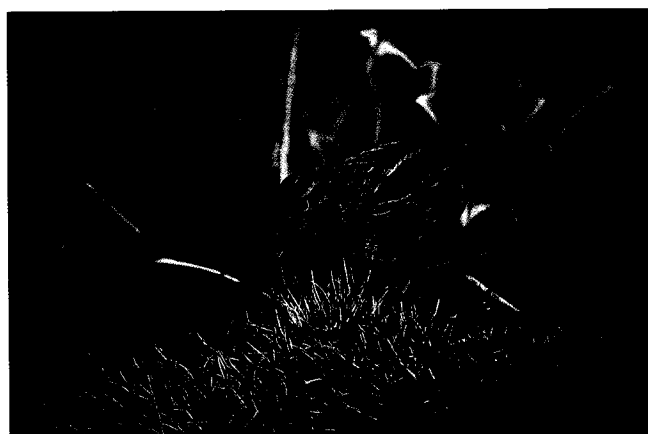
### 5.1.3 Endemism in land birds

Land birds also display a degree of endemism that is perhaps even more remarkable considering the size of some of the islands supporting local endemics. There are 14

endemic taxa altogether, with six occurring on the Auckland Islands, four on the Antipodes Islands, three on The Snares, and one at the Campbell Island group. Campbell's endemic land bird is the flightless Campbell Island teal, which, after the Madagascar pochard and Korean crested shelduck, is the world's most endangered duck (probably fewer than 25 breeding pairs). It is confined to one small offshore island. Half the endemic land birds are either flightless or weakly flighted: two teal, three snipe, a rail, and a fernbird. The 14 endemics include one full species (the Antipodes Island parakeet), which is restricted to the group. Remarkably, for a land area of little more than 2,000 ha, a second parakeet has evolved — a smaller red-crowned parakeet. The intermingling of erect-crested penguins and parakeets in coastal areas of the Antipodes group is an intriguing spectacle. All four indigenous land birds found at the Antipodes are endemic to the group. They include a subspecies of snipe, now extinct on mainland New Zealand. Separate subspecies of snipe are found at the Auckland Islands and at The Snares. The Bounty Islands and Western Chain of The Snares have no land birds, but the seabird communities at both the Bounty Islands and The Snares are astoundingly dense and populous;

throughout the breeding season they crowd the fractured granite of the Bounties, occupying virtually all available space.

A pair of Auckland Island teal on Ewing Island, Port Ross  
*Pete McClelland*



Auckland Island snipe  
*Lou Sanson*

#### 5.1.4 A haven for marine mammals

Among the marine mammals of the region the outstanding pinniped is the Hooker's (or New Zealand) sea lion. This species, possibly the rarest of the world's five sea lions, is particularly vulnerable, with fewer than five significant breeding sites in existence, and all of them located at the one island group — the Auckland Islands. The two main breeding grounds, Enderby Island and Dundas Island, are only 7 km apart. The accidental killing of sea lions in the Auckland Islands squid fishery is of serious concern and is being addressed through a long-term study of foraging and population dynamics, the enforcement of bycatch limits, and maintenance of the marine mammal sanctuary surrounding the Auckland Islands.

New Zealand fur seals, a species restricted to the New Zealand and south-east Australia regions, are less threatened, but recovery from nineteenth century exploitation is slow to occur at some of the islands. Ironically, the largest (and growing) population occurs at the smallest of the groups — the Bounty Islands. Southern elephant seals are in low to moderate numbers everywhere, with most of the breeding occurring at Antipodes and Campbell.

Socialising sea lions: Hooker's sea lions are fond of tactile contact. This group is at Sandy Bay, Enderby Island  
*Murray Williams*



Elephant seals, Campbell Island. Some of them are moulting  
*Peter Moore*



Of special interest is the dramatic recovery of the region's southern right whales from the brink of extinction. The recovery of these baleen whales is demonstrated at Auckland and Campbell islands every winter, when herds gather in sheltered waters for the breeding season. No other whale species is conspicuous in the New Zealand subantarctic region, although several species are known to occur in these waters. The region forms part of the international Southern Ocean Whale Sanctuary, which New Zealand recognises.

### 5.1.5 Unique invertebrate communities

For insects and other invertebrates, the islands are isolated refuges where endemism is common. Each island group supports distinct communities, with most invertebrate categories containing numerous examples of endemic taxa. The Snares mark the southern limit for many New Zealand mainland groups. Each of the island groups has an endemic species of weta (Orthoptera). Almost a third of the insects on the Auckland Islands are considered endemic. The level of endemism rises in the moths. Across the five island groups, 46% of moths are endemic either to the island group or to the region. For some invertebrates, the endemism occurs at genus and tribal level. An



One of the endemic moth species of the Auckland Islands is *Asaphodes oxyptera*. Like many of the moths of the New Zealand subantarctic region, the short-winged female (pictured) cannot fly.

Brian Patrick

example is the Bounty Islands flightless beetle *Bountya insularis*, the only representative of its tribe in New Zealand.

### 5.1.6 Distinctive and spectacular subantarctic flora

Plant life takes on interesting new dimensions at the New Zealand subantarctic islands. Woody species common on mainland New Zealand reach their southern limit here, including the red-flowering rata (which forms New Zealand's southernmost forest), tree daisies, tree ferns, giant tree fuchsia, *Myrsine*, *Dracophyllum*, *Cassinia*, and a range of small-leaved coprosmas. But the herbs are really the stars of the show. Exhibiting flower displays redolent of a tropical environment and colours reminiscent of continental alpine meadows, they grow to formidable size, both in their flowerheads and in their foliage. The three pleurophyllums are endemic to the larger region (including Macquarie Island). Equally spectacular for size and inflorescence are *Stilbocarpa*, *Anisotome* and *Bulbinella*. Endemic species of gentian, daisy, willowherb, cress and forget-me-not (*Myosotis*) are smaller, but no less colourful. The compact daisy *Damnania* is endemic to the southernmost two groups (Auckland and Campbell). Grasses restricted to the region include the tussock-forming *Chionochloa antarctica*.

Southern rata in full flower at Erebus Cove, Port Ross. The light-green foliage is that of the tree daisy *Olearia lyallii*.

Peter Johnson



The cool, moist climate favours a profusion of mosses and liverworts, many of them found only in the region.

The most vulnerable plant species is *Anisotome acutifolia*, a large herb in the carrot family, which is found at a few sites at The Snares. Threats to it include the collapse of cliffs through erosion, or disturbance through the spread of penguin colonies.

A total of about 250 indigenous vascular plant taxa occur at the five island groups. Thirty-five taxa are endemic. The habitats are hugely contrasting. They range from lichen-encrusted granite at the Bounty Islands to forested areas as at The Snares and the Auckland Islands. Terrestrial vegetation also encompasses extensive giant tussock grasslands, herbfields, shrubland zones and, on the higher southern islands, tundra-like fellfield. This diversity of habitats reflects the six degrees of latitudinal spread of the islands, their isolation from each other, and their differing geological origins. The paucity of species in the flora of The Snares (just 20 indigenous species) contrasts with the relative richness of the larger, but more southerly Auckland Islands group, where there are almost 200 indigenous vascular plant species. Altogether, the five groups present an outstanding sequence of vegetation in a cool-temperate oceanic region. For the most part the vegetation is close to pristine. Certainly each group has areas where disturbance from humans or alien animals is undetectable, and experience has shown the ability of the vegetation to recover once disturbing factors are removed.

### 5.1.7 Dependence on the marine environment

The sea is vital to much of the fauna referred to above, right down to the numerous invertebrates inhabiting the coastal zone. For seals and penguins especially, the intertidal zone links their water world with their life ashore. As far as they are concerned, the link is seamless. The marine environment is too important to the numerous biota encountered on land for it to be ignored in this nomination. Accordingly, this nomination contends that World Heritage Listing should extend to the 12 nautical mile territorial limit. The importance of the surrounding seas to the fauna encountered on land — in particular, sea lions and other seal species — has already been given statutory recognition in the Auckland Islands through the creation of a marine mammal sanctuary. Its seaward boundary is the 12 nautical mile limit.

## 5.2 CRITERION II

**Sites nominated “should be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, freshwater, coastal and marine ecosystems and communities of plants and animals”.**

The fauna and plant communities of the five island groups provide an insight into the evolutionary processes affecting widely dispersed oceanic islands. The biota has been strongly influenced by isolation over a long period together with climatic factors controlled by ocean currents, and the 6 degrees of latitudinal spread. In the case of the three volcanic groups, the evolutionary timeframe has varied from 25 million years at the Auckland Islands to under one million years at the Antipodes group. Thus the islands carry biota ranging from relatively mature endemic forms to relatively immature taxa. In short, they represent a fascinating laboratory for the study of genetic variation, speciation and adaptation in the Insulantarctica biogeographic province.

As an example of the ongoing evolution and development of the flora, the gentians have given rise to an intriguing theory of dispersal. The theory, in the throes of being

tested, holds that New Zealand's gentians have a single ancestor that arrived at the subantarctic islands from South America. There is a clue in the flower colours. The four subantarctic species, all endemic to the region, exhibit strong colours, chiefly purple and blue hues, and in this way they are similar to South American species. The mainland New Zealand species, on the other hand, are generally paler and often white. Among other herbs of the New Zealand subantarctic region, the development of large leaves (macrophyly) is a characteristic that at first glance appears to be at odds with the climate, especially the exposure of the herbfields to wind chill and perhaps frosts. Selection for large-leaved forms, however, is explained by the equable oceanic climate, the absence of severe frosts, the ability of the leaves to avoid wind damage by lying flat, and the advantage of large size in the absorption of solar radiation — the “solar panel” effect. Large size, in both foliage and flower structure, could also be a response to a high-fertility environment. As for the strong colours in the flowers, the suggestion is that deep colours rather than light ones absorb more warmth from weak rays of sunshine.

The New Zealand subantarctic islands are of global scientific significance because they largely retain their natural character within a “crossover” zone between the temperate environment of the South Island and the cool-temperate environment that prevails south of Stewart Island. In terms of vegetation, the result is a distinctive gradient from forest to fellfield, demonstrated by the extensive forest as at The Snares, the coastal forest and shrubland as at the Auckland Islands, a near-continuous cover of maritime tussock grassland as at the Antipodes, and grassland mixed with shrubland, herbfield, cushionfield and alpine-like fellfield as at Campbell Island. Some plants are testing the limits of their ecological tolerance. At the more southerly islands, the conditions at sea level can be compared to those at an altitude of 1,000 m in mainland New Zealand mountains. The *Olearia* (large floppy leaves) at The Snares is replaced by rata (narrow elliptic leaves) at the Auckland Islands and a dwarf forest of *Dracophyllum* (spiky, linear leaves) at Campbell Island. The Snares are of international significance because they preserve some of the world's last remaining areas of forest vegetation unmodified by humans or alien animals. These forests, dominated by *Olearia* tree daisies, are unique in the world. In addition, the flora of the Auckland Islands is immensely rich compared to other biogeographically comparable islands in Southern Ocean (see **Section 5.5**).

In respect of the avifauna, the New Zealand subantarctic islands are notable for the number of endemic species, subspecies and special forms that survive there, reflecting eons of adaptation and selection. Selection for flightlessness, or at least a life spent mainly on the ground, is pronounced. (The New Zealand subantarctic invertebrates also display an unusually high degree of flightlessness.) The Auckland Island teal and Campbell Island teal evolved flightless forms independently. They probably resulted from separate invasions of brown teal from the New Zealand mainland in the distant past. Several other subantarctic land birds exhibit reduced powers of flight: the three snipe, Auckland Island rail, and Snares fernbird. The parakeets, too, spend a good deal of time foraging at ground level. Unfortunately, this unwillingness to fly, together with a ground-nesting habit, has made a high proportion of the land birds vulnerable to alien mammalian predators (where such introductions have occurred).

Parakeets play a conspicuous role at the Antipodes Islands and Auckland Islands. The two endemic forms at the Antipodes, including a full species, are thought to have evolved following a double invasion of a similar ancestor. The larger Antipodes Island parakeet is probably descended from the original colonist, while the smaller Reischek's parakeet is only subspecifically distinct from the red-crowned parakeet of mainland New Zealand. The two parakeets of the Antipodes display significantly different feeding behaviour. The larger bird feeds mainly on tussock and sedge leaves, whereas the

smaller Reischek's parakeet is predominantly a seed-eater. The red-crowned and yellow-crowned parakeets of the Auckland Islands are considered identical to the mainland forms. As on the mainland, they have distinct niches, with red-crowned favouring shrublands and more open habitats and the yellow-crowned found more commonly in tall shrubland and forest.

The subantarctic tomtits, isolated over a long period, have evolved colour forms that differ from their mainland counterparts. Whereas the mainland birds are sexually dimorphic (males are pied and in the South Island males are yellow-breasted; females are brown-grey), the Snares Island tomtits are completely black in both sexes, and the Auckland Island tomtits are different again, with females resembling the pied males.

All the land birds are presumed to have flown to the islands from New Zealand or Australia, or to have been blown there by high winds. So long as the wind patterns continue, the process will no doubt introduce more species by this natural method. The most recent example is that of the South Island fantail, an insectivorous forest bird, which has colonised The Snares in the late 1970s or early 1980s. Today, a large breeding population exists in the forest of The Snares.

Speciation among seabirds has been assisted by the tendency of most species to return to the same breeding grounds year after year. This fidelity to the natal site is a characteristic of the albatrosses especially. Some species circumnavigate the Southern Ocean using the persistent westerly winds.

Long-term monitoring of seabird populations can reflect changes in the ocean associated with circulation or climate change. The process is dynamic. Populations are presumed to increase when there are productivity gains at sea, and vice versa. The widespread and dramatic decline of eastern rockhopper penguins since the 1940s has prompted researchers to speculate on the causes. One theory links their decline to global warming and the migration of krill (upon which the eastern rockhoppers depend) southwards largely out of reach of the penguins. Eastern rockhopper colonies monitored at Campbell Island continue to shrink. Further contraction at the periphery of colonies was observed over the 1996/97 summer. Colonies of grey-headed mollymawks at Campbell have also declined significantly, with the decline showing up well before the onset of the fisheries bycatch problem in the 1960s. On the other hand, the numbers of southern royal albatrosses, a long-lived slow-reproducing species, appear to be steadily increasing at the breeding sites at the Campbell and Auckland islands, and the Campbell mollymawk population is stable.

Many factors underlie the way birds and marine mammals exploit the seas around the New Zealand subantarctic islands. The dynamics of dependency are only sketchily known. For example, only recently has the foraging behaviour of the sea lion population of the Auckland Islands been revealed. There is much to learn about the interaction of marine-dependent fauna with the sea, and the New Zealand subantarctic region is a seminal "laboratory" for the scientific study of this relationship.

### 5.3 CRITERION III

**Sites nominated "should contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance".**

The aesthetic qualities of the New Zealand subantarctic islands are wildly and somewhat unpredictably changeable. Natural beauty here can depend on the angle of sunlight, the clarity of the humid atmosphere, and the mood of the sea, which may be pulverising exposed bluffs on one side of an island while lying unruffled and mirror-

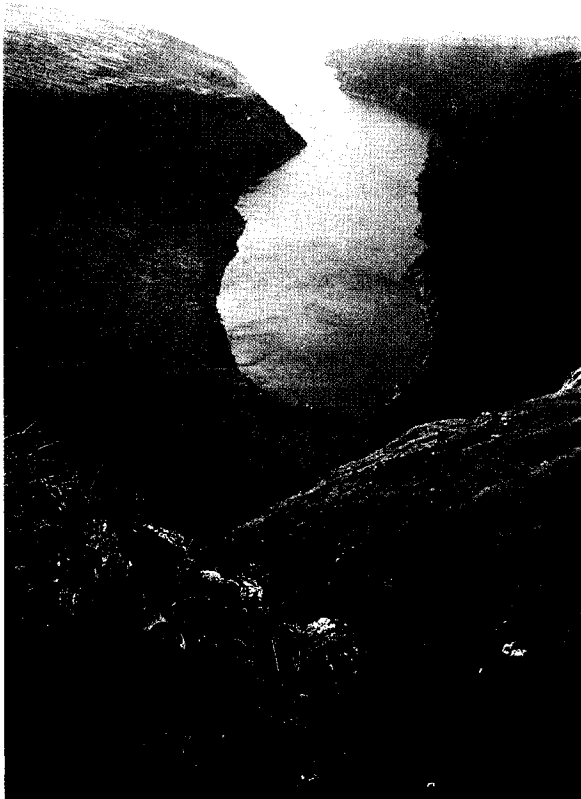
like in a fiord on the other side. Gale-force winds may make waterfalls “smoke” and run uphill on towering cliffs, or a mass flowering of megaherbs can transform an otherwise grey day into one shot through with exquisite colours. There are days when these islands are enveloped by an unsurpassed bleakness and days of bright blue clarity when they are the most invigorating and wild places on earth.

The three southernmost groups offer impressive volcanic landforms that loom out of a vast ocean, lonely and forbidding. The landforms vary in maturity. They include domes, cones, craters, plugs and a complex sequence of scoria and lavas. Columnar jointing of the basalt is strikingly exposed at the Port Ross area of the Auckland Islands and at Anchorage Bay at the Antipodes. Bollons and Archway islands at the Antipodes form a fragmented curving rim of an eroded crater that gives a strong impression of how these islands were thrust up from under the sea. Major erosional features at the Auckland and Campbell groups include calderas that have been flooded by rising sea levels following the ice ages. On the Auckland and Campbell islands (the two highest groups), glaciation has left the characteristic imprints of ice on the land: cirques, moraine-dammed lakes, and gouged valleys, some of which have been converted into fiords by higher sea levels.

But the most spectacular landscape features were created by marine erosion. Extraordinary cliffs, rock stacks, coves, sea caves, and wave-cut platforms have been carved by the sea. The western flanks of the Auckland Islands and Campbell Is-

land volcanoes have been obliterated, leaving an awesome line of cliffs perpetually wreathed by boiling surf and swirling bull kelp. At the Auckland Islands the cliffs rise almost sheer for up to 600 m, exposing layer upon layer of stratified lava, which reveal the long volcanic history of the islands. By contrast, the eastern flanks of the Auckland and Campbell groups exhibit a gentler topography, much indented by bays and inlets.

The two northernmost groups, The Snares and Bounty Islands, are of older origin - the fragmented crests of ancient granite basement. The low-profile Bounty Islands present a picture of starkness; the main islands of The Snares, on the other hand, are well vegetated, thanks to their greater elevation.



Fly Harbour, Adams Island, an ice-gouged valley now a fiord. A light-mantled sooty albatross is nesting in the foreground.  
*Lou Sanson*

The albatross, the largest and most impressive of seabirds, symbolises the isolation and aesthetic quality of the subantarctic islands  
*DOC*



In the world of birds, there are few more imposing sights than the mass flocking of sooty shearwaters over The Snares, an event that is repeated at dawn and dusk throughout the breeding season. Hundreds of thousands of birds are in the air at once. The lightening sky in the morning darkens for a time until the birds have all moved out to sea for the day. The prolific life of the New Zealand subantarctic islands produces some unusual associations: albatrosses and penguins cohabiting rock slabs with fur seals (Bounty Islands); parakeets foraging around penguin colonies (Antipodes Islands); and yellow-eyed penguins running a gauntlet of unruly breeding sea lions to get to or from the sea (Auckland Islands). The region is not short of natural wonders.

Elements of the vegetation are equally startling. Rata forest reddening the Auckland Islands coastline in summer is a counterpoint to the often overcast, drizzly weather. (Flowering occurs weeks later than on mainland New Zealand.) Of course, colours become even bolder on the landscape in the meadows of megaherbs. They inspired a member of an early expedition (R. McCormick, of Sir James Clark Ross's 1840 expedition) to describe them as "the special glory of these subantarctic islands". In more recent times, the flora and fauna of the New Zealand subantarctic islands have been recognised in a medium that is in daily use in the populated parts of New Zealand — bank notes. The five-dollar note depicts the flowerheads and foliage of the megaherbs *Bulbinella rossii* and *Pleurophyllum speciosum*, together with a yellow-eyed penguin.

#### 5.4 CRITERION I

**Sites nominated "should be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features".**

The geology of the New Zealand subantarctic islands plays an important role in unraveling the volcanic and tectonic history of the South-west Pacific Basin south of New Zealand. The volcanoes that formed the Auckland, Campbell and Antipodes groups are linked to each other (and to old volcanoes in eastern South Island) by a pattern of migrating volcanism in the late Cenozoic. This pattern was probably generated by the westward passage of a continental crustal plate carrying the South Island, Campbell Plateau and Bounty Platform over a north-south-trending hot zone of upwelling in the mantle. The eastward progression of volcanism accounts for the varying age of the three groups, with the Auckland Islands the oldest (up to 25 million years) and Antipodes Islands the youngest (five million years to under one million years).

The Snares and Bounty islands, in contrast, are the highest points of the granite and metamorphic masses forming the basement of the Campbell Plateau and Bounty Platform, with The Snares being a remnant of an ancient batholith that includes the southern part of Stewart Island. Metamorphic rocks of the basement, exposed at Campbell Island, are the subject of ongoing geological studies. Another study is monitoring the movement of the volcanic groups in relation to each other, and to mainland New Zealand and Antarctica, through the GPS satellite system. The GPS benchmarks established at Campbell, Auckland and Antipodes islands are part of a chain of benchmarks in the New Zealand region, stretching from the subtropical Kermadec Islands to the Ross Dependency sector of Antarctica.

Although free of ice today, Auckland Island and Campbell Island retain classic glacial landforms. Pleistocene ice caps and valley glaciers produced a pattern of radiating U-shaped valleys, with cirques formed in the upper reaches and sea subsequently filling the lower reaches of the valleys to create fiords.



The New Zealand Geological Society has identified two sites of national importance and nine sites of regional importance at the New Zealand subantarctic islands. The two national sites are at Auckland Island: (1) the western cliff lava flows, thought to be the thickest exposed sequence of lava flows in the New Zealand region; and (2) the Musgrave Peninsula granite, an outstanding exposure of basement rock of Cretaceous age. The nine regionally important sites are all at the volcanic groups (Auckland, Campbell and Antipodes). Among them are spectacular scoria cones at the Antipodes and Auckland Islands, columnar jointing at the Antipodes and an intrusive plug at Beeman Hill, Campbell Island.

## 5.5 COMPARISON WITH OTHER SOUTHERN OCEAN ISLANDS

The five New Zealand subantarctic island groups share the Southern Ocean with 15 other major oceanic islands, or island groups, administered by five other countries, as follows :

- Tristan da Cunha, Gough Island, Falkland Islands, South Georgia and South Shetland Islands, administered by the United Kingdom (sovereignty over the last three groups is disputed by Argentina)
- Ile Amsterdam, Ile Saint-Paul, Iles Crozet and Iles Kerguelen, administered by France
- Prince Edward Islands, administered by South Africa
- Macquarie Island, Heard and McDonald Islands, administered by Australia
- Bouvetoya, administered by Norway
- South Shetland Islands and South Orkney Islands, administered internationally under the Antarctic Treaty

These islands range from latitude 37° south to 62° south and exhibit marked diversity in their physical make-up and biological composition. However, they can be grouped within three well-recognised biogeographic zones or sub-divisions of the Province of Insulantarctica, viz. maritime antarctic zone, lying appreciably south of the Antarctic Convergence; subantarctic zone, in the vicinity of the Antarctic Convergence; and cool-temperate zone, comprising that area between the Antarctic and Subtropical Convergences (Figure 1). According to this classification, the New Zealand Islands are located in the cool-temperate zone, where the islands are characterised by a vegetation cover in which trees or woody plants are common (the Bounty Islands, without terrestrial vegetation are an exception), and a mean annual temperature generally higher than 5°C. Allied to the New Zealand islands as cool-temperate islands are Tristan da Cunha, Gough Island, Ile Amsterdam, Ile Saint-Paul and the Falkland Islands.

Macquarie Island, although a close neighbour of the New Zealand islands in the Pacific sector of the Southern Ocean, is classified biogeographically within the Subantarctic Zone. Located at around 54°30' south latitude, it lies considerably poleward of Campbell Island (52°33's). It is also colder (mean annual temperature 4.4°C) than the New Zealand islands and its vegetation communities are without woody plants. Thus, in a biogeographical sense, Macquarie Island constitutes a southern extension to the New Zealand subantarctic island region.

Despite the differences, Macquarie Island has many biological affinities with the New Zealand islands, sharing many of the same plants, breeding seabirds and marine mammals. There are also close links in the early European history between Macquarie Island and the New Zealand islands, particularly in the sealing and whaling era. Given their overlaps in natural and cultural heritage values, it has been suggested previously that there could be merit in combining Macquarie Island and the New Zealand islands in establishing a single international World Heritage site.

In assessing the relative merits of the Southern Ocean islands for World Heritage designation, it is most logical to limit comparisons to islands within a single biogeographical zone - a principle established by an IUCN study on the application of the World Heritage Convention to islands of the Southern Ocean (IUCN 1992). Thus, the following discussion encompasses islands in the cool-temperate zone only.

In Figure 9 these cool-temperate islands are compared in terms of their protected area status, their biological and landscape features, and some details of human modification of the natural environment (a tabulation of these characteristics for the rest of the Southern Ocean islands is in the Appendix).

The New Zealand islands are all legally protected as nature reserves, consistent with the legal requirements and management standards established by IUCN as Category I Strict Nature Reserves. They are also accorded greater security of legal protection, equivalent to that of a national park, through their designation as national reserves. The Prince Edward Islands were accorded the status of Special Nature Reserve in 1995, by proclamation under national conservation legislation, accompanied by an official management plan.

The French Islands, Ile Amsterdam and Ile Saint-Paul, are designed under somewhat outdated legislation as 'parc national antarctique francais', but in the absence of official management plans their management is probably equivalent to that of IUCN Category IV Habitat/Species Management Areas.

Tristan da Cunha and the Falklands are distinguished from all other islands in the Southern Ocean by the presence of substantial human populations and long-standing agricultural settlement. Protected areas are limited (less than 1% of the total area at the Falklands and approximately 11% at Tristan da Cunha). Protected areas at these groups range from nature reserves to managed resource protected areas. Some are in public ownership and some are privately owned. Gough Island is protected according to a legal management plan as a nature reserve. It is also currently the only island in the Southern Ocean accorded World Heritage status.

While there are restrictions on vessels and human activities, especially fishing, in territorial waters surrounding all islands, the marine mammal sanctuary at the Auckland Islands is the only legally established marine protected area in coastal waters at the cool-temperate islands.

In terms of the diversity of indigenous biota, the Auckland Islands group ranks highest among the islands, with 196 species of higher plants and at least 46 breeding bird species. Indeed, the indigenous plant life at the Auckland Islands is more diverse than at the Falkland Islands group despite the Falklands being more than 20 times larger in land area and including more than 400 islands. The Campbell Islands group, with 143 species of indigenous vascular plants, ranks next in order for diversity of plants. The Antipodes Islands have a higher number of indigenous plants (68) than Gough Island (63) despite being only one third as large in area as Gough island.

With respect to numbers of indigenous breeding birds, the Auckland Islands outrank all islands except the Falklands, while Campbell Island and The Snares have bird numbers comparable with Tristan da Cunha and Gough Island, and many more than the French islands.

Information on numbers of endemic plants is insufficient as a basis for making comparisons. The Falklands group surpasses the Auckland Islands in its number of endemic bird species, but the latter island group outranks all other groups, followed by The Snares, Antipodes and Campbell Island.

In respect of the presence of alien mammalian predators and pests, the New Zealand islands are much more favourably placed than virtually all other groups. Two of the New Zealand island groups are notable, not just in the Southern Ocean but in the world, for being entirely free of alien mammals. Moreover, the Antipodes has the house-mouse only, a characteristic it shares with Gough Island. In contrast, the other island groups have significant numbers of alien mammals, including: 10 species at the Falklands; eight at Tristan da Cunha; four on Ile Amsterdam and three on Ile Saint-Paul.

A comparative study of islands of the Southern Ocean, conducted by IUCN, (IUCN, 1995), uses delphi analysis to rank various attributes of the islands according to the criteria for assessing World Heritage value. This is a useful guide to the relative standing of the islands as potential World Heritage sites.

Figure 9: Comparative features of the New Zealand islands and other islands of the cool-temperate biogeographic zone in the Southern Ocean.

	Sovereignty	IUCN Category	Indigenous Vascular Plant Species	Breeding Bird Species	Endemic Vascular Plant Species	Endemic Bird Species	Endangered Plants and Birds	Ecosystem Diversity (Range) Marine/Coastal/Alpine	Introduced Mammal Species Established	Numbers of Introduced Animal	Introduced Vascular Plant Species	Degree Modification by Humans (0-3 none, low, medium, high)	Aesthetics, Scenery, Landscape, Geological, Physical character
<i>Cool-Temperate</i>													
Tristan da Cunha	UK	I-V	70	24	30?	1	0	M-CA	Cat, Dog, Ship rat, House-mouse, Donkey, Pig, Cattle, Sheep	7	100	1-3	3 major islands, 11,100 ha, 2060 m highest point, Tristan roughly circular with several coastal strips and steep cliffs, volcanic cone, basaltic lava, 1700 mm/year rainfall
Gough	UK	I	63	22	several	2	0	M-C	House-mouse	1	24	1	1 island, 6,500 ha, 910 m highest point, central plateau of rounded hills with several mountain peaks, summit of volcanic composition, 3400mm/year rainfall
Amsterdam	France	IV	?	8	1	1	1 plant	M-C	Cattle, Norway rat, House-mouse, Cat	3	many	3	1 island, 5,500 ha, 911 m highest point, steep coastal cliffs, central crater with large plateau, no volcanic activity, 1100 mm/year rainfall
Saint Paul	France	IV	?	5	?	0	0	M-C	Rabbit, Norway rat, House-mouse	3	many	3	1 island, 700 ha, 272 m highest point, triangular shaped island, summit of a volcano, 200 m high cliffs, crater rim, thermal springs, several offlying islets, 1100 mm/year rainfall
Falklands (Malvinas)	UK (Arg.)	I-VI	163	63	?	16	2 plants	M-CA	Pig, Goat, Horse, Cattle, Rabbit, Norway rat, House-mouse, Cat, Dog, Fox	5?	92	0-3	2 main islands with 420 associated islands and islets, 1.3 million ha, 705 m, rugged and hilly, some steep cliffs, many bays and inlets, several small rivers, peaty soils, strong westerly winds, 635 mm/year rainfall
Snares	NZ	I	20	23	1	4	0	M-C	0	0	2	0	2 groups of islands, 341 ha, 152 m highest point, jointed granite composition, peaty soils widespread, strong westerly winds, 1200mm/year rainfall
Auckland	NZ	I	196	54	6	8	0	M-CA	Pig, Cat, House-mouse	2	37	0-3	8 islands, 62,560 ha, 705 m highest point, steep cliffs, hilly terrain, deep valleys, remains of 2 basaltic volcanoes, basement granite rocks, peaty soils widespread, strong westerly winds, 1500 mm/year rainfall
Campbell	NZ	I	143	29	3	3	0	M-CA	Cat, Norway rat	2	85	0-3	1 main island with 3 offlying islets, 11,331 ha, steep cliffs, large inlets, hilly terrain, numerous streams, remnant of dissected shield volcano, peaty soils, strong westerly winds, 1500 mm yearly rainfall
Bounty	NZ	I	0	7	0	1	0	M	0	0	0	0	20 small islands, islets and rocks, 135 ha, 88 m highest point, bare and spray-swept, granitic composition, early Jurassic age, no soil or terrestrial vegetation, persistent westerly winds, 1000-1500 mm/year rainfall
Antipodes	NZ	I	68	25	4	4	0	M-CA	House-mouse	1	3	1	1 main island with 4 offlying islets, 2097 ha, 366 m highest point, triangular shape, steep coastal cliffs, central undulating plateau, volcanic origin, phosphate-rich peat soils, westerly winds, 1550 mm/year rainfall

The study's consideration of cool-temperate islands ranks Gough Island highest overall in World Heritage value (Gough Island is inscribed on the World Heritage List), followed by the Auckland Islands, Tristan da Cunha, and The Snares.

The same ordering of the islands occurs when analysing the landscape values alone, but in respect of geological features the Auckland Islands and Campbell Island are ranked among the top three island groups. When measured in terms of biological diversity, Tristan da Cunha, Gough Island and the Auckland Islands are, again, the highest ranked, while The Snares and Bounty Islands are ranked along with Gough Island as the least affected by human modification. On the basis of this analysis - the only one available that specifically assesses the islands in relation to the principles of the World Heritage Convention - the high standing overall of the New Zealand Islands, relative to other cool-temperate islands, is noteworthy.

## 5.6 AUTHENTICITY

In recognition of the special nature and vulnerability of the fauna, flora and ecosystems of the New Zealand subantarctic islands, each of the five groups has been accorded the highest form of protection available under New Zealand law — that of National Reserve, reinforcing the status of Nature Reserve.

The islands are managed as closely as possible to a state of nature. Legally binding protective measures are comprehensive. Introduced plant species present little threat to indigenous ecosystems. The removal of the few remaining animal pests on the main islands of Auckland, Campbell and Antipodes is a priority under the Conservation Management Strategy (CMS) for the islands, (soon to proceed from draft to final form). The CMS is a visionary document that incorporates the provisions of extant management plans for each island group, and integrates management for all island groups under a single document.

The integrity of the five groups is demonstrated by their sharing of elements of biota that rarely occur outside the region. Examples include the megaherbs (*Pleurophyllum*, *Bulbinella*, *Anisotome*, *Damnamentia*) and the large tussock-forming grasses (*Poa*, *Chionochloa*). Several species of penguin, albatross and cormorant are unique to the region. Although the Bounty Islands are mere specks of land that make little contribution to the total land area of the region, they provide vital staging points for a number of sea birds and for fur seals as well.

Humans are insignificant in the ecological picture of the islands today. Nowhere is there a permanent human settlement, and there are no roads. Track development is limited to the provision of boardwalks at a handful of designated tourist landing places. Tourism is strictly controlled and a code of conduct enforced by representatives of the Department of Conservation. A maximum of only 600 tourists a year are permitted to land. Despite the low level of tourism, there is monitoring of the landing sites to check for any adverse impacts.

A World Heritage Listing that ignored the marine environment would be failing to acknowledge the importance of the sea to the bulk of the fauna. The nominated area extends to the 12 nautical mile limit, which is the most realistic juridical boundary.

At the Auckland Islands it coincides with the boundary of a marine mammal sanctuary.

## 6. Summary

The New Zealand subantarctic islands are of international importance as refuges for a diverse range of fauna and flora. The five island groups, and the seas surrounding them, constitute a haven of endemism, the culmination of a long history of geographical isolation from each other and from the New Zealand mainland. Themes of endemism and diversity apply to each group of islands, and together they form a distinctive unit linked by their location in a productive sector of the Southern Ocean. Some of the least-modified islands in the Southern Ocean (and some of the rarest biota) are found here.

This nomination for World Heritage Listing is made largely on the basis of Criteria IV, II and III, although all four criteria are addressed.

In terms of natural features of “outstanding universal value”, the New Zealand subantarctic islands support:

- The most diverse community of seabirds in the world
- Ten seabird taxa endemic to the region, including six species (three shags, two albatrosses, one penguin) restricted to single island groups
- Ten albatross species (42 percent of world taxa), including six species endemic to the region and one New Zealand endemic species
- Four penguin species, including two endemic to the region and one New Zealand endemic
- The largest populations of “wandering” great albatrosses (Gibson’s albatross and antipodean albatross) found at a single breeding area anywhere in the world
- The world’s rarest cormorant (Bounty Island shag), the world’s third rarest duck (Campbell Island teal) and one of the rarest penguins (yellow-eyed penguin)
- Thirty percent of the world’s petrels (Procellariidae) — 21 species or subspecies
- A phenomenally large population of breeding seabirds (over six million estimated) at The Snares
- Eleven percent of all seabird species in the world (40 taxa)
- A rare and threatened sea lion, whose principal breeding range is restricted to fewer than five sites
- A significant breeding population of southern right whales, formerly endangered
- Fourteen endemic land birds (all restricted to single island groups)
- One of the largest vegetated islands in the world (Adams Island, 10,119 ha) free of alien mammals — and potentially, the whole region free of alien mammals
- A genetically distinct vascular flora of about 250 taxa, 35 of them endemic to the region and several endemic to a single island group
- Spectacular megaherbs including three species in the daisy genus *Pleurophyllum* (two endemic to the region, the third found also at Macquarie Island) and two in the genus *Stilbocarpa*
- A threatened megaherb, *Anisotome acutifolia*, restricted to a few sites at The Snares
- The southernmost tree ferns in the world and the southernmost forest (rata) in the South-west Pacific
- A distinctive community of invertebrate fauna, much of it endemic to the region
- Eleven geological sites and landforms of national and regional importance

- Spectacular sea-eroded cliffs up to 600 m high, exposing possibly the thickest sequences of lava flows in the New Zealand region
- Special aesthetic and wilderness qualities

In summary, the New Zealand subantarctic islands encapsulate a diverse set of natural heritage values, many of which are unique. Both to conservation and to science these values represent a taonga (treasure) of international significance. They are worthy of World Heritage listing.

# 7. Acknowledgements

This nomination document was researched and authored by Neville Peat, with the assistance of Les Molloy and Paul Dingwall, Department of Conservation, Wellington.

The following scientists and conservation officers are thanked for their advice and/or vetting of information:

Chris Adams, Simon Childerhouse, Elliott Dawson, John Dugdale, Nick Gales, David Given, David Glenny, Peter Johns, Peter Johnson, Pete McClelland, Colin Meurk, Peter Moore, Brian Patrick, Brian Rance, Christopher Robertson, Paul Sagar, Greg Sherley, Graeme Taylor, Ian Turnbull, Kath Walker, Murray Williams.

This document was designed by Becky Bliss of Design and Production. Manuscripts were typed by Lisa Tyler, Nesta Blackland Joanne Horner. The maps were drawn by Chris Edkins, Department of Conservation. Thanks are also due to Ian McKenzie for editorial assistance and Terry Connor for draughting advice.

Thanks are extended to the following for their contribution of photographs:

Wynston Cooper, Peter Moore, Neville Peat, Andrew Penniket, Chris Riley, Paul Sagar, Lou Sanson, Kath Walker, Paul Dingwall, Pete McClelland, Peter Johnson, Murray Williams, John Kendrick, T.E. Atkinson, G. Fleming, Dave Mail, Brian Patrick.

In the preparation of this nomination, the following parties provided valuable assistance and comment:

New Zealand Conservation Authority  
Ministry of Fisheries  
Ministry of Commerce  
Southland Conservation Board  
Antarctica New Zealand  
New Zealand Ecological Society  
Solander Holdings Limited, Nelson  
Labour Party of NZ  
Federated Mountain Clubs of NZ  
Te Runanga o Wharekauri Rekohu  
Ministry of Justice  
National Institute of Water and Atmospheric Research  
Office of Treaty Settlements  
Runanga o Ngai Tahu  
Minister for the Environment, Australia  
Ngai Mutunga ki Wharekauri  
Fiordland Travel  
Environment and Conservation Organisation of NZ  
Southland Museum and Art Gallery  
Te Puni Kokiri  
Department of the Prime Minister  
The Treasury  
Fishing Industry Board  
Fishing Industry Association  
Treaty of Waitangi Fisheries Commission  
Te Iwi Moriori Trust Board  
New Zealand Tourism Board  
Tchakat Henu Association of Rekohu Trust  
Royal Forest and Bird Protection Society  
Stewart Island Fishermans' Association  
World Wide Fund for Nature New Zealand



# 8. Selected Reading

## Books

Fraser, Conon 1986, *Beyond the Roaring Forties*, Government Printing Office, Wellington.

Heather, B.D. and H.A. Robertson 1996, *The Field Guide to the Birds of New Zealand*, Viking Penguin Books, Auckland.

Higham, Tim (ed.) 1991, *New Zealand's Subantarctic Islands - A Guide Book*, Department of Conservation Southland Conservancy, Invercargill.

Marchant S. and Higgins P.J. (coordinators) 1990, *Handbook of Australian, New Zealand and Antarctic Birds*, Vol.1 Parts A & B, Oxford University Press.

## Scientific Papers & Reports

Adams, C.J. 1981, Migration of Late Cenozoic Volcanism in the South Island of New Zealand and the Campbell Plateau, *Nature*, Vol. 294 No. 5837.

Campbell, D.J. and M.R. Rudge 1984, Vegetation changes induced over ten years by goats and pigs at Port Ross, Auckland Islands (subantarctic), *New Zealand Journal of Ecology* 7.

Clark, M.R. and P.R. Dingwall 1985, *Conservation of Islands in the Southern Ocean*, IUCN.

Cook, R.A. 1981, Geology and Bibliography of the Campbell Plateau, New Zealand, *New Zealand Geological Survey*, Lower Hutt.

Department of Conservation (Southland Conservancy) 1995, *draft Conservation Management Strategy Subantarctic Islands*.

Department of Lands and Survey 1987, Management Plan for the Auckland Islands Nature Reserve, *Management Plans Series No. NR19*.

Department of Lands and Survey 1984, Management Plan for The Snares Islands Nature Reserve, *Management Plan Series No. NR9*.

Department of Lands and Survey 1983, Management Plan for the Campbell Islands Nature Reserve, *Management Plan Series No. NR13*.

Department of Lands and Survey 1983, *Antipodes Islands Management Plan*.

Department of Lands and Survey 1983, *Bounty Islands Management Plan*.

Given, D.R. and R. Hnatiuk 1995, *Subantarctic Islands, Australia and New Zealand*, in S.D. David, V.H. Heywood and A.C. Hamilton Centres of Plant Diversity, WWF/IUCN.

Gressitt, J.L. and collaborators 1964, *Insects of Campbell Island*, Pacific Institute Monograph 7.

Gressitt, J.L. and collaborators 1971, *Entomology of the Aucklands and Other Islands South of New Zealand*, Pacific Institute Monograph 27.

Heath, R.A. 1985, A review of the physical oceanography of the seas around New Zealand, *New Zealand Journal of Marine and Freshwater Research*, Vol 19.

Hay, C.H., N.M. Adams and M.J. Parsons 1985, *The Marine Algae of the Subantarctic Islands of New Zealand*, National Museum of New Zealand, Miscellaneous Series No. 11.

ICUN 1992. Report of the Working Group on Application of the World Heritage Convention to Islands of the Southern Ocean. *Miscellaneous Report* (December 1992), IUCN, Gland, Switzerland, 13pp

IUCN 1995. Ranking the World Heritage Values of Islands of the Southern Ocean. *Miscellaneous Report* (April 1995), IUCN, Gland, Switzerland, 8pp.

Kennedy, J.A. and B.W. Hayward 1993, Inventory of important geological sites and landforms in the Southland region including the subantarctic islands, *Geological Society of New Zealand Miscellaneous Publication No. 78*.

- Kingsford, M.J., D.R. Schiel and C.N. Battershill 1989, Distribution and Abundance of Fish in a Rocky Reef Environment at the Subantarctic Auckland Islands, New Zealand, *Polar Biology* 9.
- McEwen, W. Mary (ed.) 1987, *Ecological Regions and Districts of New Zealand (revised edition), Sheet 4*, New Zealand Biological Resources Centre, Department of Conservation, Wellington.
- Meurk, C.D., M.N. Foggo and J. B. Wilson 1994, The vegetation of subantarctic Campbell Island, *New Zealand Journal of Ecology* 18 (2).
- Meurk, C.D., D.R. Given and M.D. Heatherington 1990, *Campbell Island vegetation map*, DSIR Land Resources, Wellington.
- Molloy, J. and A. Davies 1994, *Setting priorities for the conservation of New Zealand's threatened plants and Animals*, Department of Conservation, Wellington.
- Molloy, L.F. and P.R. Dingwall 1990, World Heritage Values of New Zealand Islands, in Towns D.R., Daugherty C.H. and Atkinson I.A.E. (eds) *Ecological restoration of New Zealand islands, Conservation Sciences Publication No. 2*, Department of Conservation, Wellington.
- Moore, P.J. 1992, Population estimates of yellow-eyed penguin (*Megadyptes antipodes*) on Campbell and Auckland Islands 1987-90, *Notornis* 39.
- Moore, P.J. and Moffat, R.D. 1990. Mollymawks on Campbell Island. *Science and Research Internal Report 59*.
- Moore, P.J., Scott, J.J., Joyce, L.J. and Peart, M. 1997. Southern royal albatross *Diomedea epomophora epomophora* census on Campbell Island, 4 January-6 February 1996, and a review of population figures. *Science and Research Series 101*.
- NIWA, 1996, map of *Undersea New Zealand*. 1:4,000,000. National Institute of Water and Atmospheric Research, Wellington.
- Patrick, B. 1994, Antipodes Island Lepidoptera, *Journal of the Royal Society of New Zealand*, Vol. 24 No.1.
- Robertson, C.J.R. and B.D. Bell 1984, Seabird Status and Conservation in the New Zealand Region, *ICPB Technical Publication No. 2*.
- Robertson, C.J.R. and G.B. Nunn in press 1997, Towards a new taxonomy for albatrosses, in Robertson G (ed.) *Ecology and Conservation of Albatrosses*, Surrey Beatty & Sons, Chipping Norton, Australia.
- Robertson, C.J.R. and G.Evan Tets 1982, *The status of birds at the Bounty Islands*, *Notornis* Vol 29 Part 4.
- Taylor, R.H. 1982, New Zealand fur seals at the Bounty Islands, *New Zealand Journal of Marine and Freshwater Research*, Vol. 16.
- Taylor, R.H. and G.A. Taylor 1989, Re-assessment of the status of southern elephant seals (*Mirounga leonina*) in New Zealand, *New Zealand Journal of Marine and Freshwater Research*, Vol 23.
- Udvardy, M.D.F. 1975, A classification of biogeographic provinces of the world, *IUCN occasional paper No. 18*.
- Williams, M and C.J.R. Robertson 1996, *The Campbell Island Teal*, *Wildfowl* 47.
- Young, E.C. 1995, Conservation values, research and New Zealand's responsibilities for the Southern Ocean Islands and Antarctica, *Pacific Conservation Biology*, Vol 2.

## Videos and films

- The Lost Whales* (50min), Television New Zealand Natural History Unit, Dunedin, 1997.
- No Place For People* (45min), South Coast Video, Riverton, 1996.
- Beyond The Roaring Forties*, National Film Unit, Wellington, 1986.
- Sea Lion Summer* (24min), Television New Zealand Natural History Unit, Dunedin, 1981.
- As It Wasn't In The Beginning* (24min), Television New Zealand Natural History Unit, Dunedin, 1981.

# Appendix

The following tables provide comparative information on the islands of the Subantarctic and Maritime Antarctic biogeographical zones of the Southern Ocean, as distinguished by Udvardy (1975). Subantarctic Islands are those located in the vicinity of the Antarctic Ocean, having vegetation dominated by phanerogamic communities (grasslands and herbfields) but without trees; where the mean annual temperature ranges from 1 to 5° C. Maritime Antarctic Islands are located appreciably south of the Antarctic Convergence and have cryptomagnic flora (mosses and lichens) without flowering plants; and a mean annual temperature generally lower than 0° C. The islands are compared in terms of their principal biological and landscape features, ecosystem diversity, and degree of modification of the natural environment by humans. Also compared is the protective status of the islands, using management categories of protected areas established by the World Conservation Union (IUCN) as follows:

Category I - Strict Nature Reserve/Wilderness Area, managed mainly for science and wilderness protection

Category II - National Park, managed mainly for ecosystem protection and recreation.

Category III - Natural Monument, managed mainly for conservation of specific natural features.

Category IV - Habitat/Species Management Area, managed for conservation through management intervention.

Category V - Protected Landscape/Seascape, managed mainly for land/seascape conservation recreation.

Category VI - Managed Resource Protected Area, managed mainly for sustainable use of natural ecosystems.

	Sovereignty	IUCN Category	Indigenous Vascular Plant Species	Breeding Bird Species	Endemic Vascular Plant Species	Endemic Bird Species	Endangered Plants and Birds	Ecosystem Diversity (Range/ Coastal/ Alpine)	Introduced Mammal Species Established	Numbers of Introduced Animal	Introduced Vascular Plant Species	Degree Modification by Humans (0-3 none, low, medium, high)	Aesthetics, Scenery, Landscape, Geological, Physical character
<i>Sub-Antarctic</i>													
Kerguelen	France	IV	36	30	2	2	?	M-C-A	Cat, Ship rat House-mouse Rabbit, Sheep Mouflon Reindeer	4	many	1-3	1 main island with approx. 300 offlying islets and rocks. 700,000 ha, 1850 m highest point, rocky shoreline, high mountains in the west, one large ice cap, numerous glaciers, volcanic origin, mainly basaltic rocks, strong westerly winds, 1100 mm/year rainfall
Crozet	France	IV	?	36	0	1	?	M-C-A	Cat, Ship rat House mouse	3	many	1-3	5 volcanic islands, 50,000 ha, 1090 m highest point, many volcanic cones, steep cliffs and slopes, some permanent ice, past glaciation
Heard and McDonald	Australia	I	8	19	0	1	0	M-C	0	0	3	0	Heard Island 38,000 ha, 2745 m highest point, volcanically active, ice up to 150 m, 90% glaciated, basaltic lava composition, little soil, strong westerly winds prevail. McDonald Island 260 ha, 230 m highest point, hilly interior with steep cliffs surrounding, much ice and little soil, basaltic lava composition, strong westerly winds prevail, offlying islets
Macquarie	Australia	I, IX	45	25	3	1 (subsp.)	?	M-C	Rabbit, Cat Chip rat House-mouse Weka	4	5	3	1 island, 12,785 ha, 433 m highest point, volcanic origin, rocky shoreline with steep cliffs, offlying islets, gravelly loam and acid peat soils, strong westerly winds, 900 mm/year rainfall
Prince Edward	S. Africa	I	24	29	0	1 (subsp.)	0	M-C-A	House-mouse (Marion I.)	1	14	1	Marion Island 30,000 ha, 1230 m highest point, oval shape, central mountainous slopes, volcanic, elevated lava ridges, peat soil at low altitudes, permanent ice on summit, strong westerly winds prevail, 2500 mm/year rainfall Prince Edward Island 4,400 ha, 672 m highest point, oval shape, high central area with volcanic cones, coastal plain in east, vertical cliffs in north and south, summit of a shield volcano, widespread peat soils, no permanent snow, strong westerly winds, 2500 mm/year rainfall
South Georgia	UK (Arg)	I	26	20	1	2	?	M-C-A	Norway rat	3	25	1-3	1 main and 6 smaller islands, 376,600 ha, 2950 m highest point, main island crescent shaped with a central mountain range, high sea cliffs except for north end, deep bays and fiords, 60% glaciation, strong winds, 1500 mm/year rainfall

	Sovereignty	IUCN Category	Indigenous Vascular Plant Species	Breeding Bird Species	Endemic Vascular Plant Species	Endemic Bird Species	Endangered Plants and Birds	Ecosystem Diversity (Range/ Marine/ Coastal/ Alpine)	Introduced Mammal Species Established	Numbers of Introduced Animal	Introduced Vascular Plant Species	Degree Modification by Humans (0-3 none, low, medium, high)	Aesthetics, Scenery, Landscape, Geological, Physical character
<b>Maritime Antarctic</b>													
South Sandwich	UK (Arg)	1	1	13	0	0	0	M-GA	0	0	0	0	11 islands, 31,000 ha, 1375 m highest point, most islands largely ice covered, basaltic composition, several islands volcanically active, strong westerly winds, much fog and cloud cover
South Orkney	Antarctic Treaty	1	2	13	0	0	0	M-GA	0	0	0	0	4 major islands, 62,000 ha, 1265 m highest point, numerous glaciers on Coronation Island, metamorphosed sediments with mineral and organic soil development, strong westerly winds prevail, 400 mm/year rainfall
South Shetland	Antarctic Treaty	1	0	17	0	0	0	M-GA	0	0	0	0	11 main islands, 470,000 ha, 1924 m highest point, rocky jagged coastlines, steep ice cliffs, many ice domes and glaciers, variable rock types, organic soils in some areas, much cloud cover and heavy fog, 400 mm/year rainfall
Bouvetoya	Norway	1	0	12	0	0	0	M-GA	0	0	0	0	1 island, 5,000 ha, 780 m highest point, domed plateau with steep cliffs, low lava platform on west coast, volcanic origin, basaltic composition, heavily glaciated, heavy cloud and fog

**Draft**

**Conservation**

**Management**

**Strategy**

# **Subantarctic Islands**

ISBN: 0-478-01769-3

ISSN: 1171-3526

Southland Conservancy Conservation Management Planning Series No. 6

Published by:  
Department of Conservation  
P.O. Box 743  
Invercargill  
New Zealand  
December 1995

## Foreword

New Zealand's five Subantarctic Island groups - the Auckland, Campbell, Antipodes, Snares and Bounty Islands - are some of the country's most remote protected natural areas. Being the only land masses in a vast expanse of the southern ocean, these islands are important habitats for marine mammals, penguins and countless numbers of seabirds, as well as some special terrestrial birds and plants. The southern ocean is the habitat of a diverse range of marine life, and a vast feeding ground for the wildlife which inhabits the Subantarctic Islands.

Oceanic islands are among the last bastions of nature in a world beset by massive and rapid change through human activity. New Zealand's Subantarctic Islands are among some of the least human-modified environments anywhere on the globe. Protection of these oceanic island and marine ecosystems in their natural state is of immense value to global conservation and science. They are of international significance.

The Subantarctic Islands also have a rich human history of exploration, shipwrecks, sealing and whaling, failed settlement, and wartime coastwatching. Today they are becoming increasingly attractive for tourism.

The islands have all been given the highest form of protection available in New Zealand law - they have the status of national nature reserves under the Reserves Act 1977. During the early 1980s, a separate management plan was prepared for each nature reserve (or island group). Those five management plans are now to be replaced with this Conservation Management Strategy (CMS) - it is an opportune time to review the management policies contained in the plans, most of which have been operative for over ten years. The CMS is also required to address marine habitats and resources in the surrounding southern ocean, and the vital connections between land and sea.

There will be 17 CMSs prepared to cover the whole of New Zealand and the surrounding sea out to the extent of the Exclusive Economic Zone. The Subantarctic Islands, like the Chatham Islands, are covered by a specific CMS - recognising the distinct natural values and international significance of the Subantarctic region.

This Draft CMS has been prepared in consultation with the Southland Conservation Board and a number of experienced scientists, wildlife managers, tour operators and others familiar with the Subantarctic Islands. While some differing viewpoints are discussed in this Draft CMS, the proposed management strategies are those adopted by the Department of Conservation. They are now open for public scrutiny.

Following the time period for public comment (see following pages), the Department and the Southland Conservation Board will consider all submissions carefully and make any changes considered necessary to this Draft CMS. The revised Draft will then be sent to the New Zealand Conservation Authority for approval.

I welcome your comments on this Draft Conservation Management Strategy for the Subantarctic Islands and surrounding ocean.

Bill Mansfield  
Director-General of Conservation

## Acknowledgements

Many people have made significant contributions to this draft conservation management strategy (CMS).

Special thanks go to the participants at a CMS Workshop held during June 1994 - this Draft CMS has incorporated their contributions:

Brian Bell  
Ewan Cameron  
Colin Meurk  
Andrew Penniket  
Rodney Russ  
Rowley Taylor  
Rod Morris  
Derek Angus            )        Southland Conservation Board  
Sue Bennett            )  
Bill Gordon            )  
Roger Sutton           )  
Rangi Te Maiharoa     )

Andy Cox                )        Department of Conservation  
Paul Dingwall           )  
Phil Doole               )  
Wendy Evans             )  
Pete McClelland        )  
Colin Miskelly          )\*  
Hamish Rennie          )  
Lou Sanson              )

\* Sent written contributions

Thanks also to other staff of the Southland Conservancy and Head Office, Department of Conservation, who have put so much of their valuable time into this project.

Thanks to Sherryl McCammon who created the artwork for the cover; and to Chris Rance who persevered with the Tables.

Kerry Mawhinney  
Regional Conservator  
Southland Conservancy



## **Submissions**

### Information on Submissions

Submissions on this Draft Conservation Management Strategy are welcomed.

**Submissions must be received by Friday 26th April 1996.**

Address your submission to:

Subantarctic Islands CMS  
Department of Conservation  
P O Box 743  
INVERCARGILL

Submissions should include the following information:

- \* Your name, address and phone number
- \* Whether you are commenting as an individual or on behalf of an organisation
- \* Special interests/affiliations (if applicable)
- \* The specific part (or parts) of the CMS to which your comments refer
- \* Whether you support, oppose, or seek change(s)
- \* Your views and reasons for them
- \* A recommended change (where applicable); and
- \* If you wish to present your opinions by any other medium (verbal or video).

This will help us in analysing the submissions. Should you want to make a submission by any medium other than writing, you will need to register that intent - please send a brief letter setting out what you want to do. Everyone who asks to be heard in support of their comments will be given a reasonable opportunity to do so at a meeting of representatives of the the Director-General of Conservation and the Southland Conservation Board. Any such meetings required will most likely to held during May/June 1996.

After all submissions have been made, a summary of them will be prepared. The Department will then revise the draft CMS and present it to the Southland Conservation Board for consideration.

For further information, please contact the Department of Conservation office at Invercargill:

Address: State insurance Building, Don Street, Invercargill  
Phone: 03-214 4589 Fax: 03-214 4486

# Contents

Foreword

<b>Part 1: Introduction</b>	<b>1</b>
1.1 What is a Conservation Management Strategy?	1
1.2 Subantarctic Islands - The Setting	3
1.3 Kaupapa Maori	16
1.4 Conservation Significance	17
1.5 The Future	21
1.6 Statutory Basis For Management	22
<b>Part 2: Ecosystems Management</b>	<b>29</b>
2.1 Rationale	29
2.2 Island Management Objectives	31
2.3 Terrestrial Ecosystems Management	32
2.3.1 Restoration	32
2.3.2 Pest Animals	33
2.3.3 Pest Plants	39
2.3.4 Fire Control	42
2.4 Marine Ecosystems	43
2.5 Indigenous Species	47
2.5.1 Indigenous Species other than Marine Mammals	47
2.5.2 Marine Mammals	50
2.6 Survey, Monitoring and Research	52
2.7 Taking of Plants and Animals	55
<b>Part 3: Historic Resource Management</b>	<b>57</b>
3.1 Rationale	57
3.2 Threats to Historic Places	57
3.3 Present Management and Priorities	57
3.4 Kaupapa Maori	60
3.5 Visitor Use of Historic Places	60
3.6 Strategic Direction	61
<b>Part 4: Conservation Awareness</b>	<b>63</b>
4.1 Rationale	63
4.2 Information and Awareness Review	63
4.3 Strategic Direction	64

**Part 5: Visitor Impacts Management . . . . . 65**

5.1	Rationale . . . . .	65
5.2	Review of Visitation . . . . .	66
5.3	Impact Management Strategies . . . . .	71
5.3.1	Island Visits . . . . .	71
5.3.2	Disturbance of Wildlife . . . . .	75
5.3.3	Marine Mammal Viewing . . . . .	76
5.3.4	Facilities and Site Management . . . . .	77
5.3.5	Use of Aircraft . . . . .	80
5.3.6	Logistics and Surveillance . . . . .	81
		82

**Part 6: Resource Use and Estate Management . . . . . 83**

6.1	Resource Development . . . . .	83
6.2	Telecommunication Facilities . . . . .	84
6.3	Mining (Prospecting, Exploration and Mining) . . . . .	85

**Glossary . . . . . 87**

**Index . . . . . 94**

<b>Tables</b>	1	Geographical and Historical Details of NZ Subantarctic Islands	opp 17
	2	Conservation Status of Islands in the Southern Oceans	18
	3	Island Management Categories	after 32
	4	Categorisation of NZ Subantarctic Islands	after 32
	5	Threatened Species of NZ Subantarctic Islands	after 48
	6	Conservation Science and Research Themes of the NZ Subantarctic Islands and Southern Ocean	53
	7	Historic Places Selected for Active Management	59

<b>Maps</b>	1	Conservation Management Strategy Areas	after 2
	2	Bounty Islands, Snares Islands, Antipodes Islands )	after 16
	3	Auckland Islands )	
	4	Campbell Island )	

# Part 1: Introduction

---

## 1.1 What is a Conservation Management Strategy?

The purpose of a Conservation Management Strategy (CMS) is to provide for consistent, integrated policy-making and management of the protected natural areas, wildlife and resources administered by the Department of Conservation in accordance with New Zealand laws.

A CMS is a statutory document which implements general policies and establishes objectives for the integrated management of natural resources (including land and species) and historic resources. The conduct of some activities on lands administered by the Department of Conservation can only take place by and in accordance with the CMS. Those preparing regional and district plans in accordance with the Resource Management Act 1991 must have regard to any relevant CMS. It must be noted, however, that a CMS is generally a statement of intent and does not override the provisions of legislation, general policy and agreements.

The key concept is **integrated management** - to provide a more holistic approach recognising the linkages among things and their inter-dependence and/or independence. Before CMSs were required, separate management plans were prepared for individual protected areas, and policies for some management functions were developed in isolation from the management planning process. The CMS will avoid this by presenting a broad overview of issues and responsibilities, by providing long-term integrated strategies which set management directions for protected natural areas managed by the Department, and by advocating conservation of other natural and historic resources generally.

The area covered by this Draft "Subantarctic Islands" CMS is shown on the map overleaf. New Zealand's Subantarctic Islands have the status of National Nature Reserves under the Reserves Act 1977. They are currently managed by the Department in accordance with five separate management plans, one for each island group:

- . Antipodes Islands Nature Reserve Management Plan 1983
- . Auckland Islands Nature Reserve Management Plan 1987
- . Bounty Islands Nature Reserve Management Plan 1982
- . Campbell Island Nature Reserve Management Plan 1983
- . Snares Islands Nature Reserve Management Plan 1984

The CMS will replace these five management plans. The Department has decided to prepare one CMS to cover all five Subantarctic island groups, along with the marine mammal sanctuary at the Auckland Islands and conservation issues for the surrounding southern ocean (to the extent of New Zealand fisheries waters in the region).

As well as enabling a consistent and integrated approach to management decisions, the CMS format encourages a better recognition of the connections between these islands and the surrounding sea, the regional setting of the islands in the Southwest Pacific and in particular the connections with Macquarie Island (Australia) and the remainder of the New Zealand archipelago, and the hemispheric and global significance of the islands.

This Draft CMS presents the statutory basis for management, and addresses ecosystems management, historic resource conservation, visitor management, and resource and estate use issues. How major issues and management functions should be dealt with over the next 10 years (and longer) is addressed, as are management priorities. While the CMS

outlines how the Department of Conservation proposes to fulfil its responsibilities during this period it also has wider ramifications; for example providing guidance for future tourism visits to the Subantarctic Island nature reserves.

The CMS will influence the Department's annual business planning process, which determines the appropriate allocation of available resources among the different activities of the Department for each business year. It is important that the objectives and implementation measures stated in the CMS are taken into account and followed through in this process.

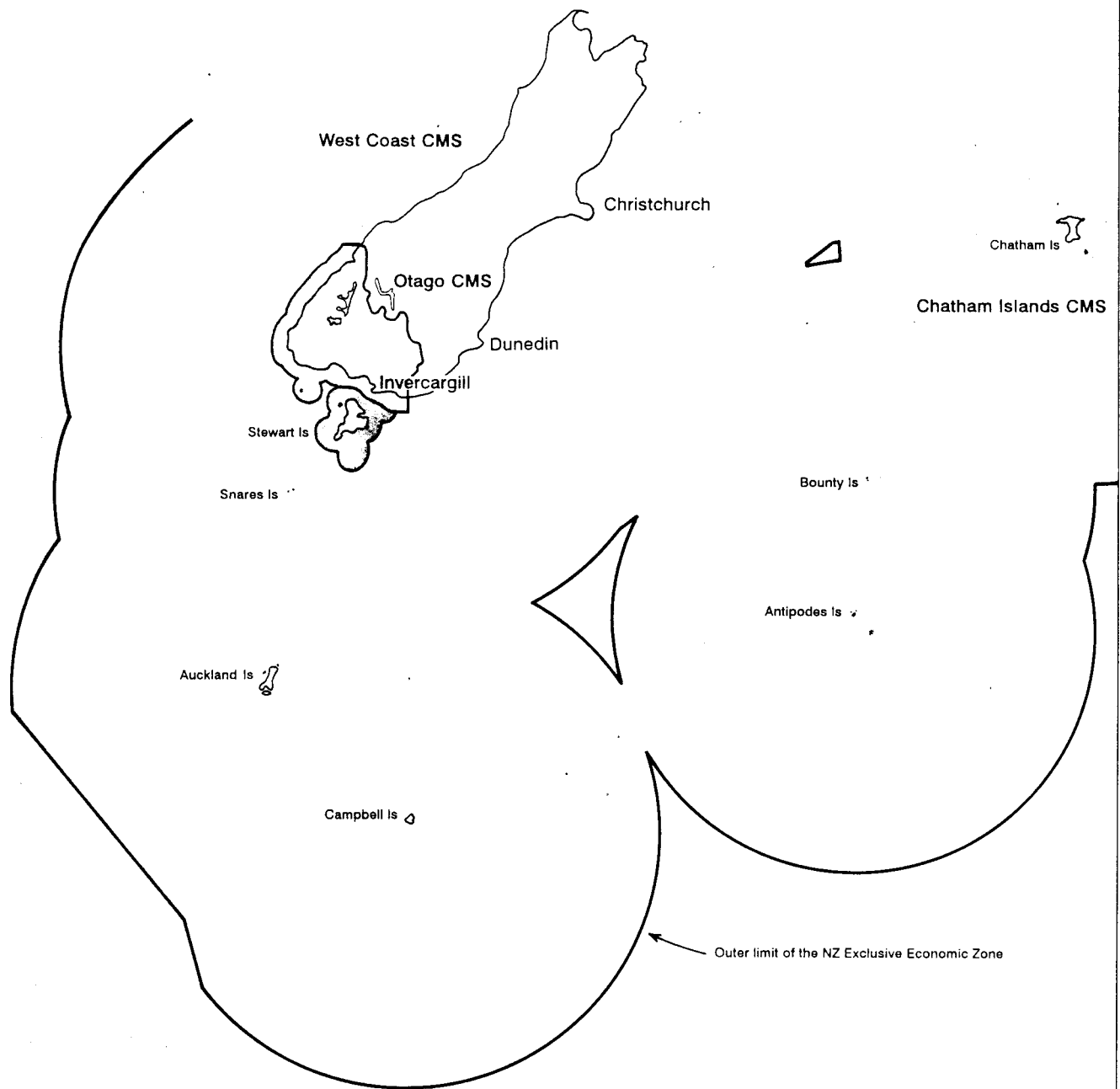
The Department also prepares a range of operational strategies and plans which are intended to direct specific work programmes. They set out in more detail how the provisions of general policies and the CMS will be implemented. Those prepared at a national level will be influenced by all relevant CMSs, which collectively indicate what should be, or needs to be done. Local operational plans will be developed within the policy framework provided by the CMS. Examples of such strategies and plans include an Historic Resources Management Strategy and Species Recovery Plans (eg, draft Recovery Plan for Subantarctic Teal).

### **How this Draft CMS Works**

The Introduction (Part 1) presents a "snap-shot" description of the Subantarctic Islands and wildlife of the surrounding ocean: it outlines physical and landscape characteristics, indigenous ecosystems, human history, today's visitors and their activities, and the conservation significance of the natural and historic resources in the CMS area. An outline of the legislation governing this CMS area is also given.

The proposed strategic directions are set out in Parts 2 to 5. Part 2 presents issues of ecosystems management, and proposed management objectives and actions to address those issues: they include a system of Island Categorisation which defines management objectives; pest control; fire control; freshwater fisheries; coastal and marine ecosystems; indigenous species; and information management. Part 3 provides direction for historic resource management. Part 4 provides direction for raising public awareness of the islands' significant values for conservation, and Part 5 sets out proposed strategies for managing the potential impacts of human visitors. Other resource and estate uses are addressed in Part 6.

# Conservation Management Strategy Areas



West Coast CMS

Christchurch

Otago CMS

Dunedin

Invercargill

Stewart Is

Snares Is

Auckland Is

Campbell Is

Chatham Is

Chatham Islands CMS

Bounty Is

Antipodes Is

Outer limit of the NZ Exclusive Economic Zone

0 500km

- Mainland Southland - West Otago
- Stewart Island
- Subantarctic Islands

## 1.2 Subantarctic Islands - The Setting

New Zealand's five Subantarctic island groups are located in the southern ocean south and east of the South Island. From a biogeographical perspective, these islands occupy a cool temperate zone: they lie between the Antarctic and Subtropical Convergences, have a mean annual temperature above 5°C and, with the exception of the Bounty Islands, are well vegetated. They display biological differences from islands in the true Subantarctic zone - in the vicinity of the Antarctic Convergence - which have mean annual temperatures of 1-5°C and no trees (eg, Macquarie Island), and those in the Maritime Antarctic zone which have mean annual temperatures less than 0° and no flowering plants (eg, Bouvetoya in the South Atlantic Ocean). Sea surface temperature in the region ranges from a summer monthly mean of 12°C around The Snares to a winter monthly mean of 5.5°C at Campbell Island, hence the marine biota is also more appropriately described as cool temperate, rather than Subantarctic.

### Physical Landscape

The five island groups are scattered across the Campbell Plateau and other submerged shelves of the southern New Zealand continental region. The plateau basement is granite and metamorphic rocks more than 100 million years old - similar to those in the mountains of Fiordland, Westland and Nelson in the South Island, and Marie Byrd Land in West Antarctica.

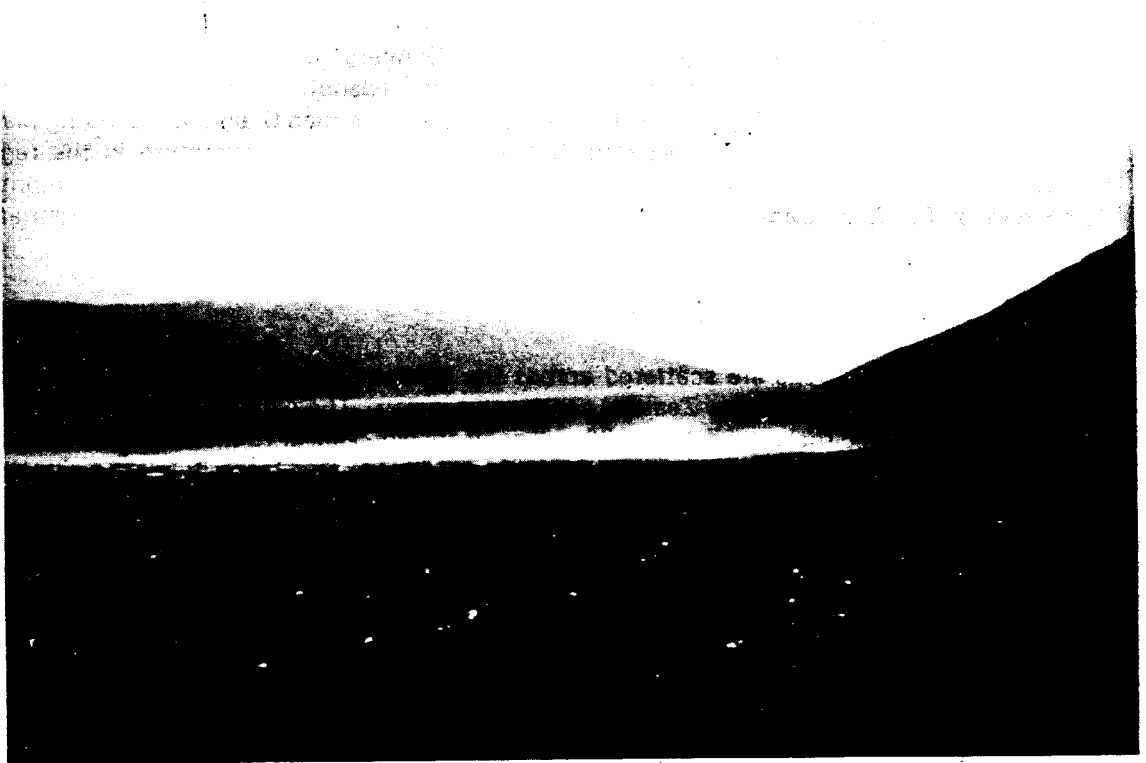
Before the south-west Pacific Ocean Basin began to form about 80 million years ago, the Campbell Plateau was connected with Antarctica as part of the Gondwana supercontinent. The tiny basement outcrops of the Subantarctic islands are therefore crucial pieces in the Gondwana jigsaw puzzle. The Great South and Campbell Basins contain thick sediments, but the protruding islands are coated with only a thin veneer of sediment. Auckland and Campbell Islands are impressive basalt shield volcanoes; and the Antipodes group is a complex of volcanic cones and vents. Volcanoes in the wider region vary in age: from between 0.1 and 5 million years old (Ma) on the Antipodes and Chatham Islands to 10 to 25 Ma on the west coast of the South Island and Auckland Island. The Auckland, Campbell and Antipodes volcanoes formed sequentially over a single magmatic zone in the earth's crust, so the islands are important for unravelling the pattern of continental drift and the volcanic history of the South West Pacific Basin. In contrast, the Snares and Bounty Islands are granite masses, which reveal the character of the continental basement rocks making up the Campbell Plateau.

Campbell and Auckland Islands are extensive and high enough to show Quaternary glacial features such as cirques, steep-walled glaciated valleys and fiords, moraines and periglacial sediments on raised beaches. All the island groups except for the Bounty Islands are mantled by peaty soils which have evolved over thousands of years under a cool, moist climate. The soils are "organic" (ie, peats composed almost entirely of plant remains), and mineral matter is a significant component only in small areas such as the sand dunes of Enderby Island, or where peat is shallow. Peat thickness is strongly influenced by slope, and flat or gently sloping areas may be blanketed by up to 5 metres of peat. The 1-2 metres of peat developed on steep slopes is prone to landsliding, as is readily seen on Campbell Island. The Bounty Islands are devoid of soil.

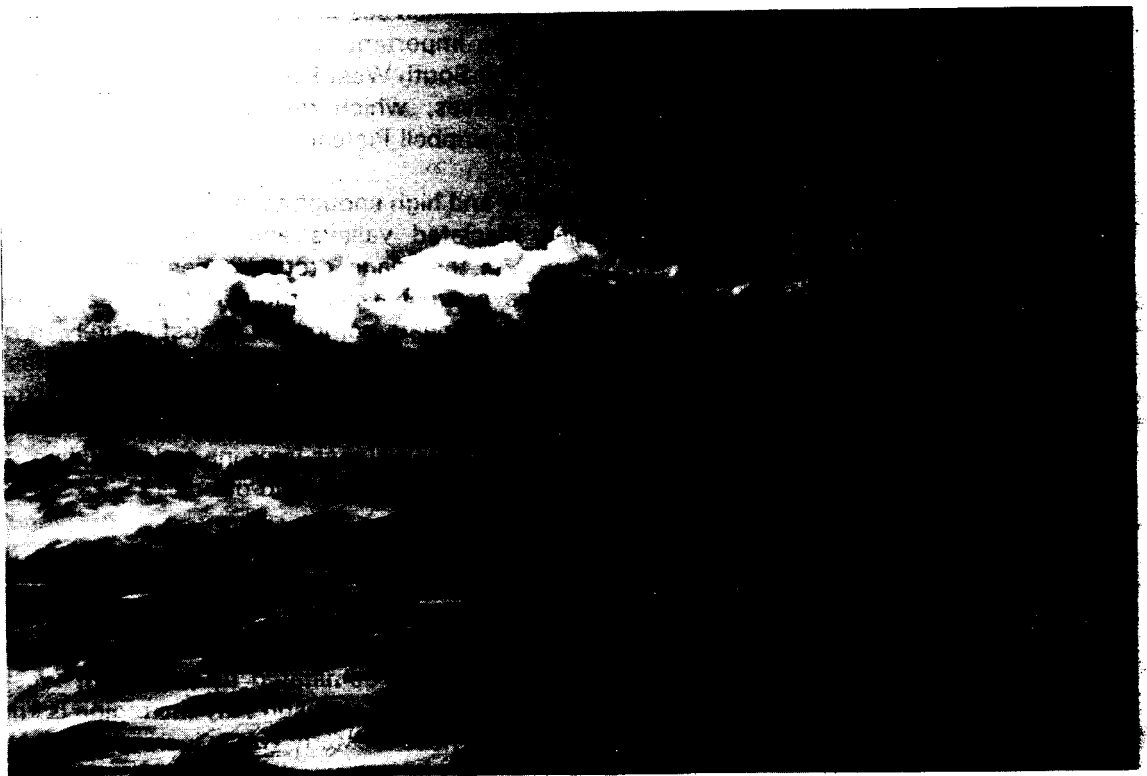
### Climate

"Cold, wet and windy" is a succinct description of Subantarctic weather. However, this rather bleak tag belies the fact that occasional days of clear, calm weather are experienced on the islands. The oceanic climate is dominated by persistent westerly winds and the frequent passage of cold fronts - this is the reason why the region is known as the "Roaring Forties" and "Furious Fifties". These westerly winds increase in intensity

with increasing latitude, and are more frequent during spring than other seasons. Measurements at the weather station at Beeman Point on Campbell Island show that wind gusts in excess of 63km/hr (35 knots) occur on about 280 days per year, gusts in excess of 96km/hr (50 knots) occur on at least 100 days annually, and the mean hourly windspeed is about 32km/hr (17 knots).



† Perseverance Harbour, ‡ Courrejoules Point, (both Campbell Island)





Cloud cover increases markedly south of New Zealand, and the annual sunshine total on Campbell Island is about 600 hours (16% of the possible amount). On mainland New Zealand, Invercargill can expect about 1620 hours, Christchurch about 2000 hours, and Auckland about 2100 hours annually.

Rainfall occurs on the islands in excess of 300 days per year, yet the average annual total of 1360mm recorded at Campbell Island is only 200-300mm more than is recorded in Wellington and Auckland. Annual rainfall varies considerably among the five groups - the Auckland Islands have about double the amount of rain that falls on the Antipodes. Light snowfalls are common during the colder seasons at the Auckland and Campbell Islands.

### Terrestrial Vegetation

The summer climate of the Subantarctic islands is as cool and windy as that of sub-alpine and alpine zones of the mainland. This and the maritime influence are the major factors affecting vegetation patterns. The peaty, acidic, waterlogged soils reflect the cool, humid climate. Seabirds and other wildlife have an important effect on vegetation, through trampling, burrowing and nutrient enrichment.

Only four of the five island groups are substantially vegetated. On the barren Bounty Islands only algae and lichens survive. Forest cover is restricted to the Snares and Auckland Islands. Shrublands are found in sheltered parts of Campbell Island. Generally, maritime and upland areas are dominated by one or more of the tussock species. Shrublands and herb moor (a mixture of stunted shrubs, cushion plants, tussocks and herbs) are also widespread. The highest peaks support alpine rushlands, cushion bogs and fellfields. There is generally a marked altitudinal zonation, although on Campbell Island this has been modified or obscured to some extent by 120 years of stock grazing.

The Auckland Islands, which have the largest land mass of the five island groups, also have the widest latitudinal and altitudinal ranges. These factors contribute to the presence of a comparatively rich flora, among the richest floral assemblages of any island group in the southern ocean. There are 233 taxa of vascular plant (196 indigenous), including three species of *Pleurophyllum* - a genus endemic to the New Zealand Subantarctic islands and Australia's Macquarie Island. Of the vascular plants, Campbell Island has 228 taxa recorded (143 indigenous); the Antipodes have 71 taxa (68 indigenous) and the Snares have 22 taxa (20 indigenous).

The subantarctic flora has four biogeographical elements:

- plants which are also found on the New Zealand mainland or beyond;
- plants which are found throughout the Subantarctic zone (ie, circumpolar species);
- species, and genera such as *Pleurophyllum* and *Damnomenia*, which are endemic to the New Zealand Subantarctic islands (and Macquarie Island); and
- several species which are endemic to individual island groups.

Although basic descriptive and taxonomic work has been done for higher plants, the cryptogamic flora (including bryophytes, lichens and algae) is still relatively poorly known.

There are two special features of the Subantarctic flora compared to that of mainland New Zealand: Subantarctic plants tend to have larger leaves and/or flowers, and they exhibit a greater diversity of colour. These features are shown in the "megaherbs" such as the large rhubarb-like punui (*Stilbocarpa polaris* and *S. robusta*) and the large-leaved, brightly-

flowered endemic daisies (*Pleurophyllum criniferum*, *P. hookeri* and *P. speciosum*, and *Damnomenia*). Large foliage is thought to be an adaptive response to the cloudy, humid conditions and cool air temperatures. Mainland New Zealand flowers are typically pale (usually white) and small, but endemic Subantarctic flowers show a range of colours: from pink through mauve to red in *Pleurophyllum*, *Anisotome*, *Gentiana* and *rata*; blue in forget-me-not (*Myosotis*) and *Hebe benthamii*; and yellow in *Bulbinella rossii* ("Maori onion") and tree daisy (*Brachyglottis stewartiae*). The reason for this diversity of flower colour is uncertain, but it may be to attract pollinators and/or to increase flower warmth and hence speed flower/seed development.



*Stilbocarpa polaris*

The islands' terrestrial biota are a culmination of a long history of geographic isolation, species dispersal, climatic factors and community interaction - until very recently without human interference. The evolution of the islands' biota is of great international taxonomic and ecological interest. All the vegetated island groups have many significant plants including endemic species (to one or more islands) uncommon or nationally threatened. The distinctive island vegetation includes some of the southern-most forests in the world, species which are at the limit of their ecological tolerance, and many vascular plants found nowhere else (endemics). Adams and Disappointment Islands in the Auckland group, and the whole Snares group are among the last substantial land masses of the world harbouring vegetation essentially unmodified by people and alien animals.

### Invertebrates

The invertebrate fauna of the islands are still poorly understood. The bleak, windswept, misty climate of the Subantarctic Islands favours a concealed life - within host plants, turf, the forest floor, tussock bases, or under piles of seaweed.

Many insect species are smaller than their counterparts on mainland New Zealand, and have evolved towards flightlessness. Flightlessness is associated with gigantism in two groups - the kelp fly *Baeopterus* and the weevil genus *Oclandius* - both at least three times

the size of their nearest relatives.

Between 220 and 280 species of insect are thought to live on the Auckland Islands, with thirty percent endemic to the group. The presence of introduced house mice on Auckland, Enderby and Antipodes Islands has reduced populations of larger insects.



Forty percent of the 275 insect species described from Campbell Island are thought to be endemic. The introduction of sheep and Norway rats to this island has had a significant detrimental effect on some insect species. The 25mm long weevil *Oclandius laeviusculus* (also on the Auckland Islands) is found only on Dent, Jacquemart and Monowai Islands, where rats are absent. Past sheep grazing affected insect populations, particularly where host plant species were eaten out.

Forty percent of the total insect fauna of Auckland and Campbell Islands is common to both island groups. The entomology of the Antipodes and Bounty Islands is less well-known than that of other island groups. The black and white, day-flying magpie moth is a conspicuous resident of the Antipodes, the hairy larvae of which feed on *Senecio antipodus*. A feature of the Antipodes insect fauna is the high percentage of species which are found around, or are restricted to, the colonies of nesting birds. The enriched soil supports host plants, and feathers and detritus provide food and habitat for insects. The presence of mice on the main Antipodes Island may explain the apparent absence of large ground-dwelling insects. A preliminary study of spiders on Antipodes Island suggests many parallels to the spider fauna of the mainland subalpine habitat - a predominance of small jumping spiders, rather than web-laying species - perhaps a reflection of the windy conditions.

There has been only spasmodic collecting of insects on the Bounty Islands. Of note are a large spider *Rubrius nummosus*, a giant *Bountyia* ground beetle, and a weta; all endemic. The presence of an endemic weta on the tiny Bounty Islands poses interesting questions about the biogeographical history of that island group.

The Subantarctic Islands have a small land molluscan fauna that is best developed on the larger islands, Campbell and Auckland. The Snares fauna is most closely related to that of southern New Zealand and Stewart Island. The other groups and Macquarie Island have similar fauna, with a small number of species endemic to each group. The land snails are generally small (less than 1cm) and inhabit grasslands, herbfields and forest from coastal to upland sites.

### Birds

More than 120 species of birds have been observed on the Subantarctic Islands and in the surrounding ocean. The New Zealand Subantarctic region supports the most diverse community of breeding seabirds in the southern ocean - some 10-15% of the world's seabird species breed here. This diversity of nesting seabirds and the marked endemism in the landbirds are recurring themes. The special character of these remote islands is epitomised by the co-occurrence of parakeets and penguins on the Antipodes and Auckland Islands.

Because land masses are few and far between in the southern ocean, these islands are vital breeding grounds for many species of seabirds. Each year the urge to breed brings seabirds of 41 species to the islands in their millions. Many of these birds would not have



touched land since the previous breeding season. Young albatrosses and petrels spend up to three years away from land, gliding over the southern ocean, until the desire for a mate draws them back to their birthplace. It can be a further five years before they start breeding.

Most seabirds return to their island of origin, many even to the same colony. Some species will, however, colonise new areas. One example is the small breeding population of southern royal albatross on Enderby Island. This population was decimated during the sealing and castaway era, but has now re-established and is slowly growing.

Eleven species of penguin have been recorded on the islands. Four of these species are regular breeders, including the solitary nesting yellow-eyed penguin which is considered the world's most endangered penguin. By contrast, the other three species (all of which are crested penguins) form large colonies. The Snares crested penguin is found only on the island group from which it takes its name. Erect-crested penguins are now confined to the Bounty and Antipodes Islands, while rockhopper penguins breed on Antipodes, Auckland and Campbell Islands, as well as other islands in the southern ocean.

The diversity of landbirds and freshwater birds on each island is largely determined by the size of the island and the range of habitats available. Some mainland New Zealand species reach their southern limit at the Snares Islands. Climate and isolation play a role in what species can become established. The Auckland Islands have the greatest diversity of landbirds, with at least 13 species including New Zealand falcon and two species of honeyeater (tui and bellbird). By contrast, the barren Bounty islands and the Western Chain islets of the Snares Islands are totally lacking in landbirds.

The Auckland Islands also have the most endemic species of landbirds, with a teal, a rail, a plover, a snipe, a pipit and a tomtit. All four native Antipodes Island landbirds are endemic - two parakeets, a snipe and a pipit. The Snares Islands have three endemics - a snipe, a fernbird and a tomtit; while the Campbell Islands have an endemic teal, now confined to outlying Dent Island. The small teals of Auckland and Campbell Islands are of particular interest as they have independently evolved into flightless forms.

All of the landbirds are presumed to have flown (or been blown) to the islands from mainland New Zealand or Australia, and this process is continuing. Between 1977 and 1982 South island fantails colonised the Snares Islands, presumably from Stewart Island, and now have a large breeding population there. Also, at least 10 species of introduced landbirds have successfully colonised one or more of the island groups.

Although the small size and isolation of the islands has largely protected them from human colonisation and development, the largest islands (Auckland and Campbell) have suffered from introductions of mammalian predators. Feral cats and pigs on Auckland Island and Norway rats and feral cats on Campbell Island have confined many smaller seabirds and endemic landbirds to the out-lying islands within each group. It is on these small islands, plus the less disturbed Snares, Antipodes and Bounty Islands that the abundance, variety and tameness of Subantarctic wildlife can be truly appreciated.

### **Other Native Fauna**

Little is known of the freshwater fauna of the New Zealand Subantarctic islands. On the larger islands the arthropod fauna appears diverse. Only the small native fish Koaro (*Galaxias brevipinnis*) has been found in streams on Campbell Island and the Auckland Islands.

There are no reptiles or amphibians known on any of the islands.

## Marine Mammals

The Auckland Islands and surrounding territorial sea are one of New Zealand's two marine mammal sanctuaries. This is the principal breeding ground of two of the world's rarest marine mammals - the New Zealand sea lion (*Phocarctos hookeri*), which is one of the rarest and the most endangered of the five species of sea lion in the world, and the southern right whale (*Eubalaena australis*), which also breed at Campbell Island. Both species were hunted to the brink of extinction by whalers and sealers during the 1800s.

The leopard seal *Hydrurga leptonyx* is a regular visitor to all the New Zealand Subantarctic islands in small numbers. Leopard seals mate at sea and do not form colonies, therefore relatively little is known about them and their life cycle. Also found in the Subantarctic are southern elephant seals (*Mirounga leonina*). Once abundant in this area, elephant seals were heavily exploited for their oil during the 1800s. Over the past 40 years, populations in the New Zealand Subantarctic region have declined for unknown reasons. The New Zealand fur seal (*Arctocephalus forsteri*) breeds throughout the Subantarctic. The largest colony is found on the Bounty Islands. Smaller colonies are found on the other island groups. The Subantarctic fur seal (*A. tropicalis*) is a very occasional visitor having been recorded on Auckland, Antipodes and Snares Islands.

A whale sanctuary has been declared over the southern ocean, south of 40 degrees latitude in New Zealand waters. New Zealand and its Subantarctic Islands straddle the north-south migratory routes of many whales found in the South Pacific Ocean. As well as the southern right species, other baleen whales (fin, sei, blue and humpback whales) and toothed whales (sperm and orca, and southern bottlenose and dusky dolphins) are sometimes seen around the New Zealand Subantarctic Islands. Two small cetaceans, the hourglass dolphin and the very rare spectacled porpoise are restricted to these latitudes and are occasionally seen in New Zealand Subantarctic waters.

## Other Marine Life

Each island group has its own unique assemblage of seaweeds, invertebrates and fish. Each assemblage has a reasonable level of endemism and is as distinctive as the terrestrial flora and fauna. The marine biota of each island group fall into three categories: the largest comprises species that are also found, or have close relatives, around the New Zealand mainland; a smaller group comprises circum-Subantarctic species; and thirdly, each island group supports a small endemic element.

One feature common to all the islands is a relatively low diversity of seaweeds and marine invertebrates compared with the New Zealand mainland. Absent are many of the common New Zealand seaweeds in all three phyla: red, brown and green. Some, however, do reach their southern limit at the Snares Islands. The same applies to many common marine mainland invertebrates and fish.

The most conspicuous seaweed on all of the islands is the massive bull kelp *Durvillaea antarctica*. Where wave action is reduced, the brown strapweed *Xiphophora sp* grows abundantly - particularly in the harbours of Auckland and Campbell Islands. In the intertidal zone are species of red seaweed, including slippery beds of *Porphyra columbina*.

The common intertidal invertebrates vary from island to island. At Auckland and Campbell Islands there are low intertidal bands of the blue mussel *Mytilus edulis aoteanus* and the ribbed mussel *Aulacomya ater maoriana*. The Antipodes Islands have no mussels in the intertidal or shallow subtidal zones. Limpets are important on all of the islands. Chitons, however, are relatively sparse. The Subantarctic whelk genus *Pareuthria* is represented on Campbell and Antipodes Islands; whereas zone-forming barnacles - so common on the mainland - appear to be relatively uncommon on the islands.

Subtidally, immediately below the kelp band, much of the rock surface is covered with calcareous red algae, particularly encrusting forms. With the exception of the steep-sided Bounty Islands, the subtidal zone down to about 10 metres is dominated by various large brown algae - including the giant kelp *Macrocystis pyrifera* (inexplicitly absent from the Snares Islands) and, at Antipodes Island, a massive undescribed species of *Durvillaea*. Encrusting sponges and tunicates are scarce in this zone. The largest mollusc in the subtidal zone on all the islands is the small paua *Haliotis virginea*. The crab *Jacquiniotis edwardsi* is the largest crustacean - it has a carapace over 150mm wide and is exceedingly abundant around Auckland and Campbell Islands from the deep water up to the intertidal zone.

The deep water life of the southern ocean comprises large fisheries and provides food for the seabirds, penguins and marine mammals. There is generally a poor level of knowledge of marine species in the subtidal zones, including the abundance of various species and the structure of food webs.

### Human History and Historic Places

Oral traditions of Kai Tahu say that the islands in the Southern ocean, together with their associated fisheries, were visited since ancient times and were used for their mahinga kai (food sources). Kai Tahu sealing and whaling gangs made frequent visits to Motumaha (Auckland Islands) during the early 1800s, but did not inhabit the islands continuously for any extended periods. In 1842 a group of Ngati Mutunga and Moriori moved from the Chatham Islands to Port Ross, where they lasted 14 years before abandoning the settlement. There are several recorded Maori occupation/findspot sites in the Auckland Island group.

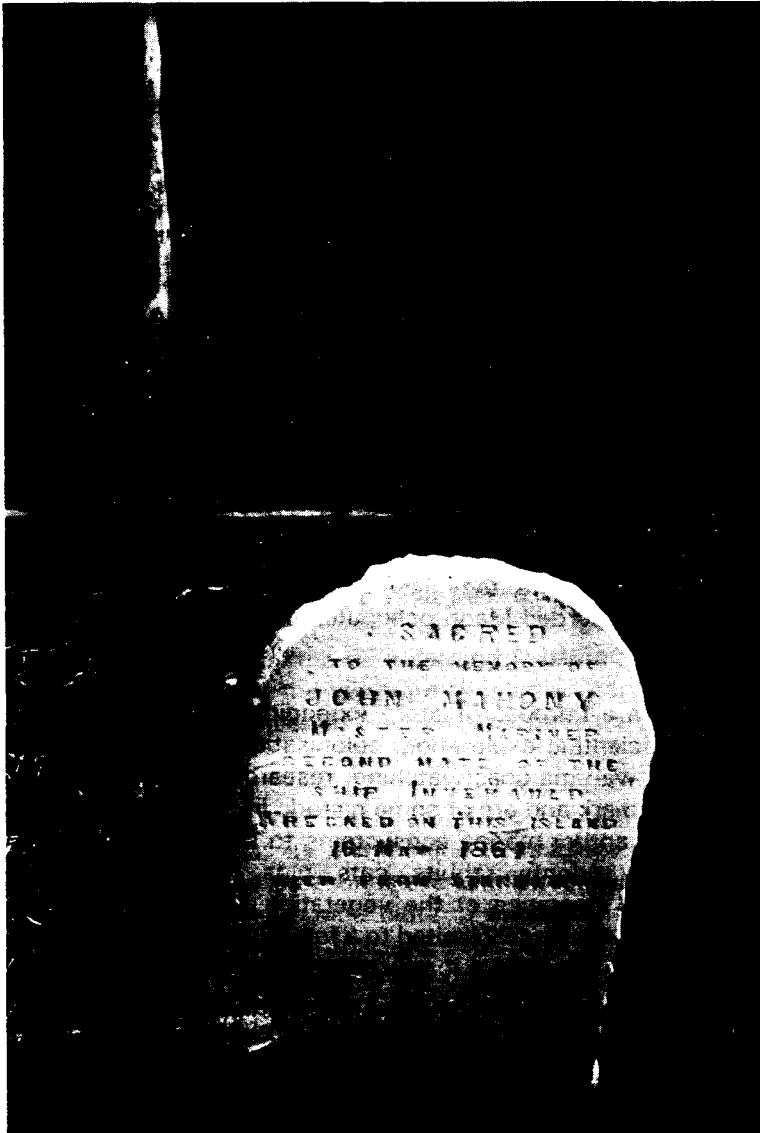
The Subantarctic Islands have a European history extending over 200 years including discovery, sealing, whaling, scientific exploration, colonisation and settlement, farming, shipwrecks of the sailing era, wartime coastwatching, research and meteorology. All of these activities have left their mark and are of some historic interest. Most have had the effect of modifying the island and/or marine ecosystems to some degree. With human presence came alien animals: rodents, rabbits, cats, pigs, sheep, goats and cattle. Settlement also involved some clearance of the vegetation by fire and the sowing of introduced plants. The effects were largely limited to a few islands. Intensive commercial fishing in the surrounding ocean has been a more recent development.

The five island groups were discovered by Europeans over a period of 21 years: 1788-1810 (refer Table 1). Following each discovery, there was a rush of sealers who all but exterminated the resident seal populations.

Antarctic explorers also visited the Subantarctic Islands. In 1839 Balleny and Freeman provisioned at Campbell Island. During 1840 three explorers visited Port Ross at Auckland Island; the first being the American Charles Wilkes. Then only two days after Wilkes, Dumont D'Urville's French expedition arrived. By far the most significant of the visits was that of an English naval expedition commanded by Captain (later Sir) John Ross. This expedition collected and described many plant species not previously recorded, undertook a hydrographic survey of the harbour, and released several animals and planted several varieties of fruit and vegetables as food for castaways.

As a result of Ross's report on the Port Ross harbour and its suitability as a whaling base for the whole southern region, an attempt to establish such a base was made by Charles Enderby. His British settlers arrived in December 1849. They found the land already occupied by the Ngati Mutunga and Moriori group, many of whom became employed as boatmen, gardeners or labourers. The settlement was named Hardwicke. Things soon began to go wrong. Vegetables and crops failed to grow in the acid peaty soil, and too

few whales were caught. By 1852 the last of the settlers had departed. The Maori and Moriori followed in 1854 and 1856. Remains of the hut sites and cobbled paths can be found in the rata forest that now covers the site of Hardwicke. The only other visible sign of the settlement is a cemetery at Erebus Cove.



Hardwicke Cemetery

Both Germany and France sent expeditions to the New Zealand Subantarctic Islands for the purpose of observing a transit of the planet Venus during 1874. The Germans on Auckland Island were lucky in that the cloud cover cleared at the crucial time of the transit. Three brick pillars used for mounting the observing instruments remain at Terror Cove. The French sent their expedition to Campbell Island, where an observatory was established at Venus Cove in Perseverance Harbour. They were unlucky, only catching a glimpse of Venus as it began to cross the face of the sun. But other scientific findings made the expedition a success. The remains of the observation station can be seen at Venus Cove.

Several shipwrecks occurred during the sailing era. With the exception of the *Perseverance* wrecked in the harbour bearing its name at Campbell Island, and two ships lost on the Antipodes Islands, most shipwrecks occurred on the Auckland Islands - at least



eight, involving the loss of over 100 lives. Particularly notable shipwrecks were: the *Grafton* driven aground in Carnley Harbour during a storm in 1864; the *Invergauld* wrecked on the western cliffs of Auckland Island in 1864; the *General Grant* also lost on the western cliffs during 1866; the *Derry Castle* driven onto the northern coast of Enderby Island in 1887; and the *Dundonald* wrecked on Disappointment Island during 1907. How survivors eked out an existence in cold inhospitable conditions until rescued (in some cases more than two years later), are stories of remarkable human endurance.

Following the earlier of these shipwrecks, castaway depots were established on all of the five island groups. These were serviced by Government ships until 1923. The oldest of these depots still standing is the Stella Hut at Sandy Bay on Enderby Island which was built in 1880 to replace an earlier hut destroyed by fire. Survivors of the *Dundonald* wreck eventually constructed a flimsy coracle in which they were able to reach a castaway depot at Erebus Cove.

Despite the failure of the Hardwicke settlement, several attempts were made between to establish pastoral farming on the Auckland Islands between 1861 and 1934. None were successful. Stock were landed on Campbell Island and Antipodes Island as part of the efforts to provide for castaways, but none of these animals survived for very long. A pastoral lease was granted for Antipodes Island in 1885 for a 21 year period but no stock were ever taken to the island by the lessees. The first pastoral lease for Campbell Island was taken up in 1895; sheep farming continued until 1931 when 4000 sheep and some cattle were abandoned on the island. Extreme isolation and transport difficulties were the downfall of the enterprise. The site of the homestead and woolshed is still evident today at Tucker Cove in Perseverance Harbour.

A small whaling station was established at Northwest Bay on Campbell Island during 1909 by whalers recruited to do farm work. Thirteen whales were caught in the first winter season using an open whale boat, and whaling continued until 1916 when the entire complement of whalers volunteered to fight in the First World War. Remains of the capstan used to haul the whales ashore can still be seen at Capstan Cove.

Several naturalists made visits to various islands through the late 1800s and early 1900s. Notably, L Cockayne visited Antipodes Island in the winter of 1903 and produced a thorough account of the vegetation. In 1907, the Philosophical Institute of Canterbury Subantarctic Islands Expedition visited the Bounty Islands, and also spent eight days on Campbell Island. This was the first scientific group to record the effects of sheep grazing on the vegetation. Another scientific party lead by Dr W R B Oliver, botanist to the Dominion Museum, visited the islands during 1927 on the Government steamer. Also on board was Guthrie-Smith, a well known conservationist. The party was less than approving of the farming activity on Campbell Island, and this visit was to herald the end of pastoral efforts on the islands, albeit not for several years.

Adams Island had been excluded from the Auckland Islands lease and declared a flora and fauna reserve in 1910. Opposition to farming on Campbell Island surfaced about 1919. By 1927 such feelings had grown stronger and gained the support of people like Guthrie-Smith. However, the pastoral runs were let until 1934 for Auckland Island, and until 1937 for Campbell Island. When the Auckland Island lease expired, the whole island group was reserved for the preservation of flora and fauna.

Scientists also participated in the "Cape Expedition" which was sent to coastwatch on the Auckland and Campbell Islands during the Second World War. Warned that war was imminent, a German steamer named *Erlangen* slipped out of Dunedin harbour on mainland New Zealand in late August 1939. Having only five days fuel the *Erlangen* headed for the Auckland Islands where the crew cut and loaded aboard rata logs in Carnley Harbour so enabling them to take the ship to South America. The New Zealand Government, alerted

by other reports that the Subantarctic islands were being visited by enemy ships, decided to establish coastwatching outposts - two on the Auckland islands (at Ranui Cove and Tagua Bay) and one on Campbell Island (at Tucker Cove in Perseverance Harbour). The volunteer personnel undertook meteorological observations and investigations of the biology and geology of the islands, in addition to their military duties.

When the coastwatching was abandoned at the end of the war, radio meteorological activities continued at Tucker Cove. In 1957 a new base was constructed a short distance away at Beeman Cove. The old base is now derelict. The meteorological station was permanently staffed, but switched to automatic operations in October 1995.



Perseverance Harbour, Campbell Island

The Campbell Islands were declared a flora and fauna reserve in 1953. Similar action was taken for the Antipodes, Bounty and Snares islands during 1961 (all became nature reserves in 1978). As reserves, the islands continued to be administered by the Department of Lands and Survey which was assisted by the Outlying Islands Reserves Committee. This committee comprised representatives of 10 Government agencies having an interest in management of the islands. It continued acting in an advisory role up until 1987 when major restructuring of Government departments took place. A management plan was prepared for each island reserve during the 1980s (refer 1.1).

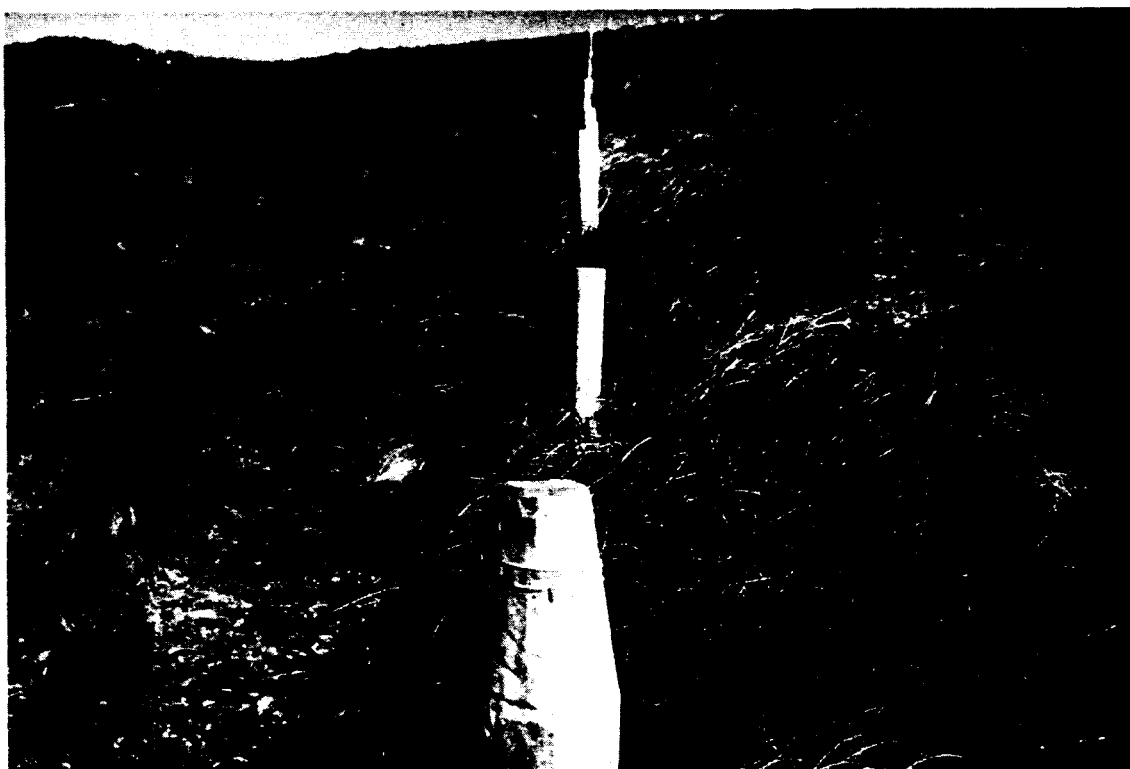
Expeditions to various islands for management and/or scientific purposes were undertaken by the New Zealand Wildlife Service, the Department of Scientific and Industrial Research (Ecology and Botany Divisions, and Oceanographic Institute), the Department of Lands and Survey, as well as other scientists. In 1961 the University of Canterbury established a biological station at the Snares Islands. Research parties then visited the station almost every summer season up to 1977. Major scientific expeditions were made to the Auckland Islands and Bounty Islands in 1972/73 and 1978, respectively. Another notable project was the erection of a dividing fence across Campbell Island during 1969/70, in order to exclude sheep from half of the island and monitor the vegetation. Several small huts have been erected to support management and scientific work on various islands.

### Recent Management and Visitor Activities

Landings on the islands have been restricted in terms of the Reserves Act 1977 and the current management plans. Since the Department of Conservation was established in 1987, the major management effort has been removal of introduced animals (refer 2.3.2 for details). Investigations are underway to trial further removal operations. Science has continued to be one of the prime reasons for visits to the islands in the recent past. Over the 1994/95 season, for example, three small teams undertook research and population monitoring of the New Zealand sea lion at the Auckland Islands, and on Wandering albatross at the Auckland Islands and Antipodes Islands.

The Department strongly endorses the promotion of information exchange among island management agencies and scientists. A close working relationship has been established with the Tasmanian Department of Parks, Wildlife and Heritage and two staff exchanges have occurred to encourage the sharing of management information between Macquarie Island and New Zealand's subantarctic islands. These two government agencies also liaised closely on devising guidelines for Subantarctic tourism. An exchange is currently being promoted with the Falkland Islands to assist conservation management there using New Zealand expertise in island management and pest eradication in particular.

The first cruise ship to visit the islands purely for tourism purposes was the *Magga Dan* which included the Subantarctic region as part of the first tourist cruises to Antarctica in 1968. Subsequently, visits were infrequent, but became regular from the 1979/80 season. In recent years there have been about 10 ship visits to the islands each summer, carrying 500-600 tourists. Tourism visits have been formalised in the management plans for Campbell and Auckland Islands since 1983 and 1987, respectively. They are allowed subject to strict controls and provided they do not compromise in any way the primary management objective of the preservation of the natural values of the islands. Currently a maximum of 600 tourism visitors are allowed to land during each summer season.



Tucker Cove fenceline, Campbell Island

There has been a major growth in tourism demand over the last five years, compared to the previous twenty years. The attraction for tourism is not difficult to identify. The remoteness of these rugged windswept islands set amongst some of the wildest oceans in the world combined with superb wildlife viewing opportunities are key attractions for tourists seeking remote destinations with a focus on nature tourism (eco-tourism).

Key elements in the raising of public awareness are television documentaries, the "Roaring Forties" displays being developed at the Southland Museum and Art Gallery in Invercargill, and other initiatives such as the 1990 "Arts in the Subantarctic" Exhibition. Such experiences offer people a taste of the remarkable character of these islands, and reduce the risks that are associated with human visits.

Recent development of commercial fisheries in the Subantarctic region has brought issues of marine mammal and seabird bycatch, which led to establishment of a marine mammal sanctuary over and around the Auckland Islands in 1993. Investigation of the interactions between sea lions and squid trawlers in fishing grounds near the Auckland Islands is a high priority research programme for the Department. Work also continues on reducing the seabird bycatch, and advocating for sustainable management of fisheries in the region.

### **1.3 Kaupapa Maori**

The Kai Tahu whanui (the extended family of Kai Tahu) represents the three principal tribes of Te Waipounamu (South Island) and Rakiura (Stewart island): Waitaha, Kati Mamoe and Kai Tahu who, in succession, occupied those lands before the arrival of Europeans. Kai Tahu established their control of the rohe (tribal area) by intermarriage, diplomacy and warfare with Waitaha and Kati Mamoe, so that today Kai Tahu is the iwi that holds manawhenua in southern New Zealand.

Kai Tahu have established their right under the Treaty of Waitangi to a reasonable share of the sea fisheries off their rohe within the 200 mile economic exclusion zone. Kai Tahu also claim traditional mana regarding the southern islands which are said to have been known to, and used by expeditions seeking food and other natural resources prior to the arrival of Europeans.

The Ngati Mutunga iwi, and the Moriori people of the Chatham Islands also have links with the Auckland Islands, specifically through the attempt to settle the Port Ross area in the period 1842-56.

The Auckland Islands lie 460 km south of the South Island of New Zealand. These islands are the eroded remains of cones of two basaltic volcanoes over basement granites. They have been subject to several periods of glaciation. The west coast of Auckland Island consists of an almost continuous line of steep cliffs, which include possibly the thickest exposed sequence of lava flows in New Zealand. The highest point is Mt Dick on Adams Island (667 m).

On the main island, southern rata forest dominates to an altitude of 50 m. Above this, a broad belt of scrub occurs. Bogs of cushion sedge are common. Above 300 m, tussock grassland predominates, giving way to herbfield (or bryophytes, mosses, lichens, sedges) at around 500 m. This basic vegetation pattern varies among the islands, largely depending on the extent of modification by man and introduced animals. Adams Island is the least disturbed, and is known internationally for its herbaceous flora. The flora of the Auckland group includes 44 fern species, and the occurrence of *Cyathea smithii* on Auckland Island represents the southern limit of tree ferns in the world.

The islands have a rich avifauna, with at least 46 species of breeding birds present. Rockhopper penguins are abundant, with erect-crested penguin and yellow-eyed penguin common. The islands are among the major breeding grounds in the world of wandering and shy albatross. Southern royal albatross and light-mantled sooty albatross occur. Sooty shearwater, Auckland Island prion, white-headed petrel, white-chinned petrel, common diving petrel, Antarctic tern, southern skua and Auckland Island shag are common. Indigenous landbirds such as bellbird, Auckland Island pipit and Auckland Island tomtit, are abundant.

Eight endemic bird species are present: Auckland Island prion, shag, teal, rail, banded dotterel, snipe, pipit and tomtit.



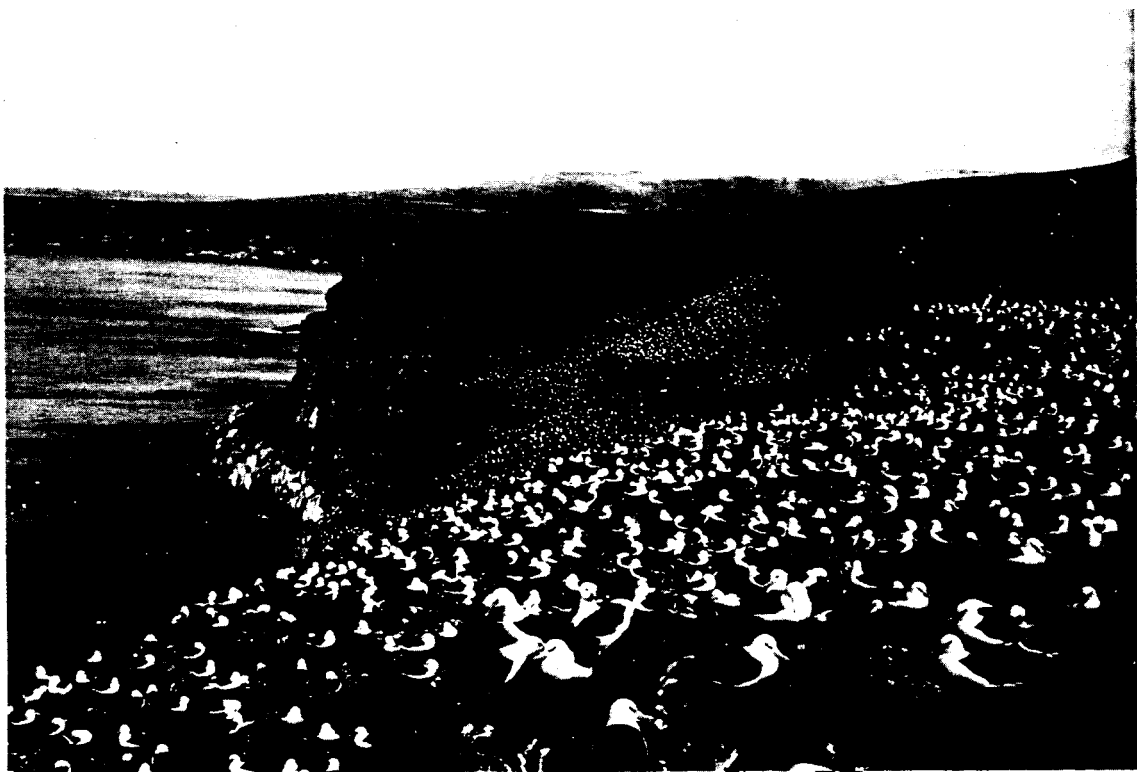
White capped mollymawk colony, Disappointment Island

The Campbell Islands lie 700 km south of the South Island of New Zealand. Campbell Island is a remnant of a dissected volcanic dome. Marine erosion has removed most of the western section, and the east coast has fiord-like inlets formed by the "drowning" of lower reaches of radial valleys. The oldest basement rocks are schist. The highest point is Mt Honey (567 m).

Three vegetation types predominate on Campbell Island: tussock grassland, shrubland and herbfield. In coastal areas, the moss *Muelleriella crassifolia* is common, along with several herbs. In sheltered areas, dwarf forest with woody shrubs and ferns occurs. Above this, the vegetation is dominated by tussock grassland. Above 300 m, herb *Bulbinella rossii* and the rush *Marsippospernum gracile* dominate an underturf of grasses, forbs, lichens and bryophytes. Areas of sphagnum bog, peat moors and cushion bog also occur. The offshore islets, which have not been modified by human activities, have dominant associations of tussock grasses and herbs. There are no endemic plant species and no indigenous trees.

Twenty-nine species of birds breed on the islands. Rockhopper penguins are very abundant, with erect-crested penguin and yellow-eyed penguin also breeding. Southern royal albatross, black-browed albatross, and grey-headed albatross are common, with northern giant petrel, Cape pigeon, southern skua, Campbell Island shag, Antarctic tern, and pipit also notable.

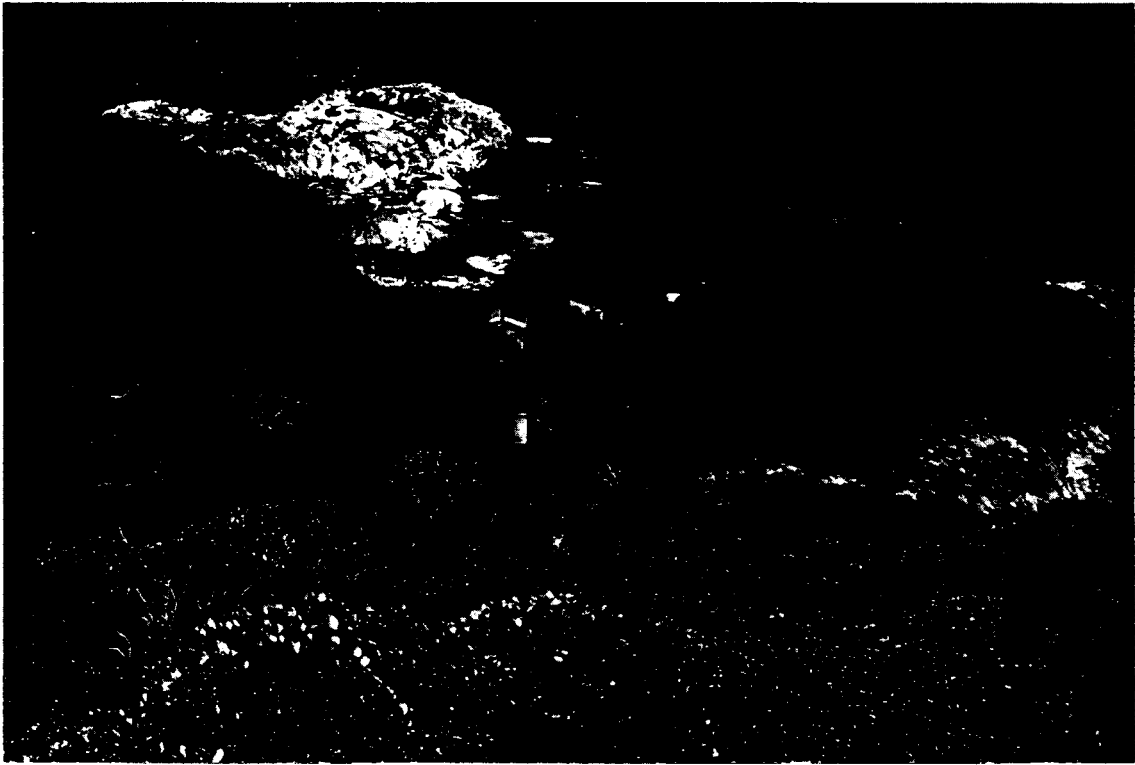
Black-browed albatross breed only on Campbell and Antipodes Islands, and Campbell Island is the major breeding site for southern royal and grey-headed albatross. Campbell Island shag are endemic. Dent Island has the only wild population of the rare, endemic, Campbell Island teal. Dent and Jacquemart Islands support large numbers of petrels and prions, which are rare on the main island.



Bull Rock mollymawk colony, Campbell Island

The Antipodes Islands lie 850 km south-east of the South Island of New Zealand. The islands are of volcanic origin, remnants of the upper portion of an extensive submerged volcanic pile. Composition is of basaltic lava with pyroclastic debris. The highest point is Mt Galloway (402 m). Predominant vegetation in coastal areas is tussock grassland of *Poa litorosa*, up to 1.5 m high. Inland, the fern *Polystichum vestitum* is common. On higher sheltered slopes, and in gullies, *Coprosma ciliata* shrub occurs with ferns and the herb *Stilbocarpa polaris*. Scattered bogs with sedge and herbs occur. In upper areas, mosses and lichens are prominent. The only woody plants are four species of *Coprosma*. Twenty-five species of bird breed on these islands. Erect-crested penguin and rockhopper penguin are very abundant, with wandering albatross and light-mantled sooty albatross, northern giant petrel, white-headed petrel, grey petrel, white-chinned petrel, and southern skua common. Four endemic bird species are present: Antipodes Island snipe, pipit, parakeet and red-crowned parakeet.

## Snares Islands Nature Reserve



Biological Station, North East Island

The Snares Islands lie some 200 km south-west of the South Island of New Zealand. They comprise two distinct groups: North East Island and islets, and the Western Chain. The islands are composed of jointed granite, and are probably part of a large batholith including areas of Stewart Island, formed about 120 MYs ago and subsequently eroded.

Vegetation is dominated by forests of *Olearia Lyallii*, with some *Senecio Stewartiae*. Ferns occur in the sub-canopy and in gullies. In open area in the forest, the herb *Stilbocarpa robusta* occurs. Dense scrub of *Hebe elliptica* is present on forest margins. Grassland of *Poa tennantiana* and *Poa astonii*, with the herb *Colobanthus muscoides*, predominates in coastal areas of North East Island between the cliffs and forest, as well as over much of Broughton Island. Islets of the Western Chain are largely devoid of vegetation.

Twenty-three species of bird breed on these islands. There are large populations of the endemic Snares crested penguin, and Salvin's mollymawk, Buller's mollymawk, mottled petrel, fairy prion, fulmar prion, and common diving petrel. Sooty shearwater are the most abundant birds, with the population on North East Island estimated at 2.75 million burrow-holding pairs (1982). Three land birds are endemic: Snares tomtit, Snares fernbird and Snares Island snipe.



Sink Hole Flat, North East Island

## Bounty Islands Nature Reserve

The Bounty Islands lie 700 km east-south-east of the South Island of New Zealand. They comprise over 20 small islands, islets and rocks in three groups: Main, Centre and East. They are of granite composition. They are bare and spray-swept. Guano deposits accumulate in summer. No terrestrial vegetation has been described, although lichens and green algae reportedly occur on a few sheltered rock faces.

The Bounty Islands support the largest known breeding population of New Zealand fur seal. The total population numbered about 16,000 in 1980 and is increasing. Seven species of bird breed on the islands. Erect-crested penguin are very abundant, as are Salvin's mollymawk which are endemic to the Bounty and Snares Islands. The Bounty Island shag, and a race of fulmar prion are endemic to this island group. Antarctic tern, Cape pigeon and southern black-backed gull breed, with possibly also the rockhopper penguin.





Islet of the Bounty Islands group

TABLE 1: GEOGRAPHICAL AND HISTORICAL DETAILS OF NZ SUBANTARCTIC ISLANDS

ISLAND GROUPS:	AUCKLAND IS	CAMPBELL IS	ANTIPODES IS	SNARES IS	BOUNTY IS
Area	62,564ha	11,331ha	2,100ha	328ha	135ha
Rainfall/yr	1500-2000mm	1450mm	1000-1500mm	1200mm	1000-1500mm
Mean annual temp	8°C	6°C	8°C	11°C	10°C
Latitude	50°44'S	52°33'S	49°41'S	48°02'S	47°45'S
Distance from New Zealand	460km	700km	850km	200km	700km
Year of Euro. Discovery	1806	1810	1800	1791	1788
Year reserved	1934 1910 (Adams)	1954	1961	1961	1961

Reference:

These notes on the five island nature reserves have been adapted from Clark, MR and PR Dingwall (1985): Conservation Islands in the Southern Ocean. A review of the protected areas of Insulantarctica. Discussion document prepared for IUCN's Commission on National Parks and Protected Areas (Reprinted 1990).

## 1.4 Conservation Significance

The Subantarctic Islands are among New Zealand's most remote and vulnerable nature reserves. They are significant island refuges for a range of plants and animals found nowhere else in the world. They are important breeding grounds for countless seabirds, penguins and marine mammals, and the habitat of some special plants. The southern ocean is equally important as habitat and vast feeding ground for wildlife. Significant natural features of the New Zealand Subantarctic region include:

- the endemic New Zealand sea lion which has its principal breeding ground at Auckland Islands
- among the greatest diversity of penguin species found in the world, comprising four breeding species (two endemic - Snares crested, erect crested, plus the Yellow-eyed and rockhopper) and seven transient species
- the world's only breeding populations of southern royal albatross; and the world's largest populations of wandering albatross, white-capped mollymawk and Salvin's mollymawk
- over six million (estimated) breeding seabirds on the 328 hectare Snares Islands
- the world's rarest cormorant, duck and penguin species (Bounty Island shag, Campbell Island teal, and Yellow-eyed penguin respectively)
- fourteen endemic species or sub-species of land birds
- 120 species of birds and 200 species of indigenous vascular plants
- a high level of endemic species of vascular plants (including some also found elsewhere only on Macquarie Island)
- the spectacular Subantarctic megaherbs including the daisy genus *Pleurophyllum* which is endemic to the New Zealand biological region
- the colourful rata forests and southernmost tree ferns in the world on the Auckland Islands
- one of the world's largest islands free of introduced mammals (Adams Island: 9896 hectares)
- eleven geological sites and landforms of national and regional importance, including granite (Tertiary dikes and sills), and volcanic features (columnar jointing, lava flows, an intrusive plug, a gabbro, scoria cones and a rare occurrence of peralkaline rhyolite)
- a fascinating human history of exploration, shipwrecks, sealing, whaling, farming and early scientific expeditions

In recognition of their rich assemblage of landforms, flora and wildlife, and the vulnerability of these ecosystems, the islands have been given the highest form of protection available in New Zealand law - the status of National Nature Reserves under the Reserves Act 1977. The Subantarctic Islands together comprise only 76,458ha in land area. But despite their small size, these islands are important - because of their isolation. Isolation has enabled retention of their many natural features and abundant wildlife, which has not been the case for so much of the remainder of New Zealand.

**TABLE 2 - CONSERVATION STATUS OF ISLANDS IN THE SOUTHERN OCEANS**

Island	Area (ha)	Degree of modification	Habitation	Exploitation of indigenous fauna	Introduced flora	Introduced fauna	Number of introduced mammal species
Falkland Islands	1300000	all levels from unaffected by humans to significant modification	permanent settlement	current	present	present	11
Kerguelen Islands	700000	from little modification to significant modification	Met or scientific station staffed year round	current	present	present	7
South Shetland Islands	470000	from little modification to localised modification	Met or scientific station staffed year round	past only	absent	absent	0
South Georgia	375000	from little modification to significant modification	Met or scientific station staffed year round	past only	present	present	3
Auckland Islands	62564	from little modification to significant modification	seasonal scientific/management visits	past only	present	present	3
South Orkney Islands	62000	from little modification to localised modification	Met or scientific station staffed all year round	past only	present	absent	0
Crozet Island	50000	from little modification to significant modification	Met or scientific station staffed all year round	past only	present	present	6
Heard Island	38000	little modification	periodic scientific/management visits	past only	absent	absent	0
South Sandwich Islands	31000	from little modification to localised modification	Met or scientific station staffed year round	past only	absent	absent	0
Marion Island	30000	significant modification	Met or scientific station staffed all year round	past only	present	present	2
Macquarie Island	12785	significant modification	Met or scientific station staffed all year round	past only	present	present	4
Campbell Islands	11331	from little modification to significant modification	Met or scientific station staffed all year round until October 1995. Seasonal scientific/management visits	past only	present	present	2
Tristan da Cunha Islands	11100	from little modification to significant modification	permanent human settlement	current	present	present	8
Gough Island	6500	localised modification	Met or scientific station staffed all year round	past only	present	present	1
Island Amsterdam	5500	high level of modification	Met or scientific station staffed all year round	past only	present	present	4
Bouvetoya	5000	little modification	uninhabited	past only	absent	absent	0
Prince Edward Island	4400	little modification	uninhabited	past only	present	absent	0
Antipodes Islands	2100	little modification	scientific hut staffed periodically	past only	present	present	1
Island Saint-Paul	700	high level of modification	uninhabited	past only	present	present	4
Snares Islands	328	little modification	scientific hut staffed periodically	past only	present	absent	0
MacDonald Islands	260	unaffected by humans	uninhabited	no exploitation	absent	absent	0
Bounty Islands	135	little modification	uninhabited	past only	absent	absent	0
Total area (all)	3179301						
Area (NZ Islands)	76456						
Updated from Clark and Dingwall (1985)							

## New Zealand's Offshore and Outlying Islands

Islands are among the most important areas for nature conservation in New Zealand. Over 100 of the 300 offshore islands listed in Atkinson and Taylor (1992) are located around the southern coast. These are islands *less than 50 km* from the mainland shore.

The outlying islands are those *more than 50km* from a mainland shore. New Zealand's Subantarctic Islands comprise five of the eight outlying island groups of the New Zealand archipelago (the others being the Chatham Is, Kermadec Is and Three Kings Is). As islands, they are part of a special conservation asset in southern New Zealand. Because these islands have retained both their indigenous flora and fauna and the conditions to maintain them, they can offer better prospects for success of conservation management actions (such as pest eradication) than mainland sites. Remote islands have the added advantage that re-invasion by eradicated organisms is unlikely because of the great distance to be travelled.

A significant feature of the Subantarctic Islands is the absence of possums and deer - alien mammals which were introduced to mainland New Zealand. Absence of predators (such as rats and cats which prey on birds, reptiles and insects) from many islands off the New Zealand mainland is another significant reason why islands are regarded as especially important for nature conservation. While about a quarter of New Zealand's islands are predator free, these account for only 1% of the area of the total island resource and about half of them are within swimming distance of stoats and rats from the mainland. Consequently the outlying islands, for which achievable barriers to predator invasion can be maintained, are of essential importance, although it needs to be recognised that few replicate mainland ecosystems. Because of their remote position and rugged topography, they are extremely difficult sites on which to undertake conservation management initiatives.

Resource uses such as fishing, mineral and oil exploration, and tourism give cause for concern because of their potential threat to the Islands' indigenous fauna and flora. Such threats include the depletion of essential food resources such as krill, squid and fish, the incidental netting of sea lions, killing of seabirds, oil spills, waste disposal and the introduction of rodents.

### The Global Network of Subantarctic Islands

New Zealand's Subantarctic Island groups share close biogeographic connections with Australia's Macquarie Island, and are part of a hemispheric chain of 22 island groups in the southern oceans lying between the Sub-tropical and Antarctic convergences (see Table 2).

New Zealand's Subantarctic Islands amount to about 2.5% of the combined area of all island groups in the Southern Ocean in Subantarctic latitudes. Auckland Islands group is the fifth largest in the southern oceans, after the Falkland Islands, Is Kerguelen, South Shetlands and South Georgia. Campbell Islands group is ranked twelfth directly after Macquarie Is (they are of similar size). Antipodes, Snares and Bounty Islands rank in the smallest five of the 22 island groups.

However, in terms of modification, New Zealand's Subantarctic Islands rank amongst the most pristine - three in the top eight that are least modified and, excluding the main islands of the Auckland and Campbell groups, these islands rank amongst the least modified island groups in the world.

Oceanic islands are among the last bastions of nature in a world beset by massive and rapid change because of human activity. New Zealand's Subantarctic Islands are some

of the least human-modified environments anywhere on the globe. Maintenance of these island ecosystems in their natural state is of immense value to global conservation and science. Experience has shown that plants and animals which have evolved on oceanic islands in the absence of terrestrial mammals are highly vulnerable and sensitive to disturbance. They are readily destroyed, but are virtually impossible to replace.

### The Ocean Connection

Further, the Subantarctic Islands do not represent discrete ecological systems but are in fact an integral part of the larger Subantarctic oceanic ecosystem. The islands, together with the adjoining off shore waters, provide important habitat, including major breeding and feeding grounds, essential for the well being of many marine-dependent species of indigenous fauna.

The islands are vital breeding grounds for seabirds, penguins and seals that spend most of their life at sea (feeding) but return to the islands for brief periods to breed. Thus, there is an inextricable link between terrestrial and marine realms in the life cycles of these animals. Conservation of seabirds, penguins and seals cannot rest solely on island protection (whereas plant conservation can) - there must also be conservation of the surrounding oceans, from which these animals find their food. While the CMS cannot directly influence use and conservation of marine resources outside of the nature reserve boundaries, it can highlight the conservation significance of the marine environment, which sustains life on the islands.



Light-mantled sooty albatross

## 1.5 The Future

All of the Subantarctic Islands are amongst the highest-valued conservation assets in New Zealand and the world, and should be managed on this basis, in perpetuity.

The values of these natural assets are such as to require those responsible for their management to lead rather than follow public opinion. Managers and decision-takers, and the wider community, have to be courageous in setting out and maintaining clear positions on matters of protection, or the islands will not, in 50 years or more, be the exceptional natural places they are today. They demand a dedicated philosophy of protection management that recognises these are not places for risk-taking and compromise. Damage, if it occurs (through rodent invasion, for example), is likely to be irreparable.

The central issue to recognise in the management of sites as close to pristine as are many of these Subantarctic Islands, is that human visits collectively pose the single biggest risk - especially with their associated transport and likely travelling companions (eg, rats, other rodents or pest organisms). Management of these island reserves is firstly about minimising the risks of adverse effects on the environment caused by people, which may be equated - to an extent - with minimising visits. In setting access policies and assessing applications for visits there must be a balance struck between degree of risk and degree of benefit. All proposals - whether for tourism, science or management purposes - should be assessed consistently against stringent environmental standards. No special privilege should be given to any proposed visit other than that which is merited by the particular contribution of the proposal to the preservation of nature, which is the primary purpose of the reserve status and classification.

Only a small number of people will be able to visit the islands directly (ie, go ashore). But because some people will try to and can exert influence against this precautionary approach, the policies regarding visitation have to be strong. However, a full awareness of the value and special character of the Subantarctic Islands by a wide spectrum of the international and national community is a vital element to their preservation in perpetuity. One means of achieving this, and increasing the opportunity for people to appreciate the islands, is by the development of off-site interpretation opportunities. The more people that can enjoy the islands from a distance the better, to bolster political support for their protection; this includes taking strong positions to reduce the risks inherent in visitation.

Threats still exist on many of the islands in the form of introduced predators. The long-term goals, regardless of whether eradication and restoration are currently achievable with existing techniques or resources, are to:

- \* hold the line by preventing further introductions of alien species, and
- \* remove entirely the populations of introduced mammals and plants in order to restore natural ecosystems.

We succeed toward these goals if we are able to leave these islands at the end of each management period in the same, if not better, condition than they were in when it started. This principle is very important when considering the increasing pressure for access to remote places for tourism, but also when considering access for science and management purposes. In some cases the best management will be the "hands-off" approach, although survey, monitoring and research is needed to assess ecosystem condition and trends.

It is also essential that the islands be managed with due consideration to the connections between the islands and their surrounding ocean areas. The goal is to minimise the threats to marine mammals and wildlife caused by human activities in the southern ocean.

## 1.6 Statutory Basis For Management

### Overview

The Conservation Act 1987 determines a structure for management of the protected natural and historic resources of New Zealand, including the public lands commonly referred to collectively as lands administered by the Department of Conservation - reserves, sanctuaries, conservation areas and national parks. The Act provides for the New Zealand Conservation Authority and regional conservation boards to advise the Department and approve Conservation Management Strategies and Plans.

The purpose of a Conservation Management Strategy (CMS) is to:

implement general policies and establish objectives for the integrated management of natural and historic resources, including any species, managed by the Department under the Wildlife Act 1953, the Marine Reserves Act 1971, the Reserves Act 1977, the Wild Animal Control Act 1977, the Marine Mammals Protection Act 1978, the National Parks Act 1980, the New Zealand Walkways Act 1990, or this Act, or any of them, and for recreation, tourism, and other conservation purposes.

(Conservation Act 1987: s.17D)

The key role of a CMS is to achieve an integrated management approach meshing, where and when appropriate, all the various management principles, aims, requirements and functions set out in the relevant governing legislation as listed above. (Note: the National Parks Act 1980 and New Zealand Walkways Act 1990 are not relevant to the Subantarctic Islands).

### Wildlife Act 1953

The Wildlife Act 1953 declares that most indigenous wildlife, including penguins and seabirds, is to be absolutely protected throughout New Zealand. Sanctuaries, refuges or management reserves may be established to assist in the protection of wildlife. The jurisdiction of this Act extends to New Zealand's territorial waters.

### Marine Reserves Act 1971

The Marine Reserves Act 1971 provides for the establishment and management of areas of the sea and foreshore as marine reserves for the purpose of preserving them in their natural state as the habitat of marine life for scientific study. Marine reserves are to be administered and maintained so that:

- they are preserved as far as possible in their natural state:
- the marine life within reserves shall as far as possible be protected and reserved:
- the value of the reserves as the natural habitat of marine life shall as far as possible be maintained:
- subject to the provisions of the Act and to the imposition of such conditions and restrictions as may be necessary for the preservation of the marine life or for the welfare in general of the reserves, the public shall have freedom of access and entry to the reserves, so that they may enjoy in full measure the opportunity to study, observe, and record marine life in its natural habitat.

The Act also provides that recreational fishing may be authorised in marine reserves if such use will not compromise these management aims.

Currently there are no marine reserves within the Subantarctic Islands CMS area.

### **Reserves Act 1977**

The Reserves Act 1977 sets out broad principles for the management of reserve lands. The Act provides for seven different classes of reserve: recreation, historic, scenic, nature, scientific, government purpose and local purpose, with specific purposes set out for each classification. Further, the Act provides for reserves to be declared *National* reserves in order to protect values of national or international importance.

All of the five Subantarctic island groups are classified as nature reserves, and all have been declared National reserves. They are to be managed for the purpose of:

protecting and preserving in perpetuity indigenous flora and fauna or natural features that are of such rarity, scientific interest or importance, or so unique that their protection and preservation is in the public interest.  
(Reserves Act 1977: s.20)

and, further:

when a reserve has been declared...to be a National reserve [it] shall...be administered...in order to provide for the application of management policies to protect [its] values of national or international significance.  
(Reserves Act 1977: s.13(5))

One of the effects of the national reserve declarations is that the nature reserve classification can only be changed by Act of Parliament. Having regard to the general purpose of nature reserves, they are to be managed so that:

- they shall be preserved as far as possible in its natural state:
- except where the Minister of Conservation otherwise determines, the indigenous flora and fauna, ecological associations, and natural environment shall as far as possible be preserved and the exotic flora and fauna as far as possible be exterminated:
- for the better protection and preservation of the flora and fauna in its natural state, no person shall enter the reserves, except under the authority of a permit....and the expression "enter the reserve" shall....be deemed to include any physical contact with the land by a boat; and for this purpose any physical contact with the land shall be deemed to include the attaching (by rope or otherwise) of a boat to a reserves or to a wharf constructed on or partly on a reserve:  
[the foreshores around the islands are included in the nature reserves - hence the reserve boundaries follow the line of Mean Low Water]
- where scenic, historic, archaeological, biological, geological, or other scientific features are present on the reserves, those features shall be managed and protected to the extent compatible with the principal or primary purpose of the reserves:

Provided that nothing in this paragraph shall authorise the doing of anything with respect to fauna that would contravene any provision of the Wildlife Act 1953 or



any regulations or Proclamation or notification under that Act, or the doing of anything with respect to archaeological features in any reserve that would contravene any provision of the Historic Places Act 1993;

- to the extent compatible with the principal or primary purpose of the reserves, their value as soil, water, and forest conservation areas shall be maintained.  
(Reserves Act: s.20)

#### **Wild Animal Control Act 1977**

The Wild Animal Control Act 1977 seeks to achieve effective control of harmful species of introduced wild animals - deer (including wapiti or moose), chamois, thar, wallabies, possums, wild pigs and wild goats. The Act is to be administered by the Department of Conservation so as to:

- ensure concerted action against the damaging effects of wild animals on vegetation, soils, waters, and wildlife; and
- achieve coordination of hunting measures; and
- provide for the regulation of recreational hunting and wild animal recovery.

The only animals currently on the Subantarctic Islands subject to this Act are wild pigs on Auckland Island.

#### **Marine Mammals Protection Act 1978**

The Marine Mammals Protection Act 1978 provides for the protection, conservation, and management of marine mammals within New Zealand and New Zealand fisheries waters (EEZ). The Act places restrictions on the taking of marine mammals from their natural habitat, and provides for the establishment of marine mammal sanctuaries.

A marine mammal sanctuary has been established around the Auckland Islands with the aim of giving better protection to the New Zealand sea lion. This sanctuary extends out 12 miles to the limit of New Zealand's territorial sea.

#### **Conservation Act 1987**

The Conservation Act 1987 sets out broad principles for the management of conservation areas, indigenous freshwater fisheries, and other natural or historic resources. The functions of the Department of Conservation under this Act include:

- advocating the conservation of natural and historic resources generally; and
- promoting the benefits to present and future generations of the conservation of natural and historic resources of New Zealand's subantarctic islands.  
(Conservation Act 1987: s.6)

Conservation, in the context of advocating for conservation purposes, means:  
the preservation and protection of natural and historic resources for the purposes of maintaining their intrinsic values, providing for their appreciation and recreational enjoyment by the public, and safeguarding the options for future generations.  
(Conservation Act 1897: s.2)

## **Treaty of Waitangi**

The Department of Conservation, in carrying out its functions, must give effect to the principles of the Treaty of Waitangi.

A set of principles in relation to the Department's responsibilities under the Treaty of Waitangi can be derived from a decision of the Court of Appeal. They are as follows:

- . Act reasonably and in good faith (the partnership principle)
- . Make informed decisions
- . Actively protect Maori taoka to the fullest extent practicable (the principle of active protection)
- . Avoid action which will prevent the redress of claims
- . Government must be able to govern

The Department acknowledges the Kai Tahu association with islands in the Southern Ocean (and claim of manawhenua); and the whanaungatunga interest that Ngati Mutunga and Moriori have with the Auckland Islands.

The Department, Southland Conservation Board and New Zealand Conservation Authority have statutory responsibilities for lands administered by the Department, with an obligation to have regard for and protect Maori interests. Management planning can assist in the caretaking role by recognising wahi taonga and incorporating iwi perspectives.

## **General Policies**

The Conservation Act 1987 provides for general policies to be prepared at the national level for guiding management of lands and resources administered by the Department of Conservation. To date only one general policy - the Concessions Policy - has been approved.

A range of other national policies is currently being developed. The draft policies have been taken into account, where applicable, in this Draft CMS.

## **Departmental Policies and Procedures**

The Department of Conservation has developed operational policies and procedures to help ensure that it executes its functions in an effective and consistent way. These policies or procedures must be in accord with legislation, general policies, and conservation management strategies and plans.

## **Other Legislation and Constraints**

While the Subantarctic Islands are lands administered by the Department of Conservation in accordance with the Reserves Act 1977, activities on or around the islands are subject to a variety of other New Zealand laws. Some of these (eg, Historic Places Act 1993; Crown Minerals Act 1991) are referred to in more detail in the appropriate sections of this CMS. Other statutes of general relevance to management of resources in the Subantarctic region are:

### *Local Government Act 1974*

This Act gives the Minister of Conservation the powers, functions and duties of both a regional and district council under the Resource Management Act 1991 (RMA), as they pertain to the Subantarctic Islands and the coastal marine areas (CMAs) surrounding them.

*Resource Management Act 1991*

The purpose of this Act is to promote sustainable management of New Zealand's natural and physical resources. Activities on land are deemed to be permitted unless they contravene a rule in a district plan. Currently there is no district plan for the Subantarctic islands, and none is envisaged, so there are no constraints on land activities in terms of this Act. However, discharges into water or air do require resource consents. Activities other than the normal passage of shipping in the CMA (defined by the line of Mean High Water Springs out to the 12 mile territorial limit) also require resource consents, unless they are specifically permitted by a rule in a regional coastal plan. There is no regional coastal plan for the Subantarctic CMAs, so resource consents are required.

The New Zealand Coastal Policy Statement prepared under the RMA is a statutory policy which is administered by the Minister of Conservation.

The RMA also provides for the Minister for the Environment to make regulations for control of discharges from vessels and dumping of waste within the territorial sea. These regulations will be the mechanism through which MARPOL and other international conventions (see below) addressing pollution of the marine environment will be implemented in New Zealand law. Intentional dumping of waste will not be allowed except when authorised by a resource consent; and a legal code will control discharges of harmful substances and contaminants from ships, including disposal from ships of sewage, garbage, oil and oily mixtures.

*Maritime Transport Act 1994*

This Act provides for oil spill management and response within the Exclusive Economic Zone. The Maritime Safety Authority and the Department of Conservation have agreed to cooperate in contingency planning for oil spills in Subantarctic waters.

*Fisheries Act 1983*

Allocation of access to fisheries is the responsibility of the Minister of Fisheries. All marine life, both plant and animal, is subject to this Act, except within marine reserves. However the Fisheries Act is currently being reviewed with proposals for some marine species to be covered by the Wildlife Act 1953 (see above).

*Building Act 1991*

This Act applies to the erection, maintenance and demolition of structures on the Subantarctic Islands.

*Foreshore and Seabed Endowment Revesting Act 1991*

Foreshore and seabed is a separate category of land of the Crown, vested in the Minister of Conservation (the foreshores around the Subantarctic Islands are included in the nature reserves).

*Other Constraints*

Management options can also be limited by other factors such as the provisions of leases or licences.

**International Conventions**

There are a number of international conventions that have a bearing on how resources in this CMS area are to be managed. Those considered to be most relevant are:

*Convention on Biological Diversity*

The New Zealand Government ratified this convention in 1993. The principles of this convention are centred around maintaining natural biodiversity (refer 2.1).

*Convention for the Regulation of Whaling*

This convention established the International Whaling Commission (IWC) which can adopt regulations on, among other matters, whale catch quotas, the protection of certain whale species, and whaling techniques.

*Convention on International Trade in Endangered Species (CITES)*

New Zealand's obligations under this convention are implemented through the Trade in Endangered Species Act.

*Convention on the Conservation of Marine Living Antarctic Resources (CCMLAR)*

Many species breeding on the Subantarctic Islands or visiting the region are subjects of this convention.

*Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol)*

New Zealand ratified this Protocol in 1994 and it is implemented through the Antarctica (Environmental Protection) Act 1994. This Protocol establishes a system of environmental evaluations for human activities in Antarctica which can also be applied to the Subantarctic (refer 5.3.1 and 5.3.4).

*Convention for the Protection of World Cultural and Natural Heritage*

There is interest in seeing the Subantarctic Islands nominated for inclusion in the World Heritage List.

*Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention)*

New Zealand ratified this convention in 1975 (refer 2.4).

*Convention for the Prevention of Pollution from Ships 1973 and amending Protocol of 1978 (MARPOL)*

New Zealand has not signed this convention, but it will be implemented through the Resource Management Act 1991 and Maritime Transport Act 1994 (refer 2.4).

## Part 2: Ecosystems Management

---

### 2.1 Rationale

The management goals are essentially to preserve the island nature reserves as far as possible in their natural state, and to protect wildlife and marine mammals on, or in the surrounding ocean (refer 1.6).

Priorities for protection of natural values are influenced by a number of external factors. Of the number of international conventions to which New Zealand is a signatory, the most significant for ecosystems management is the Convention on Biological Diversity. Preparation of a National Biodiversity Strategy for New Zealand should have considerable benefits for protection of the Subantarctic islands and the surrounding ocean.

Biodiversity encompasses all species of plants, animals, micro-organisms, their genetic diversity and the ecosystems and ecological processes of which they are part. Biodiversity provides us with our natural heritage. All nations possess their own unique complement of native species, habitats and ecosystems, and isolated nations like New Zealand have species which are found nowhere else in the world.

The loss of biodiversity is a manifestly complex issue. It is important to make the distinction between naturally occurring losses and extinctions and those which have been caused by human actions. New Zealand has had an exceptional rate of extinctions since human occupation with the diversity and number of species and ecosystems disappearing at an alarming rate.

All ecosystems undergo modification as part of natural processes. However changes related to the introduction of species and habitat destruction occur at a much greater rate than natural processes, and have generally had more devastating consequences. Habitats have been destroyed or degraded through predators and competitors, fires and over-harvesting, or they may have been fragmented so they can no longer support a viable population of key species.

In comparison to the remainder of the New Zealand archipelago, the Subantarctic Islands have been subject to only minimal modification. This lack of modification in addition to their original range of remarkable biota, makes these islands significant for the preservation of biodiversity and as benchmarks for conservation. Many of the indigenous species and communities cannot tolerate introduced mammals or invasive weeds. The impacts of human occupation have included introductions of alien mammals and weeds, as well as the direct effects of farming and harvesting (eg, burning, disturbance of wildlife, sealing).

In the marine environment, the relatively low diversity of various marine animals and seaweeds suggests that any selective harvesting of one species could have major ecological implications, particularly for feeding grounds around the smaller islands.

It is important that the interface between terrestrial ecosystems and marine ecosystems is emphasised. What happens in one area affects the other. This is a situation uniquely paramount in the case of oceanic islands.

An important role of ecosystems management is to protect the natural diversity and vitality of the Subantarctic islands and surrounding ocean. Management activities that assist in maintaining biodiversity and the protection of ecosystems involve species management through relocation, fire control, animal and plant pest control and restoration,

and protection of the marine environment. Improving scientific knowledge of the terrestrial and marine ecosystems through survey, monitoring and research, is vital to the successful achievement of management goals.

The Department establishes national priorities, plans and procedures for ecosystems management. For example, there are national recovery plans, either operative or in draft, for a number of threatened species found in the New Zealand Subantarctic region, including the Yellow-eyed penguin, Campbell Island teal and Auckland Island teal. The identification and prioritisation of threatened species has been reviewed nationally (Molloy and Davis 1994). This has been taken into consideration in identifying priorities for species management in the Subantarctic Islands CMS area.

Therefore, in determining priorities for ecosystems management many factors have to be taken into consideration. The general approach of this CMS is to set strategic direction for ecosystems management (within the CMS area) for the next ten years. This chapter outlines what should happen rather than how. For example the section covering Indigenous Species outlines which priority species require survey or monitoring but does not state how it will occur. The Department has or is preparing some operational plans such as the Southland Threatened Plant Plan, Southland Conservancy Pest Quarantine Plan, and the Southland Weed Control Plan. This CMS sets out the policy framework for operational plans.

Emphasis is also given to advocating particular actions or outcomes, especially regarding marine fisheries and other resources of the southern ocean. This is mainly because of the roles that other organisations and individuals have in managing those natural resources. The provisions in this Draft CMS reflect the separate responsibilities and functions determined by the relevant legislation.

Government organisations such as the Ministry of Fisheries, which is responsible for sustainable management and conservation of fisheries, and the Ministry for the Environment (MfE), which is responsible for the RMA, have just as vital a role to play. Sustainable management of natural and physical resources in the coastal marine areas around each island group, under the RMA, is an important function of the Minister of Conservation.

Non-government groups such as the Royal New Zealand Forest and Bird Protection Society, Greenpeace and the World Wide Fund For Nature (WWF) are involved in conservation initiatives. There are also many people who play vital roles through individual actions.

This Part of the CMS only addresses issues and management actions required to maintain, enhance or restore ecosystems and their many components, including control of introduced pests. It is not concerned with visitor impacts (refer Part 5). The aims or purposes of management are set out in the governing legislation: in the strategies that follow, emphasis is given to management directions designed to achieve the overall aims. While the strategies are separated into functions, they comprise an integrated approach to ecosystems management.

## 2.2 Island Management Objectives

All of the Subantarctic Islands have the same legal status - National Nature Reserves, but they differ in terms of ecosystems condition and vulnerability to disturbance. It is helpful to determine varying degrees of protection management for the islands according to a set of categories based on management objectives.

The islands have been categorised using a system based on that proposed in "Ecological Restoration on Islands: Prerequisites For Success" by Atkinson and Towns (1990). The categories are listed in Table 3.

Table 4 lists each Subantarctic Island (some by sub-groups) under the category deemed to be appropriate for its future management. Most of the islands have been placed in the "Minimum Impact" category, with a few including the main Campbell and Auckland Islands being placed in the "Refuge" category. The use of only these two categories gives emphasis to the relative lack of modification and the international importance of the Subantarctic Island groups (the other three categories defined by Atkinson and Towns are included in Table 3 to allow readers to judge the appropriateness of using just the Minimum Impact and Refuge categories).

This categorisation system has been adopted to help define the differing management policies that apply, or should apply to different islands. It does not imply that any islands are of lesser value than any others as they are all classified as National Nature Reserves.

### Objective

- 1 To manage the island nature reserves to ensure that their significant natural values are maintained and, where applicable, restored.

### Implementation

- 1 Manage the islands in terms of the categorisations shown in Tables 3 and 4.

## 2.3 Terrestrial Ecosystems Management

### 2.3.1 Restoration

Restoration in its widest sense encompasses a range of functions and management techniques, some of which are specifically addressed in other sections of this CMS (eg, control of pest animals and plants; translocation of indigenous species lost from an ecosystem). The principles and practices of restoration should be integrated across all management activities. The overall aim is to restore or partially restore biotic community functions and processes to promote thriving indigenous ecosystems.

Restoration actions are carried out to repair areas where natural values have been severely diminished or in some cases lost. This may have occurred because of a single event (eg, fire) or longer term degradation of ecosystems by plant and animal pests, or land use such as grazing. Restoration may also be necessary at sites of high use such as the meteorological station on Campbell Island (refer 5.3.3).

Research is required on developing methods of effective restoration. Some methods will have general applicability, but for some sites, specific methods may need to be developed.

The focus of restoration programmes for the Subantarctic Islands CMS area is dominated by rehabilitation of some islands through the removal of pest animals (refer 2.3.2) and pest plants (refer 2.3.3). None of the Subantarctic Islands has been modified or degraded to an extent to warrant categorisation as a "Restoration" island (refer 2.2 and Table 3).

#### Objective

- 1 To restore, where necessary, ecological processes and biotic communities that maintain the biological diversity and ecological integrity of the Subantarctic Islands.

#### Implementation

- 1 Identify sites or areas on the islands where restoration is required via a Conservancy Restoration Plan. When assessing whether restoration is desirable the following questions will be asked:
  - Is the viability of the ecosystem under threat without restoration measures?
  - Will restoration repair damage to sensitive areas, sites of high ecological value, or high use sites?
  - What are the constraints to the success of a restoration project?
  - Do any risks associated with the project outweigh the benefits?
- 2 Use only species of local genetic stock or the next most appropriate stock in restoration programmes (refer Table 3).
- 3 Encourage associate or interest groups to participate in restoration projects when and where practicable.
- 4 Monitor the effectiveness of any restoration project and provide for the on-going management of restored areas.



**TABLE 3 - ISLAND MANAGEMENT CATEGORIES**

	<b>Minimum Impact</b>	<b>Refuge</b>	<b>Restoration</b>	<b>Open Sanctuary</b>	<b>Multiple Use (1)</b>
<b>Primary Conservation Function</b>	Protection of indigenous species and communities, particularly those distinct from mainland communities.	Protection of indigenous species and communities, both those of islands and those of the mainland.	Recovery of viable populations of threatened species and restoration of particular communities.	Protection and interpretation to the public of indigenous species and habitats, including those threatened by extinction or destruction.	Protection and enhancement of selected values.
<b>Criteria For Recognition (2)</b>	Presence of island endemics; freedom from introduced mammals; significant areas of indigenous habitat; high vulnerability to human interference; all sizes of islands, both modified and largely unmodified.	Presence of mainland endemics as island survivors; introduced mammals sometimes present; significant areas of indigenous habitat; moderate vulnerability to human interference; all sizes of islands; all degrees of modification except those largely unmodified.	Opportunities for restoring habitats of threatened species and for restoring threatened communities, both those of islands and those of the mainland; modified and extremely modified islands of all sizes.	Opportunities for providing habitats for rare and threatened species; opportunities for public education; medium and large islands, both modified and extremely modified.	Values secondary to other uses such as farming, forestry and recreation. Mostly extremely modified islands that are sometimes farm parks or privately owned.
<b>Protective Action For Species And Biotic Communities</b>	Special precautions against establishment of introduced plants and animals and against illegal visits and fires (3).	Consistent precautions against establishment of introduced plants and animals (excepting certain threatened species, see below) and against illegal visits and fires.	Consistent precautions against establishment of introduced plants and animals (with certain exceptions, see below) and against illegal visits and fires.	Consistent precautions against some species of alien plants and animals (4). Special precautions against fires.	Variable approach depending on kind and extent of use.
<b>Protective and Restorative Action For Archaeological Sites</b>	Protection restricted to sites of outstanding archaeological value.	Protection restricted to sites of outstanding archaeological value.	Sites of archaeological value protected with restoration of selected sites (5).	Protection and interpretation of archaeological and historic sites; major restoration of such sites where appropriate.	Sites of archaeological and historic value protected whenever possible.
<b>Restorative Action For Biotic Communities</b>	Restricted to re-establishment of a few species in a few small areas.	Restricted to minor areas relative to size of island.	Restoration of island communities formerly present and extension of some still existing; Restoration of mainland communities where appropriate on islands free of limiting factors of the mainland.	Restoration of island or mainland communities according to requirements of native plant/animal species of interest.	Restoration of island or mainland communities when identified as an objective for the island.
<b>Translocation of Species Not Natural To The Island</b>	Excluded except as an extreme short-term measure.	Permitted for selected species of nationally endangered animals and plants (7). Excluded for other plants except in special circumstances (6).	Island Communities: as for refuge islands excepting use of certain introduced plants as temporary cover. Mainland communities (on islands): permitted for appropriate mainland species and, in special cases, for animal taxa from the Pacific or Australia(8).	Permitted according to ecological appropriateness, educational and species conservation needs, and risk to other biota in the region.	Undertaken according to particular objectives adopted and risk to other biota in the region.

	Minimum Impact	Refuge	Restoration	Open Sanctuary	Multiple Use (1)
<b>Habitat Manipulation For Particular Species</b>	Restricted to minor manipulation.	For threatened species: restricted to modified areas; should exclude major changes in composition of community.	Island Communities: choice of communities to be restored sometimes influenced by habitat requirements of threatened species; Mainland communities (on islands): major manipulation of habitats sometimes needed.	Major manipulation of plant and animal habitats.	Major or minor manipulation of plant and animal habitats according to particular objectives adopted.
<b>Scientific Activity</b>	Monitoring of changes; identification of biological values.	Monitoring of changes; identification of biological values; process studies not possible elsewhere.	Experimentation using carefully monitored trials to measure progress of programme	Experimentation using carefully monitored trials to measure progress of programme.	Monitoring of enhancement programme; identification of biological values.
<b>Visitors, Education and Interpretation</b>	Minimal activity that can only be carried out on the island and that allows people to appreciate island values through books, radio, film etc.	i) Low impact activities that cannot be done on a restoration or open sanctuary island (see min. impact islands); ii) permitted visitors to a few selected islands with interpretation/supervision by Departmental staff.	i) low impact activities not possible in an open sanctuary; ii) permitted visitors to a few selected islands with interpretation/supervision; iii) volunteer help with restoration work on some islands.	Major function of island: open access with interpretation programmes; supervision when necessary.	Visitation and visitor movements dependent on permission from owners.

**Footnotes**

1. Other islands, where there is no conservation use, as excluded from this classification
2. Only terrestrial criteria have been used. Allocation of an island to a functional category is often partly a value judgement. The criteria given can be used as a guide but it is not essential that all criteria listed for each category need to be met.
3. Introduced plants and animals include those native to New Zealand though not natural to the island in question.
4. Alien plants and animals are introduced species foreign to New Zealand (exotics).
5. Site selection would give preference to extremely modified parts of the island thus minimizing disruption to existing or restored communities.
6. Special circumstances could include planting of temporary food sources in already greatly modified parts of an island in order to secure survival of a species of nationally endangered animal. However, in these circumstances, control of the introduced plant may be necessary to ensure it did not spread to other parts of the island.
7. This assumes that a proper case for the introduction of a nationally threatened animal and plant has been made and the likely impact assessed.
8. Introduction and establishment of animal taxa from other parts of the New Zealand region, or from Australia or the Pacific, could be attempted where the forms are related to the taxa now extinct on the mainland (Atkinson 1988). Such attempts at replacing extinct species should be restricted to substantially modified islands and should be carried out as controlled experiments to measure the impact of the new introduction on the islands biota. The new introduction must be removable from the island at any time if the need should arise.

Adapted from: Ecological Restoration of New Zealand Islands (1990), Atkinson and Towns.

**TABLE 4 - CATEGORISATION OF SUBANTARCTIC ISLANDS**

Island	Location	Size	Maximum distance to land (metres)	Settlement	Extent of habitat modification	Introduced weeds	Introduced animal pests
<b>Minimum Impact Islands</b>							
Adams Island	Auckland Islands	10119ha	90		minimum	low	none
Alert Stack	Snares Islands	5ha	60		minimum	low	none
Antipodes Island (includes main island and all outliers not individually mentioned)	Antipodes Islands	2025ha	na		minimum	low	mice present
Archway Island	Antipodes Islands	5ha	1500		minimum	low	none
Auckland Islands (all outliers not individually mentioned)	Auckland Islands	<5ha total	various		minimum	low	none
Bollons Island	Antipodes Islands	50ha	1500		minimum	low	none
Bounty Islands (main group, centre group and east group)	Bounty Islands	135ha	1300		minimum	low	none
Broughton Island	Snares Islands	48ha	100		minimum	low	none
Campbell Island (all outliers not individually mentioned)	Campbell Islands	<5ha total	various		minimum	low	none
Cossack Rock	Campbell Island group	1ha	300		minimum	low	none
Dent Island	Campbell Island group	27ha	1400		minimum	low	none
Disappointment Island	Auckland Islands	566ha	4000		minimum	low	none
Dundas Island	Auckland Islands	1ha	2500		minimum	low	none
Ewing Island	Auckland Islands	81ha	750		extensive	high	none
Figure of Eight Island	Auckland Islands	4ha	500		minimum	low	none
French Island	Auckland Islands	1ha	50		minimum	low	none
Friday Island	Auckland Islands	1ha	200		minimum	low	none
Gomez Island	Campbell Island group	2ha	500		minimum	low	none
Green Island	Auckland Islands	1ha	2500		minimum	low	none
Hook Keys Island	Campbell Island group	3ha	1300		minimum	low	none
Inner Windward Island	Antipodes Islands	5ha	800		minimum	low	none
Jacquemart Island	Campbell Island group	19ha	550		minimum	low	none
Jeanette-Marie Island	Campbell Island group	11ha	800		minimum	low	none
Leeward Island	Antipodes Islands	6ha	100		minimum	low	none
Monowai Island	Campbell Island group	6ha	300		minimum	low	none

Island	Location	Size	Maximum distance to land (metres)	Settlement	Extent of habitat modification	Introduced weeds	Introduced animal pests
Monumental Island	Auckland Islands	3ha	90		minimum	low	none
North-East Island (includes all outliers not individually mentioned)	Snares Islands	280ha	na		minimum	low	none
Ocean Island	Auckland Islands	5ha	250	Farming settlement abandoned	moderate	medium	goats eradicated (1940)
Ord Lees Island	Antipodes Islands	1ha	50		minimum	low	none
Outer Windward Island	Antipodes Islands	5ha	800		minimum	low	none
Rose Island	Auckland Islands	75ha	250	Farming settlement abandoned	moderate	medium	rabbits eradicated (1993)
Shoe Island	Auckland Islands	1ha	800		minimum	low	none
Snares Island (western chain islands)	Snares Islands	8ha	4000		minimum	low	none
Survey Island	Campbell Island group	3ha	400		minimum	low	none
Wasp Island	Campbell Island group	4ha	1500		minimum	low	none
Yule Island	Auckland Islands	1ha	500		minimum	low	none
<b>Refuge Islands</b>							
Auckland Island (main)	Auckland Islands	50990ha	na	Farming settlement abandoned	moderate	medium	goats eradicated (1990), pigs, cats and mice present
Campbell Island (main)	Campbell Island group	11216ha	na	Farming settlement abandoned, Met. station staffed all year round, closed October 1995	extensive	high	eradication of cattle (1984), sheep (1991). Cats and Norway rats present
Enderby Island	Auckland Islands	710ha	300	Farming settlement abandoned	extensive	high	eradication of cattle and rabbits (1993), pigs (date unknown). Mice probably gone but yet to be confirmed.
Folly Island	Campbell Island group	7ha	50		minimum	low	Norway rats present
Masked Island	Auckland Islands	4ha	100		minimum	low	cats and mice present
<p>Notes:-            Introduced animal pests in the table have not included those which died out naturally unless they caused significant impacts            Settlement does not include sealing bases or castaway locations            Priorities for future eradications are: Norway rats and cats from main Campbell Island and pigs from main Auckland Island</p>							

### 2.3.2 Pest Animals

The Department's responsibilities for control of pest animals on the Subantarctic islands derive from the Wild Animal Control Act 1977, the Reserves Act 1977 and the Wildlife Act 1953. The Department also has some obligations under the Biosecurity Act 1993.

For the purpose of this CMS a pest animal is defined as any introduced animal whose presence or activities results in significant detrimental effects on native plants and/or animals or ecosystem processes, or which threatens them. Impacts can range from preventing regeneration or severely limiting the range of plants, to preying on or competing with native animals for food. The term "pest animal" includes any wild animal defined in the Wild Animal Control Act 1977.

The Snares Islands, Bounty Islands and most of the smaller offshore islands in the other Subantarctic Island groups are without introduced mammals of any kind. Alien mammals are a cause for concern elsewhere. The Auckland group has pigs, cats and mice remaining, while Campbell has cats and Norway rats. The Antipodes group has only the house mouse. The lack of other pests is important to species conservation because mice tend to cause less damage than other alien mammals, but their presence on the Antipodes is still of concern.

A comprehensive approach to alien mammal management was developed in the management plans for the island nature reserves. Significant progress has been made with the removal of introduced animals since 1987, and this work has absorbed the greatest management effort and resources. Sheep have been removed from Campbell Island. Goats on Auckland Island have been removed by shooting or live capture for transfer to New Zealand. Eradication of cattle and rabbits from Enderby Island appears to have been achieved, and techniques for eradicating the pigs from the main Auckland Island are now being considered.

The removal of introduced animals from the Subantarctic islands has been controversial. Many of the animal species introduced during the 1800s as a ready food supply for shipwrecked sailors became genetically isolated. This genetic isolation is important to among scientific, rare breeds and agricultural interests. Despite public consultation during preparation of the nature reserve management plans, each removal operation drew criticism.

For this reason the Department worked closely with the New Zealand Rare Breeds Conservation Society, so that action was taken to ensure continuation of the species and gene pools that have existed in isolation on the Subantarctic Islands. The Department remains firmly committed to the goal of ultimately removing all alien animals, as and when feasible, recognising the significant adverse impacts that these animals have had on the island ecosystems.

With advances in the effectiveness of poisons, and recent New Zealand successes on smaller islands, eradication of mice from Antipodes Islands, and rats and cats from Campbell Island, may become feasible in the future. It needs to be recognised, however, that eradication of these smaller alien mammals is likely to be much more difficult and time consuming, than has been the case for the larger animals.

#### Completed Eradication Programmes

- 1 Sheep remained on Campbell Island as a legacy of attempts at pastoral farming between 1874 and 1931. The last farmers left 4,000 sheep and some cattle unattended on the island. After an initial marked decline, sheep numbers increased again to about 3000 in the late 1960s. Fences were erected and the

sheep culled from two blocks in the 1970s and 1980s. Following excellent recovery of the palatable megaherbs in the areas excluded from grazing, and given the impact that the sheep were having on rockhopper penguin colonies, a decision was made in 1990 to eradicate all remaining sheep. Some 1200 were shot in November 1990 and follow-up operations led to the last sheep being shot in November 1991. A monitoring programme continues to investigate the recovery of vegetation following the removal of sheep.



Sheep eradication, Campbell Island

- 2 French Blue Rabbits (*Argente de Champagne*) were introduced onto Enderby Island (Auckland Is) in 1865 as food for shipwrecked sailors. A separate liberation of mixed stock rabbits had been made on Rose Island in 1850. Their presence on the islands became inconsistent with the nature reserve status and the management priority for island habitat restoration. An eradication programme commenced on both islands in 1993. The operations were planned in close liaison with the New Zealand Rare Breeds Conservation Society, and included removal of a brood stock of rabbits for a captive management programme.

A dual rabbit/mice eradication was considered impractical because of logistical requirements. However, since the rabbit eradication programme was undertaken, no mouse sign has been observed. Monitoring was undertaken in 1994 and 1995. No sign was found of any rabbits either. Further checks will be made.

- 3 Cattle were introduced onto Enderby Island for pastoral purposes in 1894. Farming was short-lived and a remnant population of 40-50 animals, with a high ratio of bulls, continued to roam over the island. Their presence became incompatible with nature reserve status, and following a four year period to allow interest groups to remove both live cattle and genetic material, their removal began in February 1991 and has since been completed.

- 4 Goats were released onto Auckland Island in 1865 as a food source for ship wrecked sailors. The population became confined to the Port Ross area as other early liberations failed. Because of their physiologically stressful environment they appeared to grow significantly larger than mainland goats. They were the most southern feral goat population in the world, existing in probably the most extreme climatic conditions tolerable for the species.

In 1987 a live capture operation removed 58 goats to the New Zealand mainland for further research and animal husbandry. These animals were split into two populations (Te Anau and Reefton) with intentions to carry out an extensive cross breeding of the species. The relocated goats had some difficulty adapting to both the warmer climate and the richer pasture feed. A downturn in goat farming has led to a lack of interest in further research.

In 1989, during 37 days of ground hunting activity 107 goats were killed. Two subsequent shooting operations (one on foot, one by helicopter) have resulted in only one additional goat being destroyed. Eradication has probably been achieved, although further checks will be made in conjunction with other visits.

#### Active Issues

- 1 Pigs introduced onto Auckland Island in the early 1800s have been responsible for what is probably the most significant ecological modification, other than that caused by rodents, anywhere in the Subantarctic Islands. They have considerably reduced the Subantarctic megaherb flora on Auckland Island. Together with cats, which are equally widespread on that island, they are responsible for the reduction or absence of burrowing petrel species. Wandering and white-capped albatrosses are subject to similar impacts. The pigs present a difficult, but potentially achievable target for feral animal eradication.

The pig population is estimated to be about 1,000 animals ranging over some 51,000 hectares of dense sub-alpine and shrubland vegetation. Over the past five years, the Department has funded research into the development of a pig bait and toxin capable of operating in the inclement weather conditions of Auckland Island. A series of non-toxic bait tests was carried out in the Port Ross area in February 1991 but was inconclusive, apparently because of the low pig population present there. Bait tests and development of toxic baits and dispensers are now continuing on mainland pig populations, before further field testing on the island.

The aim of any pig control operation should be eradication. Merely reducing pig numbers would require an on-going campaign to maintain the smaller population. This could also compromise any future attempt at eradication by "shying" the animals. Eradication will not be easy in any case; it will require substantial resources and commitment given the large size of Auckland Island, its inaccessibility, rugged terrain and, in parts, impenetrable vegetation cover.

Trials to date have indicated that eradication will require a combination of methods to be successful, such as poison, use of pig dogs and hunters, and use of snares or toxic bait stations.

- 2 Depredation by cats is one of the factors involved in the depletion of bird and insect populations on the main Campbell and Auckland Islands. The removal of cats will allow the rehabilitation of some bird species. It is unlikely that the eradication of cats would trigger off a major increase in mice or rats, since the cats are probably not a significant control agent for the rodent population.

Field trials using pheromone cat baits were carried out on Campbell Island in 1989, but because of a particularly low density distribution of the cat population, results were inconclusive. A research project continues to further develop pheromone baits and toxins capable of working in low density populations.

- 3 The Norway rat has also caused the depletion of bird and insect populations on Campbell Island. Removal of rats will allow the rehabilitation of some species.

Recent advances in techniques mean that eradication of rats on Campbell Island is probably now achievable, but the techniques need further trials on large islands.

- 4 Mice have probably had a considerable influence on ecosystems of the islands on which they occur and their eradication is desirable. Unfortunately with current methods the cost of eradication is prohibitive over such large areas.

- 5 **Rodent Quarantine:** the risk of accidental introduction of rodents to rodent-free islands and the risk of new introductions is one of the greatest threats to conservation values present on the Subantarctic Islands. Specifically, rats can be readily liberated on islands via shipwreck, ship mooring, or in landings of infested stores. Once ashore they are extremely destructive through predation of birds (particularly eggs and young) and invertebrates, and through eating seeds, fruit and other parts of plants. The colonisation of an island by rodents or an additional species of rodent could have a catastrophic effect on the island's natural values.

The primary aim of management is to provide adequate quarantine measures to prevent rodents reaching any island. If these fail an immediate intensive localised extermination campaign may prevent establishment of a viable population.

A stringent rodent contingency process applies for all visits to the islands, and this is reinforced strongly in visitor guidelines and entry permit requirements. Key measures include:

- provision of a rodent-proof field store in Invercargill for all expedition equipment
- compulsory use of rodent-proof plastic crates for landing stores on rodent-free islands
- a rodent contingency plan for the Snares Islands with a permanent set of rodent bait stations located around the boat mooring area
- a full set of rodent bait stations available for immediate deployment from Invercargill in case of accidental introduction of rodents
- rodent control at Port Pegasus, Stewart Island, which many smaller boats use as an anchorage en route to or from Subantarctic waters
- guidelines for rodent clearance for boats visiting Subantarctic islands (ie, rat guard shields on mooring lines, deployment of rodent baits).
- rodent control around meteorological station and wharf at Campbell Island

Precautions against introductions should be tailored to meet the requirements of the policy as it applies to particular permit situations. They must cover the transport vessel (in keeping with its size and type), stores, loading and unloading of stores, landings, travel between islands and any other "housekeeping" measures which are considered necessary on board any vessel and ashore.



## Objectives

- 1 To eradicate all feral pigs from Auckland Island as soon as possible.
- 2 To eradicate feral cats from Campbell, Auckland and Masked Islands as soon as is feasible.
- 3 To eradicate Norway Rats from Campbell and Folly Islands as soon as is feasible.
- 4 To eradicate mice from the Antipodes and Auckland Island groups as soon as is feasible.
- 5 To prevent new introductions of any exotic animal species to any part of the reserves, and prevent transfer of rodents to any of the rodent-free islands.

## Implementation:

### 1 Feral Pigs:

Plan in consultation with other relevant agencies for eradication of pigs and implement the required operations as soon as is feasible.

Provide other interests such as the New Zealand Rare Breeds Conservation Society with the opportunity to ensure continuation of the breed and/or gene values of the Auckland Island pigs through removal of sufficient animals.

### 2 Feral Cats:

Encourage and assist research on the distribution and ecology of cats on Auckland and Campbell Islands, and on extermination methods.

Implement a cat extermination programme when suitable techniques and resources are available.

If required in sensitive areas, such as petrel colonies, undertake local control of cats by whatever methods are deemed appropriate in terms of effectiveness and environmental constraints.

### 3 Norway Rats:

Encourage and assist research on the ecology and distribution of Norway Rats on Campbell Island, and on eradication methods.

Implement a rat eradication programme when suitable techniques and resources are available.

If required in sensitive areas, undertake local control of rats by whatever methods are deemed appropriate in terms of effectiveness and environmental impact.

### 4 Mice:

Encourage and assist research on the ecology and distribution of mice on Antipodes and Auckland Islands, and on eradication methods. Implement mice eradication programmes when suitable techniques and resources are available.

5 Feral Rabbits:

Undertake monitoring to ensure that eradication has been achieved.

6 Prevention of Future Introductions

Inform visitors to the island nature reserves and/or their coastal waters around the reserve of the precautions to be taken to prevent new introductions of animal pests. Ensure such precautions are conditions on all entry permits. Ensure strict enforcement by the Departmental representatives (refer 5.3.1).

Establish and maintain rodent poison bait stations in the vicinity of permanent huts while the huts are occupied.

Maintain a pest quarantine and contingency plan to reduce the risk of new introductions, and to enable the department to respond rapidly to confirmed introductions or events which may have caused an introduction. Continually review precautions.

### 2.3.3 Pest Plants

Control of introduced plants is an important management task (refer 1.6). The Department also has obligations under the Biosecurity Act 1993, which requires control of noxious plants listed in national or regional pest plant management strategies.

Among the islands, only the main Campbell and Auckland Islands have considerable numbers of alien plants (85 species and 37 species, respectively). Usually, introduced plants have been successful only on artificially disturbed ground, and they eventually succumb to competition from indigenous plants. However, several species have become well established and will probably continue to spread. Climatic change or habitat disturbance may favour the spread of some of these species. Those that have potential to overtop or out-compete indigenous vegetation are of particular concern.

Fortunately, only a few of the alien species currently present such a threat. In particular, *Lotus pedunculatus* (birdsfoot trefoil) and gorse and broom need to be monitored or watched for. *Arrhenatherum elatius* (tall oat grass), and possibly *Trifolium repens* (white clover) and dandelion, on Campbell Island should also be checked - eradication may be possible. *Poa pratensis* (meadow grass) may be gaining a foothold in maritime surf communities on Campbell Island.

#### Active Issues

- 1 *Olearia lyallii* (tree daisy) is naturally present on the Snares group but is thought to have reached the Auckland group less than 200 years ago, well within the time of human contact with the islands. It is now dominant on Ewing Island and is also established on the shores of Port Ross. This species could have been introduced by human activity, or it may have reached Auckland Island through natural immigration. Although timing suggests human influence is more probable, there is no evidence to substantiate either possibility, so posing a dilemma as to whether *Olearia lyallii* should be regarded as an alien species on the Auckland group.



*Could Olearia lyallii have immigrated by natural means? Yes. Even if it was actually introduced by human activity, would it have immigrated naturally in due course? Probably. Is it a legitimate member of the biogeographic zone? Yes, given its success on the Aucklands and its occurrence on the landmass immediately to the north. What are the consequences of trying to limit its range on the Aucklands? Being locked into a perpetual control of the spread of seedlings - which is not sustainable - with continual disruption to the soil providing entry opportunities for other weeds, or eliminating the seed source population - an expensive and highly disruptive exercise. What are the consequences of non-control? It will gradually spread around the island shore between the rata forest and the coastal tussock and scrub thereby narrowing the zone of the tussock-scrub-herbfield community, especially on leeward coasts, and it is likely to become a stunted member of the shrub-tussock community immediately above the rata forest zone. It will not completely displace rata forest but establish a new equilibrium in the vegetation equivalent to the mosaic of rata and Olearia on Big South Cape Island (off Stewart Island). Likewise, tussock, scrub and herbfield will survive in exposed or disturbed places as they do on the Snares Islands. This is a natural process of immigration and establishment - an interesting phenomenon in its own right.*

The management plan for the Auckland Islands Nature Reserve takes a precautionary response to the *Olearia lyallii* issue: limited control of the species is to be carried out on the shores of main Auckland Island to contain its spread, but not on Ewing Island. Control work was undertaken on the other islands of Port Ross in 1989, and on Auckland Island in 1993. Containment of the species is not considered to be a feasible option for the long-term, although this policy could be re-confirmed for action over the next 10 years or longer, if the ultimate aim is eradication when resources are available. The options are either to seek total eradication, or to accept the presence of *Olearia lyallii* on the Auckland Islands along with the probable changes it will make to the current vegetation patterns. The latter option is adopted in this Draft CMS.

- 2 A more certain introduction of a New Zealand indigenous species is the presence of New Zealand flax (*phormium tenax*), found on the Campbell and Auckland groups. No seedlings have ever been observed - all spread is vegetative and this is extremely slow, although there are fairly robust stands at Ranui Cove, Auckland Island, and Perseverance Harbour, Campbell Island. No control measures are considered necessary, unless viable seed begins to show. The flax has historical value, as does the single sitka spruce tree on Campbell island. The sitka spruce has not produced seed.

- 3 Vigilance is essential to secure these islands against further introductions of plants, particularly through transport of seeds.

Emphasis continues to be placed on plant quarantine measures for all visits to the Subantarctic islands to ensure that new introductions of alien plants are avoided. These include inspection of clothing for seeds; washing of footwear between islands; and inspection and proper packing of stores. Efforts have been increased with the recent upsurge in tourism activity in and around the islands. The presence of Departmental representatives on each tourist cruise has been instrumental in ensuring that visitors are well aware of the plant quarantine measures adopted to ensure the protection of the islands from new introductions.

- 4 A control programme was initiated to eradicate the only two known introduced plants on the Snares Islands: *Stellaria media* (chickweed) and *Poa annua* (annual grass). Plants of these species are found around the base indicating their

accidental introduction by visitors to the islands. However, recent expeditions to the Snares have not been able to implement this control programme and it is currently on hold.

- 5 Attempts could be made to remove *Lotus pedunculatus* from the Tucker Cove area on Campbell Island. This is the only known location of this species on that island.

Although there are numerous other exotic plant species present in the nature reserves, none appears to pose any significant threat to indigenous ecosystems. Practical considerations dictate that selective management only is possible. Such management is consistent with the objective of maintaining the reserves in a natural state. Management must be achieved without undue disturbance to indigenous species and communities.

### Objectives

- 1 To eradicate exotic plants wherever feasible.
- 2 To prevent the further introduction and/or establishment of exotic plant species on the Subantarctic Islands.

### Implementation

- 1 Implement quarantine procedures to halt seed and exotic plant introductions.
- 2 Require that visitors take precautions against the further spread of exotic plant species when travelling within, and between island groups.
- 3 Inform visitors to the nature reserves of the need and reasons for precautions to be taken to prevent plant introductions.
- 4 Remove any new exotic plant species (ie, any found which is not on current species lists) before it can become established or spread further.
- 5 Monitor distribution of *Olearia lyallii* on the Auckland Islands.
- 6 Eradicate *Poa annua* and *Stellaria media* from Snares Island if and when feasible control programmes can be implemented.
- 7 Keep plant control techniques under review so that opportunities can be taken, as they arise, to implement further eradication programmes.

### 2.3.4 Fire Control

Responsibilities for fire control are determined by the Forest and Rural Fires Act 1977 and the Forest and Rural Fires Regulations 1979. The Minister of Conservation is the Fire Authority for lands administered by the Department. The Department must abide by the above Act and Regulations and the Fire Service Act 1975, and it has adopted the Rural Fire Management Code of Practice.

While the fire control function is governed by the Forest and Rural Fires Act 1977 and therefore falls outside the scope of this CMS, the Reserves Act (refer 1.6) does require consideration of fire, as a threat to the reserves or as a tool to assist management.

A restricted fire season applies year-round over the island nature reserves. Permits issued by the Department are generally required for the lighting of fires in the open air (eg, for rubbish disposal).

Although weather conditions may appear to preclude any danger, fires could quickly devastate ecosystems. Fire is a particularly significant issue for the tussock islands. Should vegetation be damaged by fire, regeneration would probably be slow because of the rigorous climate. Many animals and their habitats would also be destroyed. Once alight, peat can smoulder underground for many years, often at great depths, and flare up to start surface fires in dry weather.

Potential causes of fires are: visitors generally, scientific or management operations, and vessel or aircraft mishaps. Because of the remoteness of the islands, fire control operations would be difficult and probably unachievable in some circumstances. Consequently, management provisions are concerned primarily with preventing fires from occurring.

#### Objectives

- 1 To prevent fire damage to the island nature reserves.
- 2 If fire occurs, to minimise damage to the island nature reserves.

#### Implementation

- 1 Give highest priority to the control and suppression of fires in accordance with the provisions of the Forest and Rural Fires Act 1977 and other legislation, except where the risk to fire-fighters would be unacceptable.
- 2 Restrict the lighting of all fires in the open except for rubbish disposal purposes. Prior authorization will be required from the Department for any rubbish fires.
- 3 Inform visitors of fire prevention requirements in the entry permit, including a ban on smoking, and ensure they take adequate fire extinguishers for use at all huts they intend to use.
- 4 Stipulate that visitors shall be required to do whatever they practicably can, or what is necessary, to extinguish any wild fire that occurs as a result of human actions during their presence on an island.

## 2.4 Marine Ecosystems

Marine mammals and wildlife species are protected under the Marine Mammals Protection Act 1978 (to 200 miles offshore) and the Wildlife Act 1953 (to 12 miles offshore). But their ocean habitat and food sources are generally not protected, except for a marine mammal sanctuary around the Auckland Islands.

The marine mammal sanctuary was declared in 1993, over and around the Auckland Islands including the surrounding sea to 12 nautical miles out from the low water mark. Commercial fishing is prohibited within the sanctuary, which has been established to help protect the New Zealand sea lion population (refer 2.5.2).

In 1994 the International Whaling Commission declared a sanctuary for all whale species in the southern ocean. The boundary of this sanctuary follows latitude 40 degrees south in New Zealand waters. It will improve the conservation prospects of several species of whales, but adds little to the existing protection given by the Marine Mammals Protection Act in New Zealand fisheries waters.

In addition to the two Acts mentioned above, means of protecting ocean and inshore coastal habitats are provided by the Marine Reserves Act 1971, the Resource Management Act 1991 (RMA), and the Reserves Act 1977 (the foreshores around the islands are included in the nature reserve status). Opportunities also exist under other legislation with which the Department has some involvement (refer 1.6).

The coastal marine areas around the Subantarctic Islands warrant protection to ensure their values are not reduced or lost. The RMA provides the primary means of achieving protection, within the principles of sustainable management (refer 1.6 and Glossary).

Using mechanisms in the Marine Mammals Act, Marine Reserves Act and/or Wildlife Act, and/or achieving protection under the RMA would protect some habitats. However, cooperation with the Ministry of Fisheries (MFish), commercial fishers and other resource users is required to ensure protection or conservation of the wider marine environment.

Commercial fishing developments in the vicinity of the southern islands are of concern because of (among other things) their potential to adversely affect marine mammals and seabirds. Incidental catches of marine mammals are supposed to be recorded and reported by fishers. Since April 1986, an on-board fisheries observer scheme has been operated by MFish. Observers have the task of verifying catch composition of trawls. They collect data on bycatch of protected species when practicable, but this is not sufficient to verify bycatch across the fisheries.

Protection of the marine environment from pollution associated with shipping and offshore installations will be strengthened markedly when provisions of the Maritime Transport Act 1994 and the RMA come into operation. Rules made under the RMA will apply within the 12 mile limit; rules made under the Maritime Transport Act will control discharge, dumping or incineration of waste outside the 12 mile limit. Oil spill management and response is covered by the Maritime Transport Act within and outside the 12 mile limit. These laws are consistent with MARPOL 73/78, an international convention which regulates marine pollution from ships (refer 1.6).

### Issues

- 1 Geological exploration has indicated the possibility of large oil reserves in the Great South Basin. Any future development of oil rigs, service vessels and other infra-structure would raise the potential for pollution including oil spills.

- 2 Other potential sources of pollution from marine sources would be the wrecking, grounding or sheltering of vessels along the Subantarctic Island coasts. Accidental or intentional release of pollutants, especially into the sheltered coastal inlets on Auckland and Campbell Islands could have disastrous consequences for marine life, including flightless birds. A major concern would be the release of heavy fuel oil. Deposition of plastics and other water-borne litter resulting from human activities is generally slight on the Subantarctic Islands. The adoption of good house-keeping practices on fishing vessels will continue to assist in avoiding any increase in water-borne rubbish.
- 3 Ballast waters in shipping have been found to contain a wide range of organisms including viruses, plankton, molluscs, crabs, starfish and/or other fish species, as well as other types of pollutants. Introduction of foreign organisms could alter the composition of the Subantarctic marine ecosystems. Discharges of contaminated ballast water can potentially occur during fishing operations, or when cargo is off-loaded or transferred between vessels.
- 4 Marine mammal bycatch. A major trawl fishery for squid developed around the Auckland Islands in 1979-80. At that time, a large bycatch of New Zealand sea lions was cause for concern and a programme of research was instigated to assess the current status, distribution and biology of the species, and the impact of the fishery on it. The results of this research suggest the population at one rookery, at least, has been stable for the past decade. However, the sea lion population is still vulnerable and continues to be threatened by fishing. There is also a significant bycatch of fur seals and other marine mammals across the fisheries in Subantarctic waters. The Department is working with MFish and the fishing industry to improve population estimates and to minimise the incidental bycatch of marine mammals.



Russian trawler



- 5 Seabird bycatch. Albatrosses, mollymawks and petrels are incidentally killed in fishing operations when the seabirds take baited hooks, or collide or get caught up in nets or vessel structures (netsonde monitor cables were banned in 1992 and are not an issue now; however, birds do crash into trawl warps or get caught in nets and are killed by being dragged under water). The Department is working closely with MFish and the commercial fishing industry to reduce seabird bycatch, particularly in longline tuna fishing by advocating codes of practice (eg, night netting, use of thawed baits) and the regulation of tori lines.

Considerable effort has been put into inventory and monitoring of key seabird populations (eg, white-capped and black-browed mollymawks, wandering albatross and Buller's mollymawk) with the establishment of base counts at the Snares, Campbell, Auckland and Antipodes Islands over the past four years.

- 6 Proposals were made in 1989 and 1991 to take the Yellow foot paua shellfish (*Haliotis virginea*) from inshore areas of the Bounty and Antipodes Island groups. The Department has advocated for a closed fishery around these islands prior to investigations for marine reserves, as any large scale removal of paua from the subtidal zone could have a devastating effect on the near shore marine ecology of the islands. Currently, fishing quota for yellow foot paua has been allocated but no fishing permits have been issued. There is continued commercial interest.

- 7 A significant scampi (*Metanephros challengerii*) fishery was discovered off the Auckland Islands over the 1990/91 and 1991/92 summers. Two tonnes were taken from Subantarctic waters in 1990/91 rising to 200 tonnes over the 1991/92 summer. A 300 tonne limit was set for the 1992/93 year. Little is known of the sustainability of the scampi fishery, or the interactions it has with other marine life and wildlife in and around the Subantarctic Islands.

The average size of the scampi trawlers is small, and these boats regularly seek shelter at Auckland Island anchorages. Unauthorised landings or shipwreck pose further threats of accidental introduction of rodents. The New Zealand Conservation Authority has sought a moratorium on scampi trawling around the Auckland Islands so that potential threats to the islands can be assessed.

- 8 A rock lobster fishery continues to be exploited at the Snares Islands. Following the introduction of a system of non-transferrable mooring permits in 1983, only two permits are now renewed annually and the fishers work closely with the Department in rodent contingency planning. These moorings will eventually be phased out, although the lobster fishing is likely to continue indefinitely.

- 9 There was renewed interest in the establishment of a fishery for Auckland Island crab (*Jacquinothia edwardsii*) over the 1991/92 summer, the first such attempt since 1982. After exploratory operations it appears that interest has once again lapsed because of the low meat content of the crabs, despite their large size.

The Department has and will continue to work closely with MFish in advocating for conservation of marine ecosystems and species in the control and granting of permits for commercial fishing. With continuing interest in developing fisheries in Subantarctic waters, there will always be a risk of damage to the islands through unauthorised landings, near shore visits or shipwrecks.

## Objectives

- 1 To promote adequate protection of marine ecosystems and conservation of marine resources around the Subantarctic Islands as part of New Zealand's obligations under the Convention on Biological Diversity.
- 2 To achieve protection of marine mammal and seabird species from adverse impacts of human activities.
- 3 To obtain a greater knowledge of the biological processes involved in the marine environment, and the impacts of human activities on those processes.
- 4 To ensure continued liaison and cooperation with all agencies and interested parties that have a role in management of the marine environment.
- 5 To encourage a fully integrated approach to management of land and sea in the Subantarctic Islands CMS area.

## Implementation

- 1 Raise public awareness of the actual and potential impacts of resource uses and/or development on the natural values of the islands and surrounding ocean.
- 2 Raise public and industry awareness of the potential problems of contaminants and/or exotic species being released in ballast water discharges from shipping.
- 3 Continue consultation and liaison with Ministry of Fisheries, Ministry of Transport, Maritime Safety Authority and industry groups.
- 4 Advocate for protection of wildlife, marine mammals and the significant natural values of the Subantarctic Islands and Southern Ocean in any relevant statutory or non-statutory processes.
- 5 Assess the need for, or desirability of further protected marine areas around the Subantarctic Islands, and progress worthwhile proposals using the procedures set out in the Marine Reserves Act 1971, Wildlife Act 1953 and/or Marine Mammals Act 1978.
- 6 Arrange for vessels to be notified of the access restrictions that apply to the island nature reserves and the reasons for these restrictions.
- 7 Cooperate with the Maritime Safety Authority in contingency planning for oil spills in Subantarctic waters.
- 8 Encourage and where appropriate, assist marine research within the territorial sea and New Zealand fisheries waters around the Subantarctic Islands.
- 9 Provide for effective surveillance and management of the Auckland Islands Marine Mammal Sanctuary.

## 2.5 Indigenous Species

### 2.5.1 Species Other Than Marine Mammals

The Department's responsibilities include protection of New Zealand's native animals and protection of their habitats within areas that it manages. Animals include freshwater fish. Native animals are protected under the Wildlife Act 1953. Native plants on the Subantarctic Islands are protected by the nature reserve status and other provisions of the Reserves Act 1977.

Protection of indigenous species in a remote and essentially unmodified environment like the Subantarctic islands is largely a matter of protecting their habitat - terrestrial and marine. But at times habitat protection is not sufficient and more intensive management is required for threatened species. In such cases, a Species Recovery Programme is usually developed, setting goals, objectives and actions for conservation of the species.

Intensive management is being undertaken for only one Subantarctic species, the Campbell Island teal - a flightless bird. With a remnant population estimated at less than 100 birds present on Dent Island, in a small habitat area vulnerable to landslips, the decision was made in 1990 to relocate seven birds to a captive breeding programme at the National Wildlife Centre on the New Zealand mainland. Captive breeding first occurred in the 1994/95 season, when four young were raised. It is intended to establish a second wild population of Campbell Island teal elsewhere in New Zealand using this captive stock. Ultimately the goal is to return Campbell Island teal to main Campbell Island but this will only be possible when rats and cats have been eradicated there (refer 2.3.1).

Other Subantarctic species to which special attention has been directed are the Auckland Island rail and the Auckland Island teal - another flightless bird. Previously known from only three specimens and less than 10 sightings, the rail had not been seen since 1966 but was rediscovered on Adams Island during 1989. The current population of rails on Adams Island is estimated to be several hundred, spread over a range of habitats. A second population of rail has also been confirmed on Disappointment Island. The rail has not been found on any island where it might have been eliminated by cats and/or mice. Eradication of rabbits and possibly mice from Enderby Island in 1993 should allow reintroduction of Auckland Island rail to the Port Ross area.

Auckland Island teal are found on 10 islands in the Auckland Islands group. They do not currently occur on the main Auckland Island because of mammalian predation. A long term goal is to re-establish them there. Interim management of this species will concentrate on protection of the existing wild populations.

The Department has set national priorities for the protection of threatened species based on their distinctiveness, status, threats, vulnerability and the human values attached to each. The threatened species have been divided into priority categories. Priorities have recently been reassessed (Molloy and Davis 1994). Table 5 lists threatened species known to be present on or around the Subantarctic Islands.

The Department is preparing a Seabird Conservation Strategy to set management priorities for seabird species. If threatened species have needs other than habitat protection, those needs are best addressed through the species recovery planning process, or seabird conservation strategy. The CMS, however, should set out principles or parameters for integration of species management with habitat or ecosystems management.

## Issues

The management category assigned to each individual Subantarctic Island (refer 2.2) provides a policy framework for habitat management within which species management decisions should be made. Issues include ex-situ management of species (ie, managing species in captivity or at sites outside their natural range) and introductions of species requiring refuges.

In the context of the Subantarctic islands, ex-situ management primarily concerns species vulnerable to rat predation. Animal species that exist at only one site are the most vulnerable as they could face extinction as the result of just one rat invasion event. This applies to all three land birds and possibly also the chafer beetle *Prodontria longitarsus* on the Snares Islands (regarded as one site), and the Campbell Island teal on Dent Island. The risk would be substantially reduced if breeding populations of these species could be established elsewhere. Having at least two populations of such vulnerable species would provide the best prospects for their survival. The World Conservation Union (IUCN) has long recommended that no species of endangered animal should be left in a single habitat.

Ex-situ management could involve holding populations of animal species on other islands serving as refuges. An added benefit of this might be that Subantarctic bird species could fill "gaps" in other island ecosystems where an extinction has occurred (eg, translocate Snares Island fernbird to Mangere Island (in the Chatham Islands group) both to replace the extinct Chatham Island fernbird and to reduce the threat to the Snares species).

Translocation of threatened bird species may also be possible among the Subantarctic Island groups, and within the groups. Significant opportunities to restore species to their original habitat would result if the main Auckland and Campbell Islands could be cleared of cats and rodents, although some species would probably recolonise the main islands naturally (from their current habitats on the small islands). Translocations of plant species could also be made for the same reason (eg, assist dispersal of *Pleurophyllum* seed on Enderby Island, rather than waiting for it to re-establish naturally).

A further potential source of introductions of species to some islands would be proposals to provide refuges for non-Subantarctic species, or to bring in species from elsewhere to replace "lost" species. Introductions of "eco-equivalent" species (eg, Red-breasted merganser to replace extinct Auckland Island merganser) may be acceptable if rigorous assessment can confirm compatibility with the receiving ecosystem. But there are many potential pit-falls and issues regarding compatibility and defining of "eco-equivalent" species.

A more open approach suggested for the "Refuge" islands has been considered. Specifically, other Subantarctic bird species which may have been present in the past could be introduced to one or more of the refuge islands, so they could be viewed by visitors (eg, parakeets and snipe being introduced to Campbell Island if the cats and rats can be eradicated). However, such introductions would interfere with natural processes. Each island group should be treated as a separate entity, allowing introductions only of those species appropriate for that group. In any case, introductions for the primary purpose of visitor viewing would be contrary to the management aims of these island nature reserves (refer 1.6).

The following principles are proposed to guide species translocation proposals or options:

- Re-introductions of any species for which there is convincing evidence that the species was once present in an ecosystem, should generally be acceptable.

**TABLE 5 - THREATENED SPECIES OF N.Z. SUBANTARCTIC ISLANDS**

	Habitat Type	Island Location	National Status	Southland Management Priority	Recovery Plan	Management Required
<b>CATEGORY A SPECIES</b>						
<b>BIRDS</b>						
<i>Anas aucklandica nesiotis</i> (Campbell Island teal)	Tussock, herbfield, wetland	Dent Island	Endangered, Campbell Islands endemic	High	Recovery plan	Establish back-up population, rat and cat eradication on main Campbell Island
<b>CATEGORY B SPECIES</b>						
<b>PLANTS</b>						
<i>Fissidens strictus</i> (a moss)	Rocks in streams	Auckland Island	Rare	Low	No recovery plan	Database
<i>Lepidium oleraceum</i> (Cook's scurvy grass, nau)	Coastal tussock and herbfield	Snares, Antipodes, Auckland Islands	Endangered, endemic	Medium	Southland Threatened Plant Conservation Plan	Database
<i>Pachyschistochila latiloba</i> (a liverwort)	Peaty soil	Auckland Island	Endemic	Low	No recovery plan	Database
<b>BIRDS</b>						
<i>Coenocorypha aucklandica huegeli</i> (Snares Island snipe, tutukiwi)	Olearia forest, tussock	Snares Islands	Local, endemic to Snares Islands	Medium	No recovery plan	Pest quarantine, establishment of second population
<i>Diomedea chrysostoma</i> (grey-headed mollymawk)	Coastal tussock, herbfield	Campbell Island	Vulnerable	Medium	No recovery plan	Monitoring (fishing by-catch species)
<i>Diomedea epomophora</i> (southern royal albatross, toroa)	Tussock uplands	Campbell Island, Auckland Island	Rare, endemic to NZ subantarctic	High	No recovery plan	Monitoring (fishing by-catch species)
<i>Diomedea exulans gibsoni</i> (Gibsons albatross)	Tussock uplands	Auckland Islands	Vulnerable, subspecies endemic to Auckland Islands	High	No recovery plan	Monitoring (fishing by-catch species)
<i>Diomedea melanophrys impavida</i> (NZ black-browed mollymawk)	Cliff ledges and cliff tops	Campbell Island	Vulnerable, subspecies endemic to Campbell Island	Medium	No recovery plan	Monitoring (fishing by-catch species)
<i>Eudyptes sclateri</i> (erect-crested penguin)	Coastal breeding colonies	Bounty, Antipodes Islands	Rare, endemic to NZ Subantarctic Islands	Medium	No recovery plan	Monitoring
<i>Falco novaeseelandiae</i> (NZ falcon)	Forest	Auckland Island	Vulnerable, endemic	Medium	No recovery plan	Monitoring, determine taxonomic status of Auckland Island race
<i>Megadyptes antipodes</i> (Yellow-eyed penguin)	Forest, coastal tussock, marine	Campbell, Auckland Islands	Endangered, endemic	Medium	Recovery plan	Population monitoring

	Habitat Type	Island Location	National Status	Southland Management Priority	Recovery Plan	Management Required
<b>MAMMALS</b>						
<i>Phocarctos hookeri</i> (NZ sealion, Hooker's sealion)	Marine, coastal	Breeds Auckland, Campbell, Snares Islands	Vulnerable, endemic	Medium	Recovery plan in preparation	Advocacy, monitoring (fishing by-catch species)
<b>CATEGORY C SPECIES</b>						
<b>INVERTEBRATES</b>						
<i>Oclandus laeviusculus</i> (a flightless weevil)	Pleurophyllum herbfield	Adams island, Auckland Island, islets off Campbell Island.	Vulnerable	Low	No recovery plan	Database, rodent eradication on Campbell and Auckland Island
<b>FRESHWATER FISH</b>						
<i>Galaxias brevipinnis</i> (koaro)	Freshwater	Campbell, Auckland Island	Rare*, endemic	Low	No recovery plan	Database
<b>BIRDS</b>						
<i>Bowdleria punctata caudata</i> (Snares Island fernbird, karoti)	Olearia forest, tussock, herbfield	Snares Islands	Local, subspecies endemic to Snares Islands	Medium	No recovery plan	Pest quarantine, establish back-up population
<i>Charadrius bicinctus exilis</i> (Auckland Island banded dotterel)	Coast and tussock/moor uplands	Auckland Islands	Vulnerable, subspecies endemic to Auckland Islands	Low	No recovery plan	Pest quarantine
<i>Coenocorypha aucklandica aucklandica</i> (Auckland Island snipe)	Tussock, herbfields, forest	Auckland Islands	Local, Vulnerable, subspecies endemic to Auckland Islands	Low	No recovery plan	Pest quarantine
<i>Coenocorypha aucklandica meinertzhagenae</i> (Antipodes Island snipe, tutukiwi)	Tussock, herbfield	Antipodes Islands	Local, Vulnerable, subspecies endemic to Antipodes Islands	Low	No recovery plan	Pest quarantine
<i>Cyanoramphus auriceps auriceps</i> (yellow-crowned parakeet, kakariki)	Forest, tussock and coastal	Auckland Islands	Rare, endemic	Low	No recovery plan	Pest quarantine
<i>Cyanoramphus novaezelandiae hochstetteri</i> (Reischek's parakeet)	Tussock and coastal	Antipodes Islands	Local, subspecies endemic to Antipodes Islands	Low	No recovery plan	Pest quarantine
<i>Cyanoramphus unicolor</i> (Antipodes Island parakeet)	Tussock and coastal	Antipodes Islands	Local, endemic to Antipodes Islands	Low	No recovery plan	Pest quarantine
<i>Diomedea exulans antipodensis</i> (Antipodes wandering albatross)	Tussock uplands	Antipodes Islands	Vulnerable, subspecies endemic to Antipodes Islands	Medium	No recovery plan	Monitoring (fishing by-catch species)
<i>Diomedea bulleri bulleri</i> (southern Buller's mollymawk)	Coastal slopes	Snares Islands, Solander Island	Vulnerable, subspecies	Medium	No recovery plan	Monitoring (fishing by-catch species)

	Habitat Type	Island Location	National Status	Southland Management Priority	Recovery Plan	Management Required
<i>Diomedea cauta salvini</i> (Salvin's mollymawk)	Coastal rock	Bounty and Snares Islands	Rare	Medium	No recovery plan	Monitoring
<i>Diomedea cauta steadi</i> (NZ white-capped (shy) mollymawk)	Steeper tussock slopes	Auckland Islands, Antipodes Islands	Rare	Medium	No recovery plan	Monitoring
<i>Eudyptes robustus</i> (Snares crested penguin)	Coastal	Snares Islands	Local, endemic to Snares Islands	Low	No recovery plan	Monitoring
<i>Leucocarbo campbelli</i> (Campbell Island shag)	Coastal	Campbell Islands	Local, endemic to Campbell Islands	Low	No recovery plan	Monitoring
<i>Leucocarbo colensoi</i> (Auckland Island shag)	Coastal	Auckland Islands	Local, endemic to Auckland Islands	Low	No recovery plan	Monitoring
<i>Leucocarbo ranfurlyi</i> (Bounty Island shag)	Coastal	Bounty Islands	Local, endemic to Bounty Islands	Low	No recovery plan	Monitoring
<i>Macronectes halli</i> (northern giant petrel)	Coastal tussock	Antipodes, Campbell and Auckland Islands	Rare	Low	No recovery plan	Monitoring
<i>Petroica macrocephala dannefaerdi</i> (Snares Island tit)	Olearia forest, coastal tussock	Snares Islands	Local, subspecies endemic to Snares Islands	Medium	No recovery plan	Pest quarantine, establish back-up population
<i>Petroica macrocephala marrineri</i> (Auckland Island tit)	Olearia forest, coastal tussock	Auckland Islands	Local, subspecies endemic to Auckland Islands	Low	No recovery plan	Pest quarantine
<i>Sterna striata</i> (white-fronted tern)	Coastal	Auckland Islands	Rare, endemic	Low	No recovery plan	Database
<b>CATEGORY I SPECIES (LITTLE INFORMATION, BUT CONSIDERED THREATENED)</b>						
<b>PLANTS</b>						
<i>Blindia cincta</i> (a moss)	Wet rock faces beside waterfalls	Campbell, Adams Island	Rare	Low	No recovery plan	Database
<i>Blindia seppeltii</i> (a moss)	Wet rock, lakes and seepages	Auckland, Campbell Island	Rare	Low	No recovery plan	Database
<i>Crosyba nervosa</i> (a moss)	Rata forest on branches and trunks	Auckland, Campbell Island	Rare	Low	No recovery plan	Database
<i>Ditrichum austro-georgicum</i> (a moss)	Steep soil banks	Campbell Island	Rare	Low	No recovery plan	Database
<i>Muelleriella angustifolia</i> (a moss)	Coastal rocks	Campbell Island	Rare	Low	No recovery plan	Database
<i>Muelleriella aucklandica</i> (a moss)	Coastal rocks	Auckland, Adams Island	Rare	Low	No recovery plan	Database

	Habitat Type	Island Location	National Status	Southland Management Priority	Recovery Plan	Management Required
<i>Trichostomum imshaugii</i> (a moss)	Cliff faces on exposed ridge	Campbell Island	Rare	Low	No recovery plan	Database
<i>Willia calobolax</i> (a moss)	Coastal rocks and tree trunks	Antipodes Islands	Rare	Low	No recovery plan	Database
<b>CATEGORY 0 SPECIES (THREATENED IN NEW ZEALAND BUT SECURE ELSEWHERE IN THEIR RANGE)</b>						
<b>BIRDS</b>						
<i>Eudyptes chrysocome filholi</i> (eastern rockhopper penguin)	Coastal	Campbell, Auckland and Antipodes Islands	Rare	Low	No recovery plan	Monitoring
<i>Procellaria cinerea</i> (grey petrel)	Tussock	Antipodes and Campbell Islands	Vulnerable	Medium	No recovery plan	Monitoring (fishing by-catch species), rat/cat eradication from Campbell Island
<b>MAMMALS</b>						
<i>Eubalaena australis</i> (southern right whale)	Marine	Breeds around Auckland and Campbell Islands	Rare	Low	No recovery plan	Database
<i>Mirounga leonina</i> (elephant seal)	Marine, coastline	Campbell, Antipodes Islands	Rare	Low	No recovery plan	Database
<b>CATEGORY N SPECIES (NOT LISTED IN PREVIOUS LISTS BUT CONSIDERED THREATENED)</b>						
<b>PLANTS</b>						
<i>Anisotome acutifolia</i> (herb)	Coastal tussock	Snares Island	Local, endemic to Snares Islands	Medium	Southland Threatened Plant Conservation Plan	Monitoring, database
<i>Gentiana antipoda</i> (gentian)	Tussock	Antipodes Islands	Local, endemic to Antipodes Islands	Low	No recovery plan	Nil
<i>Puccinella antipoda</i>	Coastal tussock	Antipodes Islands	Local, endemic to Antipodes Islands	Low	No recovery plan	Nil
<i>Stibocarpa robusta</i> (large herb)	Herbfield	Snares	Local, endemic to Snares	Low	No recovery Plan	Database
<b>BIRDS</b>						
<i>Rallus pectoralis muelleri</i> (Auckland Island rail)	Herbfield	Auckland Islands	Local, subspecies endemic to Auckland Islands	Low	No recovery plan	Pest quarantine, reintroduce to Enderby Island



**Definitions for Table:-**

**Department of Conservation Molloy and Davis \* (1994) Categories:-**

**Category A** - highest priority threatened species

**Category B** - second priority threatened species

**Category C** - third priority threatened species

**Category I** - species about which little information exists, but on existing evidence, are considered threatened

**Category O** - species which are threatened in New Zealand but are known to be secure outside New Zealand

**Category N** - species not listed in previous lists but considered threatened

**International Union for the Conservation of Nature and Natural Resources (IUCN) definitions:-**

**Endangered** - a plant or animal in danger of extinction and whose survival is unlikely if the causal factors continue operating

**Vulnerable** - a plant or animal believed likely to move into the "endangered" category in the near future if causal factors continue operating

**Indeterminate** - a plant or animal known to be "extinct", "endangered", "vulnerable" or "rare", but where there is not enough information to say which of the four categories is appropriate

**Rare** - species with small world populations that are not at present "endangered" or "vulnerable" but are at risk

**Local** - indicates island endemic species which, because of their restricted distributions, render them highly vulnerable to catastrophes such as rodent invasion.

**Management action definitions:-**

**Database** - entry of distribution records and other information onto establishes databases. Priorities should be given to entries onto Biosite database and the island database

**Pest quarantine** - measure put in place to prevent animal and plant pests and pathogens colonising islands or remote habitats

**Advocacy** - to promote improvements in the status of species through public awareness

**Animal pest eradication** - the eradication of animal pests from a particular site

**Monitoring** - recording trends over time in identified populations/habitats

**Establish back-up population** - the establishment of additional populations on other islands

**Recovery Plan** - development of a detailed national species recovery plan for one of two taxa. They have a five year term

\*Setting priorities for the conservation of New Zealand's threatened plants and animals. Second edition October 1994. First edition (1992) prepared by Molloy and Davis, second edition collated by Tisdall. Department of Conservation.

- Introductions of other species (including any that may have been present in the past but for which no convincing evidence exists) should not be allowed. Exceptions can be made if there are no other feasible options for ex-situ management of a species and it is compatible with the receiving ecosystem.

These principles reflect the primary purpose of the nature reserve status which is also emphasised by the proposed island management categories (ie, minimum impact, and refuge).

Species translocations do involve risks in themselves, a significant one being the potential to transfer or introduce diseases. National Translocation Guidelines have been established. Ex-situ management of a second population of a species may also be suspect if the holding site is in a different climatic zone from the home site - the two populations may evolve differently in the long-term. These aspects of intensive management must be taken into account during assessment of species recovery options.

### Objectives

- 1 To maintain the diversity of indigenous species by preventing, where possible, any further loss of indigenous species from habitats where they are currently known to exist.
- 2 To restore the diversity of indigenous species in all Subantarctic ecosystems to a range similar to that existing before human disturbance occurred, and to ensure that species are self-sustaining with minimal management input.

### Implementation

- 1 Set priorities for threatened species management having regard to national priorities, requirements of species recovery plans, and locally identified threats. Keep those priorities under review.
- 2 Allow the introduction of indigenous plant and animal species which are actually occurring or once occurred in each island group, provided the risks of disease or other negative impacts have been thoroughly assessed.
- 3 Allow removal of any plant or animal population (in whole or part) where this is necessary for species or subspecies survival and where there is no threat to the survival of other taxa.
- 4 Encourage the ex-situ propagation or breeding of endangered species if ecological restoration is feasible and other conditions are favourable. Such propagation or breeding programme is to occur only in accordance with a restoration plan or species recovery plan.

## 2.5.2 Marine Mammals

The Marine Mammals Protection Act 1978 provides for the protection, conservation and management of all marine mammals such as whales, dolphins, seals and sea lions within New Zealand and within New Zealand fisheries waters. The Marine Mammal Protection Regulations 1992 are intended to prevent harassment and harm by controlling human contact with marine mammals and prescribing appropriate behaviour around them. They also require commercial marine mammal watching ventures to have permits (refer 5.3.3).



Orca whales

Most incidents involving distressed marine mammals are natural events. The remoteness of the Subantarctic Islands means that strandings of whales or dolphins, or the presence of injured or sick sea lions or seals, is unlikely to be detected; and if they are, rescue or rehabilitation will probably not be logistically possible.

The Department has sole responsibility for the taking of material from marine mammal carcasses, whether for cultural or scientific purposes (refer 2.7).

A Recovery Plan for the New Zealand sea lion is now operative. The principal actions to be undertaken are: assessment of population; investigation of fisheries interactions; development of techniques to mitigate bycatch; assessment of foraging ecology; and other research that will assist management.

### Objectives

- 1 To protect and conserve marine mammals.
- 2 To increase understanding of marine mammal behaviour, ecology and the effects on them of human activities.

## Implementation

- 1 Attempt to assist stranded or injured marine mammals observed on or around the Subantarctic Islands if such action is practicable and reasonable, recognising logistical difficulties. Greater priority will be given to events involving threatened species.
- 2 Encourage and where appropriate, assist research on marine mammal behaviour, and the effects of human activities on them, in Subantarctic waters.
- 3 Increase the knowledge of whale species distribution patterns by recording all sightings observed at or around the Subantarctic islands.

(refer 2.4 and 2.7 also)



New Zealand sea lions on Enderby Island

## 2.6 Survey, Monitoring and Research

An understanding of natural processes and human influences in and adjacent to the reserves is necessary for effective management.

Since 1 March 1987 about 50 entry permits for scientific research purposes have been issued for the Subantarctic Islands. Preference has been given to scientific research which will significantly enhance scientific knowledge and effective management of the islands. A permit procedure system provides that research is carried out in a manner that ensures protection of the natural ecosystems without any lasting ecological modification. The strategic importance of the Subantarctic islands for global and pure research (eg, plate tectonics, climatic change) has also been recognised and accommodated where ever possible. Some of the more significant research projects are:

- \* A ten-year study based on Enderby Island investigating the population dynamics and ecology of the New Zealand sea lion *Phocarctos hookeri*.
- \* A study of the Auckland Island flightless teal on the islands of the Port Ross area, specifically appraising the population structure, distribution and productivity of teal on Ewing Island.
- \* Census work on Rockhopper penguins over the 1987/88 summer indicating an apparent decline to a current breeding population of 103,000 birds, representing a reduction of 94% from estimates of 1,700,000 birds made in 1944.
- \* A long-term programme to establish the changes in Campbell Island vegetation patterns and species dynamics following removal of feral sheep.
- \* A study to establish the significance of the Campbell and Auckland Island Yellow-eyed penguin populations for the total world population of this species, and to determine through DNA analysis if these populations mix with mainland New Zealand populations.
- \* A study to determine the species and numbers of subantarctic seabirds that are being caught or entangled in the southern ocean tuna and squid fisheries around New Zealand's Subantarctic islands. Research efforts are involved at sea as well as on indicator populations at Snares, Auckland, Campbell and Antipodes Islands.
- \* Population counts and study of breeding success of black-browed and grey-headed mollymawk on Campbell Island.
- \* Continuing development of a toxic polymer bait and method of application capable of operating effectively in low pig densities and inclement weather.
- \* The first biannual count of Royal albatross on Campbell Island was carried out over the 1991/92 and 92/93 summers.

A "Subantarctic database" has been established in the Department of Conservation office in Invercargill to improve the availability of research and management information concerning the islands, to anyone requiring access to this material.

### Rationale

There is a need to develop a science and research strategy for the Subantarctic Islands and species of the southern ocean. A draft Seabird Conservation Strategy (in preparation) will set out monitoring and research requirements for the priority species found in the

TABLE 6 : CONSERVATION SCIENCE AND RESEARCH THEMES FOR THE SUBANTARCTIC ISLANDS AND SOUTHERN OCEAN

SEABIRDS	Establishing population size and distribution (comprehensive quantitative surveys of all breeding colonies; systematic mapping of seabirds at sea)	Albatrosses and mollymawks (southern royal albatross; all Campbell Is. mollymawks; Wandering albatross including the Antipodes subspecies; Salvin's mollymawk; Light-mantled sooty albatross; NZ Black-browed mollymawk; and Grey-headed mollymawk) Burrowing seabirds (all species) Penguins (Yellow-eyed, Erect-crested, Rockhopper) Shags (three endemic Subantarctic shags)
	Breeding biology, population dynamics and demographics	Instigate more systematic and detailed studies of population dynamics; comprehensive demographic studies of petrel species (lacking to date)
(refer Draft Seabird Conservation Strategy for important or key species for research and monitoring)	Feeding Ecology	Foraging range and diet of key species; competition for food; changes in sea temperatures and prey distribution; impacts of fisheries on feeding ecology, including bycatch
(ditto)	Behaviour	Vulnerability and sensitivity to increasing human presence and contact on islands
MARINE MAMMALS	New Zealand (Hooker's) sea lion	Population size and status Fisheries inter-action and bycatch, techniques to mitigate bycatch, behaviour around fishing vessels Feeding ecology (foraging areas and behaviour, diet and energetics) Human impacts (especially tourism)
	New Zealand fur seal and Southern elephant seal	Population size, status and distribution; breeding biology; feeding ecology; human interactions and impacts including from fisheries
PLANTS/ VEGETATION	Continued monitoring of vegetation regeneration following eradication of introduced animals	Sheep (Campbell Island) Cattle (Campbell and Enderby Island) Goats (Auckland Island) Rabbits and mice (Enderby Island)
	Ecology of endemic plants genera	eg, <i>Pleurophyllum</i>
	Plant/invertebrate associations	
	Phenology of key plant species	Monitor impacts on plants of climate changes such as atmospheric warming, ozone depletion and increased UV radiation
IMPACTS OF INTRODUCED SPECIES	Ecology of Impacts	Cats and pigs on Auckland Island Mice on Antipodes Island
OCEANIC STUDIES	Promote research and monitoring of the southern ocean environment	eg, changes in sea temperatures, ocean currents, surface plankton distribution, potential impacts on food chains from any marked changes in species composition, abundance, and/or distribution.
HISTORY AND ARCHAEOLOGY		On-going site survey, inventory of artifacts, mapping and research in support of Protection Plan and Conservation plans.
VISITORS	Research and monitoring of tourism and its impacts	eg, tourist profiles, tourist attitudes and behaviour, tourism impacts, tourist advocacy, tour operators and concessionaires.

Subantarctic region. Monitoring is being undertaken on Campbell Island (for several species) and on some other islands. The desirable extent of monitoring of threatened species is shown on Table 5.

Science and monitoring should serve the broader purpose of protection and be targeted to provide key information for management. Strategic directions for the future of science in the Subantarctic region are:

- Long-term monitoring
- Scientific investigations to guide management.

Records of biological and physical changes are essential for establishing the status, condition and trend of resources and ecosystems, and are vital for assessing management programmes and procedures.

### Objectives

- 1 To establish and maintain as far as is practicable an ongoing programme to monitor changes in the natural ecosystems of the island nature reserves and species inhabiting the surrounding ocean.
- 2 To arrange, facilitate and support a programme of scientific research to assist management of the islands and species inhabiting the surrounding ocean.

### Implementation:

- 1 Develop and encourage implementation of a comprehensive science and research strategy based on the themes set out in Table 6.
- 2 Foster international cooperative research, especially among scientists working on other Subantarctic Islands (refer Table 2).
- 3 Encourage all visitors to the islands to report to the department any observations made which indicate ecological changes, for example, unusual numbers of dead plants and animals, or physical changes.
- 4 Vet all survey, monitoring and research proposals to ensure they are relevant and meet rigorous scientific standards. Science teams must be able to demonstrate that they are suitably qualified and have the necessary credentials.
- 5 Require science activities to be carried out in such a manner that:
  - protection of the natural ecosystems is ensured, and
  - they will cause no lasting changes in indigenous plant or animal populations or community relationships, and
  - they do not conflict with essential management operations.
- 6 Encourage the completion of approved science projects, and require that research including observations, data and results is fully reported to the Department.

(refer Part 5 also).

## 2.7 Taking of Plants and Animals

The Reserves Act 1977 (sections 42 and 49) controls taking of plants from reserve lands. There is no specific reference in this Acts to taking for traditional Maori purposes. The essential purposes for collection are scientific research and education. The law is silent on commercial aspects.

The Marine Mammals Protection Act 1978 protects all marine mammals. The Wildlife Act 1953 gives native animals absolute protection, although there are some exceptions and in various legislation fish are treated differently from land animals.

Under the Freshwater Fisheries Regulations 1983 it is unlawful to kill or destroy any species of indigenous fish except for human consumption or scientific research. Any indigenous fish can be taken for human consumption and scientific research, though harvesting of whitebait species (ie, koaro) is regulated. Commercial harvesting of freshwater fish from within reserves is illegal under section 50 of the Reserves Act 1977.

At present the Department issues authorities or permits in accordance with this legislation (or relevant regulations) for:

- the collection of native plants and animals, rock samples and other natural materials from the reserves
- the catching, collection, or holding of fully or partly protected wildlife or game
- the catching, collection, holding or disturbance of marine mammals or their remains

The purposes for which these materials can be taken include:

- Maori cultural uses (eg, medicines, carving, food source).
- scientific research, monitoring or inventory

### Objective

- 1 To ensure that the taking of plants, animals and other natural materials for appropriate purposes is in accord with the general aim of protecting those resources.

### Implementation

- 1 The taking of plants and animals which are threatened or locally uncommon is considered inappropriate unless it is essential for management or research purposes, and is consistent with national policy on access to New Zealand's indigenous genetic resources. In the absence of national policy, restrictions will be applied to the registration of intellectual policy rights, ability to transfer material to third parties and commercial use.
- 2 Identification and gathering of cultural materials will only be authorised in co-operation with appropriate iwi authorities, and traditional conservation techniques of gathering will be applied, in the interests of conserving the resource.
- 3 Taking of plants or dead animals (or parts thereof) for scientific or educational purposes will generally be limited to species which are abundant, and only minimal takes will be approved.



- 4 People will be encouraged to send dead specimens of indigenous species found in Subantarctic waters to the Museum of New Zealand - Te Papa Tongarewa, particularly frozen dead animals for inclusion in the frozen tissue register where appropriate.
- 5 Dead plants and animals found within the nature reserves (including the inter-tidal zones) must be left in-situ unless authorization has been given by the Department for removal.
- 6 Liaise with museums on the allocation and storage of dead specimens of protected species. Maintain information on institutions holding dead specimens.
- 7 Monitor the impacts of taking plant, animal or other natural materials to ensure conditions of permits have been complied with and the level of taking is sustainable.
- 8 Increase visitor awareness of the legislative requirements relating to the protection of natural materials and the need for a permit before material can be taken.

## Part 3: Historic Resource Conservation

---

### 3.1 Rationale

The Reserves Act 1977 provides for historic and archaeological features present on the island nature reserves to be managed and protected, provided this is compatible with the primary purpose of the reserve (refer 1.6).

The term "historic place" is defined in the Historic Places Act 1993 as "any land, site, building, or structure, or combination thereof, that forms part of the historical and cultural heritage of New Zealand, including anything that is fixed to such land".

### 3.2 Threats to Historic Places

Despite being legally protected, all historic places have their existence threatened in some way. Four categories of threat to historic resources on the Subantarctic Islands have been identified:

- Natural processes such as corrosion, rotting and weathering may continually degrade the integrity of historic resources. Disturbance by wildlife is also a threat to some historic places on the islands (eg, sea lions damaging historic structures).
- Visitors to historic places can pose significant threats directly to the sites through the removal of artefacts as souvenirs or to sell, destructive acts of vandalism, or impacts such as trampling over archaeological sites or climbing on structures.
- Management decisions and informal staff actions pose a threat through unjustified or unwarranted demolition, generally as a result of ignorance or lack of appreciation of historic places. Inappropriate restoration and maintenance on historic places can seriously degrade integrity.
- Historic information contributes to planning authentic historic conservation work and advancing public understanding of heritage. Loss of such information is therefore a considerable threat which can occur in a variety of ways. Significant losses occur when people die without having recorded their knowledge.

These threats could cause historic sites to be obscured, modified, destroyed or undervalued. Protection must be ensured where this is compatible with protection of natural features. Some historic places need active conservation management to remedy threats or help with preservation. Wherever practicable, protection of historic objects should be undertaken on site, but if removal is deemed necessary, such objects should be placed in an appropriate institution on mainland New Zealand.

### 3.3 Present Management and Priorities

The Department has developed an Historic Resources Strategy for Southland Conservancy which sets goals and provides guidance over the next five years for management of historic resources on lands administered by the Department in the region. It is an

operational plan, not a statutory or formal policy document; therefore, it has not been through a public consultation process. This Draft CMS provides an opportunity to canvass public comment on policy and priorities.

### **Priorities for Active Management**

All the known historic places, except for some of European origin recently located on Campbell Island, have been assessed in order to select sites for active management which best represent the human history of the Subantarctic Islands. Significant aspects of that history are depicted by the following themes: Maori (3 historic places), European Discovery/Exploration (2), Sealers/Whalers (6), Early European Settlements (4), Natural Resource Use (4), Shipwrecks/Castaways and Coastwatchers (43). The following criteria were used for the selection process:

- local and national historic significance (using Historic Places trust criteria)
- the need to mitigate immediate threats to the place (such as deterioration)
- the demands for and potential impacts of public visitation
- interpretation value (ability to convey historic meaning with minimal interpretation)
- representativeness (whether an individual site adequately represents its type, and whether the sites together adequately represent the range of historic themes)

Table 7 lists 15 historic places on the Subantarctic Islands that have been selected for active management, plus the Campbell Island meteorological station (see below). The table shows the place, name or description and whether the place is recorded with the New Zealand Archaeological Association (NZAA). It shows if there has been any conservation work done on the place, if there are existing visitor facilities or if these facilities need to be provided. This Table also lists significance ratings which indicate whether a site represents historic events of local, national or international significance.

In selecting the sites to be actively managed, emphasis has generally been placed on historic places having some appreciable physical remains. These sites rate more highly for interpretation and education although it is recognised that threats are increased with the accessibility of the place.

Some of the historic places included in the list of sites to be actively managed represent quite recent history - the coastwatchers lookouts. These sites are relatively accessible. The abandoned accommodation buildings associated with the coastwatch lookouts were not built of materials that can withstand the Subantarctic climate for very long, and no attempts will be made to conserve these structures.

Most of the recognised historic sites existed well before the islands were given the status of nature reserves. Activities after the coastwatchers era, current and future, will in time be regarded as historic. In keeping with the nature reserve status it is considered (as a general principle) that any facilities or structures built on the islands since the end of World War II should be totally removed, along with any associated equipment, when they are no longer needed. However, in accordance with policies of the Historic Places Trust, all historic places over 30 years old should be assessed for historic values in the context of the primary aims of the nature reserve status.

Some structures at the Campbell Island meteorological station may warrant conservation for their historic values, particularly the wharf and associated boat sheds. Whether these structures should be retained must also be considered in terms of the threat or security risk they might become by attracting unauthorised visitors (refer 5.2 and 5.3.3).

TABLE 7 : HISTORIC PLACES SELECTED FOR ACTIVE MANAGEMENT

Name of Historic Place	Special Protection	Significance Rating	Historic Conservation	Visitor Facilities
Stella Hut, Enderby Island	A	**	Y♦ (fence)	Y (boardwalk)
Derry Castle Grave Site, Enderby Island	A	*	Y♦ (marker)	R
Enderby Boatshed	A	*	Y♦	R
Finger Posts (several locations)	A	*	Y♦	R
Hardwicke Settlement and Cemetery, Erebus Cove	A	**	Y♦ (fence)	Y (boardwalk)
Ranui Coastwatchers Lookout Hut	A	**	Y♦	Y♦ (track)
German Scientific Expedition Site - Terra Cove	A	***	Y	Y (keep site clear)
Grafton (Wreck) site of "Epigwaitt" Carnley Harbour (North Arm)	A	**	N♦	R
Carnley Harbour Coastwatchers Lookout Hut	A	**	Y♦	Y♦ (track)
Maori Occupation Sites, Davis Bay & Enderby Island	A	**	N♦	R
Tuckers Farm House/Woolshed Remains, Campbell Island	A	**	N♦	R
Camp Cove, Sod Hut, Campbell Island	A	*	N♦	R
North-East Harbour - Whaling Station, Campbell Island	A	*	Y♦	R
Antipodes Island, Castaway Depot	♦?	**	Y♦	R
Snares Island, Castaway Depot	♦	**	Y♦	R
Campbell Island Met Station - Wharf and Boatsheds	?	?		

## KEY -

- A Recorded archaeological site
- Y Yes, some work done
- N No work done
- R No work required
- ♦ Further work required (see Protection Plan or Historic Resources Strategy for details)
- \*\*\* International importance
- \*\* National importance
- \* Local importance

Note: all sites will require on-going maintenance.

## Management Process

A protection plan (or inventory) has been prepared for all recorded historic places on the Subantarctic Islands. This database will be updated as changes to sites are identified. This information can then be sent to the local filekeeper for updating of the NZAA records.

Once the decision has been made to actively manage a historic place, a conservation plan is prepared, guided by ICOMOS principles and standards. The plan includes a detailed site history, description, significance, records, and a prescription for remedial work and long-term maintenance. Requirements for visitor impact management are also assessed.

## 3.4 Kaupapa Maori

The Subantarctic Islands are of cultural and spiritual significance to Maori. Liaison with, and involvement of Kai Tahu and Ngati Mutunga iwi, and the Moriori people will be essential for sites of interest to them to determine appropriate approaches to conservation and interpretation for wahi tapu.

Wahi tapu can be actively managed if approval from iwi is gained. Iwi may be interested in managing these places themselves. This will be encouraged. To allow the monitoring of disturbance or degradation and conservation work performed, the historic places managed by iwi should be listed and conservation plans prepared. Any activities proposed to be undertaken within the vicinity of places significant to iwi will require consultation with iwi before proceeding with the activity.

## 3.5 Visitor Use Of Historic Places

Currently, two places of high historical significance - the Stella hut on Enderby Island, and the Hardwicke Settlement and Cemetery at Port Ross, Auckland Island - are being managed for larger groups of tourists to visit. The other places listed in Table 7 which are on the Auckland or Campbell Islands can be visited by small guided groups (refer 5.3.1).

It must be emphasised that while visits to historic places may be permitted, the most important consideration is ensuring their protection and conservation. Each unmodified site will require on-going monitoring to check for any deterioration. If a site shows deterioration which is not acceptable, it should be closed to group visits until the desirability and cost of site conservation, and its effect on the overall significance of the site, can be assessed.

Each place selected for active conservation should be identified on-site with a cast disk or similar marker, positioned so it is seen but is not obtrusive to the place. The significance of the markers should be well publicised. This approach has seen some success in reducing human interference and damage at historic places on mainland New Zealand. Sites of maori origin should only be marked in ways acceptable to iwi.

No on-site interpretation should be put in place at sites which are very isolated and where visitation is mainly by guided groups - this principle applies to all historic places on the Subantarctic Islands. Most visitors who travel to the remote sites generally have a genuine interest and there is good published information available on the history of most sites. Concessionaires should make quality resources available to their clients.

## 3.6 Strategic Direction

### Objectives

- 1 To attain an understanding sufficient for management purposes of the values of historic resources on the island nature reserves, and the threats they face.
- 2 To protect historic resources on the islands from damage.
- 3 To identify and actively manage historic places which provide the best possible balanced representation of the history of the islands.
- 4 To avoid further accumulation of structures and relics from current or future human activities on the island nature reserves.
- 5 To promote off-site conservation of artefacts originating from the islands at suitable museums in New Zealand.

### Implementation

- 1 Undertake thematic studies, area surveys and site appraisals. Record archaeological remains or items or sites of cultural significance which have been, or may be, discovered. Prepare and maintain an Archaeological Resource Statement.
- 2 Maintain an inventory (protection plan) of all known historical places on the Subantarctic Islands. Assess historic values using criteria set out in the Historic Places Act 1993.



Coastwatch lookout, Carnley Harbour, Auckland Islands

- 3 Actively manage only those historic places listed on Table 7.
- 4 Prepare and implement a conservation plan for each historic place to be actively managed, guided by ICOMOS principles and meeting ICOMOS standards. These conservation plans shall provide for both remedial work and long-term maintenance.
- 5 Prepare Historic Places Trust registration proposals as required for actively managed sites. Seek expert advice on any disturbance of or proposal to disturb archaeological sites, with a view to remedial action, avoidance or, if this is a condition of Trust consent under the Historic Places Act 1993, appropriate scientific investigation.
- 6 Prevent degradation or deterioration of all historic places from the actions of people or animals.
- 7 Consult iwi on protection, conservation and interpretation of any wahi tapu or associated wahi taonga.
- 8 Leave antiquities and relics dating from before 1946 in their original locations, unless an item is of such significance as to warrant custody by an appropriate museum on the New Zealand mainland, and is able to be shifted without damage and be preserved, or if likely damage or pillaging is placing the relic at risk (the Secretary for Internal Affairs may direct otherwise in terms of powers under the Antiquities Act 1975 relating to Maori artifacts).
- 9 Encourage the holders of any relic or antiquity from a reserve to register them under an appropriate national recording scheme.
- 10 Provide a small marker sign at each of the actively managed historic places identifying them as managed sites and their significance. The Maori sites are only to be marked in ways acceptable to iwi.
- 11 Allow grave sites to be identified with appropriate markers including those not having original headstones.
- 12 Inform visitors of their obligations, and the need for their assistance, in protecting historical sites, antiquities and relics.
- 13 Provide visitor facilities at actively managed sites in accordance with conservation plans only where there is a need to protect the historic resources and/or improve visitor access to and appreciation of the place (refer Table 7 and 5.3.3). Visitor facilities must not adversely conflict with the significance of the place or the remote setting of the islands. No on-site interpretation will be provided (refer 4.3), except that interpretive panel displays may be placed in the boatsheds on the wharf at Campbell Island if that site is confirmed for active management.
- 14 Monitor those historic places which are accessed by visitors to the islands, to check for any deterioration.
- 15 Require all structures and equipment placed on the island nature reserves since 1945 to be removed when no longer needed; unless there will no adverse effects on natural values and an assessment of historic values provides sufficient grounds to over-rule this policy in the interests of historic resource protection.

## Part 4: Conservation Awareness

---

### 4.1 Rationale

The primary goal is protection of the Subantarctic Island nature reserves in perpetuity. Public awareness programmes which enhance public appreciation and recognition, and support for this management goal without requiring visits to the islands have become a key strategy. Visiting the islands can be one means of developing support for their protection, but visits are also the greatest threat to the islands. Consequently, the primary source of awareness should be the "off-site" experience.

### 4.2 Information & Awareness Review

A number of initiatives have been taken during recent years to increase awareness of the islands. In view of the increased national and international exposure that the New Zealand Subantarctic Islands have been gaining, the Department has given priority to the majority of people who will probably never visit the islands. In addition to the high cost of Subantarctic tours, the fragile nature of the islands means that the carrying capacity for tourism purposes will be very limited.

With these factors in mind, the Department worked closely with the Southland Museum and Art Gallery and the New Zealand Tourism Department in promoting the concept of a Roaring Forties Subantarctic Experience within the Southland Museum at Invercargill. The objective is to provide a Subantarctic experience as close as possible to what one could gain from actually visiting the islands. An audio visual presentation has recently been completed. An interpretation gallery is scheduled to open in 1996 and a range of live plant and animal displays are to be established in Queens Park immediately adjacent to the museum. This will be the only Subantarctic Island interpretation centre in the world. It is seen as a key additional attraction for cruise ships using the Port of Bluff in connection with Subantarctic and Antarctic tourism, as well as for the wider public. It is also seen as being complimentary to the visitor experience and interpretation gained in the Antarctic Visitor Centre at Christchurch.

Since few people will ever visit the islands, it is extremely important that the Department promotes a public awareness programme which provides information about the islands and their history; highlights their national and international ecological importance; documents the threats to these resources and the management measures used to combat them; and explains the reasons for restricting public entry.

This information should be communicated through all appropriate media and forwarded also, through appropriate channels, to local and foreign fishermen and seafarers likely to encounter the islands or their wildlife. Information material that is prepared for potential intruders (eg, fishing boats, cruising yachts) should be readily available, comprehensive and clear regarding the restrictions on landings and entry to the nature reserves.

Interpretation should be limited to printed material provided to permitted visitors. On-site interpretation facilities are not appropriate on these remote islands.

It is acknowledged that much of the publicity and educational material will be provided by commercial media interests, who will need access to the islands to gather suitable material. However, there has been a marked increase in applications for entry permits in



recent years, raising questions as to whether all of them can be justified. Maximum use should be made of existing material and the results of any further visits for filming.

### 4.3 Strategic direction

#### Objectives

- 1 To enhance public awareness and appreciation of the natural and historic features of the islands and their ecological significance.
- 2 To emphasise the risks inherent in human visitation and to develop opportunities for "off-site" experiences, thereby diverting demand for visits to the islands.

#### Implementation

- 1 Develop "Roaring Forties" displays in conjunction with Southland Museum and Art Gallery.
- 2 Contribute when possible, to international and national forums on management of the Subantarctic Islands and southern oceans.
- 3 Prepare interpretive literature or other media illustrating, documenting and promoting natural and historical features of the islands and surrounding ocean, and actively ensure its widespread distribution.
- 4 Have available and promote informative material for potential and permitted visitors which explains the rules of visitation and other restrictions on use of the island nature reserves, and the reasons for them.
- 5 Keep the island nature reserves free of on-site interpretation facilities (except refer 3.6(10)).
- 6 Publicise significant interesting changes and events associated with the Subantarctic Islands and southern ocean.
- 7 Occasionally permit media visits onto the island reserves to prepare general educational material or to film or document an expedition. Such visits will not be permitted if material can be obtained from existing sources. Media visits to Minimum Impact islands (refer 2.2) will only be permitted in conjunction with other authorised activities to avoid separate visits. All media visits are to be supervised by a Departmental representative. Copies of material may be required for Departmental use.

Applications for media visits will be subject to similar rigorous scrutiny as applies to science and management proposals, particularly in the case of requests to visit Minimum Impact islands (refer 5.3.1).

## Part 5: Visitor Impacts Management

---

### 5.1 Rationale

Visitor impact management applies to all visitors to the island nature reserves, and includes human interaction with marine mammals on land or at sea.

Managers must be forthright in their approach to requests for access to the islands. The islands are unquestionably of international significance. Managers must act in the interests of the natural assets and the global community. All visits - whether for management, scientific, tourism, information or manawhenua interest - involve risks and potential impacts. Therefore the frequency and level of visitation should be restricted.

Emphasis is given to managing visits so as to avoid *risk* rather than damage, and closer attention to the effects of human *disturbance*. Because of the exceptional values at stake in the Subantarctic Islands a precautionary approach is essential. (The problem with policies that seek to avoid "measurable damage" is that damage is frequently difficult to measure. Also, the damage must be done in order to measure it. Consequently, that type of policy has an implicit bias against a precautionary or risk-avoidance approach.)

Future strategy should focus on the risk deriving from visits and disturbance, especially as it relates to rodent introductions. In such a remote and vulnerable area, where vigilance is extremely difficult to maintain, it is essential to take all steps to keep landings to a minimum. The results of one of the very few long-term seabird monitoring programmes (at Taiaroa Heads on mainland New Zealand) show how subtle the long-term effects of disturbance can be, and this has implications, albeit indirect, for management practices in the Subantarctic Islands.

The features of New Zealand's Subantarctic Islands that justify their status as National Nature Reserves also make them some of the most desirable areas in New Zealand, and indeed internationally, for the development of wildlife-based nature tourism. Unfortunately some of the areas considered most desirable for visits by eco-tours are also the most ecologically or physically sensitive. The accidental introduction of a new plant or rodent species to these sites could have a devastating effect on the entire island ecosystem. Other potential impacts include disturbance of wildlife or their habitat, and physical impacts such as trampling and soil disturbance or pugging of tracks in the peaty ground.

Tourism is a valid human activity, but is not necessarily compatible with the protection of these islands. Because of economic and political pressure, there can be temptations to dispense with caution in order to realise financial benefits to individuals or the nation. Ethical questions arise as to how appropriate it is for one country or individual to put at risk something of global value. Where a difference of judgement arises between tour operators and managers, the decisions should be made on a precautionary basis.

A similar principle should apply to the approval of scientific and management projects. In general, judgements regarding these activities should be strongly precautionary in favour of protection. Science activities involving high potential or actual risks should only be approved where a species or ecosystem is in definite threat of loss or damage. Similar standards to tourism visits should be applied to scientific and management expeditions, while acknowledging different requirements such as use of hut facilities.

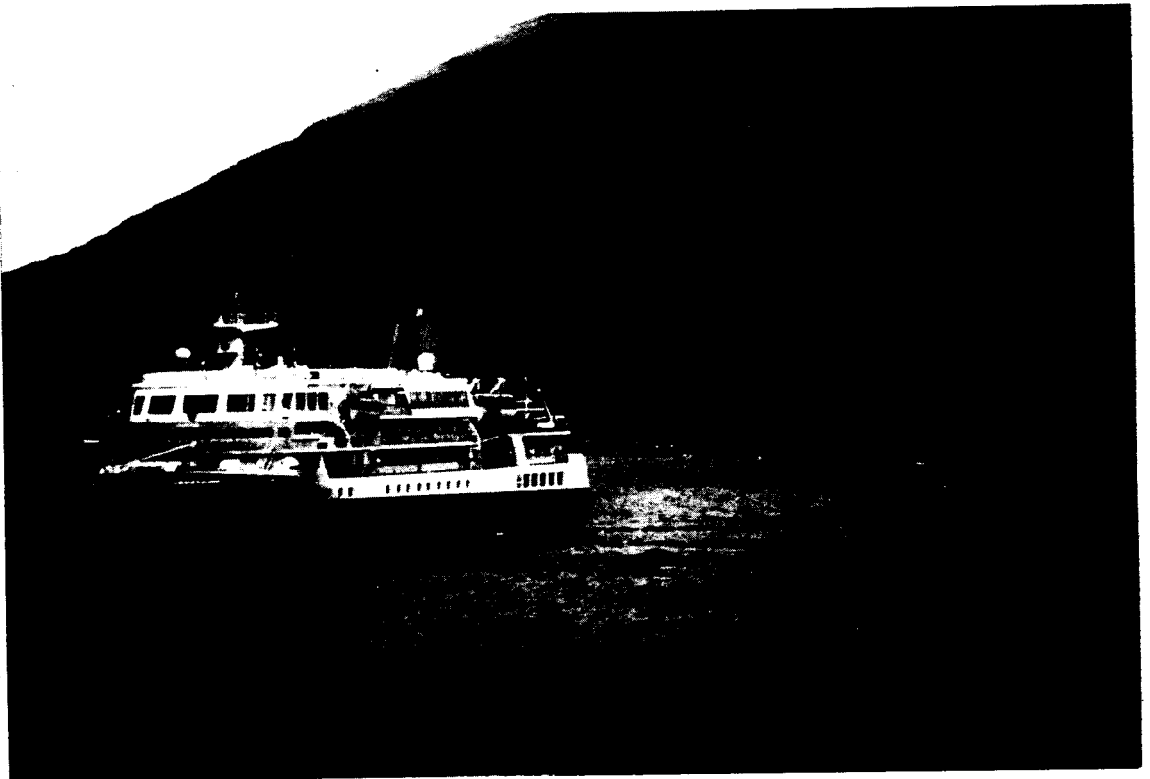
## 5.2 Review of Visitation

### Tourism

Tourists gain access to the islands in three principal ways: on cruise ships, tour boats, and private yachts. Each poses a different potential impact. The large cruise ships tend to concentrate a large number of people (100 plus) at a small number of visitor sites, and on a relatively small area at those sites. Tour boats often visit more sites with a smaller number of people and increase the risks of accidental plant or rodent introductions to a larger number of sites. Private yachts are potentially the most difficult tourist operation to regulate, given the isolation of the islands and the ability of these boats to move easily among islands undetected.

Steady growth in Antarctic tourism set the scene for a number of visits to the Subantarctic Islands by Linblad Travel and Society Expeditions between 1968 and 1987. These were stops enroute to and from the Ross Sea, Antarctica. Trips were infrequent with a maximum of two ship visits of up to 100 persons each time during a summer season, and there were also periods of no visits for up to four years (eg, 1974-1978). Lyttelton and Bluff were used equally as gateway ports during this period. Infrequent visits were also made by private yachts.

In December 1988 the first of the New Zealand based tourism operations began to focus exclusively on the attractions of the Subantarctic islands, using the sail ship *Tradewinds*. Discovery Charters South Seas marketed adventure type nature tours for small groups of people (20 passengers maximum). By the 1989/90 season, a further two New Zealand based operations Southern Heritage Tours (*Acheron* and *Pacific Ruby*) and Pegasus Dive Charters (*Pegasus II*) were marketing Subantarctic Island nature tours, in addition to the international cruise ship operators.



Cruise vessel in Perseverance Harbour

The larger cruises plus some of the New Zealand operations usually have a clear focus on environmental education. They attempt to enhance visitor experiences through use of guest lecturers, guides and interpretation material. By 1988 virtually all tours were using the Port of Bluff as their gateway port, because of the need for rapid turn around and to avoid the increased sea voyage to Lyttelton or Dunedin. Joint Antarctic/Subantarctic expedition tourist cruises had also established a pattern of voyages Bluff to Hobart and vice versa.

During the twenty year period 1968-1988, only 1300 tourists visited the Subantarctic Island nature reserves. All the New Zealand Government reports expressed a favourable reaction to the level and type of tourism activity, and the ability of the islands to withstand this level of tourism activity. By way of contrast, in the period 1988-1993 there was a significant increase in tourism activity with a further 1550 tourists going ashore in a period of only five years.

In 1988 the Department received advance notice of the intentions of both Salen Linblad Cruising (*Frontier Spirit*) and Society Expeditions (*World Discoverer*) to operate a series of Antarctic and Subantarctic Island cruises over the 1990/91 summer season, in addition to the recently established New Zealand based cruise operations. By November 1989, a total of 16 applications for entry permits totalling 1500 passengers had been lodged for the 1990/91 summer cruise season.

The challenge for the Department was to manage this increased demand, protecting the experience that these tourists were seeking and most importantly of all to ensuring the longer term protection of the islands. A limit was set of 600 visitors per season. Some protection of visitor sites was carried out, notably the construction of a boardwalk on Campbell Island. Tourists have not been allowed to stay ashore overnight on any of the islands. It is important to recognise that the Department was not developing the island sites for tourism; rather it was responding to the sudden increase in demand for existing, and approved, tourism operations.

Tourism landings have been restricted to main Auckland Island, Enderby Island and main Campbell Island, and some permits were issued for tourist landings on the Bounty Islands up until the 1990/91 season. The management plan for the Bounty Islands does not explicitly mention tourism, but it does indicate that landings would be inappropriate particularly during the seal breeding season. This proved to be the case from the Department's viewpoint, so no landing permits have been issued since 1990/91.

The continued existence of the natural ecosystems of the Subantarctic Islands is considered to be the principal benefit people receive. Tourism visits can have benefits in the form of increased awareness and can lead to worldwide support and sympathy for conservation of our outlying islands. Though strict adherence to IUCN criteria for management of nature reserves would require a prohibition on tourist entry, controlled landings by tour groups on less vulnerable islands can achieve positive benefits while minimising risk to natural values - provided visits are limited in number, the landings are supervised by a representative of the Department, are under strict conditions, and are of short duration. Tourist ships also are required to have a current de-ratting exemption certificate as part of the permit to land on the islands. Cruising expeditions must have a genuine educational or inspirational purpose relating to a better appreciation of nature. Often the most spectacular sight-seeing is obtained from the sea, and this activity is not restricted.

Issues for management of tourism visits are:

- Increasing demand
- Requests to visit vulnerable islands or sites

- Visit management (eg, visitor guidelines, Department representatives)
- Site management and facilities including boardwalks, signage and shelter
- Quality of experience - desire of visitors to preserve the exclusive, wilderness quality of their experience
- Attitudes of operators

### Science and Management

A summary of the more significant science projects undertaken on or around the Subantarctic Islands since 1987, is listed in 2.6. Science programmes can have a range of effects on the environment, which can include disturbance of wildlife through presence of humans, banding, tagging and handling of wildlife, and marking out of breeding areas. Considerations in assessing applications for scientific research include the resulting benefits to protection of the islands and/or wildlife; whether the work can be conducted elsewhere; a limitation to ensure the minimum number of people required to do the work; and a requirement for visit lengths to be as short as possible.

A further issue is "science tourism", which involves tour operators requesting entry to the nature reserves to do research and thereby gain access to islands or sites which are otherwise off-limits to tourist visitors. These requests must be assessed in the same way as all other science activities to ensure that the proposed visits have a sound justification.

Management activities (other than science) undertaken over the past 10 years are described in Parts 2 and 3. Management issues include the requirement to ensure surveillance, to maintain a "presence" both for law enforcement and to monitor ecological change or damage. Presence enables monitoring but in practice problems often come to notice through informal observation and formal monitoring is then implemented.

### *Hut Facilities*

Huts are located on North East Island (Snares Islands), Antipodes Island, Enderby Island, and the main Auckland and Campbell Islands (refer maps). The hut at Deas Head, Port Ross, Auckland Island was erected in 1989 to support goat and pig eradication programmes there.

Providing hut facilities can be the best solution for minimising impacts of science and management expeditions. They can enable better control on the conduct of visitors, but they also tend to increase the number of illegal visitors by being an attraction in themselves. They can also create additional issues including the effects of sewage disposal, servicing vessels, the presence of staff for limited or extended periods, and risks of rodent and weed introduction. The environmental impact of hut facilities on the islands continues to be closely monitored.

Temporary camps can be desirable when they entails less risk of accidental introductions of species than repeated visits from other islands where huts are located.

### *Campbell Island Meteorological Station*

Up until October 1995, this was the only continuously staffed facility on the Subantarctic Islands. The officer in charge acted as a honorary ranger for the Campbell Island nature reserve. The meteorological field programme was reduced in scale following installation of an automatic weather station (AWS) in 1990. More recently the New Zealand Meteorological Service decided to move to a fully automated operation at Campbell Island. The station is now unstaffed.



Meteorological station, Campbell Island

The Department considers that retention of the full station facilities is not warranted for management or research activities associated with the island's natural or historic resources. Only basic facilities are required to provide shelter for expeditions, similar to the huts on Enderby Island or Antipodes Island. Use of the station facilities by tourist operators is not considered acceptable in terms of the nature reserve status and the remote experience that the islands offer visitors, even those on the larger cruise ships. All facilities not required for operation and servicing of the AWS, or for science and management purposes, should be removed, unless any are of significant historical value (refer Parts 3 and 6); otherwise they are likely to become an attraction for unauthorised visitors.

#### *Automatic Weather Station - Auckland Islands*

A new automatic weather station was established on Enderby Island in 1991. It transmits readings of wind, precipitation, temperature, barometric pressure and humidity hourly via satellite to Wellington on the New Zealand mainland (refer Part 6).

#### **Access and Logistics**

All entry to the island reserves is by permit only and individual permits stipulate the conditions applicable to each visit.

Logistical arrangements for transport of science and management expeditions to and from the islands are worked closely with the Royal New Zealand Navy (RNZN), Ministry of Fisheries, New Zealand Meteorological Service, and New Zealand Antarctic Programme, all of which are involved in some way in shipping movements in the southern ocean. Transport tends to be opportunistic and irregular - the annual servicing of the Campbell Island meteorological station each October has been the only regular transport opportunity to any of the islands. Since 1987 the RNZN has supplied most logistical support (ships plus helicopters) to the eleven multi-disciplinary expeditions that have been organised to

the Subantarctic Islands. A number of smaller opportunistic visits have also occurred for management purposes. Transport arrangements for science and management staff are also made with tourist cruise operators.

### *Surveillance and Security*

The isolation of the islands and potential for unauthorised landings pose a very real dilemma for protection. The Department relies very heavily on the surveillance carried out by the Royal New Zealand Airforce P3 Orion aircraft and the RNZN frigates and support ships. Recent defence cutbacks in New Zealand have reduced operational surveillance capability in the southern ocean and on the Subantarctic islands, at the same time that human activity such as commercial tourism and fishing have increased.

### *Wharves and Moorings*

Wharf facilities and shore moorings greatly increase the chances of new rodent species getting ashore. This would have disastrous consequences on the flora and fauna of the islands and must be closely guarded against. This concerns applies mainly to transport vessels and fishing trawlers. Shore mooring of dinghies used by land-based parties does not increase the rodent risk and is acceptable.

The existing wharf and mooring at Campbell Island were provided to service the meteorological station. The wharf is no longer required for that purpose. It is of historical interest, but its future is dependent on the degree of risk it presents in attracting unauthorised landings (refer Part 3 also).

The mooring at North East Island in the Snares Islands group is unusual in that it is extremely confined and it is not possible to moor offshore. This mooring is regulated by permit pursuant to a 1986 agreement between the Crown and the Stewart Island Fishermen's association. Strict operating controls guard against the possibility of rodent introduction, and reduce the risks compared to uncontrolled near-shore mooring.

### *Helicopter Air Transport*

A trial helicopter flight by Aerospatiale Squirrel helicopter was carried out from Invercargill to Campbell Island via Auckland Island in 1991 to evaluate a system for emergency evacuation of staff working on Campbell Island. The helicopter was fitted with long range fuel tanks. Fuel is stored at the Campbell Island meteorological station. A fuel storage site has recently been established on Enderby Island to facilitate any emergency evacuation. These fuel dumps will need replacing periodically.

Issues for science and management visits are:

- Logistics and surveillance
- Facilities
- Landings with risks of rodent introductions
- "Science tourism"
- Disturbance of wildlife

## 5.3 Impact Management Strategies

### 5.3.1 Visits to Islands

Proposals to visit an island or site should be assessed by balancing the benefits to be gained by permitting a visit against the risk and disturbance which may occur. The more pristine the island or vulnerable the site, the greater the justification needs to be for allowing visits. Human activities must always remain secondary to and compatible with preservation. Continued monitoring of effects of human use on the environment and wildlife is essential.

Generally, the outcome is to impose the greatest restrictions on visits to the most pristine islands (ie, Minimum Impact islands), and provide limited opportunities for visits at the more modified islands or sites (ie, Refuge islands) - refer Table 3.

There will always be some pressure from tourists, scientists and managers to visit the "most interesting or special sites" on the islands - these tend to be the least modified and consequently amongst the most ecologically valuable. The island management categories provide clear direction for tourist visits, and science and management activities should be confined to well justified visits only. Protection should be further ensured by excluding any vulnerable sites (landscape features, sensitive habitats, breeding sites) from entry permits, except when access is required for essential scientific or management purposes.

#### Tourism Visitor Sites

The primary measure for minimising the potential impacts of tourist visitors is through limiting the sites available for visits to the Refuge islands only. At those sites further controls can be used to reduce risk of disturbance or impact:

- limiting time and/or seasons
- limiting number of visits, and frequency over a season
- limiting number of visitors (group size or annual quota, or both)
- limiting some activities, or place other constraints on visitor behaviour

The last of these controls is probably the most important. Any limits set will be arbitrary - it is difficult to precisely quantify the visitor threshold beyond which risk or impacts are unacceptable. The threshold number for some sites may vary because of changing factors such as breeding cycles and/or weather patterns.

A visitor quota, while being somewhat arbitrary, is an effective protection measure. A precautionary approach is appropriate. The current limit of tourist 600 visitors per year appears to be reasonable in terms of the precautionary principle. An adaptive approach based on monitoring effects will complement this initial setting of a visitor quota.

Sites available for tourist visits on the Refuge islands can be classed as **large** or **small** in terms of the visitor numbers they can handle. There are only three sites that are considered to be sufficiently robust to be regarded as a **large** site. They are Enderby Island, Hardwicke Settlement and Cemetery site in Port Ross (both Auckland Island), and the Beeman/Lyal-Col Saddle boardwalk on Campbell Island.

Enderby Island is generally robust, except that the Yellow-eyed penguin, sea lion and albatross populations have experienced some minor disturbance during tourist visits. This has occurred when large groups are ashore with inadequate supervision. The current visitor quota of 600 maximum per season should remain, but no more than 100 tourist visitors, including ship crews, should be landed on any one day. Visitors should be



supervised by sufficient guides (at least 1:20) and not left to wander at will. The Hardwicke site does not require any specific restrictions: tourist visits to this site will generally be limited in practice by the quota for Enderby Island.



Tourism visit to Enderby Island

A precautionary approach is required at the main Campbell Island site to avoid or minimise impacts on the albatross nesting area at the Lyal-Col saddle. The quota of 600 visitors per year is seen to be acceptable but restrictions may be required on daily group sizes.

Several other sites on the main Auckland and Campbell Islands are visited by the smaller tour operations. There are short tracks at the two historic coastwatching sites and to Lake Hinemoa on Auckland Island, and tracks on Campbell Island between Perseverance Harbour and Northwest Bay (see Map 4). Visits are also made to other sites such as the shy mollymawk colony at South West Cape, which has experienced little human impact to date. However, all these sites are fragile and vulnerable to physical impacts of over-use; and this applies generally to the whole of the two main islands except along the shorelines. It is proposed that all potential landing sites on these two islands be treated as small sites (except for the large sites and shoreline sites which can handle higher numbers within the 600 seasonal quota). Small sites should be restricted to a maximum of 150 tourist visitors per year. As well as minimising disturbance to wildlife, this reduced quota proposed for small sites should prevent trampling or pugging of the peaty ground, thereby avoiding the need for facilities (eg, boardwalks) which would impact on the remote character of these sites.

Suggestions have been made to allow limited tourism entry onto the Bounty Islands and Antipodes Island. They are categorised in this Draft CMS as Minimum Impact Islands, which excludes tourism visits. The argument against tourism or science tourism landings on these islands is that they are currently rodent-free, except for mice on the Antipodes Islands, and every effort should be made to avoid the risk of introductions. In addition, the tiny Bounty Islands are occupied almost entirely by dense colonies of seals, penguins and seabirds.

## **Supervision and Departmental Representation**

Visitor guidelines have been established, including a Minimum Impact Code, to help avoid visitor impacts. A Departmental representative accompanies all expeditions to the islands and has a key role in ensuring (through the tour operator) that all visitors understand the reasons for the adoption of the code and comply with its principles. The risks associated with visits are so great that having representatives to ensure compliance, is regarded as essential. The roles of representatives are to enforce animal and plant quarantine procedures, compliance with Reserves Act requirements and permits, explanation of policy and management to visitors, and check compliance with visitor guidelines. The use of a Departmental representative is part of the quality control process on reserve management.

## **Emergency Entry**

It is accepted that certain emergencies may lead to, or necessitate entry to one or other of the island nature reserves without prior authorization.

## **Objectives**

- 1 To maintain visitor numbers and the manner in which those numbers are managed on-shore, at a level at which long-term protection of the islands is assured.

## **Implementation**

- 1 Permit entry for scientific, management and other legitimate purposes consistent with the classification of nature reserve and in accordance with the management category assigned to each island (refer Tables 3 and 4). When possible or practicable, all visits must be ship-based and landings restricted to day-visits only.
- 2 Limit access to Minimum Impact islands to work small teams engaged in:
  - essential management tasks;
  - approved scientific activities that are likely to enhance effective management of those islands or assist protection of the wildlife present on them, or cannot be done elsewhere;
  - and/or the preparation of interpretive material for a wide audience.

Generally the size of these work teams must be the minimum required to undertake the work in a safe manner. They must only stay for the minimum time required to complete the approved work.

- 3 Permit visits by tourists to Refuge Islands only under such controls as deemed necessary to ensure protection of their natural features, ecosystems and cultural values. Exclude any vulnerable sites from entry permits.

Tourist visitor quotas for Refuge islands shall be allocated in accordance with the following criteria:

- Only one ship visit to be permitted per day at any landing site.
- Maximum 600 visitors to be permitted each year for Enderby Island, Hardwicke Settlement and Beeman Point/Col Saddle, (Campbell Island).

- Maximum 150 visitors to be permitted each year for all other acceptable landing sites on the main Auckland and Campbell Islands; except that additional numbers may be permitted for visits to shoreline sites only.
- Visitor numbers may be reduced at any site, or sites excluded from entry permits if adverse impacts are deemed to exceed acceptable limits.
- Daily visitor quotas and other restrictions may be set for sites within the yearly quota that applies, on a case by case basis.

Tourism must be ship-based: no overnight stays are to be permitted for the island nature reserves.

Commercial operators require concessions from the Department to authorise their business activity within the reserves. Entry permit quotas will be allocated on a year-by-year basis to concessionaires, and may be allocated up to five years ahead to enable forward planning (subject to any requirements to reduce visitor quotas or exclude sites from landing permits).

- 4 Maintain and implement Visitor Guidelines and a Minimum Impact Code for all landings, including strict quarantine measures and procedures to avoid the risks of marine pollution and fire in the reserves (refer 2.3.3 also). Inform visitors of the reasons for these restrictions.
- 5 Require official supervision of all entry permits to the reserves by accredited Departmental representatives.
- 6 Keep the effectiveness of the entry permit system under review and undertake visitor impact monitoring at key landing sites.
- 7 Maintain liaison with the New Zealand Antarctic Programme and cruising expedition organisers.
- 8 Ensure tour operators recognise the special values of the Subantarctic Islands and have adequate, quality interpretation services available for their clients.
- 9 Encourage expedition organisers to prepare environmental evaluations of their operations, to a standard similar to that required by the Protocol on Environmental protection to the Antarctic Treaty (refer 1.6).

(refer 2.3.4, 5.3.2, 5.3.4 and 5.3.5 also)

### 5.3.2 Disturbance of Wildlife

The long-term effects of disturbing wildlife are often subtle and go undetected. However, the small number of long-term studies have shown adverse effects. Wildlife can be disturbed by human presence (eg, tourists), by facilities but also by management and research activities - banding, handling and close observation.

#### Objective

- 1 To ensure that indigenous wildlife is not subject to disturbance which may have adverse effects on behaviour, distribution or breeding.

#### Implementation

- 1 Exclude vulnerable wildlife sites from entry permits, except for essential research or management activities.
- 2 Enforce guidelines on wildlife disturbance with the precautionary principle paramount. Require visitors carrying out science or management activities to abide by the Visitor Guidelines, except when their approved tasks require otherwise.
- 3 Monitor effects of visitors, and management and research activities whenever possible.

(refer 5.3.3 also)



### 5.3.3 Marine Mammal Viewing

All entry permits for the island nature reserves contain specific conditions as to how visitors are to behave when encountering marine mammals ashore (eg, New Zealand fur seals, elephant seals, and New Zealand sea lion).

Interest in interacting with marine mammals, either by viewing or swimming with them, is increasing. The Marine Mammal Protection Regulations 1992 have been established to manage commercial marine mammal encounters and/or viewing activities. Commercial tour operators require permits which set out specific conditions as to how such encounters with whales, dolphins and seals are to be conducted.

The 1992 Regulations set out criteria for determining what, if any, viewing activities should occur. The commercial operation should not have any significant adverse effect on the behavioural patterns of the marine mammals, and it should be in the interests of the conservation, management or protection of them that a permit be issued.

No current permits exist for marine mammal viewing in the Subantarctic region. A potential tourism opportunity is recognised in the viewing of Southern right whales at Port Ross (Auckland Islands) and Campbell Island. A significant population migrates to these sheltered waters each winter for calving and breeding. The number of whales is increasing. However, it is considered that given the low population of Southern right whales and the relatively restricted waters which comprise the calving and breeding sites, that it would be in the interests of conserving or protecting the species that no permits be issued in the immediate future. There is potential for significant impact on this population.

Any review of this stance towards viewing of Southern right whales in the Subantarctic region should be made on the basis of research, a significant increase in the population and ability to provide on-site supervision of viewing activities.

#### Objective

- 1 To protect marine mammals from visitor harassment by ensuring that no human interactions impact upon or cause changes to their behaviour.

#### Implementation

- 1 Maintain and implement Visitor Guidelines to avoid or minimise visitor disturbance of marine mammals ashore on the island nature reserves, and during non-commercial marine mammal viewing activities.
- 2 Implement a moratorium on issuing permits for commercial viewing of Southern right whales and other whale species around the Subantarctic Islands until such time as it can be demonstrated that the risks associated with viewing activities are acceptable.
- 3 Restrict the issuing of permits for commercial viewing of seal species on water to small-boat activities only; and on land to the holders of concession permits only (refer 5.3.1(3)).
- 4 Facilitate research to establish baseline behaviour, and establish on-going monitoring of any marine mammal viewing operations on or around the Subantarctic Islands.

### 5.3.4 Facilities and Site Management

A summary of existing facilities on the Subantarctic Islands is given in 5.2. A minimum of on-site facilities should be developed within the island nature reserves. However, some facilities are required to minimise the effects of visitor impacts (eg, huts, boardwalks).



Boardwalk to Lyal-Col Saddle, Campbell Island

All on-shore facilities should be brought into line with the Protocol on Environmental Protection to the Antarctic Treaty which has been adopted for facilities in the Antarctic region (refer 1.6), except for those aspects of the Protocol which are clearly not applicable to Subantarctic conditions or are over-ridden by specific provisions in this CMS.

Occasionally dogs have been used for locating rare birds and this use may be allowed in the reserve by permit; similarly, use of dogs during pest eradication or control operations may be permitted. Domestic poultry has been kept at the meteorological station in the past, with a risk of pathogen introduction or an outbreak of a disease not already present on Campbell Island. De-staffing of the station in October 1995 enabled removal of the poultry.

#### Objectives

- 1 To allow a minimum of on-shore facilities essential for management requirements, while protecting the natural values of the island nature reserves.**
- 2 To remove all non-biodegradable waste materials from the islands and dispose of biodegradable waste in ways which do not endanger or modify the natural ecosystems.**

## Implementation

- 1 Require facilities on the islands to conform with relevant provisions of the Protocol on Environmental Protection to the Antarctic Treaty by 1999.
- 2 Restrict facilities onshore for tourist visitors to tracks, boardwalks and/or signs at a limited number of sites (refer Implementation 7).
- 3 Maintain a register of all on-site work and disturbance (including research study sites and equipment), and require sites to be cleaned up as a condition of approval.
- 4 Maintain existing facilities, buildings and structures which have an on-going use or function.
- 5 Remove facilities and structures that are no longer required from the islands, unless they have historical values and will have no adverse effects on natural values (refer 3.5 also).
- 6 Allow the erection of buildings, structures or facilities where their establishment can be justified and there is minimal impact on natural features of the island reserves, provided all such facilities can be completely removed when no longer required.

Assess the environmental impact of any proposed new facilities. Their location and form shall follow these criteria:

- The form and design of the building, structure or facility will be such that impact on vegetation, topography and other natural features, and disturbance to wildlife will be minimal.
  - Materials must be sensitive to the natural surroundings, and in keeping with nearby or associated buildings, structures or facilities to be retained.
  - Facilities must not degrade the visually unmodified landscape form, except where the development of boardwalk is consistent with the objective of protecting natural soil and moisture conditions (refer 7), and huts may need to be brightly coloured for safety reasons.
- 7 Tracks will only be established and maintained for approved management activities or long-term occupation of the reserves. Tracks will be maintained to the minimum required standard with the need for each track kept under review. To minimise damage at Large sites for tourist visits (refer 5.3.1), the existing tracks may be upgraded and maintained at a higher standard; these sites are Erebus Cove (Auckland Island), Enderby Island and Beeman Point/Col-Lyal Saddle (Campbell Island).
  - 8 Prohibit establishment of new wharf and/or shore mooring facilities within the reserves (refer Part 6 also).
  - 9 Allow use of vehicles within the confines of the meteorological station on Campbell Island only until such time when the expected reduction in facilities resulting from the decision to de-staff the station has been completed.
  - 10 Prohibit the keeping of pets or other domestic animals in the reserves, except as approved for management purposes.

11 Apply the following rules for waste disposal:

- All non-biodegradable materials are to be removed from the reserves and preferably returned to mainland New Zealand.
- Rubbish may be burnt but not in pits or in contact with peat or in any other unsafe place.
- Biodegradable rubbish may be buried if it can not be conveniently removed from the reserve but at such a depth as to ensure seeds or vegetables cannot germinate or sprout. All human solid wastes are to be buried or removed. Visitors will be encouraged to use portable toilets whenever this is practicable.

(refer 2.3.4 and 2.7 also)



### 5.3.5 Use of Aircraft

Low flying over breeding colonies in particular may result in death or disturbance of animals.

#### Objectives

- 1 To avoid any unnecessary disturbance to wildlife from aircraft operations over or near to the Subantarctic Islands.

#### Implementation

- 1 Limit helicopter landings in the island nature reserves to the environs of huts or such other points as the departmental representative prescribes.
- 2 Prohibit helicopter landings except where necessary for the collection of scientific information, for search and rescue or for other purposes which have been authorised in accordance with this CMS and the Reserves Act 1977, and provided all precautions are taken against endangering or unduly disturbing plant and animal life in the process.
- 3 Prohibit helicopter landings and discourage low level flying within 200m of any bird or seal colony during the breeding season.
- 4 Seek to have restrictions imposed for low flying over or close to the Subantarctic island groups.
- 5 Apply adequate rodent precautions when stores are flown onto any of the islands.
- 6 Prohibit permanent aviation facilities within the nature reserves, except for the emergency fuel dumps on Enderby Island and Campbell Island.
- 7 Apply the following provisions to aircraft use in emergencies:
  - The department is to be notified of all emergency landings, as soon as possible, outlining the circumstances and details of the incident.
  - Helicopters may be used to rescue sick and injured persons.
  - Should the need arise to search for a lost or injured person, searchers are to make every effort to avoid disturbing the animals and vegetation.
- 7 Liaise with aircraft operators to ensure understanding of the reasons for these restrictions, and to seek support for them.

### 5.3.6 Logistics and Surveillance

#### Rationale

The Department does not have staff permanently resident on the Subantarctic Islands and has no ships of its own for patrolling the reserves. The New Zealand Defence Force assists with logistical support for management activities on the Subantarctic Islands. The Royal New Zealand Navy provides transport for expeditions and assisted with work programmes. The Royal New Zealand Airforce performs a range of monitoring tasks using aerial photography, and provides a crucial surveillance function. Both forces assist with fisheries surveillance, search and rescue and other emergency operations.

Officers in command of New Zealand naval vessels have powers of arrest and of stopping and searching vessels (section 100 of the Reserves Act 1977).

#### Objectives

- 1 To use the services of other Government agencies in the surveillance, enforcement and support aspects of reserve management.

#### Implementation

- 1 Written agreements which take account of reserve management objectives already exist between the Secretary of Defence and the Director-General of Conservation for landings and other aspects of the role that the Ministry of Defence fulfils in surveillance and servicing of New Zealand's out-lying islands.



RNZN Wasp on HMNZS Wellington

## Part 6: Resource Use and Estate Management

---

### 6.1 Resource Development and Facilities

The island nature reserves may, from time to time, be subject to proposals to exploit their natural resources or to provide base facilities for fishing or off-shore developments. For example, development of potential oil reserves in the Great South Basin may lead to proposals to site associated facilities at Campbell Island.

Management of the reserves must give effect to the primary purposes of the nature reserve classification and the national reserve status (refer 1.6). The islands must be regarded as fully protected natural areas.

The Reserves Act 1977 only allows for facilities such as buildings and structures which are necessary and desirable for the proper and beneficial management of the reserves. Authority can be given for conducting a trade, business or occupation on a nature reserve; but generally not for occupying part of the land, harvesting resources or developing facilities for tourism or other commercial purposes. An exception is telecommunication stations (refer 6.2), and mining activity is subject to separate legislation (refer 6.3).

#### Objective

- 1 To maintain the island nature reserves free of resource uses and facilities development in accordance with the primary purpose of protecting and preserving their natural values.

#### Implementation

- 1 Decline all proposals for resource uses and/or facilities development on the reserves which are not necessary or desirable for their proper and beneficial management.

(Refer 2.4, 5.3.1, 5.3.4, 6.2 and 6.3 also)

## 6.2 Telecommunication Facilities

Modern communication facilities (radio and television repeaters, cellular and microwave phone systems, VHF radio repeaters etc) generally require geographically strategic sites for maximum efficiency.

Section 48A of the Reserves Act 1977 allows for telecommunications stations to be sited on nature reserves if they cannot readily be sited elsewhere. Currently there are two communications facilities sited on Subantarctic Islands (Campbell Island and Enderby Islands).

Additional telecommunication facilities should only be permitted on the island nature reserves if it can be demonstrated that there is a proven need. The appropriateness of existing facilities should also be reviewed periodically. Potential issues are:

- Visual and aesthetic impacts
- Modification of the local environment
- Increase in helicopter use for facility servicing
- Proliferation of facilities

### Objective

- 1 To avoid adverse effects of telecommunications equipment on landscape features and other natural values.

### Implementation

- 1 Proposals to site additional telecommunications equipment on the island nature reserves will be declined if they would detract from the natural setting, or threaten the survival of any species of indigenous flora or fauna; or would materially alter or permanently damage other features of the reserve.
- 2 New telecommunications facilities will be required to co-locate at one of the existing facility sites, if applicable, unless there is a proven need to occupy an alternative site.
- 3 Environmental impacts will be strictly limited by permitting only those facilities essential for operating the telecommunications station. Site disturbance will be minimised by enforcing strict requirements concerning design, site works, landscaping and maintenance. Telecommunications facilities will be sited away from prominent skylines to minimise visual impacts. Facilities will also be required to blend into the surrounding environment.
- 4 No telecommunication facilities will be allowed on areas which have been identified as having significant Maori spiritual and cultural values which would be desecrated by the location of such facilities.
- 5 When a telecommunications site permit expires or the facility ceases to be used, the permittee will be required to remove all structures and materials associated with the facility and to restore the site to a natural state.
- 6 Any telecommunications facilities required for management of the reserves shall comply with Implementation 1-5 above, as applicable.

## 6.3 Mining (Prospecting, Exploration and Mining)

Mining activity in New Zealand is controlled by the Crown Minerals Act 1991 and the Resource Management Act 1991. The Crown Minerals Act requires that mineral permits to be obtained from the Ministry of Commerce for the prospecting, exploration or mining of any Crown-owned minerals. Resource consents under the Resource Management Act for water and land use may also be required for mining activities.

### Access Agreements

In the case of land administered by the Department, including nature reserves, an applicant must seek consent for access from the Minister of Conservation. Section 61 of the Crown Minerals Act states that the Minister shall have regard to the objectives of the relevant legislation under which land is held, the purpose of the lands status, any management strategies or plans, and safeguards against potential adverse effects of the proposed mining work; and such other matters as the Minister considers relevant. This application is considered after the applicant has obtained a minerals permit from the Ministry of Commerce.

Major mining activities would generally be inappropriate in high-use areas and areas of high scenic, scientific, natural or cultural value, due to the potential effects of mining on those values. Effects created by prospecting, exploration and some mining may be acceptable, however, if impacts can be avoided, or mitigated to acceptable environmental levels. The environmental impact assessment report should demonstrate that the impacts of the mining and associated infrastructures will be minimal and that the land and water habitat values and recreational and historic values of the area will not be compromised.

Land status has a significant bearing on any application for a mining access arrangement.

Access arrangements should not be granted in areas of outstanding scenic, historic, cultural or scientific value or of high public use or potential high public use. The Crown Minerals Act allows for land to be closed to mining through an Order in Council, with the consent of the Minister of Energy.

Any access arrangements require approval of a work plan for each stage of the proposal. This approval depends on the selected sites and their cumulative impact.

The Crown Minerals Act allows the Minister to negotiate appropriate compensation under any access arrangement. Compensation will be based on the loss of natural features or attributes of value to conservation and the market value of the land.

Mining operations require regular monitoring while they are being worked. For effective monitoring, conditions must be relevant and clearly stated while liaison with other consent agencies ensures that conditions are consistent and enforceable. The mining operator should be aware that the Department will prosecute if conditions are breached.

On the completion of mining all land administered by the Department used in conjunction with the mining operation will be landscaped and revegetated and restored to a natural state.

Access for mining is governed by the Crown Minerals Act and the Minister of Conservation cannot be bound by this CMS in exercising his/her functions under that Act. The following provisions set out matters that the Minister should have regard to when considering any application for access.

**Objectives**

- 1 To ensure that any mineral prospecting or exploration activity has no adverse effects on the natural environment of the island nature reserves.
- 2 To ensure that any proposed mining activity is properly assessed, to demonstrate that any potential adverse impacts on the significant natural values of the island nature reserves can be avoided, remedied or mitigated.
- 3 To enable track maintenance to be carried out using suitable local materials where appropriate.

**Implementation**

- 1 Access arrangements should only be granted for the island nature reserves, if it can be shown that the proposed mining activity will have no adverse effects.
- 2 Use of local rock for track maintenance purposes has advantages in that it avoids potential weed infestation from other material sources outside the area. Careful selection and supervision of extraction sites is required to ensure environmental impacts are kept to a minimum.

## Glossary

<b>Advocacy</b>	The collective term for work done to promote conservation to the public and outside agencies by the Department of Conservation, Conservation boards and the New Zealand Conservation Authority. Advocacy work includes taking part in resource management planning processes and using a range of methods to inform and educate the public and visitors on conservation issues.
<b>Amend</b>	In relation to conservation management strategies, conservation management plans, freshwater fisheries management plans and sports fish and game management plans, means any change that does not affect the objective of the strategy or plan. Such a change may not require a full public process. ( <i>Conservation Act 1987</i> ).
<b>Archaeological site</b>	Any place in New Zealand, that either was associated with human activity that occurred before 1900; and is or may be able through investigation by archaeological methods to provide evidence relating to the history of New Zealand. ( <i>Historic Places Act 1983</i> ).
<b>Biodiversity/biological Diversity</b>	The variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within species and of ecosystems. ( <i>United Nations Convention on Biological Diversity 1992</i> )
<b>Biota</b>	Life or living things.
<b>Biotic</b>	Relating to life or living things ( <i>Oxford dictionary</i> )
<b>Bryophytes</b>	Liverworts, hornworts and mosses.
<b>CITES</b>	The Convention on International Trade in Endangered Species of wild fauna and flora applies to the import, export and re-export of specimens, parts and derivatives of plants and animals which are listed in the three appendices to the convention.
<b>Concession</b>	A lease, easement, licence or permit granted to enable the carrying on of a trade or business on areas managed by the department. ( <i>Concessions Policy</i> )  Where concession is referred to in the Recreation and Tourism chapter it is defined as: Predominant purpose of facilitating recreation or tourism use and enjoyment of natural or historic resources by the operators' clients and customers. ( <i>Concessions Policy</i> )
<b>Conservation</b>	Means the preservation and protection of natural and historic resources for the purpose of maintaining the intrinsic values, providing for their appreciation and recreational enjoyment by the public, safeguarding the options for future generations. ( <i>Conservation Act 1987</i> )

<b>Conservation Board</b>	There are 17 regional conservation boards, each comprising 12 appointed members. Their functions include overseeing the preparation of the conservation management strategies and national park management plans for their area, approval of conservation management plans (eg Conservation Parks), advising the New Zealand Conservation Authority or Director-General of the Department of Conservation on regional conservation matters and advising on new walkways in the region. ( <i>Conservation Act 1987 s6M</i> )
<b>Consultation</b>	A genuine invitation to give advice and genuine consideration of that advice. To achieve consultation, sufficient information must be supplied and sufficient time allowed by the consulting party to the consulted to enable it to tender helpful advice. It involves an ongoing dialogue. ( <i>Adapted from McGrechan decision in Air New Zealand -v- Wellington International Airport - CP403/91, 6 January 1992</i> )
<b>Department, the</b>	Department of Conservation.
<b>Ecology</b>	The study of organisms in relation to one another and their surroundings. ( <i>NZ Pocket Oxford Dictionary</i> )
<b>Ecosystem</b>	A biological system comprising a community of living organisms and their environment involved together in the process of living. There is a continuous flow of energy and matter through the system. The concept implies process and interaction. Ecosystems may be small or large, simple or complex. They range in size from small freshwater ponds or pools in the earth itself.
<b>Endangered</b>	A plant or animal in danger of extinction and whose survival is unlikely if the casual factors continue. ( <i>Red Data Book of New Zealand 1981</i> )
<b>Endemic</b>	Refers to a species of plants and animals which are unique to New Zealand or animals which may migrate but breed only in New Zealand. ( <i>Red Data Book of New Zealand 1981</i> )
<b>Environment</b>	Includes ecosystems and their constituent parts, all natural resources, physical resources and the social, economic, aesthetic and cultural conditions which affect the environment or which are affected by the environment. ( <i>Environment Act 1986</i> )
<b>Extinct</b>	Species no longer known to exist in the wild.
<b>Fauna</b>	Animal life in a given place or time ( <i>Collins Concise Dictionary</i> )
<b>Fishery</b>	One or more species of freshwater fish that can be treated as a unit for the purposes of conservation management. ( <i>Conservation Act 1987</i> )
<b>Flora</b>	Plant life of a given place or time. ( <i>Collins Concise Dictionary</i> )
<b>Freshwater fish</b>	Species of finfish (classes <i>Agnatha</i> and <i>Osteichthyes</i> ) and shellfish (classes <i>Mollusca</i> and <i>Crustacea</i> ) that spend all or part of their life histories in freshwater. ( <i>Conservation Act</i> )



<b>General policy</b>	<p>A guide for decisions based on general approaches. General policy is used to mean a statement, directive or guide adopted by the Minister of Conservation, or the NZCA following a statutory process.</p> <p>Statements of General Policy are prepared pursuant to the Conservation Act, National Parks Act, Reserves Act, Wildlife Act, Marine Reserves Act, Wild Animals control Act, Marine Mammals Protection Act and the New Zealand Walkways Act. Statements of General Policy are signed by the minister of Conservation (or by the NZCA in the case of National Parks) and are binding on the Department of Conservation. CMSs are required to implement statements of General Policy. (<i>Management Planning Guidelines, Department of Conservation</i>)</p>
<b>Geopreservation</b>	<p>Sites and features needing protection because of their value to earth science.</p>
<b>Habitat</b>	<p>The environment in which a particular species or a group of species lives. It includes the physical and biotic characteristics that are relevant to the species concerned. For example, the habitat of the blue duck consists of swift water with an abundance of freshwater insects.</p>
<b>Historic place</b>	<p>Any, land building or structure that forms part of the historical and cultural heritage of New Zealand and is within the territorial limits of New Zealand. Includes anything fixed to this land. (<i>Historic Places Act 1993</i>)</p>
<b>ICOMOS</b>	<p>International Commission on Monuments and Sites; this is the leading international organisation responsible for developing principles and processes for historic conservation. The ICOMOS New Zealand Charter was produced in 1993 to guide historic conservation in this country. It is anticipated that the Department of conservation will adopt this Charter.</p>
<b>Implementation provisions</b>	<p>Specific statements on how objectives are to be achieved. These may include criteria for assessment. (<i>Management Planning Guidelines, Department of Conservation</i>)</p>
<b>Indeterminate</b>	<p>Species known to be extinct, endangered, vulnerable or rare but where there is not enough information to say which of the four categories is appropriate.</p>
<b>Indigenous species</b>	<p>Species of genetic variants of plants and animals found naturally in New Zealand and its territorial waters, including migrant species visiting New Zealand on a regular or irregular basis.</p>
<b>Integrated management</b>	<p>The management of activities, existing or potential, in a manner which ensures that each is in harmony with the other and that priorities are clear.</p>
<b>IUCN</b>	<p>International Union of Nature and Natural Resources. The World Conservation Union founded to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure any use of natural resources is equitable and ecologically sustainable.</p>

<b>Interpretation</b>	Conveying information about the origin, meaning or values of national or cultural heritage via live, interactive or static media. Occurs in the vicinity of the subject and is designed to stimulate visitor interest, increase understanding and promote support for conservation.
<b>Invertebrate</b>	Animal lacking a bone ( <i>Collins Concise Dictionary</i> )
<b>Iwi</b>	Tribe, people.
<b>Kaitiaki</b>	Guardian
<b>Land administered by the Department</b>	All land held, managed or administered under the Conservation Act and other acts administered by the Department (refer first schedule of the Conservation Act 1987)
<b>Landscape</b>	The landscape is a result of natural and cultural processes.
<b>Landscape character</b>	The visual expression of the elements which comprise the landscape and give it identity and distinctiveness.
<b>Landscape feature</b>	A clearly distinct and spatially restricted piece of landscape, normally experienced from beyond its boundaries.
<b>Lease</b>	<p>An agreement which gives the which gives the lessee the right to exclusive use of the land with the intention of conferring an interest in land as opposed to give a personal privilege.</p> <p>A lease of lands managed by the Department is appropriate only when:</p> <ul style="list-style-type: none"> <li>a) It is essential to grant the legal right of exclusive use of land, (eg, as the site for a building); and</li> <li>b) It is intended to grant an interest in the land and not just a personal privilege to use the land.</li> </ul> <p>Leases may be associated with easements (eg, to cover access to the lease area). (<i>Concessions Policy 1994</i>)</p>
<b>Licence</b>	<p>A permission given by one person to another allowing the other to do some act which would otherwise be unlawful.</p> <p>A licence (or permit) is appropriate where:</p> <ul style="list-style-type: none"> <li>a) the concessionaire does not require the right of exclusive possession of part or all the land for a trade or business; or</li> <li>b) The Department intends to grant a personal privilege; and</li> <li>c) May include building sites within the area.</li> </ul>
<b>Locally endemic</b>	Species or variety of plants and animals with distribution naturally restricted to a particular region or location.
<b>MARPOL</b>	International Convention for the prevention of pollution from ships, 1973. (The "MARPOL" Convention). ( <i>A guideline of New Zealand's international obligations affecting the coastal environment, Department of Conservation</i> )
<b>Mahika kai</b>	Traditional food gathering area.

<b>Management planning</b>	The process of setting and confirming objective for the management of natural and historic resources, and recreation, tourism and other conservation purposes, and specifying the actions and resources necessary to achieve those objectives. ( <i>Management Planning guidelines, Department of Conservation</i> ).
<b>Mineral</b>	When used with respect to mining legislation this term includes naturally occurring inorganic substances beneath or at the surface of the Earth, metallic and non-metallic minerals, fossil fuels, precious stones, industrial rocks and building stones. ( <i>Resource Management Act 1991</i> )
<b>Monitoring</b>	Repeated surveys by standard or directly comparable network at identical or comparable places.
<b>Natural and physical resources</b>	Includes land, water, air, soil, minerals and energy, all forms of plants and animals and all structures. ( <i>Resource Management Act 1991</i> )
<b>Natural character</b>	The expression of the relationship between elements which are a result of natural processes.
<b>Natural landscape</b>	Landscape not defined or influenced by humans and based in ecosystem, geological/physiographic features, ephemeral characteristics, climate etc.
<b>Natural resources</b>	Include plants and animals and their habitats, landscape and landforms, geological features, and systems of interaction living organisms, and their environment. ( <i>Conservation Act 1987</i> )
<b>Nature conservation</b>	The preservation and protection of the natural resources of New Zealand having regard to their intrinsic values and having special regard to indigenous flora and fauna, natural ecosystems and landscape.
<b>New Zealand Conservation Authority</b>	A national body of 12 appointed members formed in 1990. It took over the functions of several non-government organisations such as the former National Parks and Reserves Authority, Nature Conservation Council and New Zealand Walkways Commission. Its statutory functions include approving general policy, conservation management strategies, plans and national park management plans; advising the Minister of Conservation; reviewing and reporting on DOC's management and budget priorities. It also considers proposed changes to land classification or status for areas of national and international importance eg, creation of national parks. ( <i>Conservation Act 1987 s6A</i> ).
<b>Objective</b>	Statements of intended results. These can be broad or narrow in scope and should be accompanied by provisions of implementation. ( <i>Management Planning Guidelines, Department of Conservation</i> )
<b>Permit</b>	A written order giving permission to act, especially for entry into a place. ( <i>Concessions Policy 1994</i> )

<b>Protection</b>	In relation to are resource, means its maintenance, as far as is practicable, in its current state but includes restoration to some former state and augmentation, enhancement or expansion.
<b>Rare</b>	Species with small world populations that are not at present endangered or vulnerable but are at risk. ( <i>Setting priorities for the Conservation of New Zealand's Threatened Plants and Animals, Department of Conservation</i> )
<b>Research</b>	Systematic investigation, analysis and interpretation of information.
<b>Restoration/rehabilitation</b>	Means returning a place as nearly as possible to a known earlier state by reassembly, reinstatement and/or the removal of extraneous additions. ( <i>ICOMOS 1993</i> )
<b>Review</b>	In relation to cms's and management plans means to reconsider all objectives and policies of those parts under review and following a process of public comment to approve a new strategy or plan, having regard to increased knowledge or changed circumstances. ( <i>Conservation Act 1987</i> )
<b>Runaka</b>	Assembly, council.
<b>Species recovery plan</b>	A plan of action intended to halt the decline of a threatened species and increase its population.
<b>Survey</b>	Single measurements and assessment of condition at a defined place in defined time span.
<b>Sustainability, ecological</b>	The use of the components of an ecosystem in ways that allow for the perpetuation of the character and natural processes of that ecosystem.
<b>Sustainable management</b>	<p>Managing the use, development and protection of natural and physical resources in a way or at a rate, which enables people and communities to provide for their social, economic and cultural well-being and for their health and safety while:</p> <ul style="list-style-type: none"> <li>a) sustaining the potential of natural and physical resources (excluding mineral) to meet the reasonably foreseeable needs of future generations;</li> <li>b) safe-guarding the life-supporting capacity of air, water, soil and ecosystems, and</li> <li>c) avoiding, remedying, or initiating any adverse effects of activities on the environment.</li> </ul> <p>(<i>Resource Management Act 1991</i>)</p> <p>In practice sustainable management means; not wasting resources, taking care of land, water and air, looking at the needs of future generations, avoiding or fixing any harmful effects, considering the long-term impacts of our decisions.</p>
<b>Taking</b>	In relation to plants this includes breaking, cutting, destroying, digging up, gathering, plucking, pulling up and removing of the plant. In relation to fish it means fishing. ( <i>Conservation Act 1987</i> )

<b>Threatened, (species)</b>	A term used to mean vulnerable or more loosely used to include rare, vulnerable and endangered species.
<b>Urupa</b>	Cemetery, burial ground.
<b>Vulnerable</b>	A plant or animal believed likely to move into the endangered category in the near future if the casual factors continue. <i>Red Data Book of New Zealand 1981</i> )
<b>Wetland</b>	Permanent or intermittently wet land , shallow water and land-water margins. Wetlands may be fresh, brackish or saline, and are characterised in their natural state by plants or animals that area adapted to living in wet conditions. They include swamps, bogs, estuaries, braided rivers, and lake margins.
<b>Wild animal</b>	Deer, chamois, thar, wallaby, possum, goats and pigs that are living in a wild state. Except for deer kept in captivity for farming, does not include animlas kept in captivity or rats, mice, rabbits, stoats, ferrets or weasels. Refer to Act for legal definition.

## Index

### -A-

Adams 6, 13, 17, 47  
Adams Island 13, 17, 47  
advocacy 53, 87  
aircraft 8, 42, 70, 80, 82  
animal control 22, 24, 33  
animal pests 32, 38  
Antipodes Island 7, 9, 11, 13, 45, 53, 59, 68, 69, 72  
archaeological 23, 24, 57-59, 61, 62, 87  
Auckland Island 3, 9, 11-13, 24, 30, 33, 35, 37, 39, 40, 45, 47, 48, 52, 53, 60, 67, 68, 70-72, 78  
Auckland Island teal 30, 47  
Auckland Islands 8, 1, 3, 5, 7-17, 19, 24, 25, 31, 35, 37, 39-41, 43-47, 61, 69, 76  
automatic weather station 68, 69

### -B-

Beeman Point 4, 73, 78  
biodiversity 26, 29, 87  
Biological diversity 26, 29, 32, 46, 87  
Biosecurity Act 33, 39  
Bounty Island 17  
Bounty Islands 3, 8, 1, 3, 5, 7, 9-11, 13, 14, 19, 33, 67, 72  
Bouvetoya 3  
Building Act 26  
by-catch 53

### -C-

Campbell Island 8, 1, 3-5, 7, 9-15, 17, 30, 32-34, 36, 37, 39-41, 47, 48, 52-54, 58, 59, 62, 67-73, 76-78, 80, 83, 84  
Campbell Island teal 17, 30, 47, 48  
Campbell Islands 3, 5, 7, 9-11, 13, 14, 19, 37, 44, 48, 60, 68, 72, 73  
Campbell Plateau 3  
cats 9, 11, 19, 33, 35, 37, 47, 48, 53  
Cattle 11, 13, 33, 34, 53  
Chatham Island 48  
Chatham Islands 3, 11, 16, 48  
CITES 27, 87  
Climate 3, 5, 6, 9, 35, 42, 53, 58, 91  
Col-Lyal Saddle 78  
Commercial 11, 16, 43, 45, 50, 55, 63, 70, 74, 76, 83  
commercial use 55  
communications 84  
compliance 73  
concessionaires 53, 60, 74  
concessions 25, 74, 87, 90, 91

Conservation Act 22, 24, 25, 87-92  
Conservation Authority 3, 22, 25, 45, 87, 88, 91  
Conservation Board 3-5, 25, 88  
conservation management plans 87, 88  
Convention on Biological Diversity 26, 29, 46, 87  
Crown Minerals Act 25, 85  
cultural 27, 50, 55, 57, 60, 61, 73, 84, 85, 88-90, 92

### -D-

Dent Island 9, 47, 48  
Department of Conservation 1, 3-5, 1, 2, 15, 22, 24-26, 52, 82, 87-92  
Disappointment 6, 13, 47  
Disappointment Island 13, 47  
disposal 19, 26, 42, 68, 79  
dogs 35, 77  
duck 17, 89

### -E-

ecological management 7  
ecology 14, 37, 45, 50, 52, 53, 88  
endangered species 27, 49, 87, 93  
endemic 5-10, 17, 53, 88, 90  
endemism 8, 10  
Enderby Island 3, 9, 13, 33, 34, 47, 48, 51-53, 59, 60, 67-73, 78, 80  
environmental impact 37, 68, 78, 85  
eradication 15, 19, 21, 33-41, 47, 53, 68, 77  
Erebus Cove 12, 13, 59, 78  
European 11, 58  
ex-situ management 48, 49  
Exclusive Economic Zone 3, 26  
exotic species 46  
exploration 3, 8, 11, 17, 19, 43, 58, 85, 86

### -F-

facilities 8, 58, 59, 62-65, 68-70, 72, 75, 77, 78, 80, 83, 84  
Falkland Islands 15, 19  
fauna 6-10, 13, 14, 19, 20, 23, 70, 84, 87, 88, 91  
fire 7, 2, 11, 13, 29, 32, 42, 74  
Fire Authority 42  
Fire Control 7, 2, 29, 42  
fish species 44  
Fisheries Act 26  
fishery 44, 45, 88  
fishing 11, 16, 19, 23, 43-45, 53, 63, 70,

83, 92  
flora 5, 10, 13, 14, 17, 19, 23, 35, 70,  
84, 87, 88, 91  
French Blue Rabbits 34  
freshwater 2, 9, 24, 47, 55, 87-89

-G-

General Policy 1, 25, 89, 91  
genetic diversity 29  
geological 17, 23, 43, 91  
geology 14  
Glossary 8, 43, 87  
Goats 11, 24, 33, 35, 53, 93  
Gondwana 3  
guidelines 15, 36, 49, 68, 73-76, 89, 91

-H-

habitat 3, 7, 17, 20, 22, 24, 29, 34, 39,  
43, 47, 48, 65, 85, 89  
Hardwicke Settlement 13, 59, 60, 71, 73  
helicopter 35, 70, 80, 84  
historic conservation 57, 89  
historic place 57, 59, 60, 62, 89  
Historic Places Act 24, 25, 57, 61, 62, 87,  
89  
historic resource 7, 1, 57, 62  
hut 12, 13, 59, 60, 65, 68

-I-

ICOMOS 60, 62, 89, 92  
insects 7, 19, 89  
international significance 3, 23, 58, 65  
interpretation 21, 58, 60, 62-64, 67, 74,  
90, 92  
introduced species 53  
inventory 45, 53, 55, 60, 61  
Invertebrates 6, 10, 36  
IUCN 48, 67, 89  
iwi 16, 25, 55, 60, 62, 90

-K-

Kai Tahu 11, 16, 25, 60  
Kati Mamoe 16  
Kaupapa Maori 7, 16, 60

-L-

land administered by the Department 85,  
90  
land status 85  
land use 32, 85  
landings 15, 36, 45, 63, 65, 67, 70, 72,  
74, 80, 81  
landscape 2, 3, 71, 78, 84, 90, 91

leases 26, 90  
liaison 34, 46, 60, 74, 85  
licences 26  
litter 44

-M-

Macquarie Island 1, 3, 5, 8, 15, 17, 19  
Madrid Protocol 27  
mana 16  
management plan 3, 1, 14, 40, 67  
management priorities 1, 47  
Maori 7, 6, 11, 12, 16, 25, 55, 58-60, 62,  
84  
marine 3, 7, 8, 1-3, 10, 11, 16, 17,  
20-27, 29, 30, 43-47, 50, 51, 53, 55,  
65, 74, 76, 87, 89  
marine biota 3, 10  
marine ecosystems 3, 7, 2, 11, 29, 30,  
43-46  
marine environment 20, 26, 29, 30, 43, 46  
marine mammals 3, 7, 10, 11, 17, 21, 22,  
24, 29, 43, 44, 46, 47, 50, 51, 53, 55,  
65, 76, 89  
Marine Mammals Protection Act 22, 24,  
43, 50, 55, 89  
Marine Reserves Act 22, 43, 46, 89  
Maritime Antarctic Zone 3  
MARPOL 26, 27, 43, 90  
media 40, 41, 63, 64, 90  
mice 7, 33-37, 47, 53, 72, 93  
military use 82  
mineral 3, 19, 85, 86, 91, 92  
minerals 25, 85, 91  
mining 8, 83, 85, 86, 91  
Minister of Conservation 23, 25, 26, 30,  
42, 85, 89, 91  
Ministry for the Environment 30  
Ministry of Commerce 85  
Ministry of Defence 81  
Ministry of Transport 46  
monitor 14, 32, 41, 45, 53, 54, 56, 62,  
68, 75  
monitoring 7, 15, 21, 30, 34, 38, 45,  
52-55, 60, 65, 68, 71, 74, 76, 81, 85,  
91  
Motumaha 11

-N-

National Nature Reserves 3, 1, 17, 31, 65  
Native fauna 9  
native fish 9  
  
natural and historic resources 1, 2, 22, 24,  
82, 87, 91  
natural features 17, 23, 57, 73, 78, 85  
nature reserve 3, 1, 20, 23, 33, 34, 40,

43, 47, 49, 58, 68, 69, 73, 83  
New Zealand Coastal Policy 26  
New Zealand Defence Force 81, 82  
Ngati Mutunga 11, 16, 25, 60  
Norway rats 7, 9, 33, 37

-O-

Oclandius 6, 7  
oil 10, 19, 26, 43, 44, 46, 83  
oil spill 26, 43  
Olearia 39-41  
operational plans 2, 30

-P-

pest 7, 2, 15, 19, 21, 29, 30, 32, 33, 38,  
39, 77  
pest control 2, 29  
pest quarantine 30, 38  
petrel 35, 37, 53  
pigs 9, 11, 24, 33, 35, 37, 53, 93  
plant pest control 29  
Pleurophyllum 5, 6, 17, 48, 53  
policies 3, 1, 2, 21-23, 25, 31, 58, 65, 92  
pollution 26, 27, 43, 44, 74, 90  
Port Pegasus 36  
Port Ross 11, 16, 35, 39, 40, 47, 52, 60,  
68, 71, 76  
public awareness 2, 16, 46, 63, 64  
public use 85  
radio 14, 84  
Rakiura 16  
rat 36, 37, 48  
rata 6, 12, 13, 17, 40  
recovery 2, 24, 30, 34, 47, 49, 50, 92  
recreation 22, 23, 87, 91  
regulations 24, 26, 27, 42, 50, 55, 76  
Reserves Act 3, 1, 15, 17, 22-25, 33, 42,  
43, 46, 47, 55, 57, 73, 80, 81, 83, 84, 89  
Resource Management Act 1, 25-27, 43,  
85, 91, 92  
Restoration 7, 21, 29, 31, 32, 34, 49, 57,  
92  
Roaring Forties 3, 16, 63, 64  
Rose Island 34  
rubbish 42, 44, 79

-S-

scientific value 85  
Seabird Conservation Strategy 47, 52, 53  
sealing 3, 9, 11, 17, 29  
seals 10, 20, 44, 50, 72, 76  
search and rescue 80, 81  
sensitive areas 32, 37  
sewage 26, 68  
shrubland 35

sign 12, 34, 62  
signs 78  
sitka spruce 40  
Snares Island 41, 48, 59  
Snares Islands 8, 1, 9-11, 14, 17, 33, 36,  
40, 45, 48, 68, 70  
Southern Ocean 3, 8, 1, 3, 5, 8-11, 17,  
19, 21, 25, 30, 43, 46, 52, 53, 64, 69,  
70  
Southland Museum and Art Gallery 16, 63,  
64  
species 7, 8, 1, 2, 5-11, 17, 20-22, 24,  
26, 27, 29, 30, 32, 33, 35-37, 39-41,  
43, 44, 45-49, 51-56, 65, 68, 70, 76,  
84, 87-90, 92, 93  
Stewart Island 8, 9, 16, 36, 40, 70  
structures 26, 45, 57, 58, 61, 62, 78, 83,  
84, 91  
survey 7, 11, 14, 21, 30, 52-54, 92

-T-

taking 7, 21, 24, 50, 55, 56, 87, 92  
taonga 25, 62  
Te Waipounamu 16  
telecommunication 8, 83, 84  
Terra Cove 59  
threatened species 8, 30, 47, 49, 51, 54,  
92  
tourism 3, 2, 15, 16, 19, 21, 22, 40, 53,  
63, 65-68, 70-72, 74, 76, 83, 87, 91  
tourist 15, 40, 53, 66-73, 78  
tracks 65, 72, 78  
translocation 32, 48, 49  
Treaty of Waitangi 16, 25

-V-

vessels 26, 43, 44, 46, 53, 68, 70, 81  
visitor access 62  
visitor experience 63  
visitor impacts 8, 30, 65, 73, 77  
visitors 2, 15, 38, 40-42, 48, 53, 54, 57,  
58, 60, 62-65, 67-69, 71-76, 78, 79,  
82, 87  
vulnerable 17, 20, 44, 47, 48, 65, 67,  
71-73, 75, 89, 92, 93

-W-

Waitaha 16  
waste 19, 26, 43, 77, 79  
waste disposal 19, 79  
weed 30, 68, 86  
whale 10, 13, 27, 43, 51, 76  
wild animal 22, 24, 33, 93  
wild animal control 22, 24, 33  
Wild Animal Control Act 22, 24, 33



wild animals 24, 89

wildlife 3, 8, 1, 2, 5, 9, 14-17, 21-24, 26,  
29, 33, 43, 45-47, 55, 57, 63, 65, 68,  
70, 71-73, 75, 78, 80, 89

Wildlife Act 22, 23, 26, 33, 43, 46, 47,  
55, 89

wildlife viewing 16

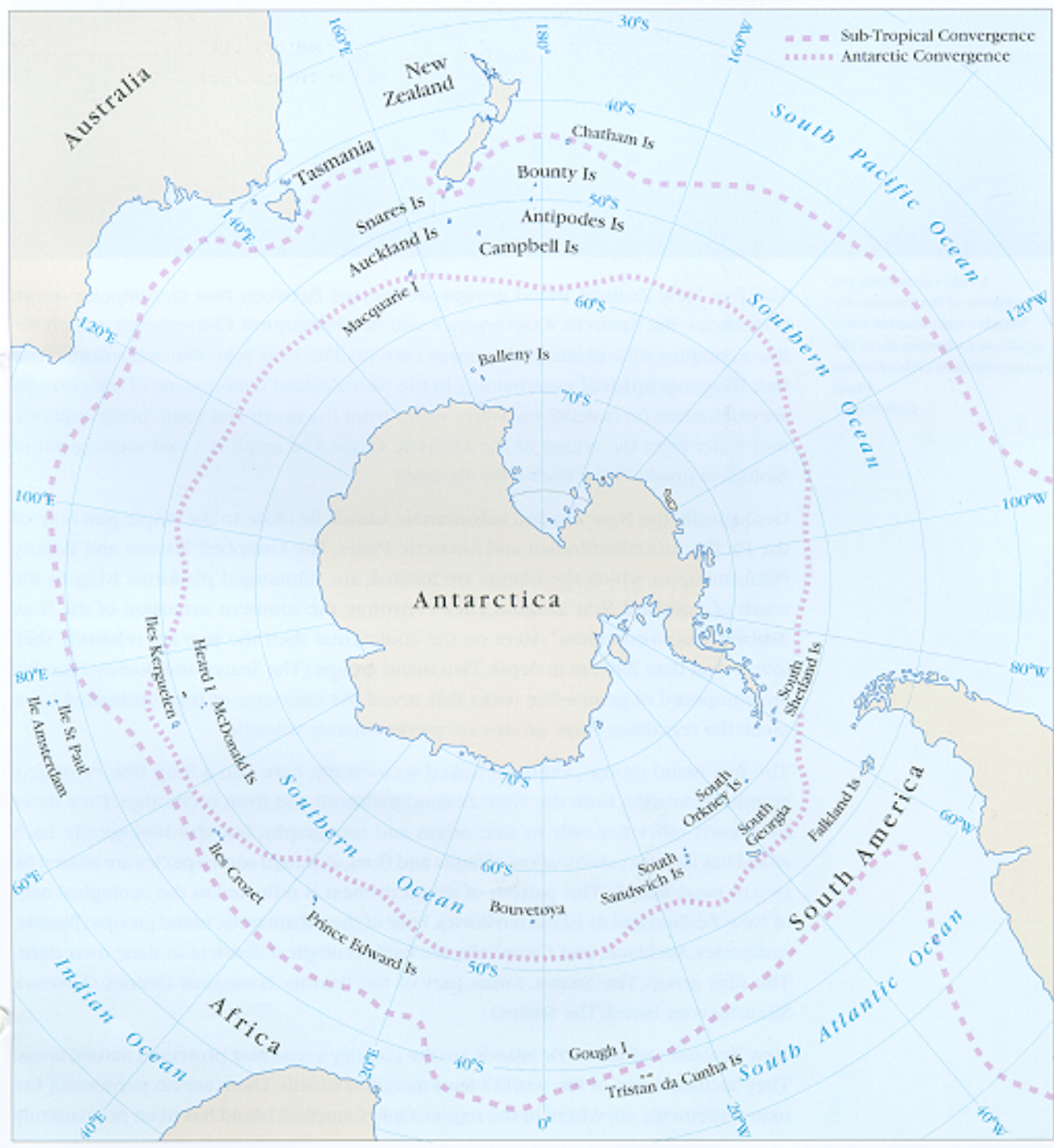
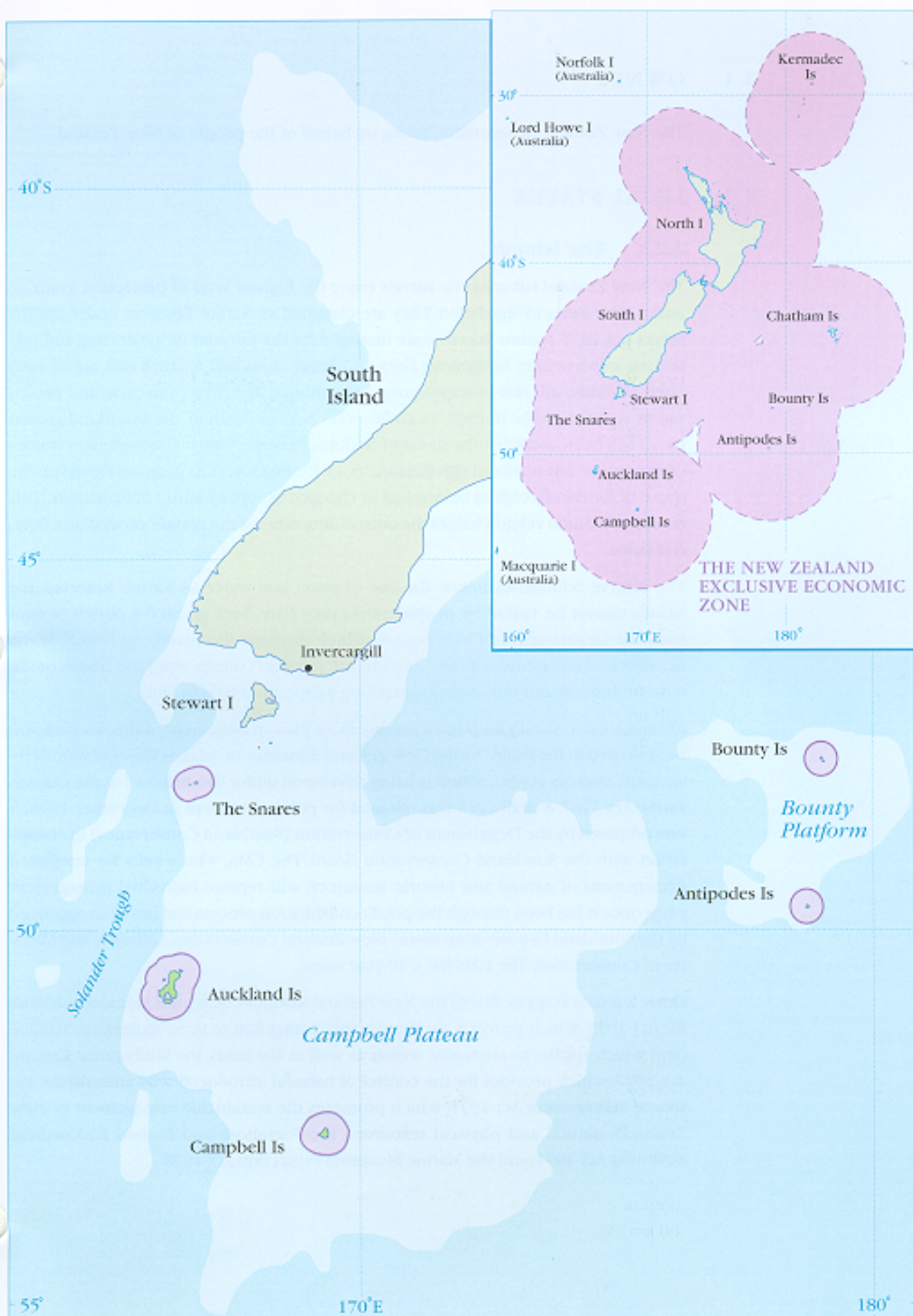


Figure 2: Location of the World Heritage nominated area (subantarctic islands and surrounding territorial seas) in relation to the New Zealand mainland and major oceanographic features.



# The Snares

48°00'S



166°30'E

35'



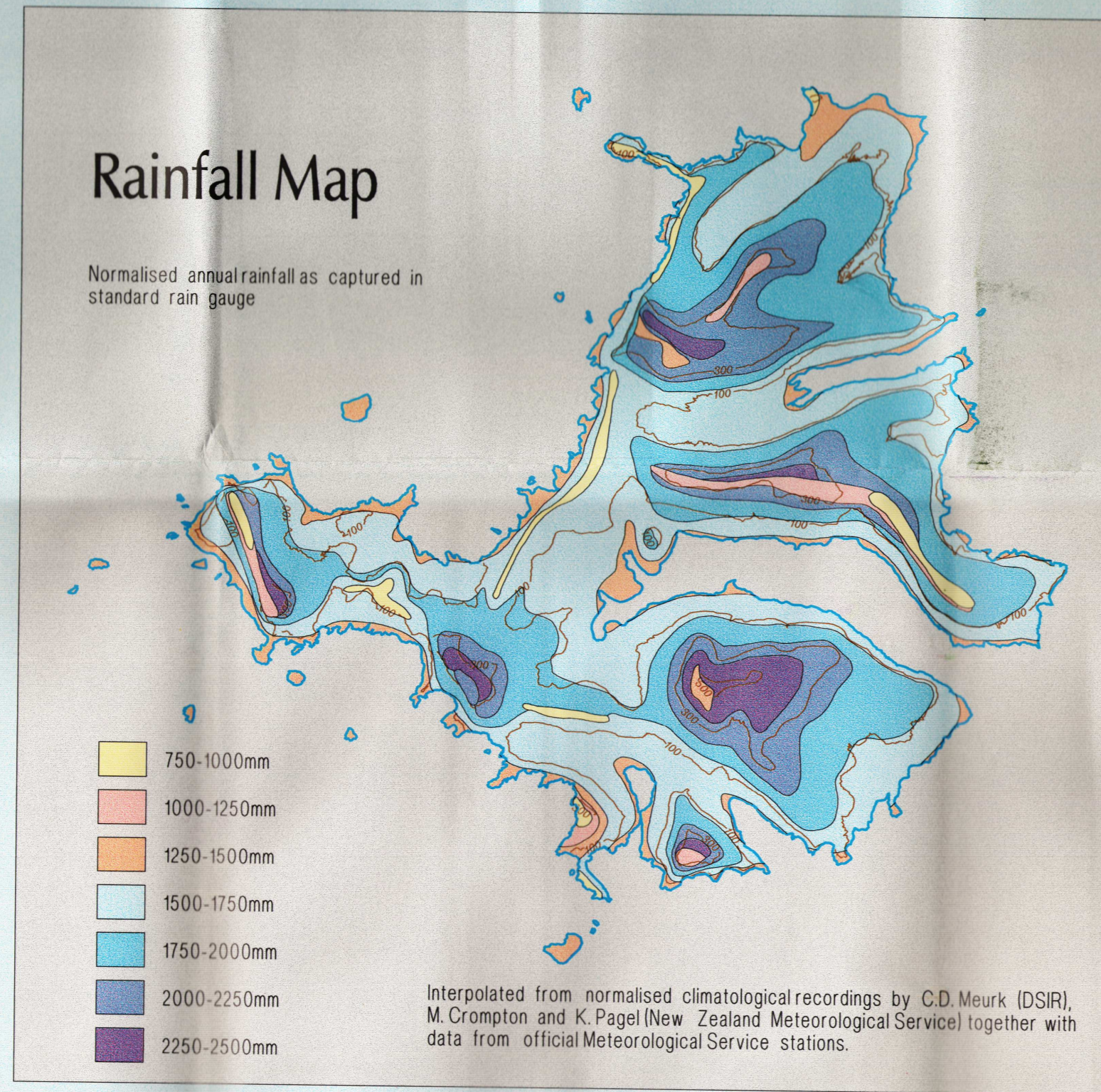
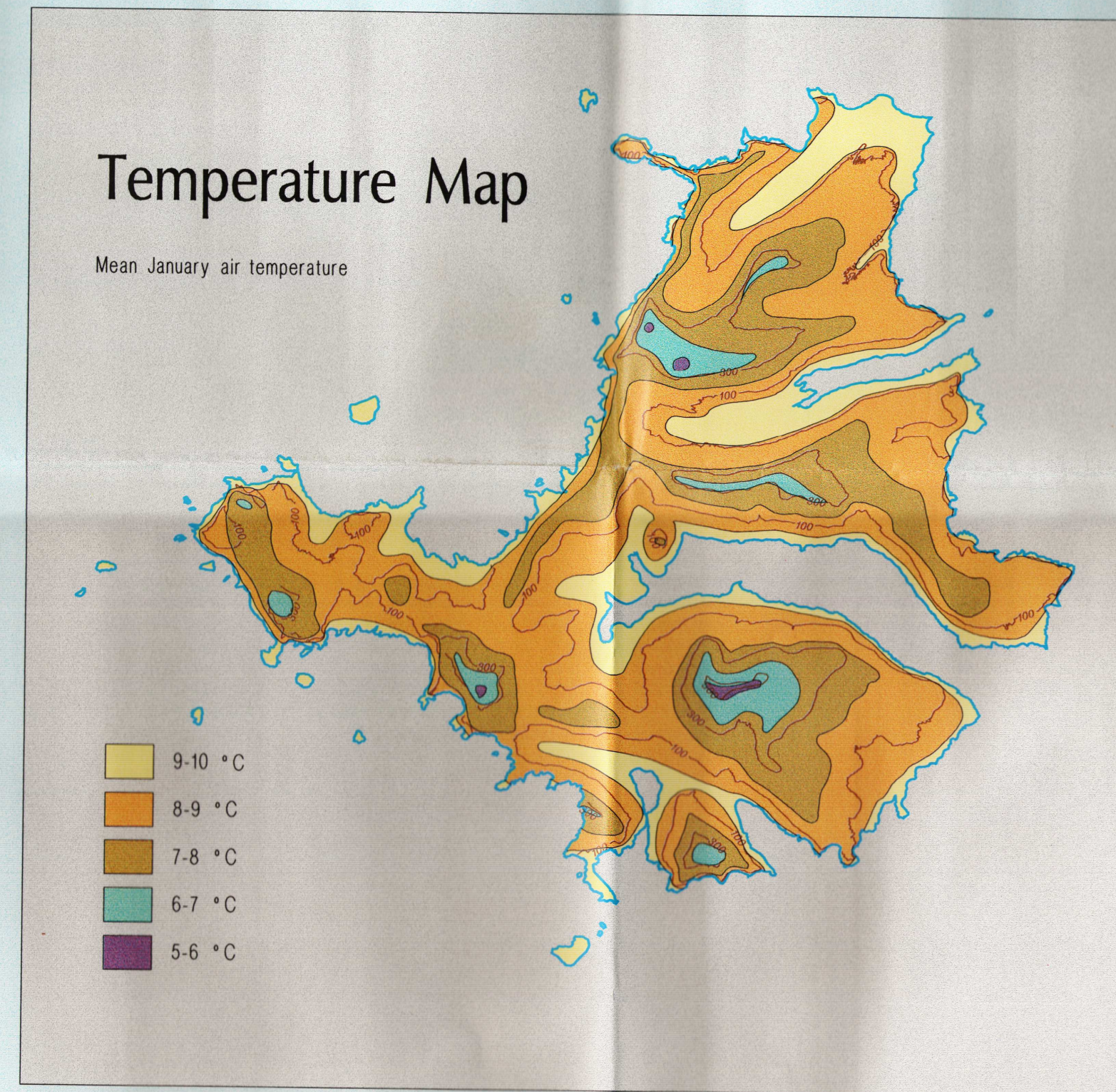






## Vegetation Map

Field Information 1970-1990



### EXTENDED LEGEND

The convention used in naming the community types is to state the dominant species or genera then a life form or structural description. Different strata are distinguished by slashes (/) and species, genera or life forms of the same stratum are joined by hyphens (-). The mapping units are formally subdivided according to Meurk's (1984, N.Z.J. Ecology 1:173-181) zonal arrangement, with a maritime complex at the base. Zonal categories reflect physiognomic similarities to other continental landscapes, but might not be ecologically equivalent.

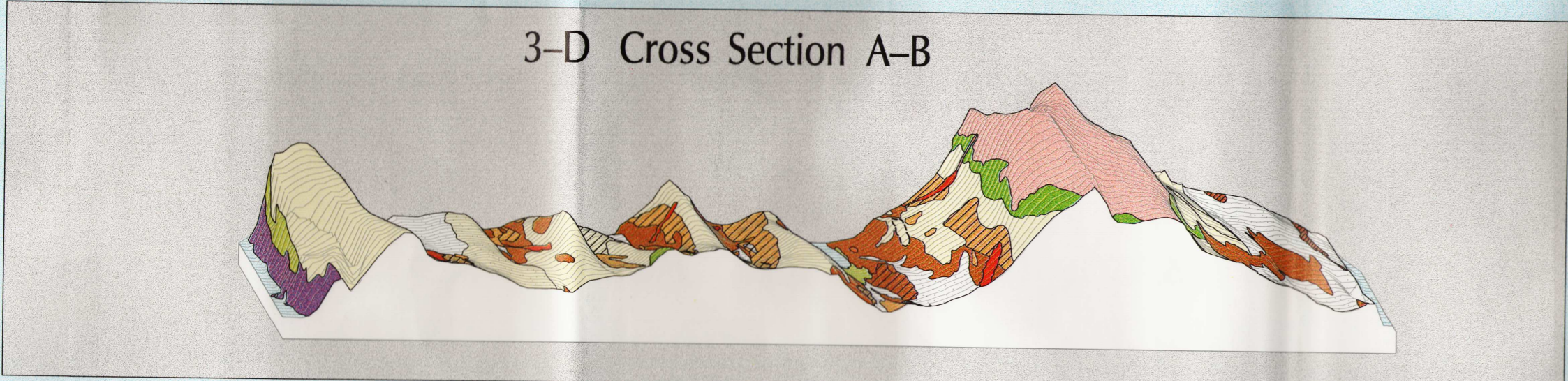
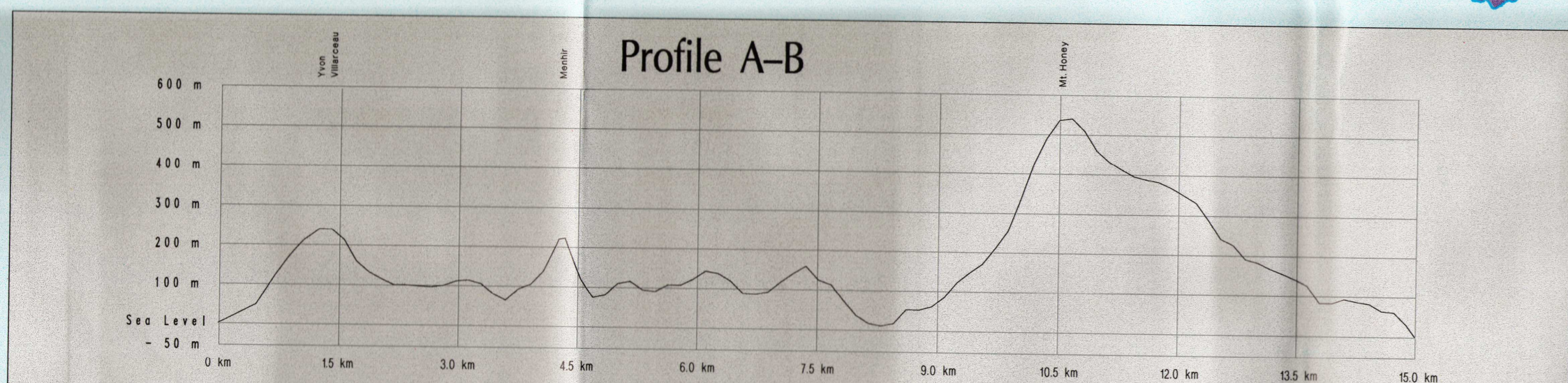
#### A. Semi-Natural Vegetation

- Upper Alpine, tundra-like vegetation mosaic of the "mountain" summits, includes the following: (see also B1)
  - cryptogam-forb-graminoid stoneland and rockfield.
  - rock ledge herbfield.
  - Marsippospermum-Bulbinella* tall turf rushland.
  - Centrolepis pallida-Isotopsis* cushion bog.
  - Rostkovia/Isotopsis* short turf rushland; sometimes with *Juncus scheuchzerioides*.
  - tarn associations.
- Low Alpine meadow, tussock and scrub tundra:
  - rock and ledge associations (unmapped inclusions in "Ch" and "P").
  - Chionochloa* tall tussock grassland.
  - Dracophyllum* scrub.
  - Chionochloa/Dracophyllum/Isotopsis-Oreobolus* tall tussock/dwarf shrub/turf-cushion bog; on plateaux or interfluvies often interfingered with deeply incised dwarf forest or scrub-filled gullies (see also B.2.c).
  - Coprosma-Myrsine*-fern swamp shrubland to scrub.
  - Carex appressa-Blechnum* tall sedge swamp; a variant is dominated by *Sphagnum* moss.
  - pioneer mixed herbfield on peat slips.
  - tarn associations (inclusions only).
  - riparian associations (inclusions along watercourses).
- Subalpine scrub and dwarf forest:
  - Dracophyllum-Myrsine/Coprosma*/fern dwarf forest and scrub.
- Maritime Complex and biotically induced communities present along entire coast but too narrow to map in the east (see also B.4.):
  - salt marsh.
  - littoral rockfield, moss-lichenfield, and littoral fringe turf cushionfield.
  - Poa foliosa-Anisotome latifolia-Stibocarpa/Blechnum durum* maritime tussock megaherbfield and cliff ledge associations.
  - biotically disturbed and enriched sites including:
    - associations of coastal bird colonies;
    - abandoned, solitary albatross nests (unmapped inclusions in "Ch" and "P");
    - sea elephant wallows.
  - Poa litorea* maritime tall tussock grassland.

#### B. Induced Vegetation (from grazing, plant introduction, other disturbances)

- Upper Alpine mosaic; not mapped separately from A.1; distinguished by reduction in megaherbs which are nevertheless recovering since removal of sheep.
- Low Alpine:
  - Bulbinella*/turf meadow (seasonally a turf or sward meadow, sometimes dominated by alien species).
  - Poa litorea*/turf short tussock meadow with seasonal prominence of *Bulbinella*; largely derived from "Ch" with corresponding variants:
    - Poa-Dracophyllum* short tussock shrubland or fernland;
    - (short tussock)/turf-cushion bog; on similar landforms to "Ch/D/Cu", but occurring at higher elevations
    - short tussock/bryophyte flush.
  - dwarf shrub/turf-cushion bog (not differentiated from "Ch/D/Cu").
- Subalpine:
  - anthropogenic associations (minor unmapped inclusions).
- Maritime Complex:
  - Bulbinella*/turf meadow, *Poa foliosa* and megaherbs grazed out (not differentiated from "Bm").

○ Areas of peat scarring.



### TOPOGRAPHICAL REFERENCE

- Contours (m)
- Streams
- Spot heights (m)
- Trig

True North vs Magnetic North  
Grid to Magnetic angle 1990 = 30°45'E  
Annual Variation = -7'

### LOCALITY DIAGRAM

New Zealand map showing location of Campbell Island.

### ACKNOWLEDGEMENTS

The topography shown on this map is based on Campbell Island (1:10 000) aerial plan 1036/3. This data should not be copied from this map without permission from NZ Department of Survey and Land Information. Partial funding of this map was provided by NZ Department of Conservation. Edition 1 1990.

Cartography and GIS operations by Martin D. Heatherington, assisted by Hamish A. Heke  
DSIR Land Resources  
Department of Scientific and Industrial Research  
Palmerston North  
New Zealand

### BIBLIOGRAPHIC REFERENCE

Meurk, C.D.: Given, D.R.: 1990: Vegetation Map of Campbell Island, Scale 1:25 000, Map (1 sheet).  
DSIR Land Resources, Department of Scientific and Industrial Research, Christchurch, New Zealand.

Scale 1:25 000





---

## WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

### NEW ZEALAND SUB-ANTARCTIC ISLANDS (NEW ZEALAND)

---

#### 1. DOCUMENTATION

- (i) IUCN/WCMC Data Sheet
- (ii) Additional Literature Consulted: Sanson, L.V. and P.R. Dingwall. 1995. Conservation Status of New Zealand's Subantarctic Islands. In Dingwall, P.R. ed. 1995. **Progress in Conservation of the Subantarctic Islands**. SCAR/IUCN. Department of Conservation. 1998. **Restoring the Dawn Chorus**. Strategic Business Plan. Davis, S.D. et. al. **Centres of Plant Diversity, Vol II**. IUCN/WWF. p. 5 16-518. Bibby, C.J. et. al. 1992. Putting Biodiversity on the Map: Priority Areas for Global Conservation. ICBP. Moos, P.J. ed. 1985. **Conservation of Island Birds** ICBP Technical Publication 3. Patenaude, N.J. and C.S. Baker nd. Population Status and Habitat use of Southern right whales in the subantarctic Auckland islands of New Zealand. In press.
- (iii) Consultations: 8 external reviewers, Dept of Conservation Officials.
- (iv) Field Visit: J. Thorsell, March, 1998 (to two of five island groups).

#### 2. SUMMARY OF NATURAL VALUES

The nominated site (NZSAI) consists of five island groups located in the Pacific Sector of the Southern Ocean off the south-eastern coast of New Zealand. Along with the Macquarie Island World Heritage site in Australia, the five islands form the only subantarctic island group in the region. The islands lie between latitudes of 47° and 52° south and include the Snares, Bounty Islands, Antipodes Islands, Auckland Islands, and Campbell Islands. Total land area is 76,458ha. The nomination includes a marine component extending 12nm from each island group. Highest altitude of 705m is found on the Auckland Islands. All islands are protected as National Nature Reserves and are State owned. The marine areas, except for Auckland Islands (which is a Marine Mammal Sanctuary) are managed under fisheries legislation. As the islands lie between the Antarctic and Sub-tropical Convergences, the seas have a high level of productivity.

The islands lie on the shallow continental shelf and three of the groups are eroded remnants of Pliocene volcanoes. Rivers are short with precipitous streams. The lakes are few and generally shallow and small. Quaternary glaciers have left shallow cirques, moraines and fjords on some islands. Cool equable temperatures, strong westerly winds, few hours of sunshine and high humidity prevail.

With the exception of the Bounty Islands which have no higher plants, the remaining islands together with neighbouring Macquarie Island, constitute a Centre of Plant Diversity and have the richest flora of all the Subantarctic islands. The Snares and two of the Auckland Islands are especially important in that their vegetation has not been modified by human or alien species. The terrestrial flora of the NZSAI comprises 233 vascular plants of which 196 are

indigenous, six endemic, and 30 are rare. Auckland Islands have the southernmost forests in the region, dominated by a species of myrtle. A particular floral feature of the islands are the “megaherbs” which contribute to rich and colourful flower gardens.

The NZSAI are particularly notable for the huge abundance and diversity of pelagic seabirds and penguins that nest there. There are 120 bird species in total including 40 seabirds of which five breed nowhere else. The islands support major populations of 10 of the world’s 24 species of albatrosses. Almost six million sooty shearwaters nest on Snares Island alone. There are also a large number of threatened endemic land birds including one of the world’s rarest ducks. 95% of the world’s population of New Zealand sealion (formerly known as Hooker’s sealion) breed here and there is a critical breeding site for the Southern Right whale. A number of endemic invertebrates also occur.

### 3. COMPARISON WITH OTHER AREAS

Currently, 21 islands or portions of islands are inscribed on the World Heritage list including three in the subantarctic: Gough, Heard and McDonald and Macquarie. The nomination documentation uses two previous IUCN comparative studies and provides a summary of how well the SAI of New Zealand rate within these regional overviews of the biogeographical province of Insulantarctica. In summary:

- the five NZSAI groups share the Southern Ocean with 15 other major oceanic island groups which are administered by five different countries;
- Insulantarctica is further divided into three sub-divisions of which the cool-temperate zone is the relevant one for the NZSAI (see map);
- the NZSAI are distinct from all the other groups in having the highest diversity of indigenous biota (plants and birds). In terms of numbers of birds, the NZSAI, when taken together, have the highest totals. Auckland Island is the only island in Insulantarctica listed by ICBP as one of the world’s 22 1 endemic bird areas;
- in terms of human disturbance, the NZSAI (except for portions of Campbell and Auckland) are much more pristine than other island groups in Insulantarctica;
- Moreover, if the IUCN Delphi panel analysis takes NZSAI as a group rather than individually, they would stand above the rest of the cool-temperate group for their biological values. Geologically, however, Macquarie is the most distinctive, and both the Gough and Heard Islands World Heritage sites would get higher rankings in terms of scenic values.

In summary, the NZSAI, taken together, are the most diverse and extensive of all subantarctic archipelagos. The five island groups of the NZSAI vary markedly in size, geology, landforms and climate but their main distinction is that they are the most significant site for seabirds in all of Insulantarctica. They also stand out for their diversity and numbers of endemic landbirds. flora and for their low level of human disturbance.

### 4. INTEGRITY

One of the strengths of the nomination is the application of legal, administrative and management systems in place to safeguard the habitats and species of the NZSAI. Each of

the five groups has been accorded the highest form of protection under New Zealand law - National Nature Reserves. Only one of the islands, however, has full protection of the surrounding marine area. Each of the islands has a management plan and a Conservation Management Strategy for all five is soon to be released.

Several of the NZSAI (Adams, Disappointment, Dent) remain in virtually pristine condition being rat and cat free and rarely visited by humans. The Antipodes group have undergone minimal transformation although sealers were once active there. Pigs, cats, mice and rats, however, do occur on the larger islands. Campbell's flora in particular was modified by an attempt at agriculture which failed in 1856. Sheep and cattle were subsequently introduced but the last few were eradicated in 1992. Rabbits and mice have been totally removed from Enderby and the degraded vegetation is steadily recovering. None of the NZSAI have been as adversely affected by human activity, however, as the Macquarie Island World Heritage site.

It is the intention of the New Zealand authorities as spelled out in the Strategic Business Plan and the Conservation Management Strategy for the NZSAI to eventually remove **all** alien species from the islands. This is a commendable goal which will take some years but will provide a model for oceanic islands elsewhere.

The measures in effect to protect the integrity of the marine component of the nomination are more problematical. Domestic commercial fishing in boats less than 43m length is allowed within 12nm of all the islands except Auckland. Longline fishing for Ling and Southern Bluefin Tuna is known to cause seabird mortality especially as the fishery around the Snares and Bounty islands occurs during the austral summer breeding season of the albatrosses. IUCN would suggest that a ban on long-line fishing within 12nm of all islands be considered. However, given the extensive foraging ranges of seabirds (particularly albatrosses and petrels) mortality will occur outside this range so all available mitigation measures (e.g. "tori" lines and night-setting) should be encouraged. Controls of fisheries by-catch are a major issue within the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). (As the work of this Convention will also have implications on other World Heritage sites in the Southern Ocean, their Secretariat should be contacted and encouraged to take a special interest in this area.)

An additional problem in management of the marine area is the recent unexplained die-off of sealions around the Auckland Islands. Sealion mortality has also been associated with the squid fishery in the area and some conservation groups have suggested closure under the Fisheries Act.

Regarding this and other marine resource management issues, it should be recognised that New Zealand's Department of Conservation has very limited legal powers to control commercial harvesting in waters surrounding the islands. If World Heritage status for the NZSAI is given, the New Zealand Ministry of Fisheries should also be encouraged to address the issues relating fisheries by-catch and squid fishery impacts.

In conclusion, the condition of the terrestrial component of the NZSAI is good, and with actions underway to reduce the impact of alien species, it is improving. In the marine area, however, legal protection for four of the islands could be strengthened and a number of conflicts between commercial fisheries and wildlife need attention.

## 5. ADDITIONAL COMMENTS

### 5.1. Whales

Since the nomination was prepared, research on the status of the southern right whale population has been conducted. The findings show that both Auckland and Campbell islands are more important for recovery of this population than was previously thought. DNA analysis has also indicated that the NZSAI population is demographically isolated from those whales wintering along the south-west coast of Australia. These findings add further weight to the consideration of the area under natural criteria iv.

### 5.2. Relationships with Macquarie Island

As all reviewers have pointed out and as the IUCN Technical Evaluation of Macquarie also drew attention to, there are strong bioregional affinities between the NZSAI nomination and the Macquarie site inscribed in 1997. Indeed the Committee “encouraged the Australian authorities to consider for the future a renomination [of Macquarie] with the Subantarctic islands of New Zealand. . .” The nomination from New Zealand also states: “Given their overlaps in natural and cultural heritage values, it has been suggested previously that there could be merit in combining Macquarie and the New Zealand islands in establishing a single international World Heritage site.”

Although Macquarie is inferior in biological and in scenic terms and has suffered badly as a result of past human activity, its natural values do complement those of the NZSAI and it extends the gradient of climate severity and biotic impoverishment. IUCN suggests that if the NZSAI are inscribed that the Australian and New Zealand authorities be urged to agree to consider the six island groups as one transfrontier cluster World Heritage site.

### 5.3. Insulantarctic Islands

The islands of Insulantarctica form a ring around the Southern Ocean. With the proposed addition of the NZSAI to the World Heritage list (which already includes Gough, Heard and McDonald and Macquarie), it has led to the suggestion by IUCN’s Antarctic Advisory Committee that all the other natural islands in the subantarctic be accorded World Heritage status. Certainly South Georgia, Inaccessible, and Prince Edward and several of the Falklands (Malvinas) Islands would be worthy of consideration. Such a “constellation” of selected Southern Ocean islands as one World Heritage site may be a premature suggestion now but should not be discounted in the future.

## 6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The nomination of the NZSAI is made under all four criteria in a very thorough and clear document. Criterion iv is presented as the core justification with supporting reasons given under ii and iii.

Certainly the NZSAI are remarkable for their high level of biodiversity (for the biogeographic province), population densities, and for endemism in birds, plants and invertebrates. The justification for each island is strong and even more convincing for all five groups as a single unit. Although not specifically addressed in the nomination text, the

World Heritage status of Macquarie strengthens this conclusion. Although some species are at risk and have decreasing populations (especially some penguins, albatrosses and sealions) others are increasing (southern right whale) or are stable. The bird and plant life, especially the endemic albatrosses, cormorants, landbirds and “megaherbs” are unique to the NZSAI and are clearly of outstanding universal value under criterion iv.

The case for criterion ii is also strong for the pattern the islands display of immigration of species, diversifications and emergent endemism. Several evolutionary processes such as the development of loss of flight in both birds and invertebrates offers particularly good opportunities for research into the dynamics of island ecology. Human impacts are confined to the effects of introduced species at Auckland and Campbell islands but their ongoing eradication is leading to a recovery of the vegetation allowing evolutionary processes to continue. In the marine component of the nomination, however, there are some concerns regarding the negative impact that commercial fisheries are having on wildlife and concern should be expressed by the Bureau.

Like all southern islands the NZSAI possess some wild natural landscapes but they are not considered superlative compared to elsewhere. Similarly, the geological features are interesting but not sufficient to qualify under criterion i.

## 7. RECOMMENDATION

That the- Committee recommend the New Zealand Subantarctic Islands nomination be inscribed under criteria iv and ii.

IUCN suggests that the Committee compliment the New Zealand authorities for submitting a model nomination but at the same time express concern over several issues relating to marine resources as discussed above. The Committee may also wish to consider inviting the New Zealand and Australian governments to continue to liaise over incorporating Macquarie and the NZSAI as one single World Heritage site in this section of the Southern Ocean.

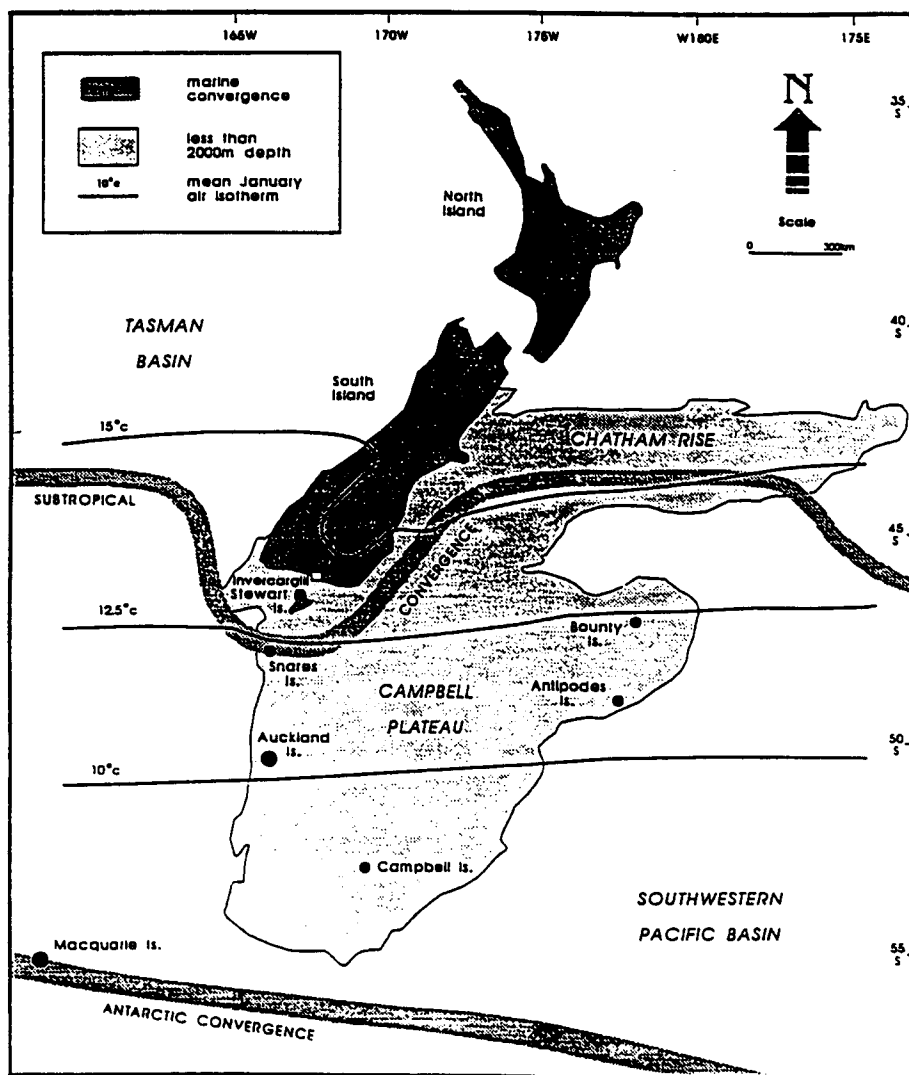
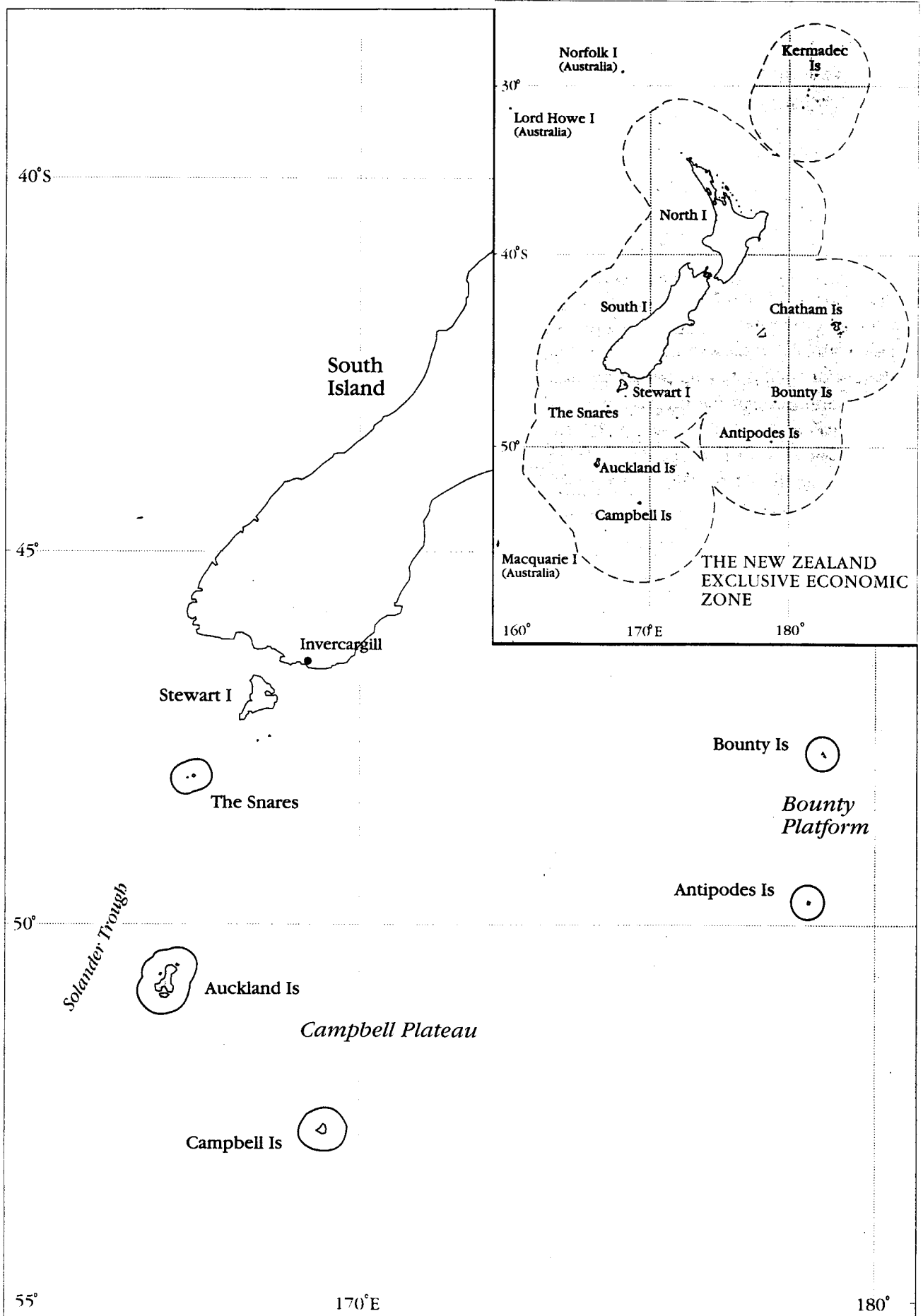


FIGURE 2. Oceanic and climatic setting of New Zealand's Subantarctic islands

Figure 2: Location of the World Heritage nominated area (subantarctic islands and surrounding territorial seas) in relation to the New Zealand mainland and major oceanographic features.





---

## DÉSIGNATION POUR LE PATRIMOINE MONDIAL - ÉVALUATION TECHNIQUE UICN

### LES ÎLES SUB-ANTARCTIQUES DE NOUVELLE-ZÉLANDE (NOUVELLE-ZÉLANDE)

---

#### 1. DOCUMENTATION

- (i) Fiches techniques UICN/WCMC
- (ii) Littérature consultée: Sanson, L.V. and P.R. Dingwall. 1995. Conservation Status of New Zealand's Subantarctic Islands. *In* Dingwall, P.R. ed. 1995. **Progress in Conservation of the Subantarctic Islands**. SCAR/IUCN. Department of Conservation. 1998. **Restoring the Dawn Chorus**. Strategic Business Plan. Davis, S.D. et. al. **Centres of Plant Diversity. Vol II**. IUCN/WWF. p. 516-518. Bibby, C.J. *et. al.*. 1992. Putting Biodiversity on the Map: Priority Areas for Global Conservation. ICBP. Moos, P.J. ed. 1985. **Conservation of Island Birds** ICBP Technical Publication 3. Patenaude, N.J. and C.S. Baker n.d. Population Status and Habitat use of Southern right whales in the subantarctic Auckland islands of New Zealand. In press.
- (iii) Consultations: 8 évaluateurs indépendants, fonctionnaires du département de la Conservation.
- (iv) Visite du site: Jim Thorsell, mars 1998 (deux des cinq archipels).

#### 2. RÉSUMÉ DES CARACTÉRISTIQUES NATURELLES

Le site désigné (NZSAI) se compose de cinq îles et archipels situés dans le secteur Pacifique de l'océan Austral, au large de la côte sud-est de la Nouvelle-Zélande. Avec le Bien du patrimoine mondial de l'île Macquarie, en Australie, les cinq archipels forment le seul groupe d'îles subantarctiques de la région. Les îles se trouvent entre les latitudes de 47° et 52° Sud et comprennent les îles Snares, Bounty, Antipodes, Auckland et Campbell. La superficie terrestre totale est de 76 458 hectares. La désignation comprend un élément marin qui s'étend jusqu'à 12 milles nautiques de chaque groupe d'îles. Le point culminant, 705 mètres, est enregistré aux îles Auckland. Toutes les îles ont le statut de «Réserve naturelle nationale» et appartiennent à l'État. Le milieu marin, sauf en ce qui concerne les îles Auckland (Sanctuaire de mammifères marins) sont gérées dans le cadre des lois sur la pêche. Comme les îles se trouvent entre les convergences antarctique et subtropicale, la productivité marine est très élevée.

Les îles se trouvent sur le plateau continental peu profond et trois des archipels sont des vestiges érodés de volcans du Pliocène. Les cours d'eau sont petits et rapides. Les lacs sont rares et généralement petits et peu profonds. Les glaciers du Quaternaire ont laissé des cirques peu profonds, des moraines et des fjords sur certaines îles. Le climat est dominé par des températures froides uniformes, de forts vents d'ouest, quelques heures d'ensoleillement et une humidité élevée.



À l'exception des îles Bounty qui n'ont pas de plantes supérieures, ensemble, les autres îles et l'île Macquarie voisine constituent un Centre de diversité botanique. De toutes les îles subantarctiques, ce sont celles qui possèdent la flore la plus riche. Les Snares et deux des îles Auckland sont particulièrement importantes car leur végétation n'a pas été modifiée, ni par l'homme ni par des espèces exotiques. La flore terrestre des NZSAI comprend 233 plantes vasculaires dont 196 sont indigènes, six endémiques et 30 rares. Les îles Auckland portent les forêts les plus australes de la région, dominées par une espèce de myrte. Une caractéristique floristique particulière des îles est ce que l'on peut appeler des «mégaherbes» qui constituent des jardins fleuris riches et colorés.

Les NZSAI sont particulièrement remarquables pour l'incroyable abondance et la diversité des oiseaux de mer pélagiques et des manchots nicheurs. On trouve 126 espèces d'oiseaux au total, dont 40 oiseaux marins parmi lesquels cinq ne se reproduisent nulle part ailleurs. Les îles accueillent d'importantes populations de 10 des 24 espèces d'albatros. Près de 6 millions de puffins fuligineux nichent sur les îles Snares uniquement. On trouve aussi un grand nombre d'oiseaux terrestres endémiques menacés, dont l'un des canards les plus rares du monde. Les îles servent de site de reproduction pour 95% de la population mondiale du lion de mer de Nouvelle-Zélande (anciennement «de Hooker») et on y trouve un site de reproduction d'importance critique pour la baleine franche du sud. En outre, un certain nombre d'invertébrés sont endémiques.

### **3. COMPARAISON AVEC D'AUTRES AIRES PROTÉGÉES**

Actuellement, 21 îles ou parties d'îles sont inscrites sur la Liste du patrimoine mondial dont trois dans la région subantarctique: Gough, Heard et McDonald et Macquarie. Le document de désignation fait référence à deux précédentes études comparatives de l'UICN et montre à quel point les îles subantarctiques de Nouvelle-Zélande sont bien placées dans ces relevés régionaux de la province biogéographique d'insulantarctique. En résumé:

- les cinq archipels des NZSAI se partagent l'océan Austral avec 15 autres grands archipels océaniques administrés par cinq pays différents;
- La province insulantarctique est en outre divisée en trois secteurs dans lesquels la zone froide-tempérée est celle qui correspond aux NZSAI (voir carte);
- Les NZSAI se distinguent de tous les autres groupes car on y trouve la plus forte diversité d'espèces indigènes de la flore et de la faune (plantes et oiseaux). Ensemble, les NZSAI ont le nombre total d'oiseaux le plus élevé. Les îles Auckland sont les seules îles de la province insulantarctique inscrites par le CIPO (aujourd'hui BirdLife International parmi les 221 zones d'oiseaux endémiques du monde;
- du point de vue des perturbations anthropiques, les NZSAI (à l'exception de certaines parties de Campbell et des îles Auckland) sont beaucoup plus intactes que d'autres archipels de la province insulantarctique;
- en outre, si l'analyse du groupe Delphi UICN considérait les NZSAI collectivement plutôt qu'individuellement, elles se situeraient au-dessus des autres archipels froids-tempérés pour leur intérêt biologique. Du point de vue géologique, toutefois, Macquarie est la plus distincte et les Biens du patrimoine mondial des îles Gough et Heard seraient mieux classés pour leur intérêt panoramique.

En résumé, les NZSAI, prises ensemble, constituent le groupe d'îles le plus divers et le plus étendu de toute la région subantarctique. Les cinq archipels des NZSAI varient fortement par leur taille, leur géologie, leur topographie et leur climat mais se caractérisent surtout par le fait qu'ils sont, de toute la région insulantarctique, le site le plus important pour les oiseaux marins. Ils se distinguent aussi pour leur diversité et pour le nombre d'oiseaux terrestres endémiques, pour leur flore et pour le faible niveau de perturbation anthropique.

#### 4. INTÉGRITÉ

Un des points forts de cette désignation repose sur les systèmes juridiques, administratifs et de gestion qui ont été mis en place pour sauvegarder les habitats et les espèces des NZSAI. Chacun des cinq archipels s'est vu accorder la protection la plus stricte au titre de la loi néo-zélandaise – ce sont des Réserves naturelles nationales. Le milieu marin environnant d'une seule des îles, toutefois, est intégralement protégé. Chacun des archipels dispose d'un plan de gestion et une stratégie de gestion pour la conservation des cinq archipels sera bientôt publiée. Plusieurs des îles (Adams, Disappointment, Dent) sont dans un état relativement intact: on n'y trouve ni rats ni chats et elles sont rarement visitées par l'homme. Le groupe des Antipodes n'a subi que de légères modifications bien que les baleiniers aient été autrefois actifs dans cet archipel. Sur les plus grandes îles, cependant, on trouve des porcs, des chats, des souris et des rats. La flore de Campbell, en particulier, a été modifiée par une tentative d'agriculture qui a échoué, en 1856. Par la suite, des moutons et des vaches ont été introduits mais les derniers animaux ont été éradiqués en 1992. Les lapins et les souris ont été totalement éradiqués d'Enderby et la végétation dégradée retrouve peu à peu ses droits. Quoi qu'il en soit, aucune des îles des NZSAI n'a été aussi malmenée par des activités anthropiques que le Bien du patrimoine mondial de l'île Macquarie.

Les autorités néo-zélandaises ont l'intention, comme il est énoncé dans le Plan de travail stratégique et la Stratégie de gestion pour la conservation des NZSAI d'éliminer, à terme, **toutes** les espèces exotiques des îles. La réalisation de cet objectif très louable ne peut se faire qu'en plusieurs années, mais servira de modèle pour les îles océaniques du monde entier.

Les mesures instaurées pour protéger l'intégrité du milieu marin inclus dans la désignation sont plus problématiques. La pêche commerciale pour le marché national, dans des embarcations de longueur inférieure à 43 mètres, est autorisée dans les 12 milles nautiques de toutes les îles à l'exception des îles Auckland. On sait que la pêche à la palangre pour la lingue et le thon rouge du sud entraîne une mortalité élevée des oiseaux de mer, notamment parce que la pêche près des îles Snares et Bounty a lieu durant la saison de nidification de l'été austral pour les albatros. L'UICN propose d'envisager d'interdire la pêche à la palangre dans les 12 milles nautiques de toutes les îles. Toutefois, vu les distances que parcourent les oiseaux marins pour se nourrir (en particulier les albatros et les pétrels), ils ne sont pas hors de danger en dehors de cette zone. Il serait donc bon d'encourager l'adoption de toutes les mesures d'atténuation possibles (par exemple, des lignes «tori» et la pause des filets de nuit). La surveillance des prises incidentes de la pêche est une des grandes questions débattues au sein de la Convention sur la conservation de la faune et de la flore marines de l'Antarctique. (Comme les travaux de cette Convention auront des répercussions sur d'autres biens du patrimoine mondial de l'océan Austral, il serait bon de contacter le Secrétariat et de l'encourager à s'intéresser particulièrement à cette région.)

La gestion de la zone marine est confrontée à un autre problème: la mortalité récente et inexplicquée des lions de mer autour des îles Auckland. La mortalité des lions de mer a été notamment associée à la pêche au calmar dans la région et certains groupes de conservation ont suggéré de fermer cette pêche dans le cadre de la Loi sur la pêche.

En ce qui concerne ce problème de gestion des ressources marines, entre autres, il convient de reconnaître que le Département de la conservation de Nouvelle-Zélande n'a pas une autorité juridique suffisante pour contrôler le prélèvement commercial dans les eaux qui entourent les îles. Si le statut de Bien du patrimoine mondial est accordé aux NZSAI, le ministère néo-zélandais de la Pêche devrait être incité à examiner les questions en rapport avec les prises incidentes de la pêche et les impacts de la pêche au calmar.

En conclusion, l'état du secteur terrestre des NZSAI est très bon et, considérant les mesures prises pour réduire l'impact des espèces exotiques, il s'améliore. Dans la zone marine cependant, la protection juridique de quatre des archipels devrait être renforcée et il convient de porter attention aux conflits entre la pêche commerciale et la faune sauvage.

## 5. AUTRES COMMENTAIRES

### 5.1 Cétacés

Depuis la rédaction de la désignation, des travaux de recherche sur l'état de la population de baleines franches du sud ont eu lieu. Les résultats montrent que les îles Auckland et Campbell sont plus importantes pour la reconstitution de cette population qu'on ne l'avait supposé jusqu'ici. Les analyses d'ADN indiquent également que la population des NZSAI est démographiquement isolée des cétacés qui hivernent le long de la côte sud-ouest de l'Australie. Ces découvertes ajoutent un poids supplémentaire à la prise en compte de la région conformément au critère naturel iv.

### 5.2 Les relations avec l'île Macquarie

Comme tous les évaluateurs l'ont fait remarquer, de même que l'évaluation technique conduite par l'UICN sur l'île Macquarie, il existe de fortes affinités biorégionales entre la désignation des NZSAI et le Bien de l'île Macquarie inscrit en 1997. En fait, le Comité avait «encouragé les autorités australiennes à envisager une nouvelle désignation [de Macquarie] conjointe avec les îles subantarctiques de Nouvelle-Zélande...» La désignation de la Nouvelle-Zélande stipule également: «Vu le chevauchement des caractéristiques naturelles et culturelles importantes du point de vue du patrimoine, il serait peut-être intéressant d'associer Macquarie et les îles néo-zélandaises en vue d'établir un unique Bien international du patrimoine mondial.»

Bien que l'île Macquarie soit d'intérêt moindre du point de vue biologique et panoramique et qu'elle ait gravement souffert d'activités anthropiques passées, ses caractéristiques naturelles complètent celles des NZSAI et élargissent le gradient de rigueur du climat et d'appauvrissement biologique. L'UICN suggère qu'en cas d'inscription des NZSAI, les autorités australiennes et néo-zélandaises soient invitées à accepter d'envisager les six archipels comme Bien transfrontière groupé du patrimoine mondial.

### 5.3 Îles insulantarctiques

Les îles de la région insulantarctique forment un anneau autour de l'océan Austral. L'ajout proposé des NZSAI à la Liste du patrimoine mondial (qui comprend déjà Gough, Heard et McDonald et Macquarie) a conduit le Comité consultatif de l'UICN sur l'Antarctique à proposer que toutes les autres îles naturelles de la région subantarctique reçoivent le statut de Bien du patrimoine mondial. De toute évidence, la Géorgie du Sud, Inaccessible, l'île du Prince

Édouard et plusieurs des îles malouines vaudraient la peine d'être examinées dans ce contexte. Il est peut-être prématuré de proposer une telle «constellation» d'îles choisies de l'océan Austral pour devenir un seul et unique Bien du patrimoine mondial mais la proposition ne devrait pas être ignorée à l'avenir.

## **6. CHAMP D'APPLICATION DES CRITÈRES NATURELS DU PATRIMOINE MONDIAL**

La désignation des NZSAI invoque les quatre critères, dans un document extrêmement fouillé et clair. Le critère iv est présenté comme justification principale étayant les raisons données au titre des critères ii et iii.

Il ne fait aucun doute que les NZSAI sont remarquables du point de vue de la diversité biologique très élevée (pour cette province biogéographique), des densités de populations et de l'endémisme des oiseaux, des plantes et des invertébrés. Les raisons justificatives pour chaque groupe d'îles sont solides et encore plus convaincantes si l'on considère les cinq archipels comme une seule unité. Bien que ce point ne soit pas expressément souligné dans le texte de la désignation, le statut de patrimoine mondial accordé à l'île Macquarie renforce cette conclusion. Certes, quelques espèces sont menacées et leurs populations diminuent (en particulier certains manchots, albatros et lions de mer) mais d'autres augmentent (baleines franches du sud) ou sont stables. L'avifaune et les plantes, notamment les albatros endémiques, les cormorans, les oiseaux terrestres et les «mégaherbes» des NZSAI sont uniques et ont, sans ambiguïté, une valeur universelle exceptionnelle au titre du critère iv.

Le justificatif du critère ii est également fort car les îles présentent une structure d'immigration des espèces, de diversification et d'endémisme émergent. Plusieurs processus évolutifs tels que l'apparition de l'incapacité au vol tant chez les oiseaux que chez les invertébrés offrent une occasion particulièrement bonne de mener des travaux de recherche sur les dynamiques de l'écologie insulaire. Les impacts anthropiques sont confinés aux effets d'espèces introduites sur les îles Auckland et Campbell, mais l'éradication en cours permet la restauration de la végétation et la poursuite des processus évolutifs. Pour ce qui est du milieu marin inclus dans la désignation, toutefois, l'effet négatif de la pêche commerciale sur la faune sauvage est préoccupant et le Bureau devrait exprimer cette inquiétude.

Comme toutes les îles australes, les NZSAI possèdent des paysages naturels sauvages mais, en comparaison avec d'autres, on ne peut les considérer comme exceptionnels. De même, les caractéristiques géologiques sont intéressantes mais ne justifient pas l'application du critère i.

## **7. RECOMMANDATION**

Que le Comité recommande l'inscription des îles subantarctiques de Nouvelle-Zélande conformément aux critères iv et ii.

L'UICN suggère que le Comité félicite les autorités néo-zélandaises qui ont soumis une désignation modèle tout en exprimant ses préoccupations concernant plusieurs questions en rapport avec les ressources marines, discutées ci-dessus. Le Comité pourrait envisager d'inviter les Gouvernements néo-zélandais et australien à rester en contact quant à la possibilité d'intégrer Macquarie et les NZSAI comme unique Bien du patrimoine mondial dans ce secteur de l'océan Austral.